

Floristic diversity in Bassi Wildlife Sanctuary, Rajasthan

Rajasthan



Botanical Survey of India
Ministry of Environment, Forest & Climate Change



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**FLORISTIC DIVERSITY IN BASSI WILDLIFE
SANCTUARY, RAJASTHAN**

**Peddi Harikrishna
Ramesh Kumar**



भारतीय वनस्पति सर्वेक्षण
BOTANICAL SURVEY OF INDIA

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MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

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FLORISTIC DIVERSITY IN BASSI WILDLIFE SANCTUARY, RAJASTHAN

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Cover photo (front): A view of Sarana lake from watch tower, Bassi
(back): *Butea monosperma* (Lam.) Taub.

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Director



भारत सरकार
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भारतीय वनस्पति सर्वेक्षण
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST
& CLIMATE CHANGE
BOTANICAL SURVEY OF INDIA



FOREWORD

The Government of India has implemented substantial measures to preserve the rich biodiversity of the country through a network of protected areas across multiple biogeographic regions. The documentation and conservation of the floristic wealth of the country including the protected areas are part of the mandates of the Botanical Survey of India. The organization plays a pivotal role in conducting floristic analysis of the protected areas in the country and sharing knowledge with the public and researchers.

In this direction, I am pleased to introduce the e-publication, "Floristic diversity in Bassi Wildlife Sanctuary, Rajasthan", which is the result of extensive research and survey in the Wildlife Sanctuary for three years. The e-book provides a comprehensive database of 468 plant taxa under 322 genera and 85 families found in the Wildlife Sanctuary. The authors have utilized Remote Sensing and Geographic Information Systems (GIS) to aid in the floristic analysis which would further help in the vegetation characterization and implementation of conservation measures. As the Wildlife Sanctuary is situated in the desert state of Rajasthan, this documentation would significantly help in understanding the important desert flora in the present climate change scenario.

It is believed that this e-book will serve as a reference guide for students, foresters, researchers, and all stakeholders who are associated with the conservation of biodiversity in our country. I congratulate the efforts of the authors for producing this important document.

(A.A. MAO)



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Ceropegia bulbosa Roxb.

PREFACE

India, recognized as one of the world's mega-diverse countries, has made significant efforts to conserve its rich biodiversity, especially as the planet faces increasing threats from human activities. To safeguard its diverse ecosystems, the Government of India has established a network of Protected Areas across various biogeographic regions. Currently, there are 106 National Parks, 573 Wildlife Sanctuaries, 115 Conservation Reserves, and 220 Community Reserves, collectively covering 5.32% of the nation's geographical area.

Systematic floristic studies of protected areas provide valuable insights into forest composition and biodiversity, forming the foundation for monitoring changes in floristic diversity over time, especially considering the evolving needs of the human populations in these regions. Inventorying and documenting indigenous flora are crucial steps for developing effective conservation strategies. With this in mind, we created a comprehensive database of the plant wealth in Bassi Wildlife Sanctuary, Rajasthan. Through intensive and extensive fieldwork, we collected and identified 964 specimens. Our documentation of the Sanctuary's angiosperm diversity reveals it supports a total of 468 taxa across 322 genera and 85 families.

Remote Sensing and Geographic Information Systems (GIS) are effective tools for biodiversity inventory, monitoring, and conservation. In Bassi Wildlife Sanctuary, vegetation types and land cover were classified into eleven distinct categories, with dry deciduous forest dominating 63.9% of the sanctuary's area. This comprehensive analysis not only reveals the rich flora of the region but also underscores challenges such as invasive alien species and forest fragmentation. The use of Remote Sensing and GIS in this study has greatly enhanced our understanding of Bassi WLS. This research serves as a valuable resource for students, foresters, researchers, and stakeholders committed to the future of this crucial ecosystem.

**PEDDI HARIKRISHNA
RAMESH KUMAR**



Aegle marmelos (L.) Correa

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Authors



View of different vegetation types at Kevdiya

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A view of Dry Deciduous forest from watch tower Amjariya



A view of Dhauk forest (*Anogeissus pendula* forest) at Bichore



A view of Tree Savannah at watchtower & Near Neeliya, Amalda

Plate 1. Vegetation types in Bassi WLS, Rajasthan



A view of Riverine forest at Jhaleshwer



View of Grasslands near sonar ki kudi & Jhaleshwer



View of Savarna Lake, Bassi Wild Life Sancturay

Plate 2. Vegetation types in Bassi WLS, Rajasthan



Plate 3. Phytosociological data collection: Plotting and recording data

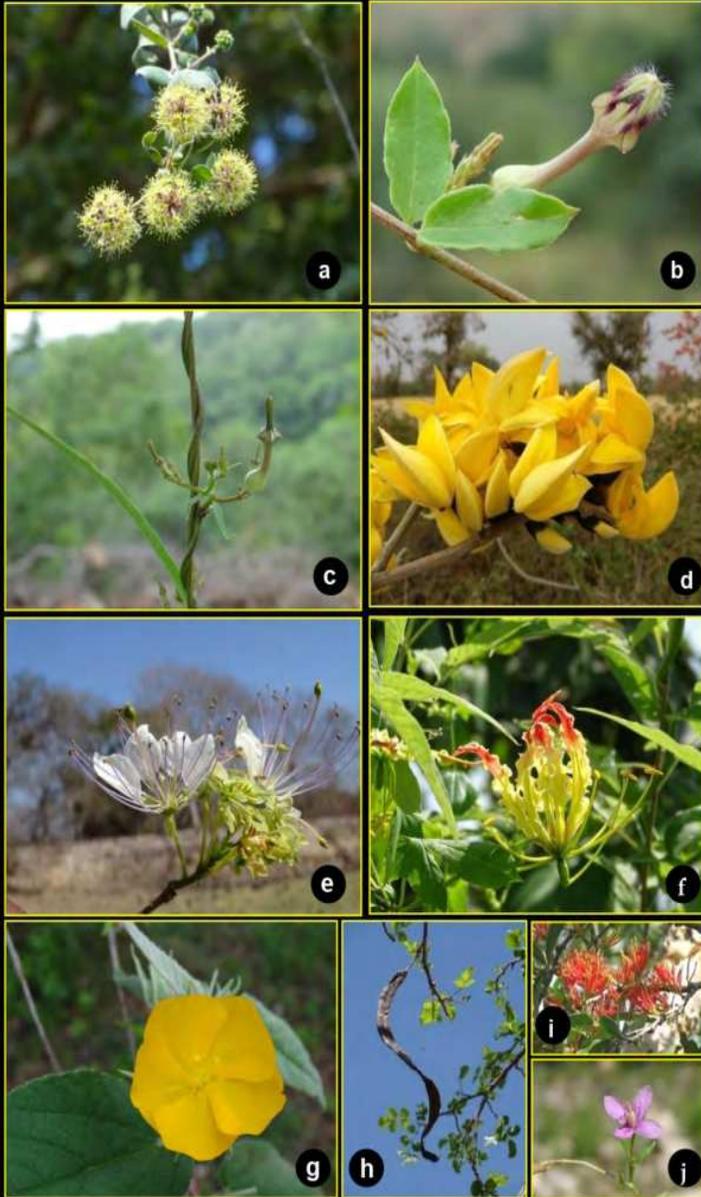


Plate 4. Some rare and threatened plant species of the sanctuary: A. *Terminalia coronata* (Stapf) Gere & Boatwr; **B.** *Ceropegia bulbosa* var. *bulbosa* Roxb.; **C.** *Ceropegia bulbosa* var. *lushii* (R. Grah.) Hook. F.; **D.** *Butea monosperma* (Lam.) Taub. Var. *lutea* (Witt.) Maheshwari; **E.** *Crateva adansonii* subsp. *odora* (Buch.-Ham.) Jacobs; **F.** *Gloriosa superba* L.; **G.** *Melhania futeyporensis* Munro ex Mast; **H.** *Dolichandrone falcata* (Wall. ex DC.) Seem.; **I.** *Dendrophthoe falcata* (L.f.) Ettingsh.; **J.** *Cleome simplicifolia* Hook.f. & Thomson



Eriolaena hookeriana Wight & Arn.



Erythrina suberosa Roxb.



Psammogeton diffusus (Roxb. ex Sm.) Rech.f. ex Pimenov

Plate 5. Some rare and threatened plant species of the sanctuary



Annona squamosa L.



Miliusa tomentosa (Roxb.) Finet
& Gagnepain



Cissampelos pareira L. var. *hirsuta*
(Buch.-Ham. ex DC.) Forman



Cocculus hirsutus (L.) W. Theob.



Tinospora cordifolia (Willd.) Miers





Nymphaea pubescens Willd.



Nelumbo nucifera Gaertn.



Argemone mexicana L.



Argemone ochroleuca Sweet



Crateva adansonii DC. subsp. *odora* (Buch.-Ham.) Jacobs



Maerua oblongifolia (Forssk.) A. Rich.



Cleome simplicifolia Hook.f. & Thomson



Portulaca oleracea L.



Portulaca tuberosa Roxb.



Bergia ammannioides Roxb. ex Roth



Pavonia zeylanica (L.) Cav.



Sida cordata (Burm. f.) Borss.



Sida cordifolia L.



Bombax ceiba L.



Eriolaena hookeriana Wight & Arn.



Helicteres isora L.



Melhania futteyporensis Munro ex Masters



Melochia corchorifolia L.



Sterculia urens Roxb.



Waltheria indica L.



Corchorus olitorius L.



Grewia flavescens A. Juss.



Grewia tenax (Forssk.) Fiori



Oxalis corniculata L



Aegle marmelos (L.) Correa



Limonia acidissima L.



Naringi crenulata (Roxb.) Nicholson



Ailanthus excelsa Roxb.



Balanites roxburghii Planch.



Boswellia serrata Roxb. ex Coleb.



Azadirachta indica A. Juss.



Melia azedarach L.



Soymida febrifuga (Roxb.) A. Juss.



Celastrus paniculatus Willd.



Ziziphus mauritiana Lam



Ziziphus nummularia (Burm. f.) Wight & Arn



Ziziphus xylopyrus (Retz.) Willd.



Ampelocissus latifolia (Roxb.) Planch.



Causonis trifolia (L.) Mabb. & J.Wen



Cardiospermum halicacabum L.



Abrus precatorius L.



Butea monosperma (Lam.) Taub.



Clitoria ternatea L.



Dalbergia sissoo Roxb. ex DC.



Grona triflora (L.) H.Ohashi & K.Ohashi



Erythrina suberosa Roxb.



Indigofera astragalina DC.



Indigofera cordifolia Heyne ex Roth



Indigofera hochstetteri Baker



Indigofera linifolia (L. f.) Retz.



Indigofera tsiangiana Metcalf





Mucuna pruriens (L.) DC.



Tephrosia pumila (Lam.) Pers.

Tephrosia purpurea (L.) Pers.



Tephrosia villosa (L.) Pers.

Tephrosia uniflora Pers. subsp. *pterosa*
(Blatt. & Halb.) Gillett & Ali



Medicago monantha (C.A.Mey.) Trautv. *Teramnus labialis* (L.f.) Spreng.



Guilandina bonduc L.



Chamaecrista absus (L.) Irwin & Barneby

Chamaecrista pumila (Lam.) Singh



Vachellia nilotica subsp. *indica*
Benth.) Kyal. & Boatwr. (



Senegalia senegal (L.) Britton



Senegalia catechu (L.f.) P.J.H.Hurter
& Mabb.



Albizia lebbek (L.) Benth.



Albizia procera (Roxb.) Benth.



Dichrostachys cinerea (L.) Wight & Arn.



Mimosa hamata Willd.



Mimosa rubicaulis subsp. *himalayana*
(Gamble) H. Ohashi



Terminalia pendula (Edgew.) Gere & Boatwr.



Terminalia anogeissiana Gere &
Boatwr.



Terminalia coronata (Stapf) Gere
& Boatwr.



Blastania garcinii (Burm.f.) Cogn.



Coccinia grandis (L.) J. O. Voigt



Diplocyclos palmatus (L.) C. Jeffrey



Momordica dioica Roxb. ex Willd.



Trichosanthes cucumerina L.





Opuntia elatior Mill.



Glinus lotoides L.



Hypertelis cerviana (L.) Thulin



Adina cordifolia (Roxb.) Brandis



Psammogeton diffusum (Roxb. ex Sm.) Rech.f. ex Pimenov



Cyathocline purpurea (Buch.-Ham. ex D. Don) Kuntze



Echinops echinatus Roxb.



Eclipta prostrata (L.) L.



Emilia sonchifolia (L.) DC.



Grangea maderaspatana (L.) Poir.



Launaea procumbens (Roxb.) Ramayya & Rajagopal



Oligochaeta divaricata (DC.) K.Koch



Lysimachia arvensis (L.) U.Manns & Anderb



Manilkara hexandra (Roxb.) Dubard



Diospyros cordifolia Roxb.



Diospyros melanoxylon Roxb.



Carissa spinarum L.



Wrightia tinctoria R. Br.



Ceropegia bulbosa var. *bulbosa* Roxb.



Ceropegia bulbosa var. *lushii* (R. Grah.) Hook. f.



Calotropis procera (Aiton) R. Br.



Leptadenia pyrotechnica (Forssk.) Decne.



Leptadenia reticulata (Retz.) Wight & Arn.



Canscora diffusa (Vahl) R. Br. ex Roem. & Schult.



Nymphoides indica (L.) Kuntze.



Evolvulus nummularius (L.) L.



Ipomoea nil (L.) Roth



Distimake aegyptius (L.) A.R.Simões
& Staples



Merremia emarginata (Burm. f.) Hall.f.



Physalis angulata L.



Solanum incanum L.



Solanum virginianum L.



Bacopa monnieri Wettst. in Engl.&Prantl.



Craterostigma plantagineum Hochst.



Limnophila indica (L.) Druce i



Lindenbergia indica (L.) Vatke.



Bonnaya ciliata (Colsm.) Spreng.



Utricularia stellaris L.f.



Martynia annual L.



Barleria cristata L.



Barleria prionitis L.



Rungia repens (L.) Nees .



Polygonum plebeium R. Br.



Bridelia retusa (L.) A. Juss.



Flueggea leucopyrus (Willd.) Muel. - Arg.



Potamogeton crispus L.



Potamogeton nodosus Poir.



Eriocaulon cinereum R.Br.



Cyperus difformis L.



Cyperus rotundus L.



Eleocharis acutangula (Roxb.) Schult.



Fimbristylis bisumbellata (Forsk.) Bubani



Abildgaardia ovata (Burm.f.) Kral (Burm.f.)
Kern.



Apluda mutica L.



Aristida funiculata Trin. & Rupr



Chrysopogon fulvus (Spr.) Chiov.



Heteropogon contortus (L.) P. Beauv. ex Roem. & Schult.



Digitaria bicornis (Lam.) Roem. & Schult. ex Loud.



Melanocenchrus jacquemontii Jaub. & Spach.

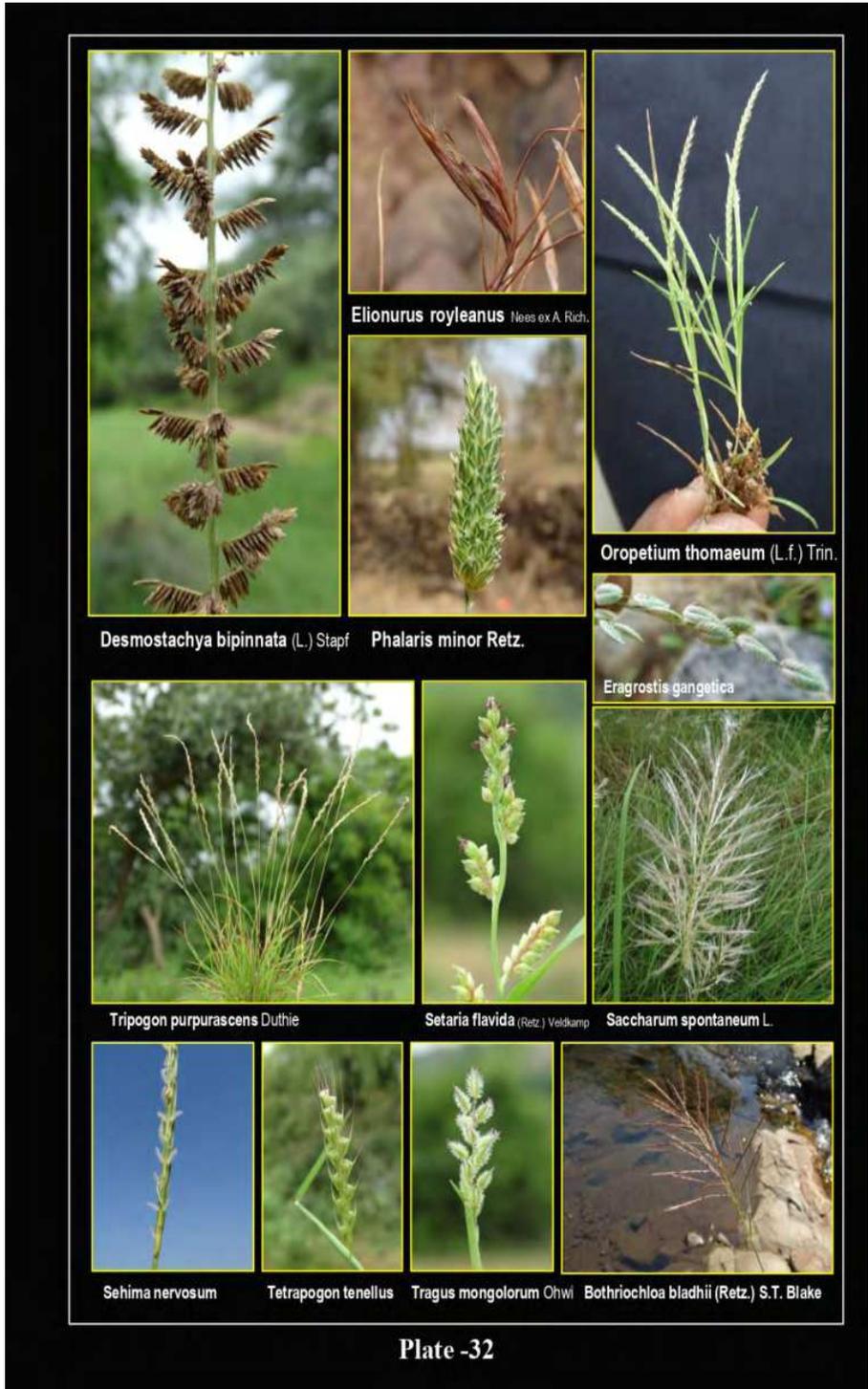


Plate -32

INTRODUCTION

Biodiversity is the diversity of life in all its forms, including the diversity of species, genetic variations within one species, and ecosystems. It is essential for human survival, economic well-being, and ecosystem function and stability (Singh, 2002). Conservation of biodiversity is one of the world's highest priorities since it safeguards ecosystems, species, and the products and services they provide for human well-being (Brooks & al., 2006). However, global biodiversity is endlessly threatened by anthropogenic habitat modification, which ultimately leads to biodiversity loss (Chapin Iii & al., 2000; Cardinale & al., 2012). The estimates derived from the field alone do not provide a clear understanding of the unprecedented changes in biodiversity at larger scales. In this scenario, comprehensive spatial data on vegetation types, fragmentation, deforestation, fire, invasive species, and other such factors are crucial for effective biodiversity conservation planning. Unfortunately, the inadequate availability of such data poses significant challenges to efforts to conserve biodiversity (Ferrier 2002). Understanding the extent and patterns of vegetation types and forest fragmentation has important implications for global commitments such as the United Nations Sustainable Development Goals (SDGs; Goal 15), the United Nations Decade of Restoration, and essential biodiversity variables (EBVs).

Satellite remote sensing has enormous potential for monitoring progress toward attaining global conservation goals and targets (Timmermans and Kissling 2021). For example, by providing consistent and repeated coverage of larger areas, remote sensing could significantly contribute to the development of EBVs and the measurement of progress towards SDGs (Timmermans and Kissling 2021). Since the last few decades, remote sensing and ecological modelling, augmented by artificial intelligence techniques, have revolutionized ecology and conservation biology. These tools improve our potential to make informed decisions, monitor changes, and implement effective conservation strategies by providing detailed information on habitat characteristics, species distributions, and landscape dynamics.

The availability of high spatial-temporal remote sensing data and emergent technologies has enabled us to conduct repeated and seamless monitoring of vegetation attributes and their change in response to anthropogenic and climate change-induced threats across larger areas. For instance, Sentinel-2 multispectral images with high spatiotemporal resolution allowed researchers to conduct fine-scale mapping of vegetation (Lang & al., 2019), land use and land cover mapping (LULC), and environmental monitoring (Pesaresi & al., 2016, Otunga & al., 2018, Vrieling & al., 2018, Phiri & al., 2020). Sentinel-2 is advantageous due to its 13 spectral bands,

which include visible, red edge, near-infrared, and short-wave infrared wavelengths. The red-edge, near-infrared, and short-wave infrared wavelengths are especially useful for monitoring and evaluating vegetation (Joseph & al., 2018, Recanatesi & al., 2018, Nzimande & al., 2021). Utilising Sentinel-2 data demonstrates its potential for supporting detailed analysis and decision-making in the fields of forestry, ecology, and wildlife research.

The identification of degraded areas, prioritization of restoration sites, and habitat connectivity and conservation status are supported by vegetation types and fragmentation maps. These studies also monitor restoration progress, assess vegetation recovery, and track changes in forest fragmentation, evaluating the efficacy of restoration and guiding management decisions. High-resolution maps of vegetation types enhance comprehension of habitat horizontal structure, human land use patterns, forest distribution patterns, and landscape structure and connectivity in the protected areas. These insights aid in the assessment of biodiversity and ecosystem health and guide conservation efforts. In addition, it facilitates distinguishing important types for various plant and animal species, as well as assessing the overall biodiversity and conservation value of a protected area. In addition, multi-temporal vegetation type mapping facilitates the monitoring of vegetation changes over time, the identification of invasive species, and the evaluation of human impacts on natural habitats.

Fragmentation of forests is recognized as a significant driver of the global biodiversity crisis. Forest fragmentation analysis is vital for comprehending the spatial patterns and impacts of habitat fragmentation within protected areas. In other words, fragmentation of large contiguous forests into small and isolated forest patches, either by natural phenomena or anthropogenic activities, leads to drastic changes in forest patch sizes, shape, connectivity, and internal heterogeneity, which restrict movement and lead to inbreeding among metapopulations and the extirpation of species (Ramachandra & al., 2016). Fragmentation has significant effects on the populations and distributions of fauna, ecological processes, and the overall health of an ecosystem. It is essential to identify areas of high fragmentation and evaluate their ecological consequences, such as edge effects, biodiversity loss, and disruption of ecological processes. This data is essential for effective conservation planning, habitat restoration, and the development of strategies to mitigate the negative effects of fragmentation. Despite the significance of vegetation type mapping and forest fragmentation analysis, protected area management struggles to acquire complete data in these areas. Insufficient financial resources, a lack of technical expertise, and logistical constraints frequently impede the collection and analysis of data at

the required resolution and scale. In addition, the vastness and diversity of wildlife sanctuaries make data collection and analysis a difficult and time-consuming task.

In this context, remote sensing-based mapping and monitoring of vegetation status and human land use patterns in protected areas have progressed significantly over the past few decades. In Indian protected areas, vegetation types and fragmentation, as well as fires and deforestation, have been mapped in numerous studies. Reddy & al., (2010), used remote sensing to classify the vegetation types of Keoladeo National Park. Mukherjee & al., (2014) mapped land cover and vegetation types in Dibang Valley Wildlife Sanctuary, highlighting the importance of accurate mapping for conservation planning. Shukla and Roy (2016) analyzed multi-temporal satellite images to map Sundarbans Biosphere Reserve land cover changes and fragmentation, highlighting the need for sustainable practices. Using remote sensing, Thapa and Murthy (2017) assessed the vegetation cover and fragmentation in Bhitarkanika Wildlife Sanctuary and emphasized the importance of continuous monitoring and conservation measures. Very few studies have evaluated the detailed account of forest fragmentation status of deforestation, fragmentation, and fires in protected areas of Western Ghats (Satish & al., 2014; Satish and Reddy 2016; Athira & al., 2017; Reddy & al., 2018). Similar research, such as that on forest cover change and forest fires, was also conducted in the Similipal Biosphere Reserve, Eastern Ghats (Saranya & al., 2014; Saranya and Reddy 2016). These studies illustrate the application of remote sensing and GIS techniques in India's protected areas, thereby facilitating an understanding of ecosystem dynamics, habitat quality, and effective conservation strategies. However, some protected areas in arid regions lack such detailed assessments at fine scale resolution. In addition, in arid regions, there are few studies on the quantification and monitoring of anthropogenic threats to biodiversity, possibly as a result of a lower biodiversity value and consequent neglect.

The main goal of this study is to assess the present status of flowering plant diversity and to utilize Sentinel-2 satellite data, along with field data and floristic surveys, to classify vegetation types and land cover categories. Furthermore, the study seeks to evaluate the level of forest fragmentation in the Bassi Wildlife Sanctuary using the Landscape Fragmentation Tool (LFT v2.0). By integrating these methods, a holistic understanding of the sanctuary's vegetation composition and the extent of fragmentation can be achieved, enabling informed conservation and management strategies.

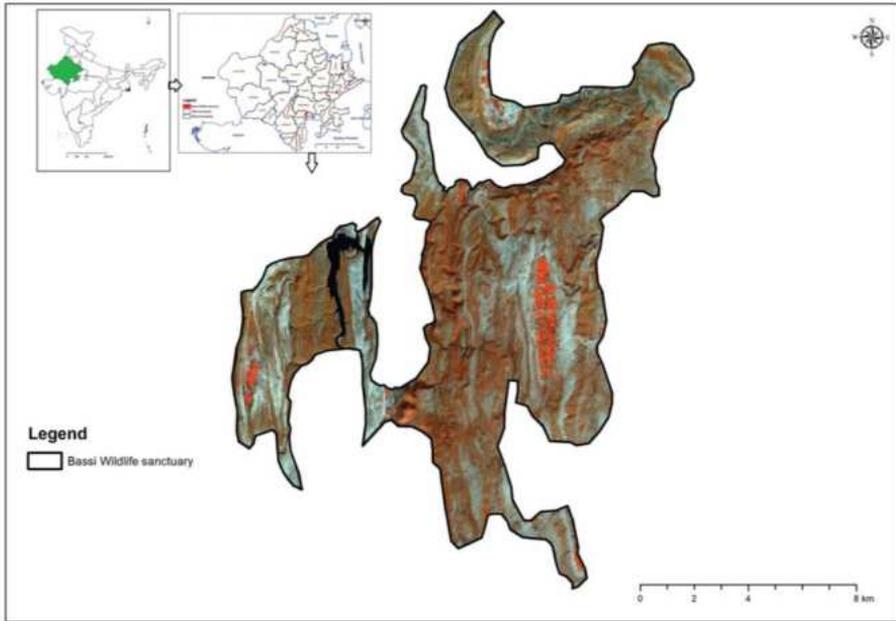


Fig.1. Study area map - Sentinel-2 Satellite image of Bassi WLS.

STUDY AREA

The Bassi Wildlife Sanctuary is situated in the Southern part of Aravalli ranges in District Chittorgarh, Rajasthan and is spread across 138.69 km². It lies between 74° 47' to 74° 57' E Longitude and 24° 55' to 25° 07' N Latitude. It was notified by the Wildlife Protection Act of 1972, vide the Gazette notification no. F(11)/41/Raj./8/86, dated 28.08.1988. The study area encompasses the Begu and Chittorgarh tehsil areas (Fig. 1). The study area covers Begu and Chittorgarh thesils.

Bassi WLS Ranges and Naka Details: Bassi (Bassi Naka: Keljar, Kevdiya, Meghpura Chowki); Parsoli Naka (Mahesara, Gopalpura); Bichore Naka (Bichore); Amalda Naka (Shivpura, Niliya Ka Mal Chowki). Additionally, there are numerous natural water bodies and wetlands within the Sanctuary area, including Naharjar, Jhaleshwer Mahadev, Narla Kalla, Bhandra Jar, Aamjar, Jhariya Mahadev, Somla Nala, Ambapani, Amjariya. Among the artificial water bodies are Sarana Talab, Bassi Dam, Orai Dam, Rajpuriya Ennikat, Naharjar Ennikat, Kadmoyi Nadi, Dikla Ka Talab, Bhujda Dam, Ruparol Dam, Panduriya Handpump.

GEOLOGY AND SOIL

The Sanctuary area consists of a wide range of habitats, such as hilly terrain, aquatic zones and plains. The geology of Bassi WLS is an admixture of complex geological formations belonging to the Archean and Purana groups of Algonkian, Archean, and Tori Dean age. It also includes the upper Vindhayan and Aravalli systems. It covers the older formations like phylites, sandstone rock & Limestone. Laterite is formed at several places. It is generally reddish brown and pisolitic. In a few places it contains bauxite segregation. Lithomeric clays are also found associated with laterites in some places.

The soil is varied from clayey, clayey-loam to gravelly depending upon topography. Black or Grey cotton soil is found in patches lying upon the older formations. The soil on slopes and plateaus is moormy and unfertile. The soil depth is good and varies from 30 cm to a few meters. The soil is mixed with pebbles and boulders.

TERRAIN

The forest tract of the sanctuary is highly undulating with broken ranges of hills of different heights. The hills and hillocks form a network leading to the bigger nallahs, entering the plains and draining into the rivers. The topography of the area can be divided into hills, piedmont zones and the plains. The hills with high altitudinal variation ranging from 250 m to 600 m. The plains down the hills are mostly agricultural fields and grasslands.

CLIMATE

The climate of this tract is sub-tropical characterized by distinct winter, summer and monsoon season. The summers commence from middle of March and the heat becomes intense in April. Hot westerner winds called 'Loo' are common in summers. The climate is usually warm during summer, with temperatures ranging from 23.8°C to 46°C. During winter, temperatures range from 11.6°C to 28.4°C.

Rainfall in the area is very erratic and unevenly distributed. Rains generally start in the last week of June and intermittently continue up to September end. High intensity of rain is generally observed in July. The average annual precipitation ranges between 600-850mm. The average number of rainy days is 30. The overall climatic conditions provide a congenial habitat for the growth and proliferation of plant species.

GENERAL ASPECTS OF VEGETATION

The topography, soil and bio-climate have resulted in various vegetation types within the Sanctuary area. The vegetation chiefly comprises tropical deciduous forests intermixed with grasslands. The Wildlife Sanctuary supports dense vegetation and presents a vibrant green landscape during the rainy seasons. In contrast, the topography appears monotonous, being barren and desolate during summer, with the hills taking on a brownish-black appearance. The vegetation of the Wildlife Sanctuary is classified into five types as per Champion & Seth (1966), namely:

1. II-Dry Tropical forest type (subclasses as follows: Group 5B - northern tropical dry deciduous forest, E1 - *Anogeissus pendula* forest, E2 - *Boswellia serrata* forest).
2. Riverine forests.
3. Tree savannah.
4. Scrublands.
5. Grasslands.

The *Anogeissus pendula* (*Terminalia pendula*) forest, locally known as Dhauk forest, represents an edaphic climax forest (6/E1) according to Champion and Seth's classification (1968). This type is primarily defined by *Terminalia pendula*, which forms nearly pure stands, often well-stocked, at about 6-8 meters in height (Plate 1.). These forests are mainly found in the northern parts of the Sanctuary, covering the Bichore, Meghpura, and Parsoli forest areas. Other common tree species associated with *Terminalia pendula* include *Senegalia catechu* (Khair), *Vachellia leucophloea* (Rainj), *Albizia odoratissima* (Siris), *A. procera* (Safed Siris), *Anogeissus latifolia* (Safed Dhok), *Bauhinia racemosa* (Jhinja), *Butea monosperma* (Khakhro, Chola), *Cassia fistula* (Karmala, Amaltas), *Diospyros melanoxylon* (Timru, Bidi-patta), *Ehretia laevis* (Tambolia), *Erythrina suberosa* (Dhobi-Palas, Dhed-Khakro), *Flacourtia indica* (Kantia), *Wrightia tinctoria* (Dudhia, Khirni), and *Ziziphus mauritiana* (Bordi), etc.

The common trees in Dry Deciduous forests as per species dominance are: *Senegalia catechu* (Khair), *Vachellia leucophloea* (Rainj), *Albizia odoratissima* (Siris), *A. procera* (Safed Siris), *Terminalia anogeissiana* (Safed Dhok), *Bauhinia racemosa* (Jhinja), *Butea monosperma* (Khakhro, Chola), *Cassia fistula* (Karmala, Amaltas), *Diospyros melanoxylon* (Timru, Bidi-patta), *Ehretia laevis* (Tambolia), *Erythrina suberosa* (Dhobi-palas, Dhed-Khakro), *Flacourtia indica* (Kantia), *Wrightia tinctoria* (Dudhia, Khirni) and *Ziziphus mauritiana* (Bordi), etc.

These forests are of the dry deciduous type; hence, except during monsoons, the ground flora is mostly dry. During monsoon season, the forests appear lush and beautiful since entire hills, slopes, and valleys are full of ephemeral herbaceous flora along with arboreal species. The common herbs and undershrubs noted in the ground flora are: *Acanthospermum hispidum*, *Achyranthes aspera*, *Aerva lanata*, *Anisomeles indica*, *Barleria prionitis*, *Bidens biternata*, *Blainvillea acmella*, *Blumea lacera*, *Chamaecrista absus*, *Cyanthillium cinereum*, *Desmodium gangeticum*, *Dipteracanthus patulus*, *Elytraria aculis*, *Evolvulus alsinoides*, *Indigofera ssp.*, *Ipomoea spp.*, *Lindenbergia indica*, *Leucas aspera*, *L. cephalotes*, *Malhania futteyporensis*, *Senna obtusifolia*, *Sida cordata*, *S. spinosa*, *Tridax procumbens*, *Triumfetta pentandra*, *T. rhomboidea* etc. along with most common and palatable fodder grass species *Apluda mutica*. The other common grass species associated with it are: *Arachne racemosa*, *Alloteropsis cimicina*, *Aristida adscensionis*, *Arthraxon lanceolatus*, *Brachiaria ramosa*, *Bothriochloa pertusa*, , *C. virgate*, *Chrysopogon zizanioides* (Khas-khas), *Cymbopogon martinii*, *Dichanthium annulatum*, *Digitaria ciliaris*, *Eragrostis spp.*, *Enteropogon dolichostachyus*, *Setaria intermedia*, *Tetrapogon tenellus*, *Themeda triandra* (Ratad) and *Urochloa ramosa* etc. *Cuscuta chinensis*- a stem parasite, also grows over ground flora. At the foot of hills in sanctuary, the *Terminalia pendula* is a dominant tree as usual and other species associated with it are: *Aegle marmelos*, *Carissa congesta*, *Grewia tenax*, *Flueggea leucopyrus*, *Vachellia leucophloea*, etc.

Boswellia serrata forest-E2: This forest type is present on the top of hills: *Boswellia serrata* (Salar), *Aegle marmelos* (Bil, Bela), *Sterculia urens* (Kadaya) etc. The pinkish - white and silvery-white defoliating bark of *Sterculia urens* and *Boswellia serrata* (Hiliophytes-sun loving plant) gives a graceful and beautiful appearance from far site. The common dominant grasses on the top of hills and slopes are: *Apluda mutica*, *Aristida spp.* and *Cymbopogon martinii*. It is also interesting to note that the semi - stem parasite *Dendrophthoe falcata* with its reddish-orange flowers growing on the trunk of *Boswellia serrata*.

Riverine forests are common along the water streams; common species are *Mitragyna parvifolia*, *Syzygium cumini*, *Mangifera indica*, *Terminalia arjuna*, *Terminalia bellirica*, *Bridelia retusa*, *Ficus racemosa*, etc. Tree savannah, scrub and grasslands are distributed in significant areas in the sanctuary (Plate 1.).

The aquatic and marshland vegetation is represented by the common aquatic species *Utricularia stellaris*, *Ottelia alismoides*, *Potamogeton sp.*, *Limnophila indica*, *Nymphoides indica*, etc. Along the streams and valleys in

moist and shaded habitats, the plants noted are: *Blumea* spp., *Euphorbia* spp., *Eclipta prostrata*, *Commelina* spp., *Oxalis corniculata*, *Lindernia* spp., *Phyllanthus nodiflora*, *Phyllanthus* spp., etc.

The common weeds in this sanctuary area are *Ageratum conyzoides*, *Argemone mexicana*, *Argemoneo chroleuca*, *Blainvillea acmella*, *Euphorbia hirta*, *Echinops echinatus*, *Lantana camara*, *Mesosphaerum suaveolens*, *Parthenium hysterophorus*, *Prosopis juliflora* and *Vernonia cinerea* etc.

EARLIER BOTANICAL STUDIES

The Bassi Wildlife Sanctuary is located in the southeastern region of Rajasthan. Earlier floristic studies in this region were likely initiated by Duthie (1903-29) in "Flora of Upper Gangetic Plains," which covered a significant portion of southeastern Rajasthan. After Duthie's publication, contributions to floristics from eastern Rajasthan were minimal until 1950. Since then, a substantial number of papers have been published about the vegetation of the Aravallis and its eastern parts. Notable contributions by Raizada & Sharma (1962), Vyas (1967), Bhandari (1965), Gupta (1965a), Vyas & Ramdeo (1965), Majumdar (1969, 76, 77), Jain (1970), Maheshwari & Singh (1974), Singh & Pandey (1980), and Parmar & Singh (1982) have enriched our knowledge. Publications such as "Flora of N.E. Rajasthan" (Sharma & Tiagi, 1979), "Flora of Banswara" (Singh, 1983), and "Flora of Tonk District" (Shetty & Pandey, 1983) have further contributed to our understanding of the flora and floral composition of eastern Rajasthan. The "Flora of Rajasthan" (Shetty & Singh, 1987, 1991, 1993), "Flora of Rajasthan" (Sharma, 2002), and the flora of Rajasthan, especially the South & South-East Region (Tiagi & Aery, 2007), have also expanded our knowledge of the region's flora and floral composition. Recently, Yadav & al. (2002), Yadav & Meena (2008 & 2009), Meena & Yadav (2009, 2010a & 2010b), and Meena (2010a, 2010b & 2010c, 2012), Pandey & al. (2005), Pandey & Meena (2012), Gena, C.B. & al. (2018), and Meena & al. (2019) have published numerous papers introducing new species to Rajasthan's flora. A substantial number of recent papers have also focused on floristic studies from eastern Rajasthan and the western desert of Rajasthan.

Vegetation in Rajasthan has been studied by Krishnaswamy and Gupta (1952), Sarup & Dutta (1954), Barucha (1960), Verma (1964), Sharma (1967, 1968), Gupta & Abhichandani (1968), who conducted an analysis of vegetation in the desert zone using air photography. The influence of the dry climate on vegetation has also been studied by Waheed Khan (1959), Raheja (1965), MeherHomji (1977), while afforestation and species suitability for plantation have been explored by Badhwar & al. (1948), Banerjee (1952), Nair (1954), Sen (1962), Puri and Jain (1962), Bhimaya & Kaul (1962), Bhimaya &

al. (1964), Mulay & Joshi (1964), Verma (1965), and Bora (1973), among others. Recently, vegetation type mapping of Rajasthan has been studied by Reddy & al. (2013).

A review of the literature reveals that while some protected areas have been floristically explored in detail, such as Parmer (1987) for Sariska Tiger Reserve, Singh & Singh (2006) for Desert National Park, Singh & Srivastawa (2007) for Ranthambore National Park, Pandey & Meena (2012) for Darrah National Park, and Meena (2014) for Sitamata WLS, the Bassi Wildlife Sanctuary remains unexplored in terms of floristics. Only a few collections from the area are deposited in various herbaria. Despite its significant potential from a floristic perspective, the Bassi Wildlife Sanctuary has yet to be thoroughly investigated. Therefore, the present study aims to address this gap.

OBJECTIVES OF THE PRESENT STUDY

- To conduct floristic exploration in vegetation types
- Mapping of vegetation types by using Remote Sensing and GIS
- Phytosociological data collection of vegetation types
- Collection, identification and documentation of all the collected plant species.
- To suggest conservation strategies and recommendations.

MATERIALS AND METHODS

3.1. Floristic survey and collection of plants:

Plant collections were made in the Bassi Wildlife Sanctuary at regular intervals from April 2017 to March 2019 (Fig. 2). Field trips of 10 to 15 days duration were planned, taking into consideration the flowering and fruiting seasons of the plants inhabiting the area. Four exhaustive botanical explorations were conducted during different seasons of the year. For each plant, two voucher specimens were collected and duly tagged. In all, 964 field numbers of plant specimens were collected (Table 1). Data on habit, habitat, locality, latitude, longitude, altitude, associated plants, distribution pattern, abundance and phenology were recorded in the field note book. A wet preservation technique was used for preserve the plants. In this method, the preservative was prepared in the following ratio of Glacial acetic acid (5 c.c.), 40% Formaldehyde (10 c.c.) and Ethyl alcohol (85 c.c.). The collections were spread out on ordinary newspaper and bundled up. Each bundle is then placed in a large polythene bag and this preservative is poured evenly over the bundles so that they get soaked thoroughly, without however leaving excess preservative in the bags. The bags are then tied tightly. No further change is required. The bundle is then brought to headquarters and then the specimens are dried in blotters. Vegetative, floral and fruit characters were critically studied. Measurements were taken for leaves, flowers, fruits and seeds. Descriptions were written using herbarium and pickled specimens. The dried specimens were mounted on hand made herbarium sheets of standard size using fevicol as adhesive.

Table 1. Details of tours conducted

Sl. No.	Tour duration details	Field No's collected
1.	10.08.2017 to 28.08.2017	391 field numbers
2.	14.03.2018 to 25.03.2018	145 field numbers
3.	1.10.2018 to 14.10. 2018	230 field numbers
4.	12.03.2019 to 19.03.2019	198 field numbers

Specimens were identified using standard floras, viz., Flora of Rajasthan, Flora of Madhya Pradesh and Flora of S-E Rajasthan. For critical identification recent monographs, revisionary works and relevant research floras were consulted for determining the correct identity of plants and

updating nomenclature. Details of local uses and critical field observations, if any, are also provided with descriptions.

Specimens were observed and studied with authenticated specimens deposited in the Herbarium of Botanical Survey of India, Arid Zone Regional Centre (BSJO). And also conducted one Herbarium consultation tour to Mohan Lal Sukhadiya University, Udaipur and Govt. College, Bhilwara, w.e.f. 30.09.2019 to 05.10.2019 and identified some unidentified field numbers and recorded the data of herbarium specimens reported from the sanctuary.

The floral wealth has been subsequently inventoried and documented. Keys for identification from family to infra-specific level have been provided. The nomenclature of all taxa is brought up-to-date in accordance with the ICN (2019-Shenzhen Code). Documentation has been done following The Angiosperm Phylogeny Group IV system of flowering plant classification (2016).

The families are arranged according to APG IV. The genera under family and species under genus are arranged alphabetically. Each species is provided with the correct name, followed by the basionym and its relevant synonyms, if any. Local names of the species have also been given after the taxonomic citation in parentheses, followed by brief descriptions of species including many general features that are observed in the field, followed by the season of flowering and fruiting, habitat ecology, specimens examined and notes on taxonomy and nomenclature, if any. The collector names are given in the abbreviated form *P. Hari Krishna* and *R. Kumar*. GPS coordinates are given in degrees, minutes and seconds (DMS) format. Colour photographs are given for some notable plant species. The herbarium specimen collections are deposited in the Botanical Survey of India, Arid Zone Regional Centre, Herbarium (BSJO), Jodhpur.

3.2. Mapping of vegetation types by using Remote Sensing and GIS

The spatial boundary of Bassi Wildlife Sanctuary was obtained from the State Forest Department. To conduct vegetation type mapping, satellite data from Copernicus Sentinel 2A for the typical dry and wet seasons of 2018 was utilized (Fig. 3). The hybrid classification technique, combining both digital classification and visual interpretation, was employed to create a vegetation type map and land cover classes at a scale of 1:25,000. The mapping of vegetation types and land cover relied on ground truth data and the visual interpretation of key elements in satellite imagery.

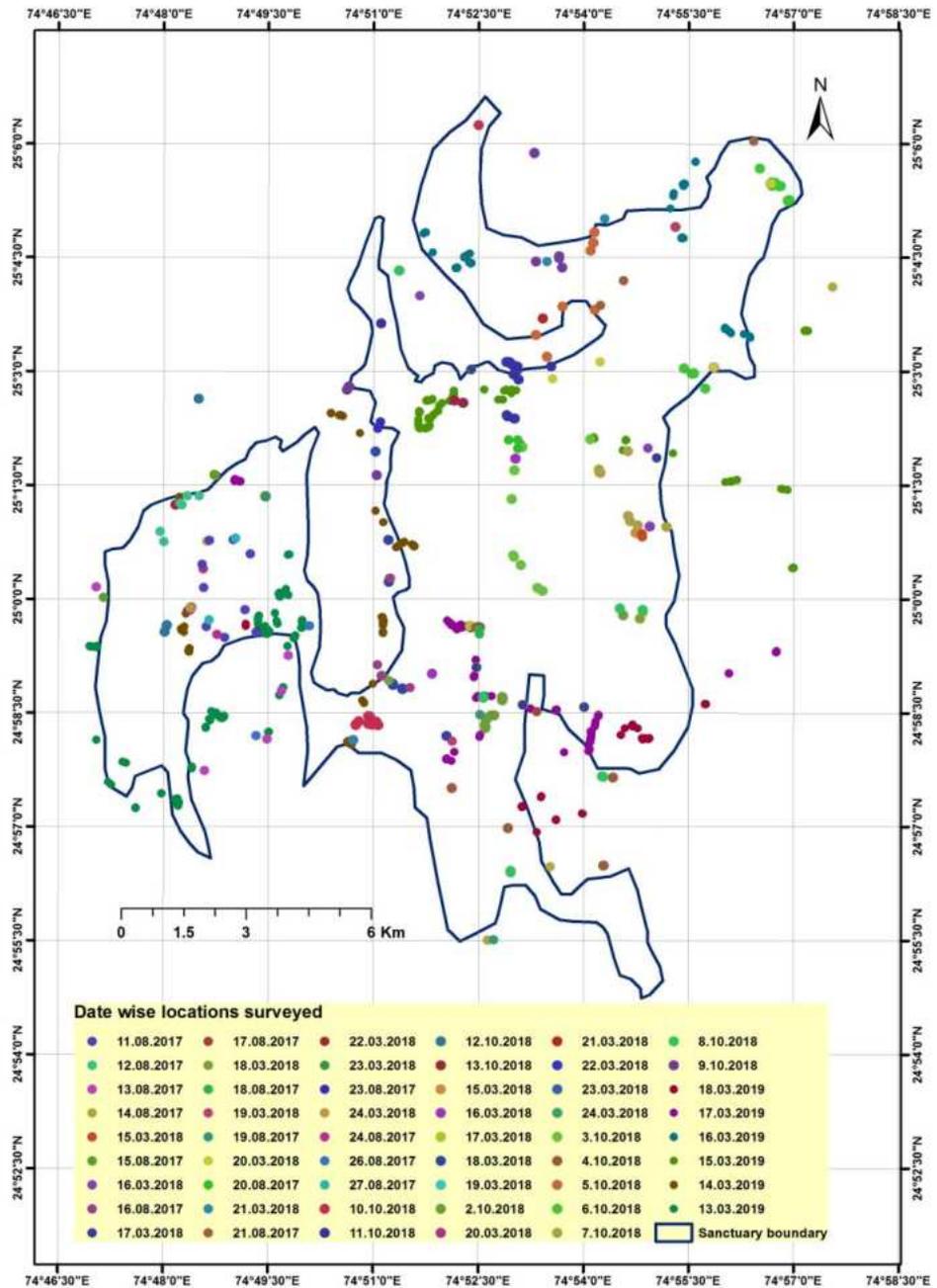


Fig. 2. Floristic Survey Map of Bassi Wildlife Sanctuary.

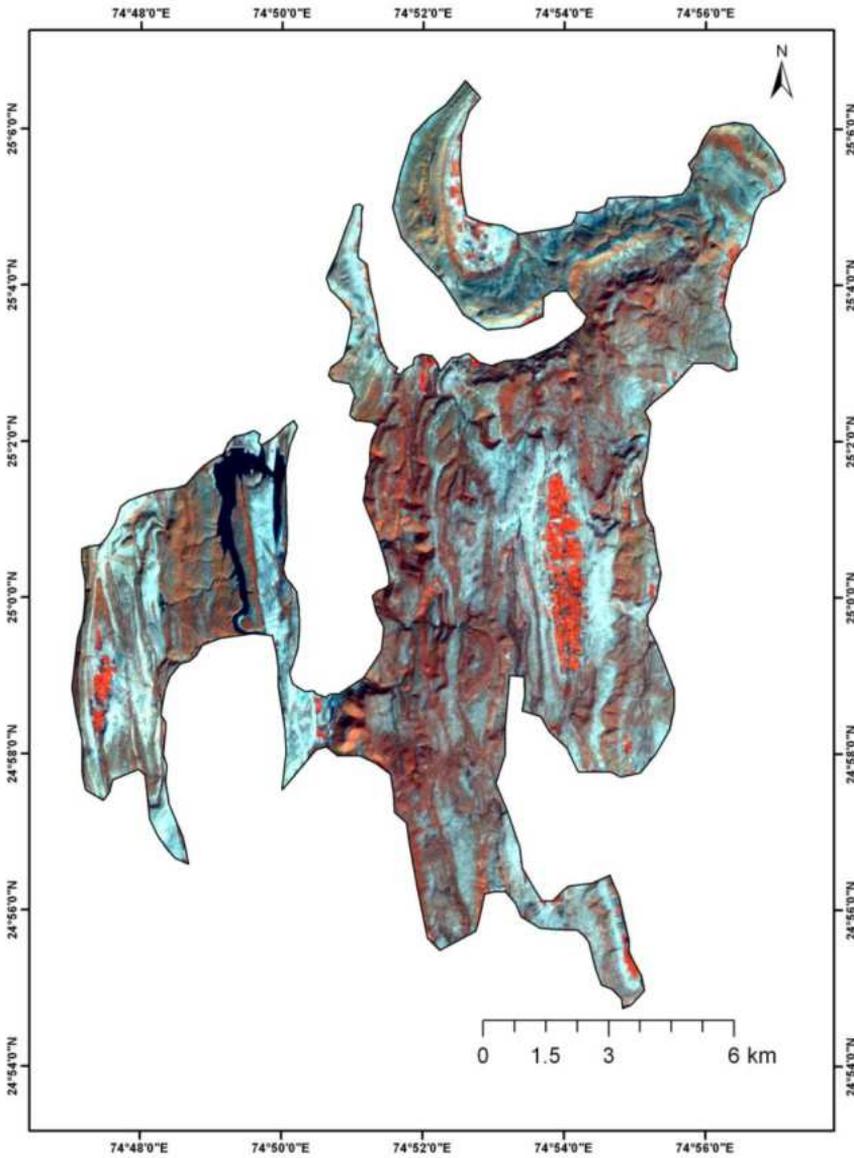


Fig. 3. Satellite map of Copernicus Sentinel 2A of 2018.

3.3. Fragmentation analysis

The fragmentation was assessed by using the vegetation type map. To quantify and compare the spatial extent of forest fragmentation, a landscape fragmentation tool was employed, which assigned each pixel a fragmentation state based on the methodology described by Elkie & al., in 1999. This tool, called Landscape Fragmentation Tool v2(0), is a Python script executed within ArcToolbox in ArcGIS 10.3. Forest fragmentation gives rise to potential edge effects along forest boundaries. In this assessment, a 100-meter edge width was selected to delineate different fragmentation classes, following the approach outlined by Riitters & al., in 2004. For this particular study, landscape metrics were computed exclusively at the landscape level, denoted as class level in the analysis. According to Vogt & al., (2007), the Landscape Level Fragmentation Analysis Tool (LFTv2) classifies forest areas into six distinct classes based on their size and characteristics. Here is a description of each class:

1. Patch: This class represents small, isolated forest patches within the landscape. These patches are relatively small in size and surrounded by non-forest or non-patch areas.
2. Edge: The edge class refers to the transitional zone between forest patches and adjacent non-forest areas. It represents the outer boundary of the forest patches and typically exhibits higher ecological and environmental variation compared to the core areas.
3. Perforated: The perforated class includes forest areas that are fragmented into several patches, leaving gaps of non-forest or non-patch areas within the forested landscape. These gaps may occur due to natural or human-induced factors, creating a discontinuous forest pattern.
4. Core 1 or small core: This class represents the smallest (<101 ha) and most fragmented forest areas within the landscape. These areas are typically highly fragmented and surrounded by non-forest or non-core areas. While they may have limited ecological functionality, they can still contribute to biodiversity and ecological processes at a local scale.
5. Core 2: It refers to forest areas that are slightly smaller (101 ha and 202 ha) and more fragmented compared to Core3. Although they may have some internal fragmentation, they still retain significant ecological value and serve as important habitat patches within the landscape.
6. Core 3 or large core: It represents the largest (> 202 ha) and most intact forest areas within the landscape. These areas are characterized by minimal fragmentation and are considered to have relatively high ecological integrity. Core 3 areas provide important habitats and

resources for forest-dependent species.

These classes provide a classification scheme that helps assess the intensity of forest fragmentation and understand the varying characteristics of forest patches within the study area.

3.4. Phytosociology and field data collection

Phytosociological studies were carried out from August 2017 to March 2019 to cover all spectrum of vegetation. Simple random sampling method was used to collect the quadrat data (Fig. 4). A total of 78 quadrats of 0.1 ha (31.6 × 31.6m) were laid in different vegetation types and recorded the phytosociological data. At each quadrat the girth at breast height (GBH) of all tree species was recorded (Plate 2). The individuals with GBH > 30 cm was considered as tree and with > 16 cm and < 30 cm gbh as saplings. For shrubs a plot of 5 × 5 m was laid down within the main plot and enumerated all the shrubs and saplings. To assess the herbaceous layer or ground flora, 1 × 1 m plot size was established in each corners and one in center (Fig. 5). The girth was measured using 2 m tape. The height of trees was measured using a Hypsometer (range finder). Plant samples were identified or confirmed with available state and regional floras (Shetty & Singh, 1987–1993; Yadav & Meena, 2011). All the trees, shrubs, climbers and herbaceous flora were recorded on a prescribed format for phytosociological analysis.

The quadrat data were quantitatively analyzed following standard procedures (Curtis & McIntosh, 1950; Philips, 1959; Misra, 1968). These analyses are generally carried out for each vegetation type for computing the Importance Value Index (IVI). The following are the formulae to derive frequency, density, dominance and IVI. For tree species in the wild, phytosociological characteristics of plant communities like; a) Frequency (percent of all transects in which a species was present), b) density (ratio of total number of trees to total number of transects) and c) abundance (ratio of total number of trees to total number of transects of occurrence) were recorded. Importance Value Index (IVI) was calculated following Curtis and Macintosh (1950).

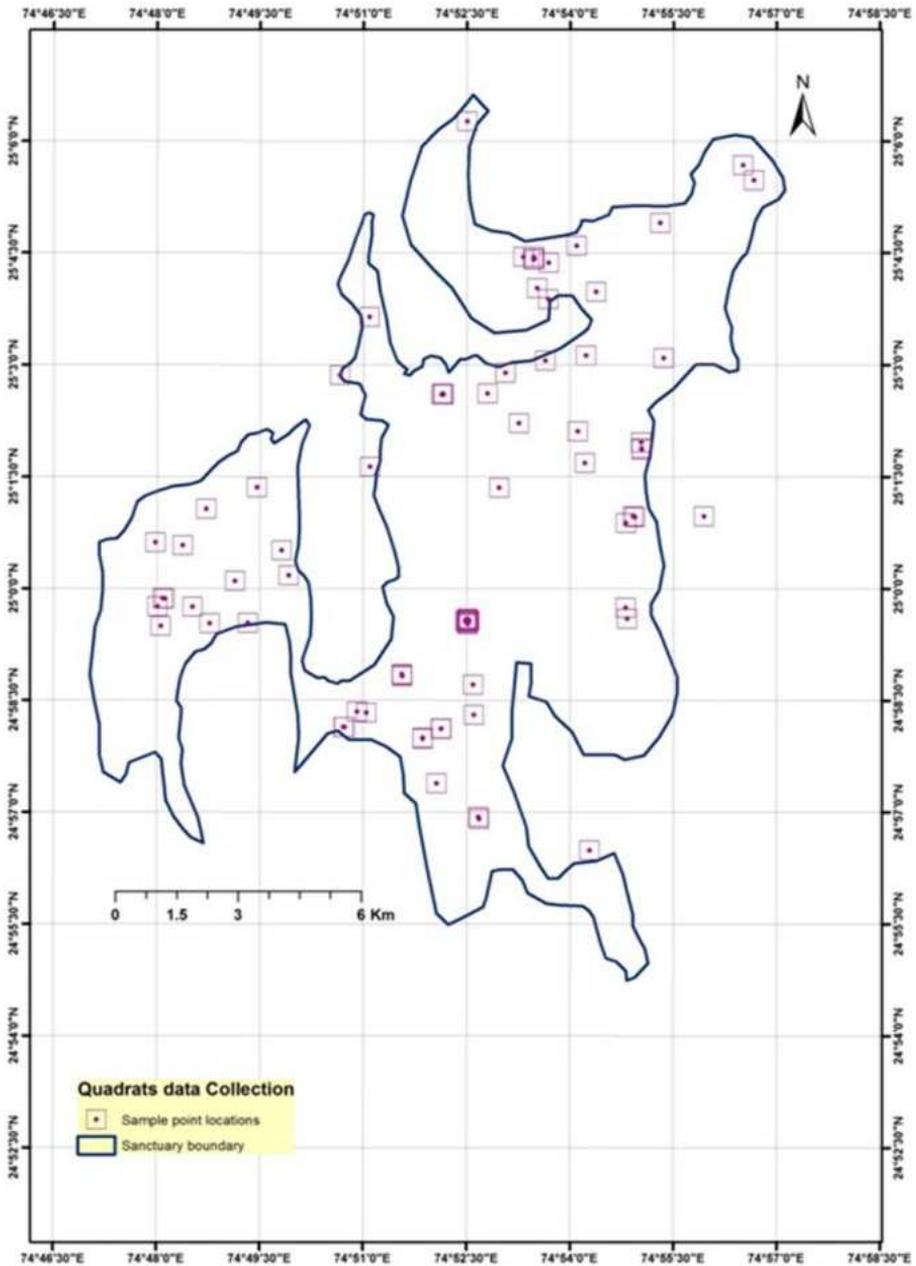


Fig.4. Spatial map of all the quadrats overlaid and data recorded locations.

$$\text{Frequency} = \frac{\text{Number of quadrats in which species occur}}{\text{Total number of quadrats studied}}$$

$$\text{Abundance} = \frac{\text{Total number of individuals of species}}{\text{Total number of quadrats in which species occur}}$$

$$\text{Density} = \frac{\text{Total number of Individuals of the species in all the quadrats}}{\text{Total number of quadrats studied}}$$

Basal area: It is an area occupied by the base of a tree. It is considered as a good indicator of the size, volume, or weight of a tree. Basal area provides information on the proportion or dominance of larger and smaller trees in an ecosystem. It is one of the most important parameters in estimating the standing biomass in an area that in turn is used as a measure of productivity. The basal area was calculated by dividing 4π with the square of cbh.

$$\text{Basal cover} = \frac{C^2}{4\pi}$$

where, C is cbh (circumference at breast height) for trees and cgh (circumference at ground level) for shrubs.

$$\text{Relative density} = \frac{\text{Number of individuals (density) of the species}}{\text{Number of individuals (sum of density) of all species}} \times 100$$

$$\text{Relative frequency} = \frac{\text{Number of occurrences (frequency) of the species}}{\text{Number of occurrences (sum of frequency) of all the species}} \times 100$$

$$\text{Relative dominance} = \frac{\text{Basal area of the species}}{\text{Total basal area of all the species}} \times 100$$

Relative abundance may be used in place of relative dominance for shrubs, saplings, seedlings and herbs. Sum of basal cover of individual plants of a species will yield total stand basal cover of that species.

IVI = Relative frequency + Relative dominance (basal area) + Relative density

The diversity was determined Shannon-Weiner diversity index ($H = -\sum [(pi)\ln (pi)]$), where P_i =Number of individuals of species i (n)/ total number of

individuals (N). The girth (GBH) was converted into basal area (BA) as $BA = GBH^2 / 4\pi$ for deriving biodiversity indices.

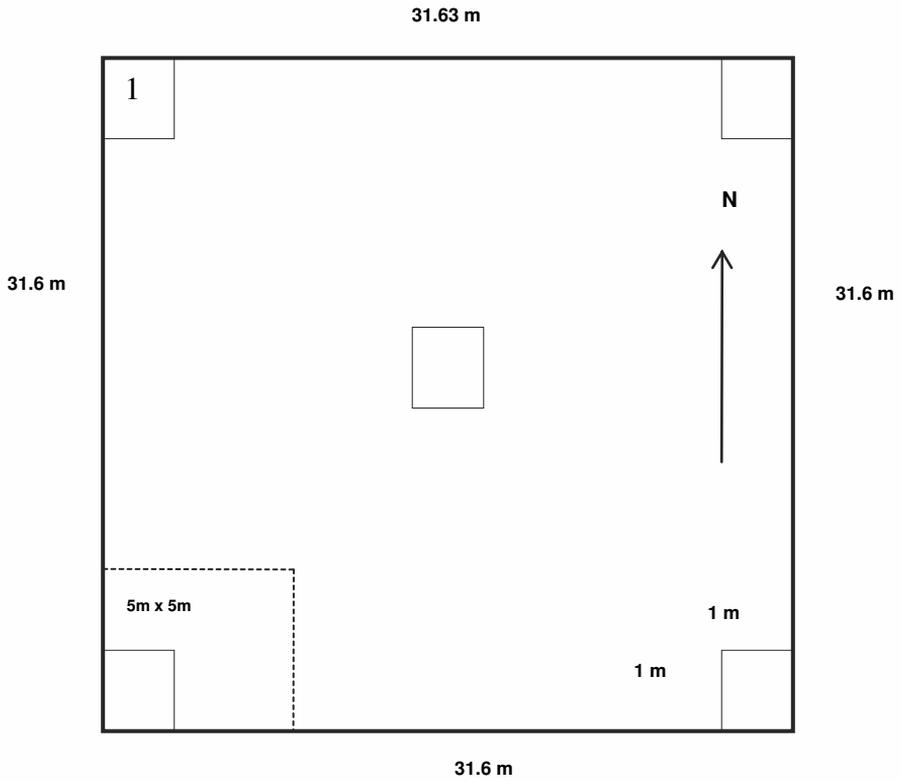


Fig. 5. Direction and position of quadrat.

RESULTS

4.1. Floristic Analysis

The total indigenous and widely naturalised angiosperm flora of the sanctuary comprises about 468 species, belonging to 322 genera in 85 families (Table 2). Of these, 346 taxa are eudicots belonging to 243 genera and 68 families, and 117 taxa are Monocots belonging to 75 genera and 14 families, Basal angiosperms are represented by 5 taxa belongs to 4 genera under 3 families respectively. Gymnosperms are completely lacking in the area; however, some species of ferns are found within the sanctuary, which are not taken into account in the present study.

Table 2. Statistical synopsis of the flora of Bassi WLS.

Category	Families		Genera		Taxa	
	No.	%	No.	%	No.	%
Basal Angiosperms	3	3.4	4	1.2	5	1.1
Monocots	14	16.2	75	23.3	117	25.0
Eudicots	68	80.2	243	75.5	346	73.9
Total	85	100	322	100	468	100

The analysis revealed that Eudicots show maximum diversity from species level (73.9%) to family level (80.2%). Monocots are represented by 75 genera and 117 species of monocots, 53 genera and 91 species belong to sedges and grasses. The family Fabaceae is the dominant family with 37 genera and 66 species followed by Poaceae with 46 genera and 65 species, Asteraceae with 28 genera and 32 species and Cyperaceae with 06 genera and 26 species (Table 3).

Table 3. Ten dominant families of Bassi WLS with ten or more species.

Position No.	Family	No. of genera	No. of species
1	Fabaceae	37	66
2	Poaceae	46	65
3	Asteraceae	28	32
4	Cyperaceae	6	26
5	Malvaceae	14	24
6	Acanthaceae	10	19
7	Apocynaceae	11	15
8	Euphorbiaceae	7	14
9	Convolvulaceae	7	13
10	Lamiaceae	8	12

Cyperus is the most species rich genus represented by 14 species, followed by *Indigofera* with 09 species, *Euphorbia* with 8 species, *Ipomoea* with 7 species, *Terminalia* with 6 species, *Ficus*, *Tephrosia*, and *Ziziphus* by 05 species each, *Alysicarpus*, *Blumea*, *Corchorus*, *Eragrostis*, *Senna* and *Sida* by 04 species each (Fig. 6).

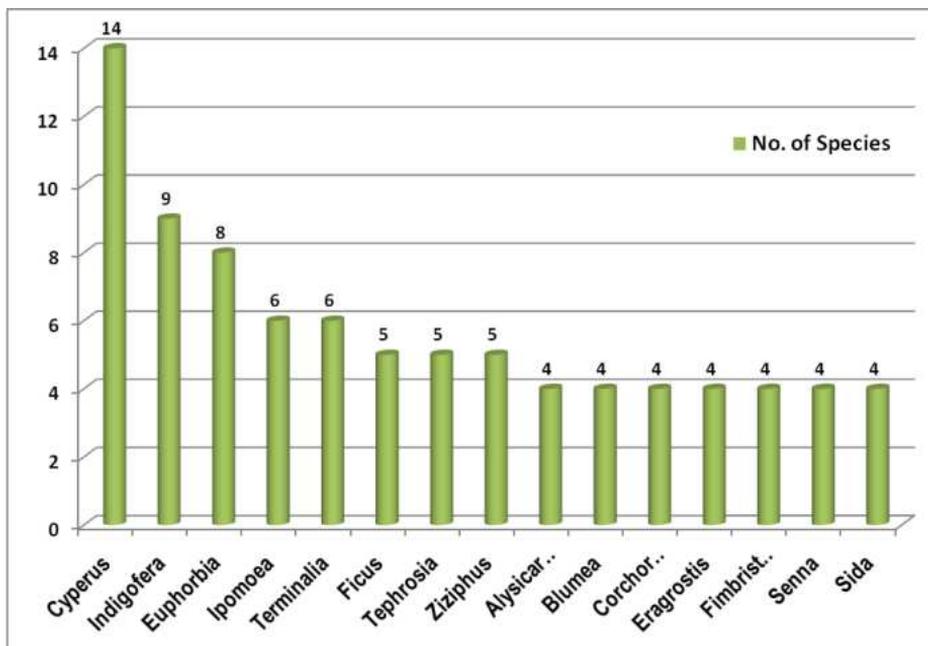


Fig. 6. Ten dominant genera in Bassi WLS.

RARE, ENDEMIC AND THREATENED TAXA OF BASSI WLS:

Among the endemic representatives of Rajasthan State, *Malhania futteypoerensis* and *Tecomella undulata* also occur in Bassi WLS. Besides these endemics, few taxa have small world populations and, hence, are classified as rare. The importance of phytodiversity of an area is determined by the presence of Rare and Threatened taxa, wild relatives of cultivated plants, economically important plants, etc. In terms of its small area of 138.69 km², Bassi WLS sustains 25 out of the 66 rare and threatened taxa of Rajasthan (Pandey & al., 2012) (Table 4). These species grow in small, sparse and scattered populations. They are very susceptible to the effects of environmental change and biotic activities, viz., land clearing, cutting, overgrazing, forest plantation, hunting, pouching, invasion of exotic weeds, etc., have adverse effects on the growth of these taxa. Further, inadequate reproductive mechanisms, inviability of seeds and a lower range of adaptation

also contribute to the dwelling of rare and threatened taxa. Therefore, immediate scientific measures are needed to conserve such germplasm in *in-situ* and *ex-situ* conditions. The local administration and the protected area management should initiate a programme or develop a strategy to examine the conservation status of habitats and species that are threatened and need protection.

Table 4. Rare and Threatened plant species of Bassi WLS

S.No.	Botanical Name	Common Name	Family	Habit	Status
1.	<i>Adina cordifolia</i> (Roxb.) Brandis	Haldu	Rubiaceae	Tree	Rare
2.	<i>Aegle marmelos</i> (L.) Correa	Beel	Rutaceae	Tree	Near Threatened
3.	<i>Albizia procera</i> (Roxb.) Benth.	Safed Siris	Mimosaceae	Tree	Rare
4.	<i>Butea monosperma</i> (Lam.) Taub. var. <i>lutea</i> (Witt.) Maheshwari	Peela palash	Fabaceae	Tree	Rare
5.	<i>Ceriscoides turgida</i> (Roxb.) Tirveng.	---	Rubiaceae	Tree	Rare
6.	<i>Ceropegia bulbosa</i> Roxb. var. <i>bulbosa</i>	--	Asclepiadaceae	Climber	Threatened
7.	<i>Ceropegia bulbosa</i> var. <i>lushii</i> (Graham) Hook.f.	--	Asclepiadaceae	Climber	Threatened
8.	<i>Crateva adansonii</i> subsp. <i>odora</i> (Buch.-Ham.) Jacobs	Varna	Capparaceae	Tree	Rare
9.	<i>Dalbergia sissoo</i> DC. (Introduced)	Sisam	Fabaceae	Tree	Threatened
10	<i>Dendrophthoe falcata</i> (L.f.) Ettings.	Vahi-hankal	Lorarthaceae	Shrub	Rare
11	<i>Eriolaena hookeriana</i> Wight & Arn.	---	Malvaceae	Tree	Rare
12	<i>Erythrina suberosa</i> Roxb.	Dhed khakhro	Fabaceae	Tree	Rare
13	<i>Gloriosa superba</i> L.	Kalihari	Colchicaceae	Climber	Least Concern
14	<i>Grewia tilliifolia</i> Vahl	Gangeti	Malvaceae	Tree	Rare

S.No.	Botanical Name	Common Name	Family	Habit	Status
15	<i>Hymenodictyon orixense</i> (Roxb.) Mabb.	Lunio	Rubiaceae	Tree	Rare
16	<i>Limonia acidissima</i> L.	Kotbadi	Rutaceae	Tree	Rare
17	<i>Maerua arenaria</i> Hook. f. & Thomson	Hemkand	Capparaceae	Climber	Rare
18	<i>Melhania futteyporensis</i> Munro ex Mast	---	Sterculiaceae	Shrub	Rare
19	<i>Mimosa hamata</i> Willd.	Aila	Mimosaceae	Shrub	Rare
20	<i>Momordica balsamina</i> L.	---	Cacurbitaceae	Climber	Rare
21	<i>Psammogeton diffusus</i> (Roxb. ex Sm.) Rech.f. ex Pimenov	-	Apiaceae	Herb	Rare
22	<i>Soyimida febrifuga</i> (Roxb.) A. Juss.	Royan	Meliaceae	Tree	Rare
23	<i>Sterculia urens</i> Roxb.	Kulu	Malvaceae	Tree	Rare
24	<i>Tectona grandis</i> L.f.	Sagwan	Lamiaceae	Tree	Threatened
25	<i>Terminalia coronata</i> (Stapf) Gere & Boatwr.	Adrukh, Indok	Combretaceae	Tree	Threatened

4.2. Vegetation type mapping

The vegetation types and land cover of Bassi WLS have been categorized into eleven classes. The total area of the sanctuary is 138.69 km², with dense dry deciduous forest contributing 35.4% by occupying 49.47 km², followed by open dry deciduous forest (39.82 km²), Savanna (19.54 km²), Thorn scrub (8.73 km²), Riverine Forest (3.50 km²), and Agricultural lands (8.21 km²), which are the major classes and areas in land cover classes (Table 5 and Fig. 7).

The classified output was carefully cross verified with the field data and high-resolution imagery of Google Earth. This comprehensive approach, incorporating multiple data sources and verification techniques, enhances the robustness and validity of the vegetation type mapping in Bassi Wildlife

Sanctuary. The overall classification accuracy achieved was 90.55%. The kappa statistic was 0.88.

Table 5. Extent of different Vegetation type and Land Cover types in Bassi WLS

Sl. No.	Vegetation and land cover classes	Area in km ²	Area in %
1	Dense dry deciduous forest	49.47	35.4
2	Open dry deciduous forest	39.82	28.5
3	Riverine forest	3.5	2.5
4	Savanna	19.54	14
5	Thorn scrub	8.73	6.2
6	Grasslands	0.91	0.7
7	Plantations/orchards/ToF	1.71	1.2
8	Agricultural lands	7.21	5.9
9	Waterbody	2.54	1.8
10	Barrenlands	4.94	3.5
11	Built-up	0.32	0.2
	Total	138.69	100

Vegetation types of Bassi WLS

Dry Deciduous Forest: This vegetation type, equivalent to northern dry mixed deciduous forests, is characterised by dominant species such as *Terminalia pendula* (Dhauk), *Diospyros melanoxylon*, *Senegalia catechu*, *Lannea coromandelica*, *Terminalia anogeissiana*, *Flacourtia indica*, *Butea monosperma*, *Vachellia leucophloea*, *Aegle marmelos*, and *Mitragyna parvifolia*. This forest variety is a significant component of the sanctuary's natural vegetation, occupying an area of 89.29 km² (64.38 % of the total land area).

Riverine Forest: These forests, which are classified as dry tropical riverain forests, are located along rivers and streams with a consistent water flow compared to their surroundings. *Mitragyna parvifolia*, *Terminalia arjuna*, *Syzygium cumini*, *Mangifera indica*, and *Ficus racemosa* are some of the species that are commonly found in these forests. During dry seasons, these regions appear as contrastingly dark tones on satellite images.

Scrub: Scrub vegetation consists largely of shrubs and small or stunted trees, with crown densities of less than 10%. Commonly found at the

edges of forests, on hilltops, and near human settlements is thorn scrub encompassing an area of 8.73 km².

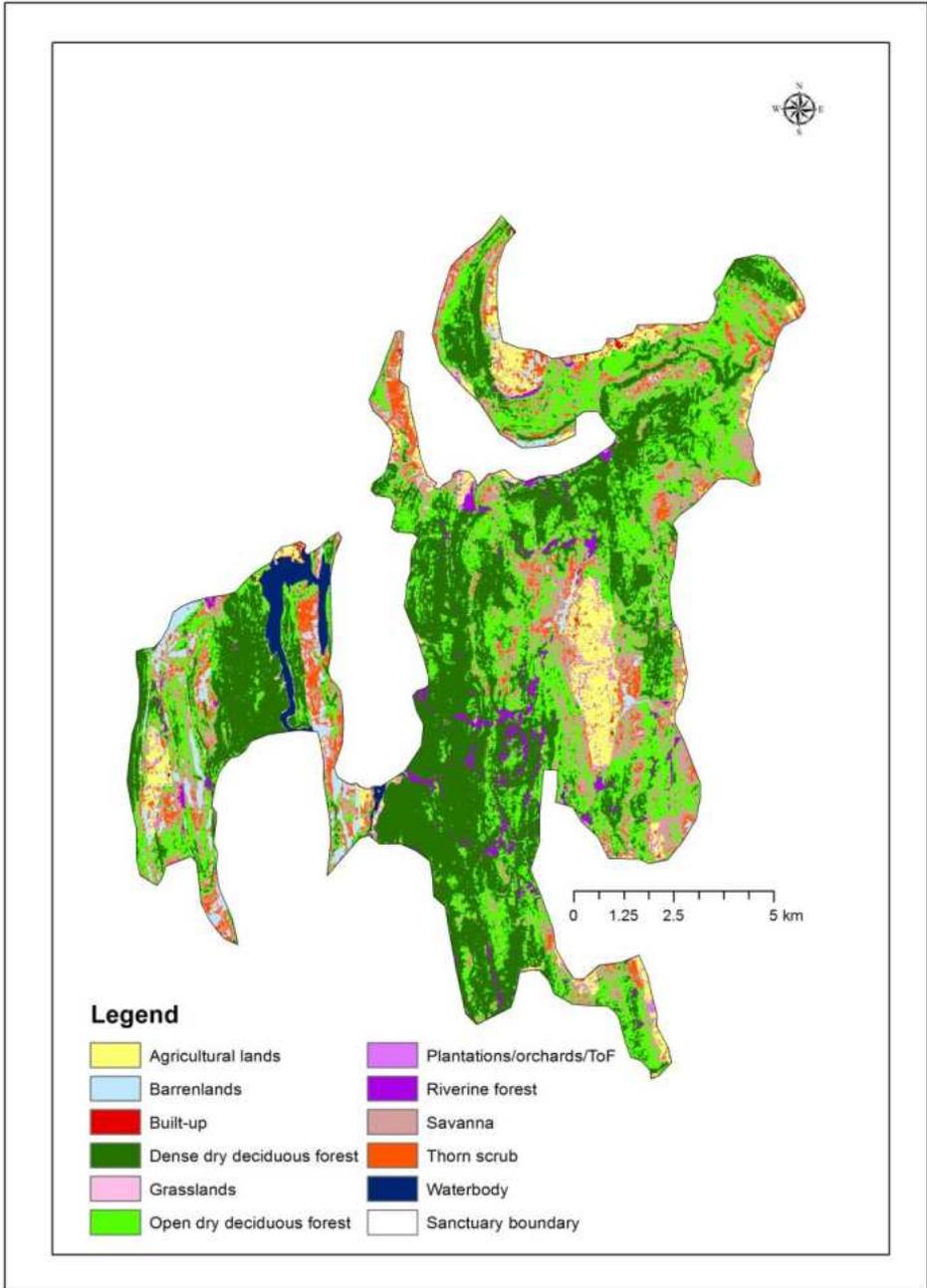


Fig. 7. Vegetation type and land cover map of Bassi Wildlife Sanctuary

Savannah: Formerly categorized as dry savannah forest, this vegetation type degrades due to factors such as fire, grazing, and edaphic conditions, transforming into woodland. *Senegalia catechu* and *Vachellia leucophloea* are prevalent tree species found in the savannah.

Grasslands: The sanctuary is dominated by grasslands, with grass species such as *Heteropogon contortus*, *Aristida* spp. (including *Aristida hystrix*, *Aristida adscensionis*, and *Aristida funiculata*), and *Dichanthium pertusum*. *Chrysopogon fulvus* is a widespread grass found in the sanctuary's grasslands and savannahs.

Other non-vegetation classes mapped include orchards, which consist of fruit trees, agricultural lands, water bodies, barren lands, and built-up areas (settlements). The identification of these classes was based on their distinct characteristics and ease of interpretation during the mapping procedure. For effective conservation and management strategies within Bassi WLS, it is essential to have a thorough understanding of the vegetation types and fragmentation distribution patterns. Overall, the mapping results revealed the distribution and composition of vegetation types and land cover classes across the Bassi WLS, which is essential information for the development of effective management and conservation strategies within the sanctuary.

4.3. Fragmentation analysis

The mapped forest area in the Bassi WLS was 92.79 km², of which 31.3% was classified as large core (Core 3) and 68.9% as other fragmentation (Figs. 8 & 9). The calculated percentage of edge forest area was 23.30 percent. The patch forest accounts for 2.7% of the total forest cover. The vast majority of the area, 35.14 km², falls under the perforated class of fragmentation (37.9%; Table 6). Perforated areas are considered a threat to the conservation of species. If no measures are taken to mitigate forest fragmentation, it will persist and negatively impact the forest ecosystem in subsequent years.

Table 6. Forest fragmentation analysis

Class	Area in km ²	Area in %
Patch	2.47	2.7
Edge	21.35	23.0
Perforated	35.14	37.9
Core 1	3.62	3.9
Core 2	1.19	1.3
Core 3	29.02	31.3
Total	92.79	100

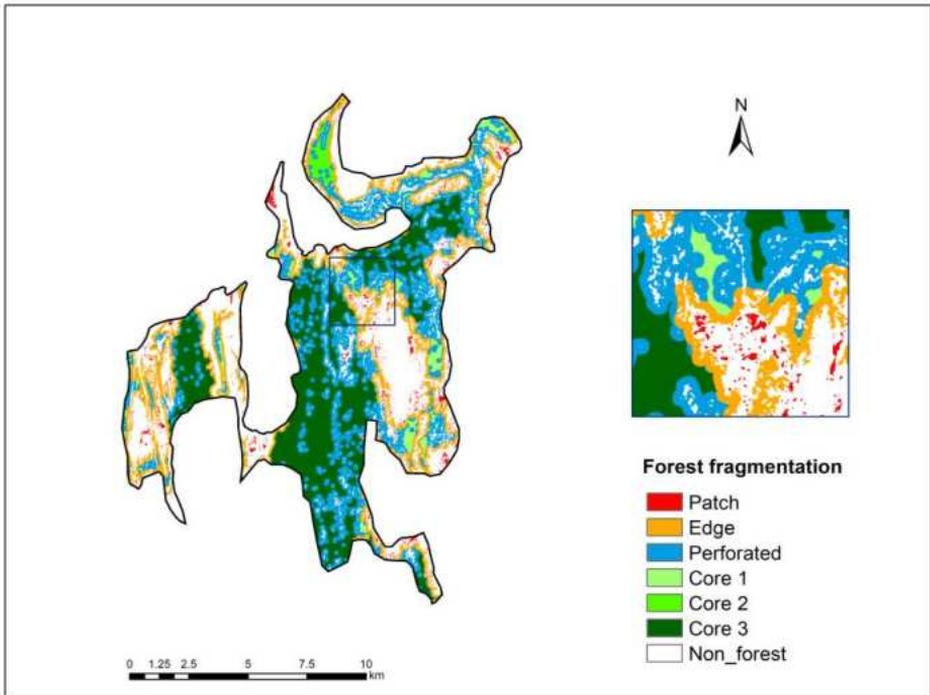


Fig. 8. Forest fragmentation map of Bassi WLS.

Overall, the results indicate that 68.7% of the forest cover in Bassi WLS falls into various fragmentation categories, indicating that a substantial portion of the forest area is fragmented. This highlights the significance of addressing fragmentation as a potential forest ecosystem threat. The presence of a significant perforated area highlights the need for targeted conservation efforts to mitigate the effects of fragmentation on species and preserve the integrity of the forest ecosystem. The forest ecosystem may suffer long-term consequences if fragmentation is not addressed.

Existing fragmentation is likely to persist and continue to negatively impact the forest ecosystem in the coming years if effective mitigation measures are not implemented. To assure the preservation of species in the sanctuary, it is vital to address the issue of forest fragmentation. Future protection of the integrity and functionality of the forest system will depend on the implementation of measures to mitigate and reduce fragmentation. Forest fragmentation results indicated that 68.7% of the area is fragmented, with 37.9% of the area being perforated, followed by 23.0% of the edge, indicating that biological conservation is at risk in the perforated and edge areas of the sanctuary. These findings raise conservation concerns for biodiversity within the sanctuary.

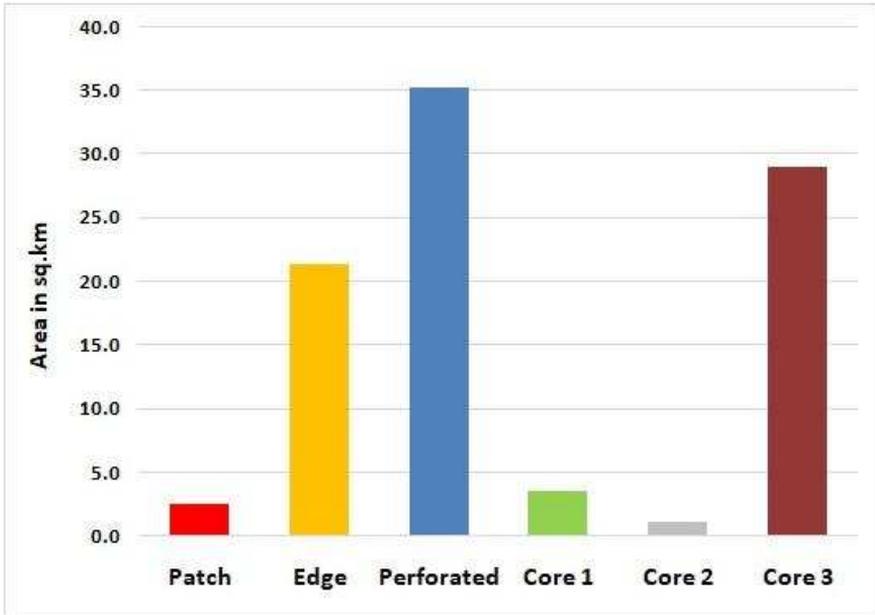


Fig. 9. Forest fragmentation status in Bassi Wild Life Sanctuary

4.4 Phytosociological data analysis

Importance Value Index (IVI):

Trees having a GBH of more than 30 cm were only considered for IVI calculation. *Terminalia pendula* (Dhok) is the dominant species with IVI of 135.33, followed by *Diospyros melanoxylon* (130.38), *Senegalia catechu* (84.43), *Lannea coromandelica* (76.23), *Terminalia anogeissiana* (70.37), *Flacourtia indica* (68.77), *Butea monosperma* (63.72), *Vachellia leucophloea* (56.45) and *Aegle marmelos* (37.13) (Table 7). The top dominant shrub species in dry deciduous forest species are *Ziziphus nummularia* (50.33), followed by *Carissa spinarum* (44.07), *Barleria prionitis* (34.55), *Grewia flavescens* (32.99), *Lantana camara* (30.61), *Vitex negundo* (24.41) and *Calotropis procera* (11.04). We found 161 herb species in the inventory. The top dominant herb species are *Senna tora* (85.68), *Elytraria acaulis* (79.09), *Justicia simplex* (66.92), *Evolvulus alsinoides* (62.55), *Chamaecrista pumila* (58.09), *Aristida funiculata* (51.64), *Peristrophe bicalyculata* (50.10) and *Sida cordata* (40.20). Top ten dominant species with their IVI in each vegetation type is given in Table 3. Some species were represented by single individuals and are considered as rare in the area. Shannon-Weiner diversity index of diversity of tree species was found to be 3.45.

Species area curve for vegetation types is presented in Fig. 10. A total of 221 plant species representing 51 families and 155 genera were recorded in the inventory of Bassi Wildlife Sanctuary. Among them, herbs formed the most species-rich life form with 150 species (67.9%), trees represented nearly a quarter of the total species (46 tree species; 21.3%), and 20 shrub species accounted for 9.0% of the total species.

Stand Density, Basal Area and Girth Class distribution

A total of 3411 trees were enumerated from the study sites of Bassi Wildlife Sanctuary and the total basal area (BA) was found to be 32.44 m². The stand density was calculated as 170 stems/ ha. The stand density and basal area showed a decreasing trend with increasing girth class in Bassi WLS (Table 8). The highest stem density of 906.5 stems/ ha and basal area of 190.28 sq. m/ ha was recorded for the lowest girth class of 30-60 cm GBH. The lowest stem density of 212 stems/ ha and basal area of 282.63 sq. m/ ha was calculated for trees of the highest girth class (> 90 cm).

Table 7. Top ten dominant species in each vegetation type in Bassi WLS.

Dry deciduous forest		<i>Anogeissus pendula</i> forest	
Species	IVI	Species	IVI
<i>Terminalia pendula</i> (Edgew.) Gere & Boatwr.	135.33	<i>Terminalia pendula</i> (Edgew.) Gere & Boatwr.	231.20
<i>Diospyros melanoxylon</i> Roxb.	130.38	<i>Lannea coromandelica</i> (Houtt.) Merr.	111.27
<i>Senegalia catechu</i> (L.f.) P.J.H.Hurter & Mabb.	84.43	<i>Diospyros melanoxylon</i> Roxb.	110.48
<i>Lannea coromandelica</i> (Houtt.) Merr.	76.23	<i>Senegalia catechu</i> (L.f.) P.J.H.Hurter & Mabb.	77.25
<i>Terminalia anogeissiana</i> Gere & Boatwr.	70.37	<i>Bauhinia racemosa</i> Lam.	70.97
<i>Flacourtia indica</i> (Burm.f.) Merr.	68.77	<i>Vachellia leucophloea</i> (Roxb.) Willd.	70.13
<i>Butea monosperma</i> (Lam.) Kuntze	63.72	<i>Ziziphus mauritiana</i> Lam.	44.14
<i>Vachellia leucophloea</i> (Roxb.) Willd.	56.45	<i>Holoptelea integrifolia</i> Planch.	38.69
<i>Aegle marmelos</i> (L.) Corr.	37.13	<i>Flacourtia indica</i> (Burm.f.) Merr.	38.56
<i>Mitragyna parvifolia</i> (Roxb.) Korth.	32.99	<i>Wrightia tinctoria</i> R.Br.	38.02

Floristic Diversity in Bassi Wildlife Sanctuary, Rajasthan

Riverine forest type		Tree Savannah	
Species	IVI	Species	IVI
<i>Mitragyna parvifolia</i> (Roxb.) Korth.	114.70	<i>Senegalia catechu</i> (L.f.) P.J.H.Hurter & Mabb.	163.26
<i>Aegle marmelos</i> (L.) Corr.	111.46	<i>Vachellia leucophloea</i> (Roxb.) Willd.	153.46
<i>Terminalia anogeissiana</i> Gere & Boatwr.	104.81	<i>Anogeissus pendula</i> Edgew.	113.48
<i>Terminalia pendula</i> (Edgew.) Gere & Boatwr.	94.57	<i>Diospyros melanoxylon</i> Roxb.	72.28
<i>Terminalia bellirica</i> (Gaertn.) Roxb.	75.03	<i>Flacourtia indica</i> (Burm.f.) Merr.	51.66
<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	72.32	<i>Lannea coromandelica</i> (Houtt.) Merr.	45.78
<i>Mangifera indica</i> L.	72.04	<i>Ziziphus mauritiana</i> Lam.	41.99
<i>Terminalia elliptica</i> Willd.	69.55	<i>Wrightia tinctoria</i> R.Br.	38.66
<i>Senegalia catechu</i> (L.f.) P.J.H.Hurter & Mabb.	64.86	<i>Ziziphus xylopyrus</i> (Retz.) Willd.	37.72
<i>Syzygium cumini</i> (L.) Skeels	58.09	<i>Bauhinia racemosa</i> Lam.	37.52
Scrub		Grasslands	
Species	IVI	Species	IVI
<i>Ziziphus nummularia</i> (Burm. f.) Wight & Arn.	50.33	<i>Aristida funiculata</i> Trin. & Rupr.	94.95
<i>Carissa spinarum</i> L.	44.07	<i>Oropetium thomaeum</i> (L.f.) Trin.	74.92
<i>Grewia flavescens</i> Juss.	38.81	<i>Chrysopogon fulvus</i> (Spreng.) Chiov.	74.92
<i>Barleria prionitis</i> L.	34.55	<i>Apluda mutica</i> L.	73.74
<i>Lantana camara</i> L.	32.99	<i>Melanocenchris jacquemontii</i> Jaub. & Spach	73.74
<i>Vitex negundo</i> L.	30.61	<i>Chloris virgata</i> Sw.	72.56
<i>Abutilon indicum</i> (L.) Sweet	24.42	<i>Digitaria bicornis</i> (Lam.) Roem. & Schult.	72.56
<i>Capparis sepiaria</i> L.	24.42	<i>Eragrostis ciliaris</i> (L.) R.Br.	71.38
<i>Flacourtia indica</i> (Burm.f.) Merr.	11.04	<i>Chamaecrista pumila</i> (Lam.) K. Larsen	70.20
<i>Grewia tenax</i> (Frosk.) Fiori.	10.24	<i>Oplismenus burmannii</i> (Retz.) Beauv.	53.67

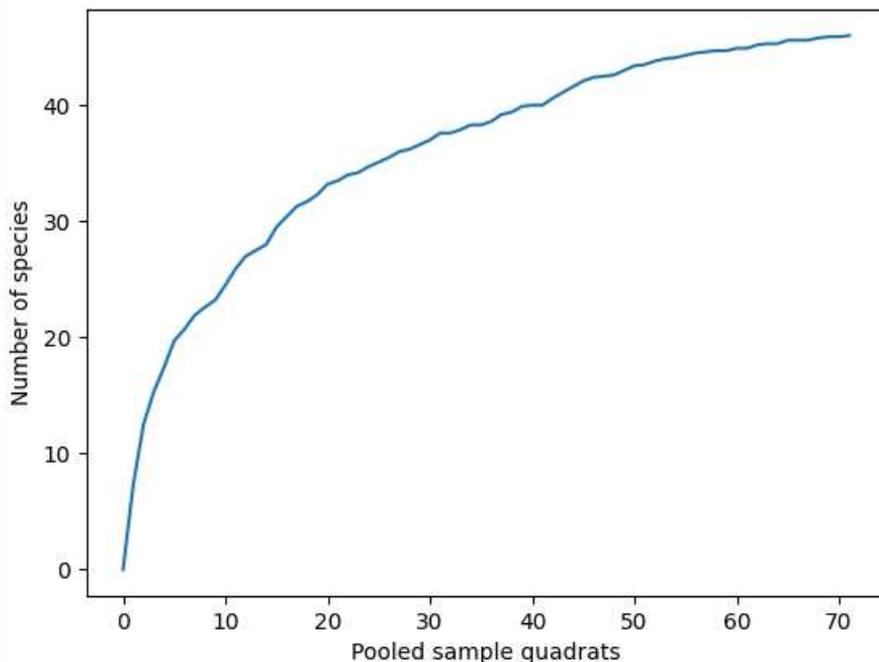


Fig. 10. Species area curve

Table 8: Girth class distribution according to density and basal area of tree species enumerated from Wildlife Sanctuary

Girth Class	Density (Stems ha ⁻¹)	Basal Area (m ² ha ⁻¹)
< 60 cm	906.5	190.28
61- 90 cm	399.0	170.42
> 90 cm	212.0	282.63

The density, abundance and distribution of individual species are measurable indicators of plant diversity (Wattenberg & Breckle, 1995). The species richness of 46 tree species over 39.50 ha sampled area in forest areas of Bassi WLS reflects a moderate level of diversity. The result of the study compared well with other large-scale inventories conducted in tropical forests both in India and elsewhere. For example, 63 species were recorded for 50 ha plot at Mudumalai Forest Reserve, India, to 272 species in the 60 ha area in southern Eastern Ghats (Pragasam & Parthasarathy, 2010).

4.5. Disturbances in the Bassi WLS

Biotic and Abiotic Pressure:

The loss of biodiversity in Bassi Wildlife Sanctuary is mainly due to its inherent eco-cycle and a number of endogenous and exogenous processes, which accelerate the erosion resulting in habitat destruction and depletion of valuable germplasm. Anthropogenic pressure is mainly responsible disturbance factor viz., grazing, illicit felling and firewood collection, etc. The villagers depend largely on the forests for meeting their requirements of wood for the house construction, agricultural implements, firewood, fencing materials etc. They obtain the requisite wood generally from the adjoining forests legally or illegally. Grazers also do considerable damage by way of lopping fodder trees and bamboos and felling young saplings to feed the cattle, Healthy valuable trees are usually girdled and felled by the villagers for encroachment. Bassi WLS is closely surrounded by about 30 villages. Some are in close proximity to the boundary of WLS, while others are little away. Some villages exist within the Sanctuary. The human population residing in and around the Sanctuary is dependent on forests for timber, fuel-wood and minor forest products like grass, gum and resin, fruits and even leaves of tendu to make Bidis.

Natural Hazards:

A list of 25 invasive alien species was recorded in the sanctuary (Table 9). At present these are spreading all over the Sanctuary area. *Senna tora* infestation is along the road sides and open forest areas. *Lantana camara* and *Mesosphaerum suaveolens* infestation is more in open forest areas and near marshy areas. All the Invasive alien species are to be controlled it from the forests are very essential for conserving native flora. The species that have already had a substantial impact on natural ecosystems of Bassi WLS and referred as major invaders. The list contains those species that currently have a lower impact on natural ecosystems are referred as minor invaders. The invasive species information generated from inventory work will be useful in invasive species management planning.

Table 9. List of Invasive alien species in Bassi WLS, Rajasthan

Sl. No.	Species	Family	Habit	Nativity	Status
1	<i>Acanthospermum hispidum</i> DC.	Asteraceae	Herb	Brazil	Major invader
2	<i>Bidens pilosa</i> L.	Asteraceae	Herb	Trop. America	Major invader
3	<i>Blainvillea acmella</i> (L.) Philipson	Asteraceae	Herb	Trop. America	Major invader

Botanical Survey of India

Sl. No.	Species	Family	Habit	Nativity	Status
4	<i>Blumea lacera</i> (Burm.f.) DC.	Asteraceae	Herb	Trop. America	Minor invader
5	<i>Calotropis procera</i> (Ait.) R.Br.	Apocynaceae	Shrub	Trop. Africa	Minor invader
6	<i>Catharanthus pusillus</i> (Murray) Don	Apocynaceae	Herb	Trop. America	Minor invader
7	<i>Dicliptera paniculata</i> (Forssk.) I.Darbysh.	Acanthaceae	Herb	Trop. America	Major invader
8	<i>Euphorbia heterophylla</i> L.	Convolvulaceae	Herb	Trop. America	Major invader
9	<i>Indigofera linifolia</i> (L.f.) Retz.	Fabaceae	Herb	Trop. South America	Major invader
10	<i>Ipomoea pes-tigridis</i> L.	Convolvulaceae	Herb	Trop. East Africa	Major invader
11	<i>Lantana camara</i> L.	Verbenaceae	Herb	Trop. America	Major invader
12	<i>Malvastrum coromandelianum</i> (L.) Garcke	Malvaceae	Herb	Trop. America	Minor invader
13	<i>Merremia aegyptia</i> (L.) Urban.	Convolvulaceae	Herb	Trop. America	Minor invader
14	<i>Mesosphaerum suaveolens</i> (L.) Kuntze	Lamiaceae	Herb	Trop. America	Major invader
15	<i>Neltuma juliflora</i> (Sw.) Raf.	Mimosaceae	Shrub	Mexico	Major invader
16	<i>Parthenium hysterophorus</i> L.	Asteraceae	Herb	Trop. North America	Major invader
17	<i>Physalis angulata</i> L.	Solanaceae	Herb	Trop. America	Minor invader
18	<i>Ruellia tuberosa</i> L.	Acanthaceae	Herb	Trop. America	Major invader
19	<i>Saccharum spontaneum</i> L.	Poaceae	Herb	Trop. West Asia	Major invader
20	<i>Senna tora</i> L.	Caesalpiaceae	Herb	Trop. South America	Major invader
21	<i>Tribulus terrestris</i> L.	Zygophyllaceae	Herb	Trop. America	Minor invader
22	<i>Tridax procumbens</i> L.	Asteraceae	Herb	Trop. Central America	Major invader
23	<i>Triumfetta rhomboidea</i> Jacq.	Malvaceae	Herb	Trop. America	Major invader
24	<i>Waltheria indica</i> L.	Malvaceae	Herb	Trop. America	Minor invader
25	<i>Xanthium strumarium</i> L.	Asteraceae	Herb	Trop. America	Major invader

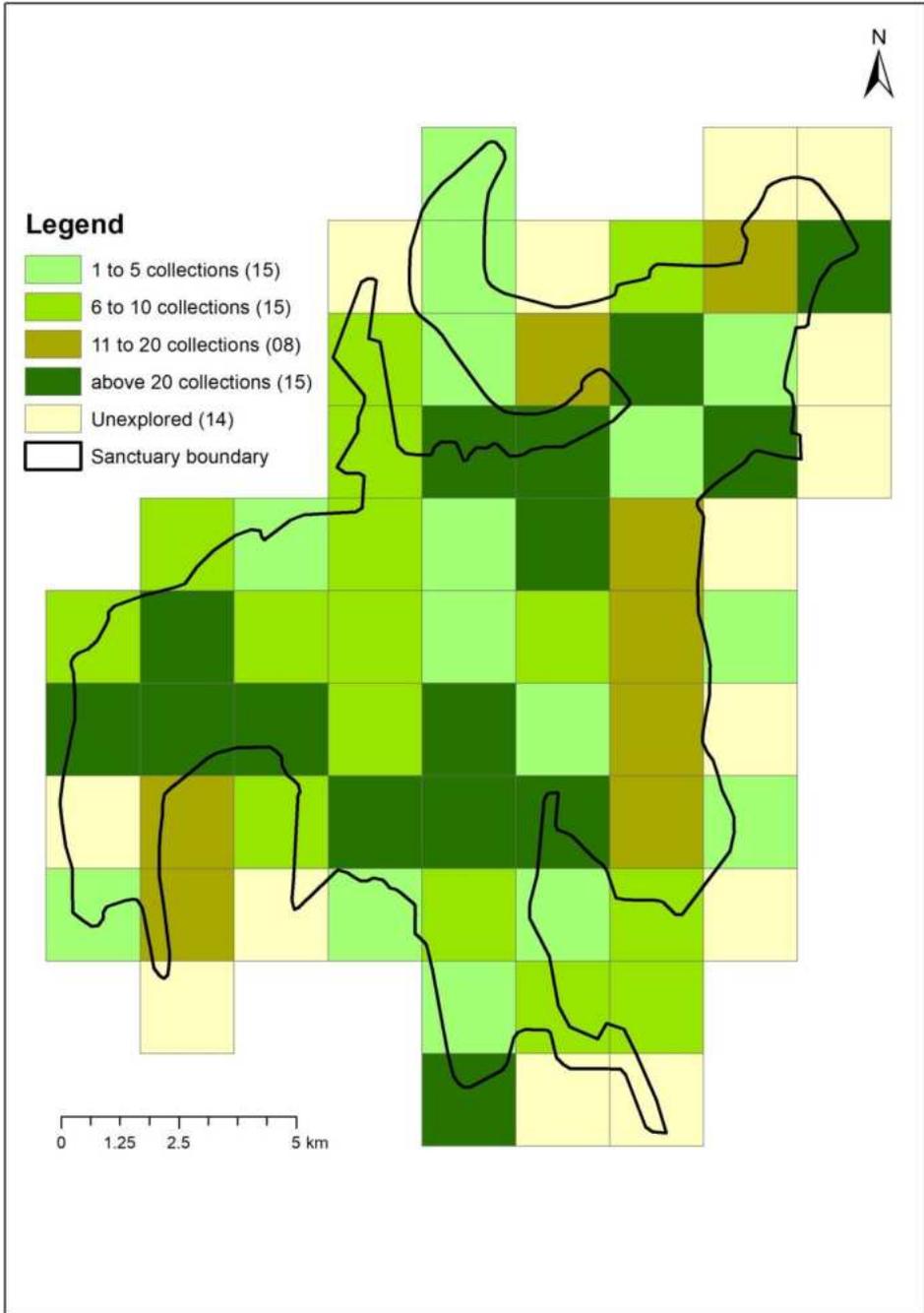


Fig. 11. Spatial grid wise plants collection representation of floristic survey of Bassi WLS, Rajasthan

DISCUSSIONS

The present study provides a comprehensive account of the floristic diversity within Bassi Wildlife Sanctuary, Rajasthan. It has catalogued a total of 468 taxa, spanning 322 genera distributed across 85 families, by the meticulous survey method, organized in a 2x2 km grid, underscores the breadth of its coverage. Notably, despite the sanctuary's considerable geographic expanse, a substantial number of species were identified.

The study, conducted through a meticulous survey of the floristic exploration areas organized in a 2 x 2 km grid, provides valuable insights into the sanctuary's ecological dynamics. The research revealed that the majority of the sanctuary's territory has been meticulously explored, with only a few isolated grids situated in peripheral or small sections of the sanctuary remaining unexplored. This exploratory endeavour covered a total of 67 grids, with varying levels of botanical collections. Specifically, 15 grids exhibited an impressive number of over 20 field numbers collected, while 8 grids presented 11 to 20 field numbers, and another 15 grids featured 6 to 10 field numbers. Regrettably, a total of 14 grids remain unexplored (Fig. 11). Through this survey, the majority of the sanctuary's territory was meticulously explored, with only a few isolated grids remaining unexplored. The spatial distribution of species, particularly those rare and threatened, was elucidated, providing critical data for conservation efforts. The study's findings on species diversity, as measured by Shannon's Index, align with established ranges for Indian forests, affirming the sanctuary's ecological significance.

Furthermore, the assessment of vegetation types and land cover revealed eleven distinct classes, dominated by dry deciduous forest. However, forest fragmentation emerged as a significant threat, with a substantial portion of the sanctuary's land already fragmented. This poses grave concerns for habitat quality and ecosystem stability.

The application of remote sensing and Geographic Information Systems (GIS) has provided a comprehensive understanding of the Bassi Wildlife Sanctuary, shedding light on its rich biodiversity and the challenges it faces, particularly in the context of forest fragmentation. The study emphasises the need for mitigation measures to address forest fragmentation within Bassi WLS. Key strategies include identifying and prioritizing areas for conservation, restoring and enhancing fragmented habitats, reducing habitat loss and fragmentation, managing edge effects, and actively engaging and educating stakeholders. These measures are essential for safeguarding the sanctuary's unique and valuable forest ecosystem.

In conclusion, the study not only provides a detailed snapshot of the sanctuary's flora and ecological landscape but also highlights the critical challenge of forest fragmentation. It emphasises the importance of mitigating this fragmentation through strategic interventions and measures to ensure the long-term preservation of the sanctuary's diverse and vital ecosystems. Moreover, the enumeration of flora serves as a valuable resource for various stakeholders, including students, researchers, and conservationists. Recommendations for conservation measures are outlined, emphasizing the importance of habitat protection, restoration, and stakeholder engagement. By implementing these measures, Bassi Wildlife Sanctuary can continue to thrive as a vital ecosystem, contributing to the broader conservation goals of the region.

Suggestions and Recommendations for Conservation Measures:

The study proposes several key recommendations for the conservation of Bassi Wildlife Sanctuary's phytodiversity:

- i. Removal of invasive alien plants to mitigate their impact on native species.
- ii. Restoration of degraded forest areas through afforestation programs.
- iii. Protection of species diversity areas and threatened plant species.
- iv. Multiplication and reintroduction of rare and threatened plants through forest nurseries.
- v. Implementation of education and awareness programs for nature conservation.
- vi. Control of biotic interference, particularly near settlement areas, through permanent boundary walls.
- vii. Establishment of permanent forest plots for ongoing monitoring and study of flora regeneration.

These measures, if effectively implemented, can contribute to the long-term conservation and sustainable management of Bassi Wildlife Sanctuary's rich biodiversity.

SYSTEMATIC ENUMERATION

Artificial key to the families

- 1a. Plants either terrestrial or aquatic, flowers usually in clusters or in specific inflorescences, rarely solitary, placentation other than laminar..... **2**
- b. Plants aquatic, flowers large, solitary more than 9 cm in diameter, ovary polycarpellary with laminar placentation..... **Nymphaeaceae**
- 2a. Leaves usually with parallel venation; cotyledon 1; flowers usually 3-merous; vascular bundles in stem scattered and closed..... **5**
- b. Leaves usually with reticulate venation; cotyledons 2; flowers 4 or 5- and rarely 3-merous; vascular bundles of the stem arranged in ring. .. **3**
- 3a. Plants always terrestrial; leaves always simple large, net veined; flowers with parts in multiples of three (petals, sepals, stamens) **4**
- b. plants aquatic or terrestrial; leaves either large, scaly or filiform, net veined or reticulate, simple or compound; flowers with parts in multiples of four or five **18**
- 4a. Calyx modified into utricle structure, plants herbaceous**Aristolochiaceae**
- b. Calyx not as above, plants woody tree.....**Annonaceae**
- 5a. Flowers in spikelets with bristly or scaly perianth; ovary 1-celled **6**
- b. Flowers not in spikelets; ovary 1-many-celled..... **7**
- 6a. Clums with nodes and internodes; leaves with open sheaths; florets usually subtended by lemma and palea; fruit a caryopsis.....**Poaceae**
- b. Clums without nodes and internodes; leaves with open sheaths; florets not subtended by lemma and palea fruit an achene..... **Cyperaceae**
- 7a. Plants aquatic, marshy or riparian..... **8**
- b. Plants terrestrial or epiphytic..... **13**
- 8a. Plants submerged aquatics (with submerged flowers).....**Potamogetonaceae**
- b. Plants submerged or not; if submerged, flowers always at or above the water surface **9**
- 9a. Flowers unisexual, in involucrate capitula; perianth scarious or membranous **Eriocaulaceae**

b. Flowers uni-or bisexual, not in involucrate capitula	10
10a. Flowers in 2 cylindrical superimposed brownish spikes	
..... Aponogetonaceae	
b. Flowers otherwise	11
11a. Ovary inferior.....	Hydrocharitaceae
b. Ovary superior	12
12a. Leaves radical, floating or submerged.....	Pontederiaceae
b. Leaves cauline, neither floating nor submerged.....	Commelinaceae
13a. Leaves compound; flowers enclosed in spathe-like bracts ...	Arecaceae
b. Leaves simple, if compound then flowers not enclosed in spathe-like bracts.....	14
14a. Ovary superior	15
b. Ovary inferior	17
15a. Plants cormatous	Colchicaceae
b. Plants not cormatous	16
16a. Tubers fasciculate and branched, flowers white.....	Asparagaceae
b. Tubers not as above, flowers yellow	Hyoxidaceae
17a. Plants with bulbs	Amaryllidaceae
b. Plants without bulbs	Dioscoreacea
18a. Plants terrestrial, simple leaves or lobed leaves, flowers are usually bisexual. If aquatic, stamens with hook-like appendage, leaves not scaly; pollens usually tricolpate.....	19
b. Plants terrestrial or aquatic, leaves simple or compound, flowers might be bisexual or unisexual. If aquatic, stamens without hook-like part, leaves lobed or scaly; pollens other than tricolpate.....	21
19a. Stamens 10 or fewer.....	Menispermaceae
b. Stamens more than 15; rarely 11-12	20
20a. Plants aquatic with floating leaves.....	Nelumbonaceae
b. Plants terrestrial	Papaveraceae
21a. Plants usually autotrophic; flowers polypetalous or apetalous (except Cucurbitaceae); flowers usually actinomorphic (except Cleomaceae, Fabaceae, Malvaceae and Violaceae); plants usually monoecious, if dioecious plants with lobed leaves and milky latex	22

- b. Plants autotrophic, heterotrophic or insectivores; flowers either Polypetalous, gamopetalous or apetalous; flowers actinomorphic sometime zygomorphic if perianth fused; plants monoecious if dioecious petals fused and plants without milky latex 53
- 22a. Fruits pod or lomentum **Fabaceae**
 - b. Fruits neither pod nor lomentum 23
- 23a. Perianth is differentiated into distinct calyx and corolla 24
 - b. Perianth not distinguished into separate calyx and corolla 49
- 24a. Ovary fully inferior or semi-inferior 25
 - b. Ovary is superior 31
- 25a. Petals are in more than three whorls, and stamens are numerous **Rosaceae**
 - b. Petals are in less than three whorls, and stamens are 5 to 50 26
- 26a. Plants are trees with gland-dotted leaves, and stamens are twice as long as petal lobes **Myrtaceae**
 - b. Plants are herbs, shrubs, or trees with non-glandular leaves, and stamens are equal to or shorter than petal lobes27
- 27a. Flowers are unisexual, leaves have various lobes.....**Cucurbitaceae**
 - b. Flowers bisexual, leaves lobed or unlobed 28
- 28a. Plants are marshy herbs 29
 - b. Plants are not marshy and terrestrial 30
- 29a. Fruits are elongated and cylindrical**Onagraceae**
 - b. Fruits are not elongated, but depressed or globose **Lythraceae**
- 30a. Plants are large shrubs or trees with flowers in spikes... **Combretaceae**
 - b. Plants are herbs, shrubs, or trees with flowers not in spikes.. **Lythraceae**
- 31a. Corolla is zygomorphic (irregularly shaped) 32
 - b. Corolla is actinomorphic (radially symmetrical) 34
- 32a. Fruit is a twisted follicle **Malvaceae**
 - b. Fruit is not a twisted follicle 33
- 33a. Fruit is two-loculated **Polygalaceae**
 - b. Fruit is three-loculated or has more than three locules..... **Violaceae**

- 34a. Flowers with hypogynous disc (a fleshy structure below the ovary)35
 b. Flowers do not have a hypogynous disc 46
- 35a. Petals are caducous (falling off soon after opening), fruits are single-seeded berries, and plants are usually tendrilled **Vitaceae**
 b. Petals not as above, fruits one to many seeded, plants rarely tendrillar 36
- 36a. Stamens more than 15 **Rutaceae**
 b. Stamens less than 15 37
- 37a. Flowers unisexual or polygamous 38
 b. Flowers bisexual 40
- 38a. Carpels separating in fruiting **Simaroubaceae**
 b. Carpels remain united throughout 39
- 39a. Ovary unilocular **Anacardiaceae**
 b. Ovary is two- or three-locular..... **Sapindaceae**
- 40a. Leaves digitately lobed, plants herbs **Oxalidaceae**
 b. Leaves pinnate or simple, or if digitate plants not herbs 41
- 41a. Sepals in bud: valvate or imbricate in trees with pinnately compound leaves 42
 b. Sepals in bud: imbricate 45
- 42a. Stamens 5 usually opposite to petals **Rhamnaceae**
 b. Stamens 10, or if 5 not opposite to petals 43
- 43a. Leaves gland dotted, winged seeds, or small single-seeded fruits with pinnate leaves **Meliaceae**
 b. No glands on leaves, seeds not winged 44
- 44a. Simple leaves with crenate margin, fruit dehiscent **Celastraceae**
 b. Compound leaves, fruit indehiscent **Burseraceae**
- 45a. Leaves not gland dotted **Zygophyllaceae**
 b. Leaves gland dotted **Rutaceae**
- 46a. Plants with tiny flowers, plants always marshy, herbs **Elatinaceae**
 b. Flowers conspicuous, plants usually terrestrial rarely aquatic 47
- 47a. Stamens as long as or shorter than petal lobes, fruit indehiscent **Malvaceae**

- b. Stamens much longer than petals if shorter fruit dehiscent 48
- 48a. Shrubs or trees fruit pulpy, many seeded, or seeds enclosed in red aril **Capparaceae**
- b. Herbs or undershrubs, fruit dry dehiscent; seeds not as above **Cleomaceae**
- 49a. Plants usually dioecious **Salicaceae**
- b. Plants monoecious 50
- 50a. Fruit winged fruit (papery-samara) **Ulmaceae**
- b. Fruit not a winged fruit 51
- 51a. Trees with milky sap, style with 1-2 branches, ovary with 1-3 chambers, seeds not attached to central column **Moraceae**
- b. Herbs, shrubs, or trees with or without milky latex, style usually 3-fid, ovary usually tricarpellary, placentation axile 52
- 52a. Flowers in clusters in terminal or axillary, usually cyathium, catkin, seeds with a fleshy appendage (carunculate), plants with milky or watery sap, ovary with one ovule **Euphorbiaceae**
- b. Flowers single or clustered in leaf axils, seeds without an appendage, flowers always present in axils beneath leaves, plants without milky sap, ovary with two ovules **Phyllanthaceae**
- 53a. Petals or perianth usually free if fused plants either shrubby, woody tree or parasitic never herb; flowers usually actinomorphic, if zygomorphic plants parasitic54
- b. Petals or perianth usually gamopetalous at least from the base or completely fused, if free stamens more than the number of petals; flowers actinomorphic with equal or more number of stamens to the perianth lobes (except Oleaceae) if zygomorphic stamen number is less than the perianth lobes. 63
- 54a. Plants parasitic or insectivores 55
- b. Plants autotrophic 56
- 55a. Stem parasites **Loranthaceae**
- b. Root parasites **Santalaceae**
- 56a. Whole plant succulent, leaves either terete, fleshy or reduced into spines 57
- b. Plants not as above, leaves membranous, filiform or leathery 58

57a. Succulent leafless shrubs, corolla more than 4 cm across, ovary inferior	Cactaceae
b. Plants with well developed leaves, corolla less than 3 cm across, ovary superior or semi-inferior	Portulacaceae
58a. Leaves filiform, whorled on nodes	Caryophyllaceae
b. Leaves not as above	59
59a. Leaves alternate	61
b. Leaves opposite or whorled	60
60a. Plants with ochreate stipules	Polygonaceae
b. Plants without ochreate stipules	Amaranthaceae
61a. Calyx with with stalked glands	Plumbaginaceae
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62a. Fruit anthocarp with single ovule	Nyctaginaceae
b. Fruit not as above, ovules one to many	Molluginaceae
63a. Petals all united, at least at base.....	64
b. Petals free or only some united	85
64a. Stamens more than corolla lobes	65
b. Stamens as many as petals or fewer	66
65a. Corolla urceolate; flowers usually unisexual	Ebenaceae
b. Corolla rotate to campanulate; flowers bisexual	Sapotaceae
66a. Ovary semi-inferior or inferior	67
b. Ovary superior	69
67a. Anthers united around style (syngenesious)	68
b. Anthers free; leaves opposite	Rubiaceae
68a. Flowers in involucrate heads; ovary 1-locular	Asteraceae
b. Flowers not in heads; ovary 2-more-locular	Campanulaceae
69a. Stamens opposite the petals	70
b. Stamens alternate with the petals	71
70a. Ovary 2-many-locular; placentation axile.....	Sapotaceae
b. Ovary 1-locule; placentation free-central	Primulaceae
71a. Corolla irregular; stamens 4 or 2	72

- b. Corolla regular, stamens usually 5 78
- 72a. Fruit elastically dehiscent; seeds often on upcurved processes; inflorescence usually with conspicuous bracts **Acanthaceae**
- b. Not as above 73
- 73a. Ovules and seeds few 74
- b. Ovules and seeds many 76
- 74a. Ovary 4-lobed; style arising from between the lobes of the ovary **Lamiaceae**
- b. Ovules entire; style apical 75
- 75a. Plants viscid-pubescent..... **Pedaliaceae**
- b. Plants not viscid-pubescent **Verbenaceae**
- 76a. Leaves compound; seeds winged **Bignoniaceae**
- b. Leaves simple; seeds not winged 77
- 77a. Placentation free-central; plants aquatic or wet places, typically with small insectivorous bladders **Lentibulariaceae**
- b. Placentation axillary, solid and unbranched **Scrophulariaceae**
- 78a. Leaves opposite 79
- b. Leaves alternate 83
- 79a. Stamens 2, fewer than corolla lobes **Oleaceae**
- b. Stamens 4 or more, as many as the corolla lobes 80
- 80a. Plants always with milky or watery latex, fruits always follicles with comose seeds **Apocynaceae**
- b. Plants without milky latex, fruits not follicle, seeds not comose..... 81
- 81a. Plants hispid; ovary 4-locular..... **Boraginaceae**
- b. Plants herbaceous, ovary 1-locular or ovary 2-locular 82
- 82a. Herbs fruit 2-celled capsule **Loganiaceae**
- b. Herbs, fruit 1-celled capsule **Gentianaceae**
- 83a. Ovules and seeds many 84
- b. Ovules and seeds few **Convolvulaceae**
- 84a. Plants aquatic; placentation parietal **Menyanthaceae**
- b. Plants terrestrial; placentation axile **Solanaceae**
- 85a. Ovary inferior **Apiaceae**
- b. Ovary Superior **Primulaceae**

BASAL ANGIOSPERMS

Order: **Nymphaeales**
NYMPHEACEAE Salisb.
Nymphaea L.
Key to the species

- 1 a. Leaves entire or distinctly toothed, lower surface glabrous.
..... **1. N. nauchali**
- b. Leaves margin sharply dentate-mucronate, lower surface pubescent.
..... **2. N. pubescens**

1. Nymphaea nauchali Burm. f., Fl. Ind. 120. 1768; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 64. 1987. *N. stellata* Willd., Sp. Pl. 2: 1153. 1799; Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 114. 1872. '*Kumudini*'

Perennial aquatic herbs. Leaves long petiolate, floating, elliptic-orbicular, papery, abaxial glabrous, green above, purple beneath, peltate, irregularly sinuate-dentate with broad obtuse teeth. Flowers solitary, emersed, showy, violet, pale blue or white, fragrant. Berry subglobose. Seeds many, ellipsoid-globose, longitudinally striate, greyish-white.

Fl. & Fr.: August- December.

Common, in ponds and tanks.

Specimens examined: Kevdia forest area [24 59 58.2 N, 74 49 57.9 E, 419 m], *P. Hari Krishna & R. Kumar* 35472(BSJO).

2. Nymphaea pubescens Willd., Sp. Pl. 2: 1154. 1799; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 64. 1987. *N. lotus* auct. non L. var. *pubescens* (Willd.) Hook.f. & Thoms., Fl. Ind. 241. 1855. *N. lotus* auct. plur. non L. 1753; Hook.f. & Thoms., in Hook.f., Fl. Brit. India 1: 114. 1872. (Plate-7). '*Kamal*'

Perennial aquatic herbs. Leaves ovate-elliptic to orbicular, sinuately spinous-dentate, crispate along margins, prominently veined beneath, glabrous above, pubescent beneath. Flowers solitary, solitary, up to 15 cm across, red, pale rose or white. Fruits berry, globose, green, fleshy. Seeds ovoid, rough, tuberculate and with transverse striations.

Fl. & Fr.: August - November.

Common in shallow water bodies.

Specimen examined: near Bassi [25 01 47.76 N, 74 47 50.72 E, 405 m], *P. Hari Krishna & R. Kumar* 35422(BSJO).

Uses: Fruits are edible.

MAGNOLIIDS

Order: Piperales

ARISTOLOCHIACEAE Juss.

Aristolochia L.

Aristolochia indica L., Sp. Pl. 2: 960. 1753; Hook.f., Fl. Brit. India 5: 75. 1886; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 756. 1991. *A. lanceolata* Wight, Icon. 5(2): 17.17.t. 1858. 'Hooka bel'

Twinning shrubs up to 3.5 m. Leaves variable, oblong to oblong-obovate, 2 - 5 x 1.5 - 2.5 cm, truncate to subcordate or panduriform, apex obtuse to acuminate. Racemes axillary or terminal, 8-12 flowered. Flowers dark purple. Capsules 3.5 x 2.5 cm. Seeds oblong, obtuse, black, winged.

Fl. & Fr.: August - December.

Rare found in deciduous forests.

Specimens examined: Bichhor forest area [25 03 50.3 N, 74 54 13.2 E, 428 m], *P. Hari Krishna & R. Kumar* 35415(BSJO); Near Bheru ji ka Mandir [25 03 48.90 N, 74 54 09.71 E, 437 m], *P. Hari Krishna & R. Kumar* 35747(BSJO).

ANNONACEAE Juss.

Key to the genera

- 1a. Ripen carpels united **1. Annona**
b. Ripen carpels free..... **2. Miliusia**

1. Annona L.

Annona squamosa L., Sp. Pl. 1: 537. 1753; Hook.f., & Thoms. in Hook.f., Fl. Brit. Ind. 1: 78. 1872; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 58. 1987; B.D. Sharma & al., Fl. India. 1: 207 - 208. 1993. (Plate-6). 'Sitaphal'

Small trees, up to 6 m high. Leaves elliptic-oblong or oblong-lanceolate, entire, cuneate at base, obtuse at the apex, glabrous on both sides. Flowers greenish-white, axillary, solitary or leaf-opposed. Fruits composite, 7-10 cm ovoid-globose, pulp white, edible. Seeds many, smooth, black, shiny, arillate.

Fl. & Fr.: May - January

Common, in scrub forest

Specimen examined: Sarana Talab [25 01 38.94N, 74 48 43.55E, 410 m], *P. Hari Krishna & R. Kumar* 35289(BSJO).

Uses: Fruits are edible.

2. Miliusa Leschen. ex A. DC.

Miliusa tomentosa (Roxb.) Finet & Gagnepain in Bull. Soc. Bot. France 53 (4): 153. 1906; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 59. 1987. *Uvaria tomentosa* Roxb., Pl. Cor. 1: 31. t. 35. 1795 & Fl. Ind. 2: 667. 1832. *Saccopetalum tomentosum* (Roxb.) Hook.f. & Thomson, Fl. Ind. 152. 1855 & in Hook.f., Fl. Brit. India 1: 88. 1872. (Plate-6). 'Umbh, Umbho'

Large trees, bark fissured, blackish-brown. Leaves alternate, ovate-oblong or elliptic, subacute at base, acute at apex, entire. Flowers greenish-yellow, axillary, terminal, solitary or in leaf-opposed or terminal cymes. Bracts several. Sepals lanceolate, tomentose. Fruit a ring of subglobose stalked carpels. Seeds light brown.

Fl. & Fr.: March - July.

Occasional found in forests.

Specimen examined: Semladar [24 57 30.82N, 74 52 07.39E, 542 m], P. Hari Krishna & R. Kumar 35702 (BSJO).

MONOCOTS

Order: Alismatales R.Br. ex Bercht. & J.Presl

HYDROCHARITACEAE Juss.

Key to the genera

- 1a. Plants submerged aquatics (with submerged flowers) **2. Najas**
- b. Plants submerged or not; if submerged, flowers always at or above the water surface..... **2**
- 2a. Plants with well developed branched stem, with cauline leaves **1. Hydrilla**
- b. Plants stemless, with stoloniferous, with radical leaves. **3**
- 3a. Leaves distinctly petioled..... **3.Ottelia**
- b. Leaves without a distinct petiole..... **4. Vallisnaria**

1. Hydrilla L.C. Rich.

Hydrilla verticillata (L. f.) Royle, Ill. Bot. Himal. 376. 1839; Hook.f., Fl. Brit. India 5: 659. 1888; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 816. 1991. *Serpicula verticillata* L. f. Suppl. 416. 1781. *Vallisneria verticillata* (L. f.) Roxb. Fl. Ind. 3: 751. 1832. *Hydrilla polysperma* Blatt. in J. & Proc. Asiat. Soc. Bengal n.s. 26: 356. 1930.

Perennial, submerged, fresh water herbs. Leaves sessile, in whorls of 3-5, 5-7 x 1-3 mm, linear-oblong, serrate-dentate. Male flowers solitary, axillary. Female flowers sessile. Fruits ca 5 mm long. Seeds 2-5, 1.6-2.5 mm long, ovate, truncate at base, on one side, brown.

Fl. & Fr.: August - December.

Occasional in ponds and streams.

Specimens examined: Sarna Talab [24 59 51.46 N, 74 04 8 19.85 E, 486 m], *P. Hari Krishna & R. Kumar* 38303(BSJO); Bassi Dam [24 59 33.01 N, 74 49 29.83 E, 410 m], *P. Hari Krishna & R. Kumar* 38303(BSJO).

2. *Najas* L.

Najas minor All. Auct. Syn. Meth. Strip. Hort. Taurin. 3. 1773 & Fl. Pedem. 2: 221. 1785; Hook.f., Fl. Brit. India 6: 569. 1893; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 880. 1993. *Fluvialis minor* (All.) Pers. Syn. 2: 530. 1807.

Submerged aquatic herbs. Leaves linear, 0.6 - 3 x 0.06-0.08 cm, with spinules on the margins. Spathes necked, ellipsoid, enclosed in male flowers only, ending above the perianth in a short cylindrical neck. Perianth closely investing the anther. Flowers solitary, sessile, perianth lobes obscure. Fruits oblong, trigonous. Achenes brown, ellipsoid.

Fl. & Fr.: August - December.

Occasional in shallow water bodies.

Specimens examined: Crocodile view point-Bassi dam [25 00 35.97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35493 (BSJO).

3. *Ottelia* Pers.

Ottelia alismoides (L.) Pers. Syn. Pl. 1: 400. 1805; Hook.f., Fl. Brit. India 5: 662. 1888; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 818. 1991. *Stratiotes alismoides* L., Sp. Pl. 1: 535. 1753.

Submerged or partly floating, aquatic herbs. Leaves dimorphic, 5- 12 x 4- 10 cm, ovate- reniform, acute or obtuse. Flowers white with yellow base, solitary, axillary. Fruits 2-3 cm long, oblong, elliptic, 6-valved, enclosed in the spathe. Seeds oblong, brown.

Fl. & Fr.: Almost throughout the year.

Rare in ponds and streams.

Specimen examined: Near Modiya Mahadev area [24 59 35.73 N, 74 52 30.62 E, 502 m], *P. Hari Krishna & R. Kumar* 35348(BSJO).

4. *Vallisneria* L.

Vallisneria spiralis L. in Sp. Pl.: 1015. 1753; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 818. 1991.

Submerged aquatic herbs. Leaves ribbon-like, up to 30 x 0.3-0.8 cm, margins serrulate or entire. Flowers unisexual. Male flowers trimerous. Female flowers solitary. Fruits many seeded, seeds oblong-fusiform.

Fl. & Fr.: February - November.

Occasional in ponds and ditches.

Specimens examined: Near salaria [24 58 59.28 N, 74 51 07.29 E, 429 m], *P. Hari Krishna & R. Kumar* 35320(BSJO); Near Amjariya [24 58 59.66 N, 74 51 07.46 E, 401 m], *P. Hari Krishna & R. Kumar* 38378(BSJO).

APONOGETONACEAE Planch.

Aponogeton L.f.

Aponogeton natans (L.) Engl. & Krause in Engl. Pflanzenr. 13:11. 1906; Subram. Aquat. Angiosp. 92. t. 5. f. 54. 1962; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 875 . 1993. *Saururus natans* L. Mant. Alt. 2: 227. 1771. *Aponogeton monostachyon* L. f. Suppl. Pl. 214. 1782; Hook.f., Fl. Brit. India 6: 564. 1893.

Aquatic herbs. Leaves submerged or floating, 2-6 x 0.8-1.5 cm, lanceolate to linear - oblong, 5 to 7 - nerved. Flowers light pink or violetish in a solitary spike. Fruits globose, smooth, sharply beaked. Seeds 8, winged.

Fl. & Fr.: August - March.

Occasional, in lakes and ponds.

Specimens examined: Crocodile view point - Bassi dam [25 00 35.97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35105(BSJO); Kevdiya forest area [24 59 58.2 N, 74 49 57.9 E, 419 m], *P. Hari Krishna & R. Kumar* 35473(BSJO).

POTAMOGETONACEAE Bercht. & J.Presl

Key to the genera

- 1a. Leaves filiform, opaque **2. Stuckenia**
- b. Leaves otherwise **1. Potamogeton**

1. Potamogeton L.

Key to the species

- 1a. Leaves all submerged. **1. P. crispus**
b. Upper leaves floating. **2. P. nodosus**

1. Potamogeton crispus L., Sp. Pl. 1: 126. 1753; Hook.f., Fl. Brit. India 6: 566. 1893; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 876. 1993. (Plate-29).

Aquatic, submerged, tufted, glabrous herbs. Leaves 3.5-9 x 0.6-1.5 cm, linear-oblong, crisped or serrulate on margins, semi-amplexicaul at base. Flowers small, in few-flowered, 6-8 mm long spikes. Tepals suborbicular, valvate, green. Druplets obliquely ovoid or subglobose, with a compressed, recurved beak, scarcely keeled. Seeds subreniform.

Fl. & Fr.: October - March.

Occasional, in ditches, ponds and streams

Specimens examined: Bassi dam [24 59 33.01 N, 74 49 29.83 E, 410 m], *P. Hari Krishna & R. Kumar* 38457 (BSJO).

2. Potamogeton nodosus Poir. in Lam., Encycl. Meth. Bot. Suppl. 4: 535. 1816; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 877. 1993. *P. indicus* Roxb., Fl. Ind. 1: 471. 1820, *non* Roth ex Roem. & Schult. 1818; Hook.f., Fl. Brit. India 6: 565. 1893. (Plate-29).

Submerged herbs. Leaves 2.5 - 6 x 1.5-3.5 cm, upper ones floating, elliptic-oblong or oblanceolate, acute or obtuse, lower ones submerged. Flowers in axillary, dense spikes, reddish - brown. Druplets oblique. Seeds subreniform.

Fl. & Fr.: May - October.

Common in ditches and ponds.

Specimens examined: Near Savarna Talab [24 59 53.09 N, 74 48 23.70 E, 487 m], *P. Hari Krishna & R. Kumar* 35631 (BSJO); Savarna lake [24 59 51.19 N, 74 45 21.63 E, 489 m], *P. Hari Krishna & R. Kumar* 37386 (BSJO); Jhaleshwer [24 57 20.79 N, 74 48 10.49 E, 454 m], *P. Hari Krishna & R. Kumar* 38353 (BSJO).

2. Stuckenia Börner

Stuckenia pectinata (L.) Börner in Fl. Deut. Volk: 713. 1912. *Potamogeton pectinatus* L., Sp. Pl. 1: 127. 1753; Hook.f., Fl. Brit. India 6 : 567. 1893; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 877. 1993.

Submerged aquatic herb; stem and branches filiform, distichously branched. Leaves submerged, alternate, linear-ensiform, acucular. Spikes axillary. Flowers in few distant whorls, minute, green. Tepals 4, obovate-oblong, base clawed, cuneath. Drupelets obovate, obscurely beaked.

Fl. & Fr.: October - March.

Occasional in permanent water bodies.

Specimens examined: Bassi dam [24 59 33.01 N, 74 49 29.83 E, 410 m], *P. Hari Krishna & R. Kumar* 38302 (BSJO).

Order: Dioscoreales Mart.

DIOSCOREACEAE R.Br.

Dioscorea L.

Key to the species

- 1a. Leaves simple..... **1. D. bulbifera**
b. Leaves palmately compound **2. D. pentaphylla**

1. Dioscorea bulbifera L., Sp. Pl. 2: 1033. 1753; Hook.f., Fl. Brit. India 6: 295. 1892; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 836. 1991.

Twining or climbing herbs; underground tubers solitary, globose. Leaves alternate, 10 - 12 x 11 - 13 cm, broadly ovate, acute, cordate at base, entire. Male flowers whitish-pink. Female flowers in axillary, solitary, pendulous spikes. Seeds winged on basal side.

Fl. & Fr.: August - December.

Occasional, found in forest outskirts.

Specimen examined: Ambapani Nala [24 58 50.13 N, 74 51 31.54 E, 446 m], *P. Hari Krishna & R. Kumar* 35329(BSJO); Bichhor forest area [25 03 27 N, 74 53 5.9 E, 426 m], *P. Hari Krishna & R. Kumar* 35419(BSJO).

2. Dioscorea pentaphylla L., Sp. Pl. 2: 1032. 1753; Hook.f., Fl. Brit. India 6: 289. 1892; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 838. 1991. *D. triphylla* L., Sp. Pl. 2: 1032. 1753. *D. jacquemontii* Hook.f., l.c. 6 : 290. 1892.

Twining herbs. Leaves alternate, 3 to 5- foliolate, glabrous; leaflets 4- 12 x 1.5-4 cm, digitate, obovate - elliptic or ovate - elliptic. Male flowers axillary or terminal panicles, pale - greenish. Female spikes solitary or paired,

to 12 cm. Capsules with dark wings, retuse at the apex. Seeds 1.3 to 1.6 cm long, winged at base.

Fl. & Fr.: August - November.

Rare in the forests.

Specimen examined: Ambapani stream [24 58 50.13 N, 74 51 31.54 E, 446 m], *P. Hari Krishna & R. Kumar* 35324(BSJO).

Order: Liliales

COLCHICACEAE DC.

Key to the genera

- 1a. Climbing herbs, leaf tip ending with tendril **1. Gloriosa**
- b. Erect herbs, leaf tip not ending in atendril **2. Iphigenia**

1. Gloriosa L.

Gloriosa superba L., Sp. Pl. 1: 305. 1753; Hook.f., Fl. Brit. India 6: 348. 1892; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 844.1991.

Tuberous, climbing herbs, up to 5m high. Leaves sessile, 5.5 - 8 x 1.4 - 1.6 cm, lanceolate, entire, glabrous, acumen of upper ones tendril-like. Flowers large, showy, axillary, solitary, yellow in lower half, red in upper half, finally red with age. Capsules 2-3 cm long, oblong. Seeds subglobose, black.

Fl. & Fr.: August - November.

Rarely found in forests and wastelands

Specimens examined: Bijaypur road Bassi [24 59 53.19 N, 74 47 0.16 E, 421 m], *P. Hari Krishna & R. Kumar* 35213 (BSJO); near Mahesara [25 03 28.87 N, 74 53 19.19 E, 410 m], *P. Hari Krishna & R. Kumar* 35742(BSJO).

2. Iphigenia Kunth

Iphigenia indica (L.) A. Gray ex Kunth, Enum. Pl. 4: 213. 1833; Hook.f., Fl. Brit. India 6: 357. 1892; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 844. 1991. *Melanthium indicum* L. Mant. Pl. 2: 226. 1771.

Perennial herbs up to 25 cm high with tubers. Leaves, 6- 12 x 0.4 - 0.7 cm, linear to linear - lanceolate, acuminate. Flowers axillary, 1 to 3 together, purple or violet. Capsules oblong-ellipsoid, obtuse. Seeds subglobose, brown.

Fl. & Fr.: June - October.

Rare, found in deciduous forests on grassy slopes.

Specimen examined. Near Jariya Mahadev forest area [25 02 05.93 N, 74 53 3.79 E, 489m], *P. Hari Krishna & R. Kumar* 35372(BSJO).

Order: Asparagales Link

HYPOXIDACEAE R.Br.

Curculigo Gaertn.

Curculigo orchioides Gaertn. Fruct. Sem. 1: 63. t. 16. f. 11. 1788; Hook.f., Fl. Brit. India 6: 279. 1892; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 834. 1991. *C. malabarica* Wight, Icon 6: 22. t. 2043 A. f. 1. 1853. 'Kali musli'

Perennial herbs, with thick, tuberous root stock. Leaves sessile or sub-sessile 8 - 35 x 1.6 - 6cm, linear - lanceolate to elliptic. Flowers 2 to 3 - together on 4 - 8 cm long axillary, bright yellow. Capsules 1 to 4 - seeded, sessile. Seeds black.

Fl. & Fr.: August - November.

Common in mixed habitats on the hills.

Specimens examined: Ambapani Nala [24 58 50.13 N, 74 51 31.54 E, 446 m], *P. Hari Krishna & R. Kumar* 35432(BSJO); near Semla dhar [24 55 30.79 N, 74 52 43.22 E, 552 m], *P. Hari Krishna & R. Kumar* 35354(BSJO).

Uses: It is useful in cough and jaundice.

AMARYLLIDACEAE J.St.-Hil.

Crinum L.

Crinum defixum Ker-Gawl. in Journ. Sci. & Arts 3: 105. 1817; Hook.f., Fl. Brit. India 6: 281. 1892; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 829-830.1991. 'Jal- kanda'

Herbs with bulbous rootstocks. Leaves clustered at tip of short caudex, 35-80 x 3 -5 cm, linear-oblong, obtuse or acute. coriaceous. Flowers 6-12 flowered umbels, white. Stamens scarlet, bright- red. Capsules subglobose. Seeds rugose.

Fl. & Fr.: August - October.

Occasionally found along streams and marshy areas.

Specimen examined: Near Phusaria [24 58 10.9 N, 74 04 9 19.5 E, 412 m], *P. Hari Krishna & R. Kumar* 35426 (BSJO).

Uses: Leaf extract is used as a treatment for pimples.

ASPARAGACEAE Juss.

Key to the genera

- 1a. Plants with scapigerous inflorescence 2
b. Plants without scapigerous inflorescence 2. **Asparagus**
2a. Scape erect stout, leaves thick, fibrous 1. **Agave**
b. Scape slender, leaves membranous, leathery 3
3a. Root stock small with fleshy or tuberous roots..... 3. **Chlorophytum**
b. Root stock a bulb or corm 4. **Drima**

1. **Agave** L.

Agave americana L., Sp. Pl. 1: 323. 1753; Hook.f., Fl. Brit. India 6: 277. 1892; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 833. 1991.

Undershub, perennial, stem stout. Leaves erect-patent, with strong, widely patent or recurved spines, glaucous, often with longitudinal, white or yellow streaks or bands. Perianth funnel-shaped, yellowish green. Scape with 5-8 m high panicles. Capsule oblong-clavate, beaked.

Fl. & Fr.: January - August.

Common along hedges of cultivated lands.

Specimen examined: Near Gopalpura [25 2 27.08 N, 74 50 23.54 E, 383 m], *P. Hari Krishna & R. Kumar* 38462 (BSJO).

2. **Asparagus** L.

Asparagus racemosus Willd., Sp. Pl. 2 : 152. 1799; Hook.f., Fl. Brit. India 6: 316. 1892; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 841.1991.

Much branched shrubs; roots tuberous; stem terete. Cladodes 1.1-2.5 cm long, in axillary whorls of 2 - 6, spreading, linear, falcate, acuminate, spinous - pointed. Flowers white. Berries 6 - 8 mm across, scarlet when ripe.

Fl. & Fr.: August - February .

Commonly found in deciduous forests.

Specimen examined: Near Jariya Mahadev forest area [25 02 05.93 N, 74 53 3.79 E, 489 m], *P. Hari Krishna & R. Kumar* 35386(BSJO).

Uses: It is useful in ulcers and diabetes.

3. **Chlorophytum** Ker.- Gawley

Chlorophytum laxum R. Br. Prodr. 277.1810; Hook.f., Fl. Brit. India 6: 336. 1892; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 842. 1991. *C. parviflorum* Dalz. in Hook. Kew Journ. Bot. Misc. 2: 141. 1850.

Erect herbs up to 20 cm, roots fibrous usually with small, hanging tubers. Leaves 6-12, grass like, 10-25 cm, flat. Flowers few, white, distant, in racemes. Capsules obcordate, 3-winged. Seeds angled, black.

Fl. & Fr.: June - October.

Occasional found on the hilly slopes and as forest undergrowth.

Specimen examined: Near Jariya Mahadev forest area [25 02 05.93 N, 74 53 3.79 E, 489 m], *P. Hari Krishna & R. Kumar* 35369 (BSJO).

4. *Drimia* Jacquin ex Willd.

Drimia indica (Roxb.) Jessop in J. S. Afr. Bot. 43: 272. 1977. *Scilla indica* Roxb. Fl. India 2: 147. 1824. *Urginea indica* (Roxb.) Kunth, Enum. Pl. 4: 333. 1843; Hook.f., Fl. Brit. India 6: 347. 1892; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 845. 1991. *U. coromandeliana* (Roxb.) Hook.f., Fl. Brit. India 6: 347. 1892. 'Mar kando, Jangli-kanda'

Perennial herbs, with tunicate white bulbs, 4-10 cm in diam. Leaves radical, spreading on the ground, 4.5 - 20 x 1.6 - 4 cm, linear, flat, acute. Flowers few, pale brown, very distant, in slender, lax flowered racemes. Capsules oblong or ellipsoid. Seeds ca. 5 x 4 mm, elliptic, flat, winged, black.

Fl. & Fr.: March - June .

Frequently found among the grasses and open forests in rocky habitates.

Specimen examined: Sarna Talab [24 59 51.76 N, 74 48 21.97 E, 492 m], *P. Hari Krishna & R. Kumar* 38361 (BSJO).

Order: **Arecales** Bromhead

ARECACEAE Bercht. & J.Presl

Phoenix L.

Phoenix sylvestris (L.) Roxb. Fl. Ind. 3: 787. 1832; Beccari. & Hook. in Hook.f., Fl. Brit. India 6: 363. 1892; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 861.1993. *Elate sylvestris* L., Sp. Pl. 2: 1189. 1753. 'Khajoori'

Unbranched palms, up to 8 m high. Leaves pinnately compound, up to 25 x 3 cm, linear - lanceolate, rigid, canaliculate, spine-tipped. Spadices to 1 m; spathes as long as spadices. Male flowers fragrant, creamish - yellow. Drupes up to 2 cm long, oblong - ellipsoid, orange-yellow. Seeds oblong, pale brown.

Fl. & Fr.: March - July.

Common along the water streams and wastelands.

Specimens examined: Kelzar village road [24 58 43.23 N, 74 46 54.13 E, 450 m], *P. Hari Krishna & R. Kumar* 35227(BSJO); Badapani [25 04 45.47 N, 74 55 23.78 E, 415 m], *P. Hari Krishna & R. Kumar* 38401(BSJO).

Order: Commelinales Mirb. ex Bercht. & J.Presl

COMMELINACEAE Mirb.

Key to the genera

- 1a. Perfect stamens 3; staminodes present. **2**
b. Perfect stamens 6; staminodes absent. **2. Cyanotis**
- 2a. Cymes enclosed in spathaceous bracts; filaments glabrous
..... **1. Commelina**
b. Cymes not enclosed in spathaceous bracts; filaments bearded.
..... **3. Murdannia**

1. Commelina L.

Key to the species

- 1 a. Leaves linear or linear-oblong **2. C. forskaolii**
b. Leaves ovate or ovate-lanceolate..... **1. C. benghalensis**

1. Commelina benghalensis L., Sp. Pl. 1: 41. 1753; Hook.f., Fl. Brit. India 6: 370. 1892; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 853. 1991.

Decumbent herbs, rooting at lower nodes. Leaves, 2.5 - 4 x 1.3 - 1.5 cm, ovate - oblong. Corolla blue transversely oblong. Stamens with slightly curved, blue filaments and dark blue anthers. Seeds oblong, brown.

Fl. & Fr.: July - October.

Common in moist and shady places.

Specimen examined: Mahuria-Jhaleshwar Nala [25 01 15.75 N, 74 48 14.93 E, 418 m], *P. Hari Krishna & R. Kumar* 35179(BSJO).

2. Commelina forskaolii Vahl, Enum. 2: 172. 1805; Hook.f., Fl. Brit. India 6: 371. 1892; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 854. 1991.

'Mokano'

Much branched herbs, rooting at nodes. Leaves 5-7 x 0.6 -1cm, oblong-elliptic, obtuse or subacute, narrowed at base, often undulate-margined, glabrous or sparsely hairy; sheaths pubescent, ciliate on mouth. Spathes sparsely hairy; flowers in 3 to 5-flowered cymes. Petals blue coloured. Capsules subglobose, brown, usually 3 - seeded.

Fl. & Fr.: August - November.

Common, grows in wet and shaded places of the sanctuary area.

Specimens examined: Near Amarpura [25 04 41.75 N, 74 54 08.38 E, 394 m], *P. Hari Krishna & R. Kumar* 35737(BSJO); Jariya Mahadev waterfall area [25 01 59.29 N, 74 53 1.91 E, 469 m], *P. Hari Krishna & R. Kumar* 35396(BSJO); near Mahesara forest area [25 03 07.68 N, 74 52 55.48 E, 419 m], *P. Hari Krishna & R. Kumar* 37360(BSJO).

2. *Cyanotis* D. Don.

Key to the species

- 1a. Flowers blue- violet. **1. *C. cristata***
b. Flowers pink. **2. *C. fasciculata***

1. *Cyanotis cristata* (L.) D. Don, Prodr. Fl. Nepal. 46. 1825; Hook.f., Fl. Brit. India 6: 385. 1892; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 857. 1991. *Commelina cristata* L., Sp. Pl. 1: 42. 1753.

Annual herbs, up to 40 cm high. Leaves, 3.5 - 5 x 1.2 - 1.6 cm, ovate-oblong, acute. Flowers bisexual, blue-violet. Petals 3, lilac or bluish purple. Capsules oblong, glabrous. Seeds ovate to ovate-deltate, black.

Fl. & Fr.: July - December.

Common in moist and shaded localities.

Specimen examined: Crocodile view point, Bassi dam [25 0 35.97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35108(BSJO).

2. *Cyanotis fasciculata* (B. Heyne ex Roth) Schult.f. in Roem. and Schult. Syst. 7(2): 1152. 1830; Hook.f., Fl. Brit. India 6: 387. 1892; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 858. 1991. *Tradescantia fasciculata* Heyne ex Roth., Nov. PL., Sp. 189. 1821.

Erect or ascending, densely woolly herbs. Branchlets cottony or cobwebby. Leaves sessile, 1.5 - 3 x 0.4 - 0.8 cm, linear-lanceolate, acute. Flowers in compact, axillary and terminal cymes, pink. Capsules oblong, trigonous. Seeds 2, oblong, faintly rugose, brown.

Fl. & Fr.: August - December.

Occasional, in moist, shady places among rocks on hills.

Specimens examined: near Kevdiya Chowki [24 59 38.89 N, 74 50 05.49 E, 444 m], *P. Hari Krishna & R. Kumar* 35462 (BSJO); Kevdiya Chowki [24 59 38.89 N, 74 05 0 05.49 E, 445 m], *P. Hari Krishna & R. Kumar* 35470 (BSJO); near Modiya Mahadev area [24 59 35.73 N, 74 52 30.62 E, 502 m], *P. Hari Krishna & R. Kumar* 35345 (BSJO).

3. *Murdannia* Royle

Murdannia nudiflora (L.) Brenan in Kew Bull. 7: 189. 1952; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 858. 1991. *Commelina nudiflora* L., Sp. Pl. 1: 41. 1753, *p.p. Aneilema nudiflorum* (L.) Sweet in Hort. Brit.: 430. 1826.

Diffuse or ascending, annual herbs. Leaves sessile, 3 - 5 x 0.4 - 0.8 cm, linear-lanceolate, subcordate at base, subacute at apex. Flowers in axillary and terminal lax, bracteate, cymose panicles. Petals 3, free, purplish-pink to blue. Seeds trigonous, reddish to dark brown.

Fl. & Fr.: August - November.

Occasionally found among the grasses in marshy places.

Specimens examined: Mahuria-Jhaleshwar Nala [25 01 15.75 N, 74 48 14.93 E, 418 m], *P. Hari Krishna & R. Kumar* 35175(BSJO).

PONTERIACEAE Kunth

Pontederia L.

Pontederia vaginalis Burm.f. Fl. Ind. 80. 1768. *Monochoria vaginalis* (Burm.f.) C.Presl ex Kunth in Enum. Pl. 4: 134.1843; Hook.f., Fl. Brit. India 6: 363. 1892; Subram. Aquat. Angiosp. 69. f. 47. 1962; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 848.1991.

Amphibious herbs, up to 45 cm high. Leaves 6 - 9 x 0.4 - 0.8 cm, broadly ovate - oblong, acute to acuminate at apex. Racemes solitary, terminal, to 7 cm, deflexed, 6-10-flowered. Flowers regular, to 2 cm across. Tepals 6, blue - violet, 6 -10 mm long. Seeds ovoid, 10 - ribbed, brown.

Fl. & Fr.: September - November.

Occasionally found in still waters and marshy places.

Specimen examined: Nandwai to Amla route [25 00 37.49 N, 74 56 55.58 E, 432 m], *P. Hari Krishna & R. Kumar* 35253 (BSJO).

Order: Poales Small

ERIOCAULACEAE Martinov

Eriocaulon L.

Eriocaulon cinereum R. Br. Prodr. 254. 1810; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 882. 1993. *E. sieboldianum* Sieb. & Zucc. ex Steud. Syn. Pl. Glum. 2: 272. 1855; Hook.f., Fl. Brit. India 6: 577. 1893.

Glabrous herbs, up to 7 cm long. Leaves basal, in rosette, narrowly linear, entire, acute. Heads, ovoid - globose, grey, whitish or purple, peduncles numerous, slender, finely ribbed. Seeds ellipsoid, transversely striate, pale - brown.

Fl. & Fr.: September - December.

Occasionally found in moist wet places and shaded localities.

Specimens examined: Near Modiya Mahadev area [24 59 37.86 N, 74 52 31.01 E, 493 m], *P. Hari Krishna & R. Kumar* 35712 (BSJO); Savarna lake [24 59 51.19 N, 74 45 21.63 E, 489 m], *P. Hari Krishna & R. Kumar* 37384 (BSJO); Jhalesher [24 59 51.76 N, 74 48 21.97 E, 492 m], *P. Hari Krishna & R. Kumar* 38357 (BSJO).

CYPERACEAE Juss.

Key to the genera

- 1a. Glumes on spikelets distichous 2
- b. Glumes on spikelets spiral 3
- 2a. Plants bulbous-thickened basally; style base persistent; spikelets 1-3
..... **1. *Abildgaardia***
- b. Plants not bulbous-thickened basally; style base deciduous; spikelets
numerous **3. *Cyperus***
- 3a. Style-base dilated or spongy, thickened on the nut. 4
- b. Style-base continuing with the ovary, not dilated on the nut.
..... **6. *Schoenoplectiella***
- 4a. Leaves absent, hypogynous bristles present. **4. *Eleocharis***
- b. Leaves well developed, hypogynous bristles absent. 5

- 5a. Style-base falling with style, leaving no tumor on achene. **5. Fimbristylis**
- b. Style-base persistent, not falling with style, thus leaving a tumor on achene. **2. Bulbostylis**

1. *Abildgaardia* Vahl

Abildgaardia ovata (Burm.f.) Kral in Sida 4: 72. 1971. *Fimbristylis ovata* (Burm.f.) Kern in Blumea 15: 126. 1967; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 925. 1993. *Carex ovata* Burm. f. Fl. Ind. 194. 1768. (Plate-30).

Densely tufted sedge, up to 25 cm high. Leaves filiform, acute with very few hairs at apex, flat or inrolled. Inflorescence a single terminal spikelet or rarely two. Spikelets, ovate, terete, subcompressed. Glumes broadly rhomboid-ovate, apiculate, reddish brown-streaked. Stamens 3. Stigmas 3, pubescent. Nuts broadly obovate, trigonous, shiny, stramineous, straw - coloured.

Fl. & Fr.: August - November.

Occasionally found in moist habitat.

Specimens examined. Mahuria-Jhaleswar [25 01 14.56 N ,74 48 16.12 E, 421 m], *P. Hari Krishna & R. Kumar* 35172 (BSJO); Near Nal forest area [24 05 32.59 N, 74 56 37.82 E, 414 m], *P. Hari Krishna & R. Kumar* 35758 (BSJO); Savarna lake [24 59 51.19 N, 74 45 21.63 E, 489 m] , *P. Hari Krishna & R. Kumar* 38444 (BSJO).

2. *Bulbostylis* Kunth

Key to the species

- 1a. Inflorescence capitate, nuts smooth..... **1. B. barbata**
- b. Inflorescence of loose or crowded anthelas; nuts transversely wrinkled..... **2. B. densa**

1. *Bulbostylis barbata* (Rottb.) C. B. Clarke in Hook.f., Fl. Brit. India 6: 651. 1893; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 889.1993. *Scirpus barbatus* Rottb., Descr. Pl. Rar. Progr. 27. 1772 & Ic. Rar. Nov. Pl. 52. t. 17. f. 4. 1773. *Isolepis barbata* (Rottb.) R. Br. Prodr., Fl. Nov. Holl. 222. 1810. *Fimbristylis barbata* (Rottb.) Benth., Fl. Austr. 7: 321. 1878.

Glabrous herbs up to 20 cm high. Leaves filiform, acute at apex. Inflorescence a terminal head of of 5-20 spikelets. Spikelets sessile, oblong -

- b. Glumes obtuse 6
- 6a. Spikelets few, digitate in twice compound umbels.. **13. C. tenuispica**
- b. Spikelets many in compact heads **4.C. difformis**
- 7a. Rachilla of spikelets distinctly winged, with decurrent base of glumes.. **8**
- b. Rachilla of spikelets not winged; glumes without decurrent base. **11**
- 8a. Leaves reduced to sheaths, if present, then less than half the length of culm..... **9. C. pangorei**
- b. Leaves nearly as long as the culm. 9
- 9a. Stolons soon disappearing, terminating into tunicated bulbs, leaves arising from the stem at some distance, above the base and below the middle. **1. C. bulbosus**
- b. Stolons persistent, bearing ovoid black tubers, leaves radical. **10**
- 10a. Stolons bearing hard black fragrant tubers, nuts oblong. **11. C. rotundus**
- b. Stolons not or tuberiferous, nuts oblong-obovate... **14. C. tuberosus**
- 11a. Annual with stuffed stem roots fibrous only. **12**
- b. Perennial with woody rhizomes and often with long stolons. **8. C. nutans**
- 12a. Slender herbs, spikelets 1-2.5 cm long. **2. C. compressus**
- b. Stout herbs; spikelets 0.3-1 cm long. **5. C. iria**
- 13a. Stigmas 3; nuts trigonous. **12. C. squarrosus**
- b. Stigmas 2; nuts bilaterally flattened. **10. C. richardii**

1. Cyperus bulbosus Vahl, Enum. Pl. 2: 342. 1805; C.B. Clarke in Hook.f., Fl. Brit. India 6: 611. 1893; Karthik, & al. Fl. India, Enum. Monocot. 44. 1989; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 899. 1993.

Perennial herbs, up to 30 cm high, Stolons thin, filiform terminated by ovoid-globose tubers. Leaves narrowly linear, gradually acuminate. Inflorescence reduced to antherodium or capitate head. Spikelets linear, reddish - brown. Rachilla with ovate, persistent wings. Nuts ellipsoid, trigonous, apiculate at apex, black.

Fl. & Fr.: August-December.

Common in wet-moist localities.

Specimens examined: Jariya Mahadev waterfall area [25 01 59.29 N, 74 53 1.91 E, 469 m], *P. Hari Krishna & R. Kumar* 35390 (BSJO).

2. *Cyperus compressus* L., Sp. Pl. 1: 46. 1753; Clarke in Hook.f., Fl. Brit. India 6: 605. 1893; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 900. 1993.

Herbs up to 30 cm high, culms triquetrous, striate. Leaves, few, basal, linear, acute. Inflorescence a simple lax antherodium. Spikelets many-flowered, compressed, greenish, turning to straw-colour when mature. Rachilla flexuous, with caducous wings. Glumes ovate, acute-mucronate, strongly keeled. Nuts obovoid, trigonous, shining dark brown, obtuse, apiculate, stipitate.

Fl. & Fr.: August - December.

Common in wet - moist localities.

Specimens examined: Sarna Lake [24 59 51.17 N, 74 48 22.95 E, 491 m], *P. Hari Krishna & R. Kumar* 35145 (BSJO).

3. *Cyperus cuspidatus* Kunth in H.B.K. Nov. Gen. & Sp. Pl. 1: 204. 1815; C.B. Clarke in Hook.f., Fl. Brit. India 6: 598. 1893; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 901. 1993. *C. angustifolia* Nees in Wight. Contr. Bot. India 79. 1834. *Cyperus uncinatus* Poir. in J.B.A.M.de Lamarck, Encycl. 7: 247.1806.

Herbs, with fibrous roots. Stem slender, trigonous. Leaves blades nearly setaceous, narrowly linear. Inflorescence a single, terminal, compact, nearly globose head. Spikelets linear, strongly flattened, compressed, reddish-brown, rachilla persistent. Nuts obovate, trigonous winged, dark brown.

Fl. & Fr.: July - December.

Common in moist places.

Specimens examined: Sarna Lake [24 59 51.19 N, 74 45 21.63 E, 489 m], *P. Hari Krishna & R. Kumar* 37388 (BSJO).

4. *Cyperus difformis* L. Cent. Pl. 2: 6. 1756; Clarke in Hook.f., Fl. Brit. India 6: 599. 1893; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 902. 1993. (Plate-30).

Glabrous sedges, with fibrous roots. Leaves shorter than the culm, linear, acuminate, obscurely nerved, flaccid; sheaths yellowish - brown. Inflorescence terminal, simple or compound umbel with 3 - 6 rays. Spikes globose or capitate, with many spikelets. Glumes orbicular, rounded to slightly emarginate at apex, membranous, faintly 3-nerved. Nuts obovate-elliptic, triquetrous, nearly equalling the glumes, yellowish.

Fl. & Fr.: August - December.

Common, grows in moist and marshy places.

Specimens examined: Meghpura Chowki [25 01 38.94 N, 74 48 43.55 E, 410 m], *P. Hari Krishna & R. Kumar* 35309 (BSJO); Ambapani [24 58 49 N, 74 51 25 E, 430 m], *P. Hari Krishna & R. Kumar* 35556 (BSJO); Near Savrna Talab [24 59 53.09 N, 74 48 23.70 E, 487 m], *P. Hari Krishna & R. Kumar* 35624 (BSJO); Near Modiya Mahadev area [24 59 37.55 N, 74 52 30.47 E, 491 m], *P. Hari Krishna & R. Kumar* 35726 (BSJO); Devalgadh forest area [24 58 20.97 N, 74 50 45.32 E, 415 m], *P. Hari Krishna & R. Kumar* 37330 (BSJO).

5. *Cyperus iria* L., Sp. Pl. 1: 45. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 6: 606. 1893; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 906. 1993. *C. paniciformis* Franch. & Sav., Pl. Jap. 2: 103. 537. 1879. *C. iria* var. *paniciformis* (Franch. & Sav.) C.B. Clarke in Hook.f., Fl. Brit. India 6: 607. 1893.

Tufted sedges, with fibrous roots, up to 50 cm high. Leaves 2 or 3, 3 - 5 mm wide, linear, flat, acute, scabrous on the margins towards apex. Sheaths reddish-brown. Inflorescence terminal, compound umbel up to 10 cm long. Spikes oblong - ovoid, 18-20 flowered. Nuts elliptic -obovoid, minutely apiculate, triquetrous, blackish - brown.

Fl. & Fr.: August - November.

Common in ditches and on marshy places

Specimens examined: Near Amalda [24 59 18.26 N, 74 56 45.14 E, 456 m], *P. Hari Krishna & R. Kumar* 35268 (BSJO); Jariya Mahadev water fall area [25 01 59.29 N, 74 53 01.91 E, 469 m], *P. Hari Krishna & R. Kumar* 35399 (BSJO); Near Nal forest area [25 05 26.76 N, 74 56 47.37 E, 419 m], *P. Hari Krishna & R. Kumar* 35763 (BSJO).

6. *Cyperus meeboldii* Kukenth. in Fedde, Rep. 18: 345. 1922; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 907. 1993; Prasad & Singh in J. Econ. Taxon. Bot. (Adl. Ser.) 21: 109. 2002.

Terrestrial sedges, with fibrous roots. Leaves few, 4 cm or more long, filiform, shorter than the culm. Inflorescence solitary, terminal, dense, globose head, subtended by two, leafy involucral bracts of unequal length. Spikelets oblong, yellowish brown. Nuts trigonous, broadly obovate, apiculate, punctate, glossy, brown.

Fl. & Fr.: August - November.

Rare in ditches and on marshy habitats

Specimens examined: Jhaleshwar Mahadev gate [25 01 21.99 N, 74 48 30.65 E, 424 m], *P. Hari Krishna & R. Kumar* 35167(BSJO).

7. *Cyperus michelianus* subsp. ***pygmaeus*** (Rottb.) Asch. & Graebn. in Syn. Mitteleur. Fl. 2(2): 273. 1904. *C. pygmaeus* Rottb. Descr. & Ic. Rar. Nov. Pl. 20. t. 14. f. 4-5. 1773; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 911. 1993.

Densely tufted sedges, up to 20 cm high, with fibrous roots. Leaves linear, flat, shorter than the culm. Sheaths pale to reddish-brown. Inflorescence a contracted, lobed head, with 3 to many, dense glomerules of spikelets. Spikelets ovate to ovate-lanceolate, often twisted, strongly compressed, 10 to 20-flowered, whitish-green. Nuts oblong or elliptic - oblong, trigonous, pale brown.

Fl. & Fr.: Throughout the year..

Common in wet and drying beds of ditches, ponds and streams.

Specimens examined: Bujrabandh - Bichhor[25 04 54.41 N, 74 55 18.94 E, 434 m], *P. Hari Krishna & R. Kumar* 35583 (BSJO); Jhaleshwer [24 59 51.76 N, 74 48 21.97 E, 492 m], *P. Hari Krishna & R. Kumar* 38358 (BSJO); Mahudia- Maheshra [25 02 36.95 N, 74 52 09.32 E, 430 m], *P. Hari Krishna & R. Kumar* 35609 (BSJO); Near Savrna Talab [24 59 53.09 N, 74 48 23.70 E, 487 m], *P. Hari Krishna & R. Kumar* 35625 (BSJO).

8. *Cyperus nutans* Vahl, Enum. Pl. 2: 263. 1805; C.B. Clarke in Hook.f., Fl. Brit. India 6: 607. 1893; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 908. 1993.

Perennial herbs, with thick, culm-like rhizomes; culms solitary, trigonous, smooth. Leaves few, shorter than the culm, linear, narrowed to an acute apex. Inflorescence lax, compound or decompound, spicate umbel. Spikes narrow, loose, sub erect, bearing 8-20 spikelets, rachis glabrous. Spikelets to linear-oblong, compressed, light brown. Glumes oblong, obtuse, membranous, keeled. Nuts triquetrous, oblong, apiculate, brown.

Fl. & Fr.: August - February.

Occasionally found in ditches and on marshy habitats

Specimens examined: Sarna Lake [24 59 51.17 N, 74 48 22.95 E, 491 m], *P. Hari Krishna & R. Kumar* 35144 (BSJO); Near Sagarani [24 55 32.13 N, 74 52 30.64 E, 491 m], *P. Hari Krishna & R. Kumar* 35283 (BSJO).

9. *Cyperus pangorei* Rottb. Pl. Rar. Progr. 18. 1772 *et* Descr. Ic. Rar. Nov. Pl. 31.t.7.f.3. 1773; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3 : 909. 1993. *C. tegetum* Roxb. Fl. Ind. 1 : 208. 1832; Clarke in Hook.f., Fl. Brit. India 6: 613. 1893.

Perennial herbs up to 1 m high; rhizomes woody. Leaves reduced to 4 - 6 subphyllus. Inflorescence terminal, compound umbel; rays 5-7, up to 3 cm long. Spikelets linear, compressed, reddish-brown. Rachilla straight, winged. Glumes erect-patent, half imbricate. Nuts oblong - obovoid, reddish - brown.

Fl. & Fr.: August - December.

Common, grows along the water reservoirs.

Specimens examined: Jhaleswar Mahadev gate [25 1 21.99 N, 74 48 30.65 E, 424 m], *P. Hari Krishna & R. Kumar* 35659 (BSJO).

10. *Cyperus richardii* Steud. in Syn. Pl. Glumac. 2: 8.1854. *Kyllinga bulbosa* Beauv., Fl. Oware & Benin 1: 11. t. 8. f. 1. 1804; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 933. 1993.

Annual sedge, with short, erect rhizomes. Leaves as long as or shorter than culm, few, linear, gradually acuminate. Inflorescence a terminal head of usually 3, sessile spikes. Spikelets numerous, densely packed, compressed, oblong or oblong-lanceolate, 1-flowered, pale green. Glumes usually 4, ovate-oblong to oblong-lanceolate, acute, with a smooth keel. Nuts obovoid, apiculate, laterally flattened, brownish.

Fl. & Fr.: August - December.

Rare in wet and marshy places.

Specimen examined: Crocodile view point-Bassi dam [25 0 35.97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35101(BSJO).

11. *Cyperus rotundus* L., Sp. Pl. 1: 45. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 6: 614. 1893; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 911.1993; Prasad & Singh in J. Econ. Taxon. Bot. (Adl. Ser.) 21: 122. 2002. (Plate-30). *'Motha'*

Perennial sedges, up to 25 cm high, with slender stolons and ellipsoid tubers. Leaves linear, flat, scabrid on the margins towards apex; sheaths brown, parallel fibres. Inflorescence simple or compound, terminal corymb; rays 3 - 9. Spikelets linear, strongly compressed, 10 to 30 - flowered, dusty - brown. Glumes closely imbricating, ovate. Nuts oblong-obovoid, apiculate at apex, trigonous, minutely punctulate, brown.

Fl. & Fr.: Almost throughout the year.

Common in marshy habitates.

Specimens examined: Kevdiya forest chowki , [24 59 15.85 N, 74 49 47.22 E, 412m.], *P. Hari Krishna & R. Kumar* 35236(BSJO); Near Modiya Mahadev [24 59 35.73 N, 74 52 30.62 E, 502m.], *P. Hari Krishna & R. Kumar*

35347(BSJO); Mahudia- Maheshra [25 02 36.95 N, 74 52 09.32 E, 430m.], *P. Hari Krishna & R. Kumar* 35612(BSJO).

12. *Cyperus squarrosus* L. Cent. Pl. 2: 6. 1756. *Mariscus squarrosus* (L.) C.B. Clarke in Hook.f., Fl. Brit. India 6: 623. 1893; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 939. 1993.

Densely tufted herbs, up to 25 cm high, with reddish - purple, fibrous roots. Leaves 3-5, linear, flat, acuminate. Inflorescence open or reduced to a single, hemispherical spike. Involucral bracts 2-4, unequal. Spikes oblong - ovoid or subglobose, yellowish - green. Spikelets many, oblong, spreading, 10 to 20 flowered. Nuts oblong - obovate, trigonous, obtuse, minutely apiculate at apex, brown.

Fl. & Fr.: August - December.

Occasional, found in moist places.

Specimen examined: Bassi dam [25 0 35.97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 38451(BSJO).

13. *Cyperus tenuispica* Steud. Synop. Pl. Glumac. 2: 11. 1855; Karthik & al., Fl. Ind. Enum. Monocot. 44. 1989; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 913. 1993.

Erect or diffuse herbs, up to 30 cm long, with fibrous, red - purple roots. Leaves linear, unicostate. Sheaths red - brown. Inflorescence a terminal, compound or decompounds. Spikelets in digitate clusters of 3 to 6, linear - oblong, with 20 flowered. Glumes at base empty, oblong-ovate, mucronate. Nuts globose-obovoid, trigonous, white or creamy - yellow.

Fl. & Fr : April - December.

Common grows in moist and marshy places.

Specimens examined: Near Modiya Mahadev area [24 59 37.47 N, 74 52 31.45 E, 498 m], *P. Hari Krishna & R. Kumar* 35718 (BSJO).

14. *Cyperus tuberosus* Rottb. Descr. in Ic. Rar. Nov. Pl. 28.t.7. f.1.1773 ; C.B. Clarke in Hook.f., Fl. Brit. India 6: 616. 1893; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 913. 1993.

Perennial sedges, with creeping rhizomes. Leaves linear, weakly folded. Sheaths reddish - brown. Inflorescence a simple to partially compound corymb. Spikes turbinate, loosely bearing 2 - 11 spikelets. Spikelets linear, 8 to 20 - flowered, yellow - brown. Nuts obovate - oblong, trigonous, brown.

Fl. & Fr.: August - December.

Occasionally found in moist places.

Specimens examined: Mahudia- Maheshra [25 02 36.95 N, 74 52 09.32 E, 430 m], *P. Hari Krishna & R. Kumar* 35611(BSJO).

4. *Eleocharis* R. Br.

Key to the species

- 1a. Spikelets cylindrical **1. *E. acutangula***
b. Spikelets ovoidal to ellipsoidal. **2**
2a. Stamens 2; glumes keeled **2. *E. atropurpurea***
b. Stamens 3; glumes scarcely keeled. **3. *E. geniculata***

1. *Eleocharis acutangula* (Roxb.) Schult., in Roem. & Schult. Mant. 2: 91. 1824; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 914. 1993. *Scirpus acutangulus* Roxb. Fl. Ind. 1: 216. 1820. *Eleocharis fistulosa* (Poir.) Schult. in Roem. & Schult. Mant. 2: 89. 1824, *nom. illegit.*; C.B. Clarke in Hook.f., Fl. Brit. India 6: 626. 1893.

Herbs, up to to 60 cm high. Basal sheaths 3 or 4, the lower ones scales like, brownish, the upper most pale green. Spikelets terete, cylindrical, pale-green. Glumes many, spiral, broadly ovate. Nuts obovoid, turgid, glossy, striate, yellowish-brown.

Fl. & Fr.: August - April.

Rare found in marshy habitats.

Specimens examined: Kevdiya area [24 58 47.35 N, 74 49 41.44 E, 419 m], *P. Hari Krishna & R. Kumar* 35245(BSJO).

2. *Eleocharis atropurpurea* (Retz.) Presl, Reliq. Haenk. 1: 196. 1828; C.B. Clarke in Hook.f., Fl. Brit. India 6: 627. 1893; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 915. 1993. *Scirpus atropurpureus* Retz. Obs. Bot. 5: 14. 1789.

Densely tufted herbs, with fibrous roots. Sheaths mucronate, purplish. Leaves absent; basal sheaths pale to reddish - tinged at base. Spikelets ovoid to oblong, many-flowered, purple to reddish. Glumes elliptic-oblong, membranous, loosely arranged, mid-vein green and broad. Stamens 2. Nuts biconvex, obovoid, rounded-truncate at apex, shining black.

Fl. & Fr.: September - April.

Occasionally found in marshy habitates.

Specimens examined: Near Nal forest area [24 05 32.59 N, 74 56 37.82 E, 414 m], *P. Hari Krishna & R. Kumar* 35755(BSJO).

3. Eleocharis geniculata (L.) Roem. & Schult. Syst. Veg. 2: 150. 1817; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 916 .1993. *Scirpus geniculatus* L., Sp. Pl. 1: 48. 1753. *Eleocharis capitata* (L.) R. Br. Prodr. Fl. Nov. Holl. 1: 225. 1810; C.B. Clarke in Hook.f., Fl. Brit. India 6: 627. 1893.

Tufted annual herbs. Stem slender, erect, angular, smooth. Basal sheath herbaceous pale green, usually tinged with purplish-brown on lower parts. Spikelets ovate - globose to ovoid ellipsoid. Stamens usually 3. Glumes many, spiral, ovoid-suborbicular. Nuts broadly obovate, biconvex, rounded at apex, tapering at base, blackish brown.

Fl. & Fr.: Number - April.

Common in wet moist or marshy localities.

Specimens examined: Near Nal forest area [24 05 32.59 N, 74 56 37.82 E, 414 m] ,P. Hari Krishna & R. Kumar 35754 (BSJO).

5.Fimbristylis Vahl.

Key to the species

- 1a. Stigmas 2, nuts lenticular. **2**
- b. Stigmas usually 3, nuts triquetrous or trigonous...**4. F. quinquangularis**
- 2a. Glumes hairy atleast in the apical part. **3. F. ferruginea**
- b. Glumes glabrous throughout. **3**
- 3a. Spikelets terete, 2.5 33 broad, anthers 1mm long. **2. F. dichotoma**
- b. Spikelets angular, 1-1.5 mm broad, anthers 0.5 mm long.....
.....**1. F. bisumbellata**

1. Fimbristylis bisumbellata (Forsk.) Bubani. in Dodecanthia. 30. 1850; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 921. 1993. *Scirpus bisumbellata* Forssk. Fl. Aegypt.-Arab. 1: 15. 1775. *Fimbristylis dichotoma* auct. non Vahl, 1806; Nees in Wight, Contrib. Bot. India 101. 1834; Kunth, Enum. Pl. 2: 225. 1837; C.B. Clarke in Hook.f., Fl. Brit. India 6: 635. 1893. *Scirpus pallescens* Roxb. Fl. Ind. 1: 229. 1820. (Plate-30).

Densely tufted, herbs, up to 30 cm high, with fibrous roots. Leaves flat, rarely folded, 7-17 x 0.1 cm, pubescent, apex acuminate, sheaths 1.5-3 cm long, ligule a fringe of white. Inflorescence usually a compound corymb. Spikelets solitary ovoid or ovate - oblong, many flowered, yellowish - brown. Nuts obovoid, biconvex, obovate, light yellow.

Fl. & Fr.: August - December.

Commonly found in marshy and aquatic habitats.

Specimens examined: Near Panduria [24 58 36.47 N, 74 53 08.26 E, 524 m], *P. Hari Krishna & R. Kumar* 35548(BSJO); Mahudia- Maheshra [25 02 36.95 N, 74 52 09.32 E, 430 m], *P. Hari Krishna & R. Kumar* 35608(BSJO); Near Nal forest area [24 05 32.53 N, 74 56 37.96 E, 415 m], *P. Hari Krishna & R. Kumar* 35759(BSJO); Savarna lake [24 59 51.19 N, 74 45 21.63 E, 489 m], *P. Hari Krishna & R. Kumar* 38445(BSJO).

2. *Fimbristylis dichotoma* (L.) Vahl Enum. Pl. 2: 287. 1805; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 923. 1993. *Scirpus dichotomus* L., Sp. Pl. 1. 50. 1753. *S. diphylla* Retz. Obs. Bot. 5: 15. 1789. *Fimbristylis diphylla* (Retz.) Vahl, Enum. Pl. 2: 289. 1805; C.B. Clarke in Hook.f., Fl. Brit. India 6: 636. 1893. *F. annua* var. *diphylla* Kukenth, Act. Hort. Got. 5: 109.1929. *F. annua* var. *paucispiculata* Blatt. & McC. in Journ. Bombay Nat. Hist. Soc. 37. 544. 1934.

Herbs, up to 60 cm high. Rhizome very short or absent. Leaves shorter than culm, linear, herbaceous, obtuse. Spikelets solitary or in clusters of 2 to 10, ovoid to ovoid - ellipsoid. Glumes rhomboid-ovate, mucronate, reddish brown-tinged. Nuts obovate, cream - coloured.

Fl. & Fr.: Throughout the year.

Occasional, along water streams.

Specimens examined: Near Hanuman Choraya [24 59 43.59 N, 74 48 39.24 E, 493 m], *P. Hari Krishna & R. Kumar* 35489 (BSJO).

3. *Fimbristylis ferruginea* (L.) Vahl, Enum. Pl. 2 : 291. 1805; C.B. Clarke in Hook.f., Fl. Brit. India 6: 638. 1893; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 924. 1993. *Scirpus ferrugineus* L. Sp. Pl. 1: 50. 1753.

Tufted Herbs, up to 70 cm high, with short, woody, creeping rhizomes. Leaves narrowly linear, shorter than the culm. Inflorescence simple or decompound, bearing 3 - 12 spikelets. Spikelets solitary, terete, ovoid, many - flowered, brown. Glumes spiral, ovate-elliptic or oblong-ovate, subacute, keeled; keel 1-nerved. Stamens 3. Stigmas 2. Nuts biconvex, broadly obovate, obtuse-truncate at apex, smooth, light orange - brown.

Fl. & Fr.: August - December.

Occasional grows near water reservoirs.

Specimens examined: Bichhor forest area [25 04 12.2 N, 74 54 37.36 E, 447 m], *P. Hari Krishna & R. Kumar* 35411(BSJO).

4. *Fimbristylis quinquangularis* subsp. ***quinquangularis*** (Vahl) Kunth in Enum. Pl. 2: 229. 1837. *F. miliacea* (L.) Vahl, Enum. Pl. 2: 287.

1805; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 925. 1993. *Scirpus miliaceus* L. Syst. Veg. ed. 10. 868. 1759.

Rhizomatous sedges, up to 30 cm high. Leaves smaller or long as the culm; sheaths papery, with glabrous, membranous orifice; ligule absent. Inflorescence compound to decompound, lax corymb, bearing 10-25 spikelets. Spikelets solitary, ovate, many - flowered, pale brown. Nuts trigonous, obovoid to suborbicular, minutely stipitate, verruculose, pale - brown.

Fl. & Fr.: August - December.

Rare, in marshy places.

Specimens examined: Savarna lake [24 59 51.19 N, 74 45 21.63 E, 489 m], *P. Hari Krishna & R. Kumar* 37389(BSJO).

6. *Schoenoplectiella* Lye

Key to the species

- 1a. Culms septate **1. *S. articulatus***
b. Culms not septate **2. *S. roylei***

1. *Schoenoplectiella articulata* (L.) Lye in Lidia 6: 20. 2003. *Schoenoplectus articulatus* (L.) Palla in Bot. Jahrb. Syst. 10: 299. 1888; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 946. 1993. *Scirpus articulatus* L., Sp. Pl. 1: 47. 1753; Clarke in Hook.f., Fl. Brit. India 6: 656. 1893.

Tufted annual sedge, up to 50 cm high. Culms terete, hollow, glabrous, dark green. Inflorescence a pseudolateral, dense head of many spikelets. Spikelets sessile, many - flowered, oblong-cylindrical. Glumes suborbicular. Stamens 3. Stigmas 3. Nuts broadly obovate, blackish - brown at maturity.

Fl. & Fr.: August - March.

Occasional, in water logged areas, marshy places and shallow waters.

Specimens examined: Jhaleshwer [24 57 20.79 N, 74 48 10.49 E, 454 m], *P. Hari Krishna & R. Kumar* 38356(BSJO); Kevdia to Savarna [25 01 21.30 N, 74 49 27.60 E, 424 m], *P. Hari Krishna & R. Kumar* 35622(BSJO).

2. *Schoenoplectiella roylei* (Nees) Lye in Lidia 6: 26. 2003. *Schoenoplectus roylei* (Nees) Ovcz. & Czukav. in Fl. Tadzhiksk. S.S.R. 2: 40.1963; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 3: 950. 1993. *Isolepis roylei* Nees in Wight, Contrib. Bot. Ind. 107. 1834. *Scirpus quinquefarius*

Buch.-Ham. ex Boeck. in *Linnaea* 36: 701. 1870; C.B. Clarke, in *Hook.f., Fl. Brit. Ind.* 6: 657. 1893.

Erect, tufted herbs, up to 30 cm tall. Culms terete, slender, slightly compressed. Leaves absent. Spikes ovoid or ellipsoid. Spikelets in a single, lateral cluster near the top of the stem, pale-brown. Nuts triquetrous, obovoid, almost plano-convex, black.

Fl. & Fr.: August-December

Common in marshy habitats

Specimen examined: Savarna lake [24 59 51.19 N, 74 45 21.63 E, 489 m], *P. Hari Krishna & R. Kumar* 38442(BSJO).

POACEAE Barnhart

Key to the genera

- 1a. Large woody shrubs or trees with large culm sheaths..... **15. Dendrocalamus**
- b. Perennial or annual herbs or shrubs, not woody, without culm- sheath. **2**
- 2a. Spikelets with 1 to many-flowered, breaking up at maturity above the persistent glumes, or if falling entire then not 2-flowered. Spikelets laterally compressed or terete..... **3**
- b. Spikelets 2-flowered, falling entire at maturity, with upper floret bisexual and lower one male or barren, the latter often much reduced. Spikelets dorsally compressed..... **25**
- 3a. Spikelets with 2 or more fertile florets, or if with one fertile floret then with sterile reduced floret above it **4**
- b. Spikelets with one fertile floret, with or without one or two male or barren florets below it. **20**
- 4a. Low or moderately tall grass. Lemmas and rachilla glabrous, if hairy, the hairs not enveloping the lemmas, or if so, then the lemma with a geniculate awn. **5**
- b. Tall grass, with large, plume-like panicles. Lemmas or rachilla - joints bearing long, silky hairs which envelop the lemmas; lemmas awnless or with a straight awn from the tip. **19**
- 5a. Glumes shorter than lowest floret and the upper floret distinctly exerted, if longer, then with firm, dull margins like the lemmas, or if with hyaline margins then the lemmas firmly keeled. Lemmas awnless or with a

- straight or curved awn from the entire or 2-fid apex or several awned or lobed..... **6**
- 5b. Glumes as long as lowest floret, often as long as spikelet and enclosing florets, if shorter than the lowest floret, then the palea with two awns. Lemmas usually awned..... **7. Avena**
- 6a. Inflorescence of panicles, if racemes or spikes, then the spikelets not secund. **7**
- b. Inflorescence a raceme or panicle of racemes; the spikelets secund.... **14**
- 7a. Lemmas entire at the apex, obtuse, acute, acuminate or mucronate, or if 2-toothed or nerved from the tip, then glabrous near the margins and along the side nerves..... **8**
- 7b. Lemmas emarginate or 2 to 4-lobed or toothed at apex, or if entire, then hairy along the nerves..... **13**
- 8a. Glumes aristate- acuminate; spikelets sessile on the flattened branches of narrow panicle..... **19. Dinebra**
- b. Glumes obtuse, acute or acuminate; spikelets in digitate spikes or in short raceme of spikes..... **9**
- 9a. Spikelets in open, contracted or spike-like panicles or solitary, secund spikes or in globose dense clusters **10**
- b. Spikelets in digitate or racemosely arranged spikes or spike-like racemes, or in solitary spike, but not second **11**
- 10a. Inflorescence a panicle or spike-like panicle **24. Eragrostis**
- b. Inflorescence a solitary secund spike **23. Eragrostiella**
- 11a. Axis of the spikes terminating into a sharp point. **14. Dactyloctenium**
- b. Axis and branches of the inflorescence ending in a spikelet..... **12**
- 12a. Spikelets falling entire at maturity from the axis of straight spikes; the latter crowded into a long, narrow, dense panicle..... **16. Desmostachya**
- b. Spikelets in pseudo whorls along the clum axis. **1. Acrachne**
- 13a. All florets fertile. Lemmas glabrous **45. Tripogon**
- b. Upper 1-3 florets sterile, reduced to empty lemmas; lemmas shortly hairy. **42. Tetrapogon**
- 14a. Inflorescence terminal, spicate, neither digitate nor of racemose spikes. **15**
- b. Inflorescence of digitate spikes or spikes racemose. **17**

- 15a. Inflorescence of pedunculate groups of awned spikelets on a simple rachis; spikelets not sunk in rachis. **27. Melanocenchris**
- b. Inflorescence a simple spike of awnless, sessile spikelets sunk in rachis. **16**
- 16a. Spikelets sunken into the thick tough rachis.....**30. Oropetium**
- b. Spikelets not sunken in a thick rachis **22. Enteropogon**
- 17a. Spikelets 1-flowered, bisexual, usually without sterile floret above, sometimes a tiny vestigial floret present on the rachilla extension. Lemmas not widened above, glabrous. **18**
- b. Spikelets 2 to 4-flowered, fertile floret only one. Rachilla produced and bearing 1 to several empty lemmas. Lemmas widened above, hairy.....**10. Chloris**
- 18a. Lemmas long-awned. **37. Schoenefeldia**
- b. Lemmas awnless. **13. Cynodon**
- 19a. Lemma hairy all over the back. **6. Arundo**
- b. Lemmas glabrous. **33. Phragmites**
- 20a. Glumes minute or suppressed. Fertile lemma and palea similar in shape and texture. Stamens 6 **31. Oryza**
- b. Glumes well-developed. Fertile lemma and palea dissimilar. Stamens 3. **21**
- 21a. Spikelets with three florets. **32. Phalaris**
- b. Spikelets with 1 or 2 florets only **22**
- 22a. Spikelets not falling entire, if falling entire, then with firmly membranous to coriaceous, awned or 5-nerved lemmas. **23**
- b. Spikelets falling entire at maturity, either singly or in clusters from the axis of slender spike-like panicle or raceme; lemmas delicate, 1 to 3-nerved. **44. Tragus**
- 23a. Lemmas hyaline or membranous at maturity, rarely indurated and then laterally compressed; awns simple or absent **24**
- b. Lemmas indurated or rigid at maturity, terete or dorsally compressed; awns trifid. **4. Aristida**
- 24a. Lemmas usually 3 to 5-nerved, awned. Glumes longer and firmer than the hyaline lemma or when the lemma is longer than the latter indurated. Grains with an adhering pericarp.....**34. Polypogon**

- b. Lemmas 1 to 3-nerved, awnless. Glumes and lemmas very similar in texture, hyaline or thinly membranous, shining. Grains with a free pericarp..... **41. Sporobolus**
- 25a. Spikelets solitary, if paired, then the spikelets all alike. Glumes membranous; the lower mostly smaller or sometimes suppressed. Lower lemma resembling the upper glume in texture; upper one papery to very tough and rigid, awnless. **26**
- b. Spikelets paired, with one sessile and other pedicelled, if solitary, then all alike. Glumes of equal size, as long as the spikelet and enclosing the floret, rigid. Lower lemma hyaline or membranous lemmas not resembling upper glume; upper one with a geniculate awn..... **28**
- 26a. Spikelets with an involucre of bristles or subtended by a solitary bristle and falling with or without the bristles at maturity. **27**
- b. Spikelets not subtended by bristles, or if so, then the bristles persisting after the spikelets have fallen. **32**
- 27a. Bristles caducous. Upper lemma smooth..... **9. Cenchrus**
- b. Bristles persistent. Upper lemma transversely rugose..... **39. Setaria**
- 28a. Lemma of the upper floret more or less crustaceous or coriaceous, usually with narrow inrolled margins, exposing much of the palea. **29**
- b. Lemma of the upper floret thinly cartilaginous, with flat, hyaline margins. **30**
- 29a. Lower glume turned away from the rachis of the racemes or spike, the back of the upper lemma facing it, i.e. spikelets abaxial.....**31**
- b. Lower glume turned towards the rachis, the back of the upper lemma turned away from it, i.e. spikelets adaxial..... **46. Urochloa**
- 30a. Spikelets awnless. **18. Digitaria**
- b. Spikelets awned. **2. Allopteroopsis**
- 31a. Culms erect or suberect; leaf-blade linear; racemes dense.. **20. Echinochloa**
- b. Culms creeping and ascending; leaf-blade lanceolate to ovate; racemes comparatively loose..... **29. Oplismenus**
- 32a. Sessile and the pedicelled spikelets of each pair hermaphrodite. Joints of the panicle thin, linear or somewhat expanded at the top. **33**

- b. Sessile spikelet of a pair hermaphrodite, the pedicelled one male or sterile or completely absent or if more or less similar then the joints of the racemes and the pedicel thick and swollen..... **34**
- 33a. Spikes in compound panicles or racemes **36. Saccharum**
 - b. Spikes digitate or subdigitate.**35. Pseudopogonatherum**
- 34a. Sessile spikelets with a male and a hermaphrodite florets; upper lemma mostly awned..... **35**
 - b. Sessile spikelets with a hermaphrodite floret only or occasionally with a male floret below; upper lemma awnless. **37**
- 35a. Joints of rachis and pedicels of the pedicelled spikelet swollen, 3-angled, rounded or flattened **36**
 - b. Joints of the rachis and the pedicels narrow, seldom thickened upwards, occasionally with a translucent longitudinal groove. **39**
- 36a. Racemes 1-noded, reduced to three hermaphrodite spikelets, enclosed in a boat-shaped spathe..... **3. Apluda**
 - b. Racemes many-noded, not enclosed in a spathe-like sheath **38. Sehima**
- 37a. Sessile spikelet spherical. Lower glume pitted all over. Pedicelled spikelets reduced..... **25. Hackelochloa**
 - b. Sessile spikelet not spherical. Lower glume not pitted. Pedicelled spikelet well developed or absent. **38**
- 38a. Racemes covered with shaggy hairs. **21. Elionurus**
 - b. Racemes usually glabrous not conspicuously hairy **28. Ophiuros**
- 39a. Spikelets in racemes are not interrupted by spathes or solitary at the ends of branches; the racemes collected into whorled panicle. Joints and pedicels not furrowed. **40**
 - b. Panicle of racemes are interrupted by spathes, or the espatheate racemes digitate or in pairs or solitary and terminal, sometimes the joints and/or pedicels with a translucent median furrow..... **41**
- 40a. Spikelets dorsally compressed.**40. Sorghum**
 - b. Spikelets compressed from the sides. **11. Chrysopogon**
- 41a. Upper lemma of the sessile spikelet with a basal awn. **5. Arthraxon**
 - b. Upper lemma of the sessile spikelet awned from the tip or from the cleft or upper lemma reduced to the hyaline base of the awn, very rarely unawned..... **42**

- 42a. Margins of the lower glume of the sessile spikelets sharply infolded, 2-keeled; awn glabrous..... **43**
- b. Margins of the lower glumes inturned and rounded at the sides, at the most keeled upwards; awns hairy **45**
- 43a. Joints and pedicel with a translucent longitudinal furrow..**8. Bothriochloa**
- b. Joints and pedicel without a translucent longitudinal furrow..... **44**
- 44a. Grass not aromatic; racemes not supported by spathes. Upper lemma of the sessile spikelet not cleft, often stipitate and passing into the awn. **17. Dichanthium**
- b. Aromatic grass; racemes supported by spathes. Upper lemma of the sessile spikelet 2-lobed or 2-cleft, awned in the sinus ..**12. Cymbopogon**
- 45a. Racemes surrounded at the base by an involucre **43. Themeda**
- b. Racemes without an involucre. **26. Heteropogon**

1. Acrachne Wight & Arn. ex Chiov.

Acrachne racemosa (Heyne ex Roem. & Schult.) Ohwi in Bull. Tokyo Sci. Mus. No. 18: 1. 1947; Bor, Grass. Burm. Ceyl. Ind. Pak. 487. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 969. 1993. *Eleusine racemosa* B. Heyne ex Roem. & Schult., Syst. Veg. ed. 15. 2: 583. 1817. *E. verticillata* Roxb., Fl. Ind. 1: 346. 1820; Hook.f., Fl. Brit. India 7: 295. 1896.

Glabrous tufted, annual grass, up to 70 cm high. Leaf blades linear-lanceolate, sparsely pilose, acuminate at apex, rounded at base, minutely serrulate and ligule ovate to truncate, membranous, fimbriate at apex. Spikes slender, ascending, many, scattered or whorled. Spikelets many-flowered, greenish-straw coloured, glabrous. Caryopsis oblong-globose, rugose, grooved, straw-coloured.

Fl. & Fr.: August - November.

Occasional in grasslands and open forests.

Specimen examined: Near Umar ka Khal [24 59 47.34 N, 74 54 34.30 E, 480 m], *P. Hari Krishna* & *R. Kumar* 35675(BSJO).

2. Alloteropsis C. Presl

Alloteropsis cimicina (L.) Stapf in Prain, Fl. Trop. Afr. 9: 487. 1919; Bor, Grass. Burm. Ceyl. Ind. Pak. 276. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 970. 1993. *Milium cimicinum* L., Mant. Alt. 184. 1771. *Axonopus cimicinus* (L.) P. Beauv., Ess. Agrost. 12. 1812; Hook.f., Fl. Brit. India 7: 64. 1896.

Tufted herbs, up to 60 cm high. Leaves ovate-lanceolate, deeply cordate at base, acute, margins ciliate. Racemes whorled; spikelets solitary, 3-6 mm long, ellipsoid, 2-flowered, shining, lower florets male, upper bisexual, upper lemma aristate. Spikelets solitary or clustered, green. Caryopsis elliptic-oblong, pale brown.

Fl. & Fr.: July - October.

Common in wastelands and open forests.

Specimens examined: Crocodile view point-Bassi dam [25 0 35.97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35114 (BSJO); Jamunia [25 0 45.47 N, 74 48 0.9 E, 466 m], *P. Hari Krishna & R. Kumar* 35207(BSJO); Kelzar village road [24 58 54.71 N, 74 46 54.5 E, 431 m], *P. Hari Krishna & R. Kumar* 35221(BSJO); Near Jariya Mahadev [25 02 05.93 N, 74 53 3.79 E, 489 m], *P. Hari Krishna & R. Kumar* 35375(BSJO); Mahuria-Jhaleswar Nala [25 02 05.93 N, 74 53 3.79 E, 489 m], *P. Hari Krishna & R. Kumar* 35187(BSJO).

3. *Apluda* L.

***Apluda mutica* L.**, Sp. Pl. 1: 82. 1753; Bor, Grass. Burm. Ceyl. Ind. Pak. 93. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 972. 1993. *A. aristata* L. Amoen. Acad. 4: 303. 1956. *A. varia* Hack. in DC. Monogr. Androp. 6: 197. 1889, incl. subsp. *aristata* & *mutica*; Hook.f., Fl. Brit. India 7: 150. 1896. *A. mutica* L. var. *aristata* (L.) Hack. ex Backer, Handb. Fl. Java 2: 54. 1928. (Plate-31). 'Gundo'

Perennial tufted grass, up to 1 m high and rooting from the lower nodes. Leaf blade elliptic to linear, attenuate at the base to petiole, acuminate. Panicles compound, terminal, simple racemes. Spikelets in threes, one sessile and two pediceled. Spikelets sessile, enclosed in boat shaped spathe, greenish-yellow. Glumes chartaceous, many-nerved. Caryopsis ellipsoid.

Fl. & Fr.: August -January.

Common in rocky and sandy plain grasslands.

Specimens examined: Near Ram Mandir-Bassi [25 00 01.16 N, 74 47 09.02 E, 435 m], *P. Hari Krishna & R. Kumar* 35303 (BSJO); Near Semla dhar [24 55 30.79 N, 74 52 43.22 E, 552 m], *P. Hari Krishna & R. Kumar* 35355 (BSJO); Near Hanuman Choraya [24 59 43.59 N, 74 04 8 39.24 E, 493 m], *P. Hari Krishna & R. Kumar* 35487 (BSJO); Near Umar ki Khal [24 59 44.63 N, 74 54 48.55 E, 492 m], *P. Hari Krishna & R. Kumar* 35533(BSJO); Muroli Forest area [25 03 03.34 N, 74 55 51.72 E, 433 m], *P. Hari Krishna & R. Kumar* 35598, (BSJO). Near Nelia Kamal Enclosure [24 59 51.57 N, 74 54 50.86 E, 539 m], *P. Hari Krishna & R. Kumar* 37311(BSJO); Near Bhungiria

[24 57 21.19 N, 74 48 10.37 E, 451 m], *P. Harikrishna* & *R. Kumar* 38350(BSJO).

4. *Aristida* L.

Key to the species

- 1a. Articulation between lemma and awns present. **2. *A. funiculata***
b. Articulation between lemma and awns absent. **1. *A. adscensionis***

1. *Aristida adscensionis* L., Sp. Pl. 1: 82. 1753; Hook.f., Fl. Brit. India 7: 224. 1896; Bor, Grass. Burm. Ceyl. Ind. Pak. 407. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 973. 1993. *A. depressa* Retz., Obs. Bot. 4: 22, 1786; Bor, *l.c.* 409. 1960. '*Lampriyo, Lamba*'

Erect or decumbent herbs, up to 50 cm high. Leaves flat or convolute, linear, rough, filiform, smooth; sheaths smooth, with rounded auricles; ligule a ridge of fine hairs. Panicles contracted, oblong, up to 30 cm long, occasionally lax, green or purple. Spikelets linear, erect, often tinged with purple, single-flowered. Caryopsis linear-oblong, straw-coloured.

Fl. & Fr.: August - December.

Common in open hilly tracts and gravelly-rocky habitats.

Specimen examined: Near Jariya Mahadev forest area [25 02 05.93 N, 74 53 03.79 E, 489 m], *P. Hari Krishna* & *R. Kumar* 35363(BSJO).

2. *Aristida funiculata* Trin. & Rupr., Sp. Gram. Stip. 159 1842; Hook.f., Fl. Brit. India 7: 226. 1896; Bor, Grass. Burm. Ceyl. Ind. Pak. 410. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3 : 974. 1993. *A. royleana* Trin. & Rupr., *l.c.* 160. 1842; Bor, Grass. Burm. Ceyl. Ind. Pak. : 412. 1960. (Plate-31). '*Lampi*'

Slender, annual herbs, up to 45 cm high. Leaves convolute or flat, ciliate at base with long, white hairs; sheaths glabrous; ligule a small, ciliate at the base. Panicles contracted to 15 cm long, lax, narrow, with capillary branches, rachis angular. Spikelets linear-lanceolate, green with purple tinge. Glumes awned. Lemmas smooth, awned; awns articulated, 3-fid. Caryopsis oblong-cylindrical, blackish-brown.

Fl. & Fr.: August-December.

Occasional in grasslands and sandy-rocky habitats.

Specimens examined: Near Savrna Talab [24 59 53.09 N, 74 48 23.70 E, 487 m], *P. Hari Krishna* & *R. Kumar* 35637 (BSJO); Near Bhungiria [24 57 20.80 N, 74 48 10.49 E, 455 m], *P. Hari Krishna* & *R. Kumar* 38345 (BSJO); Near Taleti [24 58 42.65 N, 74 52 50.68 E, 547 m], *P. Hari Krishna* & *R. Kumar* 35663 (BSJO); Near Jharia Mahadev [25 01 41.97 N, 74 53 00.74 E, 488 m], *P. Hari Krishna* & *R. Kumar* 35689 (BSJO).

5. *Arthraxon* P. Beauv.

Arthraxon lanceolatus (Roxb.) Hochst., Flora 39: 188. 1856; Hook.f., Fl. Brit. India 7: 143. 1896; Bor, Grass. Burm. Ceyl. Ind. Pak. 100. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 979. 1993. *Andropogon lanceolatus* Roxb., Fl. Ind. 1: 262. 1820.

Rhizomatous grass, up to 50 cm high. Leaves ovate-lanceolate, acuminate. Racemes slender, greenish-purple or violet. Sessile spikelets linear-lanceolate, glabrous, awned. Pedicilled spikelets oblong-lanceolate, unawned. Caryopsis terete, straw-coloured.

Fl. & Fr.: August - October.

Occasional, along the streams and moist places.

Specimens examined: Near Semla dhar [24 55 30.79 N, 74 52 43.22 E, 552 m], *P. Hari Krishna & R. Kumar* 35360 (BSJO); Near Modiya Mahadev [24 59 37.44 N, 74 52 31.52 E, 500 m], *P. Hari Krishna & R. Kumar* 35708 (BSJO).

6. *Arundo* L.

Arundo donax L., Sp. Pl. 1: 81. 1753; Hook.f., Fl. Brit. India 7: 302. 1896; Bor, Grass. Burm. Ceyl. Ind. Pak. 413. f. 44. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 982. 1993. 'Bru'

Tall perennial grass, up to 5 m high, terete, erect, simple, hollow, with creeping rhizomes. Leaves flat, lanceolate, acuminate or ensiform. Panicles large, up to 70 cm long, decomposed. Spikelets lanceolate, laterally compressed, straw-coloured, 2-flowered. Caryopsis oblong, with linear hilum, straw-coloured.

Fl. & Fr.: August - October.

Rare, along water streams and canals.

Specimen examined: Ambapani Nala [24 58 50.13 N, 74 51 31.54 E, 446 m] ,*P. Hari Krishna & R. Kumar* 35332(BSJO).

7. *Avena* L.

Avena sterilis subsp. ***sterilis*** L. in Sp. Pl., ed. 2.: 118.1762. *Avena sterilis* L. var. *culta* Raizada in Ind. For. 80: 36. 1954; Maheshwari, Illus., Fl. Delhi f. 272. 1966; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 983. 1993. *A. sativa* auct. non L., 1753; Bor, Grass. Burm. Ceyl. Ind. Pak. 434. 1960.

Tufted annual grass, 40-80 cm high, with glabrous stem. Leaves linear-lanceolate, acute. Panicles lax, terminal. Spikelets 2-3-flowered. Glumes papery, whitish. Caryopsis tightly enveloped by lemma and palea, silky.

Fl. & Fr.: November - January.

Occasional in cultivated fields.

Specimen examined: Near Bhongidiya [24 58 50.13 N, 74 51 31.54 E, 446 m], P. Hari Krishna & R. Kumar 38440(BSJO).

8. Bothriochloa Kuntze

Key to the species

- 1a. Inflorescence subdigitate, or with a central axis shorter than the lowest raceme; lower racemes longer than the rachis; leaves mostly basal..... **2. B. pertusa**
- 1b. Inflorescence with a long central axis; lower racemes shorter than the main rachis; leaves cauline **1. B. bladhii**

1. Bothriochloa bladhii (Retz.) S.T. Blake in Proc. Roy. Soc. Queensland 80: 62. 1969; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 985. 1993. *Andropogon bladhii* Retz., Obs. Bot. 2: 27. 1781. *Bothriochloa glabra* (Roxb.) A. Camus in Ann. Soc. Linn. Lyon 76: 164. 1931; Bor, Grass. Burm. Ceyl. Ind. Pak. 107. 1960. (Plate-32)

Rhizomatous perennial grass, 40-120 cm high. Leaves narrowly linear, acute-acuminate, glaucous, ciliate at base. Panicles simple, with a central axis. Sessile spikelets green to purplish elliptic. Lower glume characterus, hairy below the middle, long awned with or without pit.

Fl. & Fr.: July - October .

Occasionally found in grassland.

Specimen examined: Near Jharia Mahadev [25 01 51.29 N, 74 53 01.91 E, 469 m], P. Hari Krishna & R. Kumar, 35505 (BSJO).

2. Bothriochloa pertusa (L.) A. Camus in Ann. Soc. Linn. Lyon (n.s.) 76: 164. 1931; Bor, Grass. Burm. Ceyl. Ind. Pak. 109. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1021. 1993. *Holcus pertusus* L., Mant. 2: 301. 1771. *Andropogon pertusus* (L.) Willd., Sp. Pl. 4(2): 922. 1806; Hook.f., Fl. Brit. India 7: 173. 1896. *Dichanthium pertusum* (L.) Clayton in Kew Bull. 32: 4. 1977. *Amphilophis pertusa* (L.) Nash ex Stapf in Agric. News W. Indies 15: 179. 1916.

Tufted perennial grass, up to 40 cm high. Leaves 6-30 x 0.20 -0.40 cm, linear-lanceolate, acuminate to acute, glabrous or pubescent. Inflorescence of 3-15, purplish, subdigitate, silky hairy. Sessile spikelets oblong-lanceolate.

Pedicellate spikelets glabrous on the back, mostly pitless or rarely pitted. Caryopsis oblong.

Fl. & Fr.: August - December.

Occasional in open grassy plains and moist localities.

Specimens examined: Near Semla dhar [24 55 30.79 N, 74 52 43.22 E, 552 m], *P. Hari Krishna & R. Kumar* 35359 (BSJO); Near Jariya Mahadev forest area [25 02 05.93 N, 74 53 3.79 E, 489 m], *P. Hari Krishna & R. Kumar* 35378 (BSJO).

9. *Cenchrus* L.

Cenchrus americanus (L.) Morrone, *Ann. Bot. (Oxford)* 106: 127. 2010. *Setaria glauca* (L.) P. Beauv. *Es. Agrostogr.* 51: 169.178.1812; Hook.f., *Fl. Brit. India* 7: 78. 1896; Bor, *Grass. Burm. Ceyl. Ind. Pak.* 360. 1960; Pandey in Shetty & Singh (eds.), *Fl. Rajasthan* 3: 1111. 1993. *Panicum glaucum* L., *Sp. Pl.* 1: 56. 1853.

Ascending or erect grass up to 0.6 m tall. Leaves, 4.5 - 20 x 0.2 - 1.6 cm, linear, acuminate with scabrid margins. Inflorescence c. 8 cm long, cylindrical. Spikelets c. 4mm long Broadly elliptic, solitary, glabrous. Bristles reddish- brown. Caryopsis ca 2 mm long, ellipsoid, plano convex.

Fl. & Fr.: August - December.

Common in grasslands and open forests.

Specimen examined: Near Panduria [24 58 31.31 N, 74 53 20.19 E, 512 m], *P. Hari Krishna & R. Kumar* 35339(BSJO).

10. *Chloris* Sw.

Chloris virgata Sw. *Fl. Ind. Occ.* 1: 203. 1797; Hook.f., *Fl. Brit. India* 7: 291. 1896; Bor, *Grass. Burm. Ceyl. Ind. Pak.* 468. 1960; Pandey in Shetty & Singh (eds.), *Fl. Rajasthan* 3: 1001. 1993.

Erect, tufted grass, up to 70 cm high. Leaves flat, linear, acute, glabrous, sheaths glabrous, compressed, mouth bearded with long hairs; ligule a narrow, membranous ridge. Spikes digitate; rachis 5- angular. Spikelets bi-seriate, 3-flowered, 2-awned, shortly pedicellate. Stamens 3, yellow. Caryopsis ellipsoid-oblong, pale brownish.

Fl. & Fr.: August - November .

Common in open forests and scrub vegetation.

Specimen examined: Kevdiya forest chowki [24 59 15.85 N, 74 49 47.22 E, 412 m], *P. Hari Krishna & R. Kumar* 35238 (BSJO).

11. **Chrysopogon** Trin.

Key to the species

- 1a. Upper glume of the sessile spikelet keeled, pectinate 1. **C. fulvus**
b. Lower glume muriculate; joints and pedicels glabrous. 2. **C. zizanioides**

1. **Chrysopogon fulvus** (Spreng.) Chiov., Fl. Somala 1: 327. 1929; Bor, Grass. Burm. Ceyl. Ind. Pak. 116. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1003. 1993. *Pollinia fulva* Spreng. Pugill. 2 : 10. 1815. *Chrysopogon montanus* Trin. ex Spreng. Neue Entdeck. 2: 93. 1821. *Andropogon monticola* Roem. & Schult., Syst. Veg. Mant. 2: 665. 1827; Hook.f., Fl. Brit. India 7: 192. 1896. *Chrysopogon monticola* (Roem. & Schult.) Haines in Ind. For. 4: 495. 1914. (Plate-31). 'Sebba'

Glabrous, simple or branched grass, up to 1 m high. Leaves linear, acute to acuminate, scabridulous on margins; sheaths keeled, glabrous, keeled; ligule a very shallow rim. Panicles terminal, golden yellowish-purple, branches filiform, arranged in whorls. Spikelets in groups of 3, one sessile, rest 2 pedicellate. Anthers 3, yellow-purple. Stigmas purple, plumose. Caryopsis, linear, yellowish-brown.

Fl. & Fr.: August - December.

Common in in plains and hilly tracts.

Specimens examined: Semaldar [24 59 37.66 N, 74 52 30.46 E, 491 m], *P. Hari Krishna & R. Kumar* 35707 (BSJO); Near Mevasa Gate [24 59 29.91 N, 74 48 52.83 E, 423 m], *P. Hari Krishna & R. Kumar* 35129 (BSJO).

2. **Chrysopogon zizanioides** (L.) Roberty in Bull. Inst. Fondam. Afrique Noire, Sér. A, Sci. Nat. 22: 106.1960. *Vetiveria zizanioides* (L.) Nash in Small, Fl. South-East U.S. 67. 1903; Bor, Grass. Burm. Ceyl. Ind. Pak. 258. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1137. 1993.. 'Khas'

Perennial herbs, up to 1.5 m high, roots spongy, aromatic. Leaves up to 40 x 1.60cm, glaucous, linear, acute, erect. Panicles ca. 24 cm long, terminal, cylindrical, up to 35 cm long. Sessile spikelets hermaphrodite, linear to lanceolate, acute to subacute, yellowish. Racemes 4-8 cm long, purplish, with paired spikelets. Sessile spikelets 2.5-6.5 mm long, linear-lanceolate. Pedicellate spikelets ca. 4.5 mm long, ovate-lanceolate, purplish, upper lemma entire, acute.

Fl. & Fr.: August - February.

Occasional found in moist habitats, along the water streams and lakes.

Specimens examined: Jhariya Mahadev [25 02 01.60 N, 74 53 04.90 E, 471 m], *P. Hari Krishna & R. Kumar* 35471(BSJO).

Uses: It is used to treat skin disorders.

12. *Cymbopogon* Spreng.

Key to the species

- 1a. Sessile spikelets awned; leaves odourless..... **2. *C. martini***
b. Sessile spikelets not awned; leaves having lemon like flavor. **1. *C. citratus***

1. *Cymbopogon citratus* (DC.) Stapf in Kew Bull. 1906: 357. 1906; Bor, Grass. Burm. Ceyl. Ind. Pak. 126. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1008. 1993. *Andropogon citratus* DC., Cat. Hort. Monsp. 78. 1813; Hook.f., Fl. Brit. India 7: 210. 1896.

Rhizomatous perennial grass, up to 1.5m. high. Leaves falt, linear, acuminate, whitish on the upper side. Panicels 35-55cm long, decomound, spatheate. Racemes 2-nate, 12-2.5 cm long, purplish-red. Fertile spikelet ca. 5 mm long, narrowly lanceolate, acuminate, reddish, glabrous. Glumes, ciliate; upper one mostly absent.

Fl. & Fr.: August - February .

Rare found in grassland.

Specimen examined: Amalda Naka [24 59 18.49 N, 74 56 45.43 E, 446 m] , *P. Hari Krishna & R. Kumar* 38428 (BSJO).

2. *Cymbopogon martini* (Roxb.) Watson in Atkins. Gaz. N. W. Prov. India 10: 392. 1882; Bor, Grass. Burm. Ceyl. Ind. Pak. 129. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1010. 1993. *Andropogon martinii* Roxb. Fl. Ind. 1: 280. 1820. *A. schoenanthus* L. var. *martinii* (Roxb.) Hook.f., Fl. Brit. India 7: 204. 1896. 'Gandhej-ghas'

Perennial herb, up to 2 m high. Leaves linear-lanceolate, subcordate or amplexicaul at base, filiform at tip. Panicles up to 25 cm long. Sessile spikelets of the lower pair male or neuter, others hermaphrodite, awned. Pedicelled spikelet: male or barren, oblong. Stamens 3.

Fl. & Fr.: August - March.

Occasional along the edges of water courses and moist-shaded places.

Specimens examined: near Bhungiria [24 57 20.95 N, 74 48 10.45 E, 452 m], *P. Hari Krishna & R. Kumar* 38348 (BSJO); near Umar ki Khal [24 59 44.63 N, 74 54 48.55 E, 492 m], *P. Hari Krishna & R. Kumar* 35521(BSJO);

near Nal forest area [25 05 15.84 N, 74 56 56.64 E, 414 m], *P. Hari Krishna & R. Kumar* 35770 (BSJO).

13.Cynodon L.C. Rich.

Key to the species

- 1a. Rhizomatous grass; lemmas longer than the upper glumes
..... **2. C. dactylon**
- b. Grass not rhizomatous; lemmas equal or shorter than upper glumes
..... **1. C. barberi**

1. Cynodon barberi Rang. & Tad. in J. Bombay Nat. Hist. Soc. 24: 846. 1916; Bor, Grass. Burm. Ceyl. Ind. Pak. 469. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1011. 1993.

Perennial herb; rooting at nodes. Leaves linear-lanceolate, acute to obtuse, rarely acuminate, glabrescent. Spikes 2-6, whorled, spreading, each up to 4 cm long. Spikelets alternate, sessile, ovate to oblong, acute, solitary. Caryopsis oblong, triquetrous, acute to obtuse, straw coloured.

Fl. & Fr.: August - October.

Rare found along moist - shaded habitats.

Specimen examined: Near Ram Mandir-Bassi [25 00 01.16 N, 74 47 09.02 E, 435 m], *P. Hari Krishna & R. Kumar* 35300(BSJO).

2. Cynodon dactylon (L.) Pers. Syn. Pl. 1: 85. 1805; Hook.f., Fl. Brit. India 7: 288. 1896; Bor, Grass. Burm. Ceyl. Ind. Pak. 469. f. 52. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1011. 1993. *Panicum dactylon* L., Sp. Pl. 1: 58. 1753. *'Dub, Doob.'*

Creeping, stoloniferous perennial herb, rooting at nodes. Leaves distichous, flat, linear-lanceolate, acute, sheaths bearded at mouth; ligule a rim of fine, white hairs. Spikes 3-4 digitate, erect, spreading, purplish. Spikelets sessile, 1-flowered, crowded, secund; rachilla produced. Caryopsis oblong- obovoid, turgid, smooth.

Fl. & Fr.: January - December.

Common in open fields and along water channels.

Specimens examined: Near Bassi Dam [24 59 33.92 N, 74 49 30.19 E, 411 m], *P. Hari Krishna & R. Kumar* 38317 (BSJO); Near Savrna Talab [24 59 53.09 N, 74 48 23.70 E, 487 m], *P. Hari Krishna & R. Kumar* 35627 (BSJO).

14.Dactyloctenium Willd.

Key to the species

- 1a. Grass not stoloniferous; inflorescence compact; spikes upto 2 cm long
..... **2. D. aristatum**
- b. Grass not stoloniferous; inflorescence open; the spikes 2.5-6.0 cm long
..... **1. D. aegyptium**

1. Dactyloctenium aegyptium (L.) Willd., Enum. Hort. Berol. 1029. 1809; Bor, Grass. Burm. Ceyl. Ind. Pak. 489. f. 54. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1012. 1993. *Cenchrus aegyptius* P.Beauv. in Ess. Agrostogr.: 157. 1812, pro syn. *Eleusine aegyptia* (L.) Desf., Fl. Atlant. 1 : 85. 1798; Hook.f., Fl. Brit. India 7: 295. 1896.

'Madhana'

Ascending annual grass, 12-40 cm high. Leaves flat, linear-lanceolate, hairy, ciliate with bulbous-based hairs, tapering into a fine point; ligule a ring of white hairs. Spikes 2-4, terminal, digitately radiating, each 1.5 - 5 cm long. Spikelets 3-5 flowered, laterally compressed. Anthers 3, yellow. Caryopsis compressed, subglobose, rugose, reddish.

Fl. & Fr.: August - November.

Common in open forests and wastelands.

Specimen examined: Amalda Naka [24 59 33.92 N, 74 49 30.19 E, 411 m], *P. Hari Krishna & R. Kumar* 38450 (BSJO).

2. Dactyloctenium aristatum Link, Hort. Berol. 1: 59. 1827; Bor, Grass. Burm. Ceyl. Ind. Pak. 489. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1013. 1993. *Eleusine aristata* sensu Hook.f., Fl. Brit Ind. 7: 296. 1896. *Dactyloctenium aegypticum* (L.) Willd. var. *aristatum* (Link) A. Chev. in Rev. Bot. Appl. Agric. Trop. 14: 130. 1934.

Tufted annual herbs, up to 30 cm high. Leaves linear-lanceolate, sheaths compressed, glabrous, margins ciliate, ligule very short. Spikes solitary, terminal, usually 4 or more, each up to 2 cm long, rachis slender. Spikelets densely crowded, sessile, in 2-rows, 3-5 flowered. Caryopsis broadly elliptic to obovate.

Fl. & Fr.: July - November.

Common in moist sandy and gravelly habitats.

Specimen examined: Jhaleshwar Mahadev gate [25 1 21.99 N, 74 48 30.65 E, 424 m], *P. Hari Krishna & R. Kumar* 35162 (BSJO).

15. Dendrocalamus Nees

Dendrocalamus strictus (Roxb.) Nees in Linnaea 9: 476. 1834; Gamble in Hook.f., Fl. Brit. India 7: 404. 1896; Pandey in Shetty & Singh

(eds.), Fl. Rajasthan 3: 1014. 1993. *Bambusa stricta* Roxb. Pl. Cor. 1 : 58. t. 80. 1798. 'Bans'

Perennials, woody bamboos, up to 10 m tall, culms more or less solid, with swollen nodes. Lower nodes often rooting. Internodes 25-50 cm long. Leaves shortly petiolate, linear-lanceolate or ovate-lanceolate. Inflorescence a panicle of dense, globose heads. Spikelets crowded, hairy, spinescent; perfect florets 2 or 3, intermixed with many, small, sterile florets. Caryopsis ovoid-subglobose, shining brown.

Fl. & Fr.: At the intervals of many years (March - May).

Occasional on hill-tops and high slopes, rarely in the valleys.

Specimens examined: Bichhor forest area [25 04 12.2 N, 74 54 37.36 E, 447 m], *P. Hari Krishna & R. Kumar* 35402 (BSJO); Aamjharua [25 00 46.86 N, 74 51 12.96 E, 422 m], *P. Hari Krishna & R. Kumar* 35565 (BSJO).

16. *Desmostachya* Stapf

Desmostachya bipinnata (L.) Stapf in Dyer, Fl. Cap. 7: 632. 1900; Bor, Grass. Burm. Ceyl. Ind. Pak. 491. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1015. 1993. *Briza bipinnata* L., Syst. Nat. ed. 10. 2: 875. 1759. *Poa cynosuroides* Retz., Obs. Bot. 4 : 20. 1786. *Eragrostis cynosuroides* (Retz.) P. Beauv., Ess. Agrost. 162. 1812; Hook.f., Fl. Brit. India 7: 324. 1896 'Dab'

Rhizomatous, perennial herb, up to 1.25 m high. Leaves flat, linear-convolute, acute, sheaths leathery, often flabellate at base of the culm. Inflorescence large panicle, up to 20 cm long of many spikes. Spikelets sessile, linear-oblong, purplish-brown, 3-6 flowered. Caryopsis ovoid, laterally compressed, straw coloured.

Fl. & Fr.: August - November.

Common in grasslands and along riverbeds.

Specimen examined: Bichhor forest area [25 04 12.2 N, 74 54 37.36 E, 447 m], *P. Hari Krishna & R. Kumar* 35412 (BSJO).

17. *Dichanthium* Willemet

Key to the species

- 1a. Inflorescence terminal panicle or digitate raceme.... **1. *D. annulatum***
- b. Inflorescence a solitary raceme..... **2. *D. foveolatum***

1. *Dichanthium annulatum* (Forssk.) Stapf in Prain, Fl. Trop. Africa 9: 178. 1817; Bor, Grass. Burm. Ceyl. Ind. Pak. 133. 1960; Pandey in Shetty

& Singh (eds.), Fl. Rajasthan 3: 1017. 1993. *Andropogon annulatus* Forssk. Fl. Aegypt.-Arab. 173. 1775; Hook.f., Fl. Brit. India 7: 196. 1896.

Tufted, Perennials, up to 1.5 m high, with strong roots. Leaves flat, linear-lanceolate, margins scabrid, sheaths terete, striate. Inflorescences of 3-10, terminal racemes. Sessile spikelets bisexual, narrowly oblong-lanceolate, dorsally compressed, acute, awned, greenish to purple. Pedicelled spikelets male or barren, oblong-oblancoelate, unawned. Caryopsis broadly-ellipsoid, slightly compressed, pale brown.

Fl. & Fr.: August - November.

Common in grasslands and open forests.

Specimens examined: Near Ram Mandir-Bassi [25 00 01.16 N, 74 47 09.02 E, 435 m], *P. Hari Krishna & R. Kumar* 35302 (BSJO); Aamjharia [25 00 46.86 N, 74 51 12.96 E, 422 m], *P. Hari Krishna & R. Kumar* 35566 (BSJO); Mahudia- Maheshra [25 02 36.95 N, 74 52 09.32 E, 430 m], *P. Hari Krishna & R. Kumar* 35606(BSJO); Near Palka [24 59 22.18 N, 74 46 57.50 E, 438 m], *P. Hari Krishna & R. Kumar* 38342(BSJO).

2. *Dichanthium foveolatum* (Delile) Roberty in Boissiera 9:170.1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1019. 1993. *Andropogon foveolatus* Del., Fl. Egypt 16: t.8. f.2. 1812; Hook.f., Fl. Brit. India 7: 168. 1896. *Andropogon strictus* Roxb., Fl. Ind. 1: 260.1832. *Eremopogon strictus* (Roxb.) A. Camus in Ann. Soc. Linn. Lyon.(n.s.) 68: 208. 1921.

Perennial herbs, up to 1 m high. Leaves flat, linear-lanceolate, glabrous, acute. Inflorescence of 3-6 pubescent racemes, digitate. Sessile spikelets narrowly Obovate-lanceolate. Anthers 3, yellow. Pedicellate spikelet pitted or not, acute.

Fl. & Fr.: August - December.

Common in sandy and rocky habitats.

Specimens examined: Near Jariya Mahadev forest area [25 02 05.93 N, 74 53 3.79 E, 489 m], *P. Hari Krishna & R. Kumar* 35362 (BSJO); Meghpura Chowki [25 01 36.6 N, 74 48 49.2 E, 410 m], *P. Hari Krishna & R. Kumar* 35457(BSJO); Umarthana Forest Closer [25 00 51.79 N, 74 54 50.25 E, 508 m], *P. Hari Krishna & R. Kumar* 35501 (BSJO); Near Umar ki Khal [24 59 44.63 N, 74 54 48.55 E, 492 m], *P. Hari Krishna & R. Kumar* 35530 (BSJO); Near Nelia Kamal Enclosure [24 59 51.57 N, 74 54 50.86 E, 539 m], *P. Hari Krishna & R. Kumar* 37313 (BSJO); Near Mevasa Gate [24 59 29.91 N, 74 48 52.83 E, 423 m], *P. Hari Krishna & R. Kumar* 35135 (BSJO).

18. *Digitaria* Haller

Digitaria bicornis (Lam.) Roem. & Schult.in Syst. Veg., ed. 15[bis]. 2: 470.1817; Bor, in Webbia 11: 323. 1955; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1024. 1993. *Paspalum bicorne* Lam., Tab. Encycl. Meth. Bot. 1: 176.1791. *Panicum bicorne* Kunth, Enum. Pl. 1:83.1833. *Paspalum heteranthum* Hook.f., Fl. Brit. India 7: 16. 1896, non Link 1820, non Nees & Meyen 1843. *Digitaria biformis* Willd., Enum. Pl.: 92. 1809; Bor, Grass. Burma Ceyl. Ind. Pak. 299.1960.

Erect annual herbs, up to 40 cm high, often rooting at the lower nodes. Leaves linear-lanceolate. Inflorescence of 2-6 racemes, terminal digitate. Spikelets in pairs, elliptic-lanceolate, heteromorphous. Caryopsis ellipsoid, with circular dot-like hilum, tightly enclosed by hardened palea and lemma, yellowish-brown.

Fl. & Fr.: August - December.

Occasionally found in wet-moist habitats.

Specimen examined: Near Panduria [24 58 36.47 N, 74 53 08.26 E, 524 m], *P. Hari Krishna & R. Kumar* 35549 (BSJO).

19. *Dinebra* Jacq.

Dinebra retroflexa (Vahl) Panz. in Denkschr. Acad. Wiss. Munch.1813: 270.t.12.1814; Bor, Grass. Burma Ceyl. Ind. Pak. 491. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1031. 1993. *Cynosurus retroflexus* Vahl, Symb. Bot. 2: 20. 1791. *Dinebra arabica* Jacq., Fragm. 77.t. 121. f.1. 1809; Hook.f., Fl. Brit. India 7: 297. 1896. (Plate-32). '*Bada sarpat*'

Tufted annuals, up to 70 cm high, rooting at lower nodes. Leaves linear-lanceolate, base cordate, apex acuminate. Spikes stiff, deflexed, arranged racemosely in long axis, deciduous at maturity, greenish-yellow or purplish. Spikelets sessile, imbricate, wedge-shaped, 1-3 flowered. Caryopsis ellipsoid-oblong, loosely enclosed in lemma and palea.

Fl. & Fr.: July - September.

Common in wastelands and cultivated fields.

Specimens examined: near Ram Mandir-Bassi [25 00 01.16 N, 74 47 09.02 E, 435 m], *P. Hari Krishna & R. Kumar* 35305(BSJO); near Nal forest area [25 05 26.76 N, 74 56 47.37 E, 419 m], *P. Hari Krishna & R. Kumar* 38452 (BSJO).

20. *Echinochloa* P. Beauv.

Echinochloa colona (L.) Link, Hort. Berol. 2: 209. 1833; Bor, Grass. Burm. Ceyl. Ind. Pak. 308. f. 34. 1960; Pandey in Shetty & Singh (eds.), Fl.

Rajasthan 3: 1033. 1993. *Panicum colonum* L. Syst. Nat. ed. 10. 2 : 870. 1759; Hook.f., Fl. Brit. India 7: 32. 1896.

Erect or ascending annual herb, up to 60 cm high, rooting at lower nodes. Leaves linear-lanceolate, acuminate, glabrescent or margins scabridulous, marked with purplish-brown band at the junction of the blade and sheath. Racemes 10-20 cm long, along the main axis. Spikelets ovoid-ellipsoid, crowded, pubescent, green or purple, sessile in 3-5 rows. Caryopsis plano-convex, broadly elliptic, reddish brown-dull white.

Fl. & Fr.: March - August.

Common in marshy habitats and cultivated fields.

Specimen examined: Jhaleswar Mahadev gate [25 1 21.64 N, 74 48 20.12 E, 423 m], *P. Hari Krishna* & *R. Kumar* 35170 (BSJO).

21. *Elionurus* Kunth ex Willd.

Elionurus royleanus Nees ex A. Rich. Tent. Fl. Abyss. 2:471.1851; Hook.f., Fl. Brit. India 7: 161. 1896; Bor, Grass. Burm. Ceyl. Ind. Pak. 145. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1036. 1993. (Plate-32).

Slender annual grass with pubescent nodes. Leaves linear-lanceolate, acute to acuminate; ligule a short membrane. Racemes up to 5 cm long, yellowish-green with purplish tinge. Sessile spikelets with 2-fid long beak, ciliate, 8 - 10 mm long, ciliate. Glumes margins with a row of tubercles. Lower lemma nerveless, glabrous. Pedicellate spikelets up to 1.5 cm long, awned.

Fl. & Fr.: August - November.

Occasionally found on rocky slopes.

Specimens examined: Near Umar ki Khal [24 59 44.63 N, 74 54 48.55 E, 492 m], *P. Hari Krishna* & *R. Kumar* 35534 (BSJO).

22. *Enteropogon* Nees

Enteropogon dolichostachyus (Lag.) Keng in Clav. Gen. Sp. Gram. Prim. Sin.: 197. 1957. *Chloris dolichostachya* Lagasca, Gen. Sp. Pl. 5. 1816; Bor, Grass. Burm. Ceyl. Ind. Pak. 466. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 999. 1993.

Perennial herb, up to 1m high. Leaves linear, finely acuminate, flat, rounded at base, tapering to an acute tip; ligule a rim of hairs. Spikes 4-6, digitately arranged. Spikelets in 2-rows, 2-flowered, 2-awned, each subsessile. Stamens 3, yellow. Caryopsis 3-gonous, oblong or linear-oblong, enclosed in persistent lemma and palea, straw coloured.

Fl. & Fr.: August - March.

Occasional in open forests.

Specimens examined: Jhaleshwar Mahadev [25 00 56.90 N, 74 47 59.43 E, 421 m], *P. Hari Krishna & R. Kumar* 35198 (BSJO); Nandwai to Amla route [25 00 37.49 N, 74 56 55.58 E, 432 m], *P. Hari Krishna & R. Kumar* 35260 (BSJO); Near Kevdiya Chowki [24 59 38.89 N, 74 05 0 05.49 E, 444 m], *P. Hari Krishna & R. Kumar* 35464 (BSJO); Near Hanuman Choraya [24 59 43.59 N, 74 04 8 39.24 E, 493 m], *P. Hari Krishna & R. Kumar* 35478 (BSJO).

23. *Eragrostiella* Bor

Key to the species

- 1a. Leaf blades narrow, filiform, apex setaceous..... **1. *E. bifaria***
b. Leaf blades broader, short, apex obtuse..... **2. *E. brachyphylla***

1. *Eragrostiella bifaria* (Vahl) Bor in Indian For. 66: 270. 1940 & Grass. Burm. Ceyl. Ind. Pak. 494. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1040. 1993. *Poa bifaria* Vahl, Symb. Bot. 2: 19. 1791. *Eragrostis bifaria* (Vahl) Wight ex Steud. Nom. Bot. ed. 2.1: 562. 1840; Stapf in Hook.f., Fl. Brit. India 7: 325. 1896. 'Jondli'

Perennial grass, up to 50 cm high. Leaves linear, acute, glabrous, ligule membranous, blades linear, filiform. Racemes up to 25 cm long, terminal, olive-grey or green. Spikelets secund, 10 to 25-flowered, elliptic-oblong, laterally compressed, olive-green; rachilla fracturing at maturity towards base. Caryopsis broadly ovate or ellipsoid, pale brownish-grey.

Fl. & Fr.: August - October.

Occasional found on rocky slopes and along road-sides..

Specimens examined: near Mevasa Gate area [24 59 29.91 N, 74 48 52.83 E, 423 m], *P. Hari Krishna & R. Kumar* 35134(BSJO); near Semla dhar [24 55 30.79 N, 74 52 43.22 E, 552 m], *P. Hari Krishna & R. Kumar* 35358(BSJO); near Jariya Mahadev forest [25 02 05.93 N, 74 53 3.79 E, 489 m], *P. Hari Krishna & R. Kumar* 35374(BSJO).

2. *Eragrostiella brachyphylla* (Stapf) Bor in Ind. For. 66: 270. 1940 & Grass. Burm. Ceyl. Ind. Pak. 494. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1040. 1993. *Eragrostis brachyphylla* Stapf. in Hook.f., Fl. Brit. India 7: 327. 1896.

Slender perennial grass, up to 40 cm high. Leaves filiform, linear, acute. Inflorescence a raceme, up to 25 cm long, straw coloured, terminal,

compressed. Spikelets linear-oblong, secund, slightly compressed, up to 20-flowered. Caryopsis ca. 1.5 mm long, shortly ellipsoid, straw coloured.

Fl. & Fr.: August - October.

Rare found in rocky slopes.

Specimen examined: Enclosure Jhariya Mahadev [25 02 24.50 N, 74 52 54.91 E, 494 m], *P. Hari Krishna & R. Kumar* 37356 (BSJO).

24. *Eragrostis* N.M. Wolf

Key to the species

- 1a. Spikelets breaking up from above downwards; rachis fragile.
..... **1. *E. ciliaris***
- b. Spikelets breaking up from below upwards; rachis tough. **2**
- 2a. Annuals. **3**
- b. Perennials. **3. *E. nutans***
- 3a. Plants totally devoid of glands; spikelets many flowered.
..... **2. *E. gangetica***
- b. Plants with or without glandular. **4. *E. pilosa***

1. *Eragrostis ciliaris* (L.) R. Br. in Tuckey, Narr. Exp. Congo, App. 478. 1818; Stapf in Hook.f., Fl. Brit. India 7: 314. 1896; Bor, Grass. Burm. Ceyl. Ind. Pak. 506. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1045. 1993. *Poa ciliaris* L. Syst. Nat. ed. 10.2: 875. 1759. *Eragrostis ciliaris* (L.) R. Br. var. *brachystachya* Boiss. Fl. Orient. 5 : 582. 1884; Stapf in Hook.f., l.c. 7 : 315. 1896; Bor, l.c. 506. 1960.

Ascending or prostrate grass, up to 40 cm high. Leaves flat, narrowly linear-lanceolate, acute; sheaths bearded with long hairs at mouth; ligule a fringe of short hairs. Panicles up to 10 cm long, terminal, woolly due to the long, cilia on the keels of palea. Spikelets 3-5 mm long, 5-12 -flowered, broadly ovate, compressed, green with reddish tinge. Caryopsis ovoid or ellipsoid, pale brown.

Fl. & Fr.: August - November.

Common in grasslands and moist sandy habitats.

Specimens examined: Near Parsoli forest area [25 06 14.77 N, 74 52 29.86 E, 432 m], *P. Hari Krishna & R. Kumar* 37351 (BSJO); near Savrna Talab [24 59 53.09 N, 74 48 23.70 E, 487 m], *P. Hari Krishna & R. Kumar* 35638 (BSJO); near Taleti [24 58 40.03 N, 74 52 50.67 E, 554 m], *P. Hari*

Krishna & R. Kumar 35679(BSJO); near Muroli forest area [25 03 30.96 N, 74 56 5.72 E, 434 m], *P. Hari Krishna & R. Kumar* 38417 (BSJO).

2. Eragrostis gangetica (Roxb.) Steud. Syn. Pl. Glum. 1: 266. 1854; Bor, Grass. Burm. Ceyl. Ind. Pak. 508. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1047. 1993. *Poa gangetica* Roxb. Fl. Ind. 1: 341. 1820. *Eragrostis stenophylla* Hochst. ex Miq. in Verh. Konink.-Nederl. Inst. 3(4): 39. 1851; Stapf in Hook.f., Fl. Brit. India 7: 318. 1896, *p.p.*

Tufted perennial grass, up to 45 cm. Leaves linear, rigid, convolute, glabrous, acute; sheaths glabrous with bearded mouth; ligule a rim of short hairs. Panicles 4-16 cm long, oblong-ovate, terminal, branched. Spikelets 3-6 mm long, linear to linear-oblong, 10 to 20-flowered. Caryopsis, oblong to subglobose, brown.

Fl. & Fr.: August - December.

Occasional in grasslands and sandy soils habitats.

Specimen examined: Near Ram Mandir-Bassi [25 00 01.16 N, 74 47 09.02 E, 435 m], *P. Hari Krishna & R. Kumar* 35307(BSJO).

3. Eragrostis nutans (Retz.) Nees ex Steud. Nom. Bot. ed. 2. 563. 1840; Bor, Grass. Burm. Ceyl. Ind. Pak. 511. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1049. 1993. *Poa nutans* Retz. Obs. Bot. 4: 19. 1786. *Eragrostis stenophylla* auct. non Hochst. ex Miq. 1851; Stapf in Hook.f., Fl. Brit. India 7: 318. 1896.

Erect or ascending perennial grass, up to 45 cm high, with glabrous nodes. Leaves high, with glabrous nodes. Panicles 8-25 cm long; ovate or oblong in outline, branches alternate and distant. Spikelets 3-6 mm long, linear-oblong, 6-30- flowered. Caryopsis broadly oblong or subglobose, reddish-brown.

Fl. & Fr.: August - December.

Rare, found in moist localities and along drainage channels.

Specimens examined: Near Nal forest area [24 05 32.53 N, 74 56 37.96 E, 415m.], *P. Hari Krishna & R. Kumar*, 35760(BSJO).

4. Eragrostis pilosa (L.) P. Beauv., Ess. Agrost. 71, 162, 175. 1812; Stapf in Hook.f., Fl. Brit. India 7: 323. 1896; Bor, Grass. Burm. Ceyl. Ind. Pak. 512. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1050. 1993. *Poa pilosa* L., Sp. Pl. 1: 68. 1753. *P. verticillata* Cav. Ic. Pl. 1: 63. t. 93. 1791.

Erect or ascending annual grass, 25-50 cm high, glandular below nodes. Leaves linear, flat, acuminate, glabrous. Panicles 6-20 cm long, oblong or elliptic, lowest branches white. Spikelets 4.5-8 mm long, purplish-

green, linear-oblong, compressed, 5-10 flowered. Caryopsis, ellipsoid, laterally compressed, apiculate at base, reddish-brown.

Fl. & Fr.: August - January.

Occasional in moist shady places and marshy habitats.

Specimen examined: near Panduria [24 58 31.31 N, 74 53 20.19 E, 512 m], *P. Hari Krishna & R. Kumar* 35636 (BSJO).

25. *Hackelochloa* O. Ktze.

Hackelochloa granularis (L.) O. Ktze. Rev. Gen. Pl. 2: 776. 1891; Bor, Grass. Burm. Ceyl. Ind. Pak. 159. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1057. 1993. *Cenchrus granularis* L. Mant. 2: 575. 1771. *Manisuris granularis* (L.) L.f., Nov. Gram. Gen. 37. 1779; Hook.f., Fl. Brit. India 7: 159. 1896.

Erect or ascending, annual herb, 30 cm high, with white tuberculate hairy nodes. Leaves linear-lanceolate, acute, minutely hairy with bulbous-based hairs. Racemes solitary, axillary or terminal, spatheate, glabrous, pale green. Spikelets paired, sessile spikelets. Sessile spikelets up to 1.5 mm long, subglobose, glabrous, 4-glumed, with obconical callus. Pedicellate spikelets 2-glumed, up to 2.5 mm long. Caryopsis ca. 2.5 mm long, obovoid, brownish.

Fl. & Fr.: September - December.

Rare, found in grasslands and low hillocks.

Specimens examined: Near Sarna Talab [25 00 23.89 N, 74 04 8 34.31 E, 500 m], *P. Hari Krishna & R. Kumar* 35440 (BSJO); Near Muroli forest area [25 03 02.66 N, 74 55 26.24 E, 44 5m], *P. Hari Krishna & R. Kumar* 35781 (BSJO).

26. *Heteropogon* Pers.

Heteropogon contortus (L.) P. Beauv. ex Roem. & Schult., Syst. Veg. 2: 836. 1817; Bor, Grass. Burm. Ceyl. Ind. Pak. 163.f.6. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1059. 1993. *Andropogon contortus* L., Sp. Pl. 2: 1045. 1753; Hook.f., Fl. Brit. India 7: 199. 1896. (Plate-31).

'Kali-lamp'

Erect or decumbent, perennial herb, 30-110 cm high. Leaves 4-18 x 0.20-0.50 cm, flat or folded, linear-lanceolate. Racemes solitary, 3-12 cm long. Spikelets closely imbricate; clothed with stiff, tubercle based, brownish bristles, lower 2-6 sessile spikelets awnless, male or neuter; upper sessile spikelets with long, twisted awns, female or hermaphrodite. Caryopsis c. 2 mm long, cylindrical-oblong, hairy, brown.

Fl. & Fr.: August - November.

Common in grasslands and savannahs.

Specimens examined: Meghpura Chowki [25 01 36.6 N, 74 04 8 49.2 E, 410 m], *P. Hari Krishna & R. Kumar* 35425 (BSJO); near Fathepura [24 56 29.39 N, 74 54 17.56 E, 509 m], *P. Hari Krishna & R. Kumar* 35370 (BSJO); near Nelia Kamal Enclosure [24 59 51.57 N, 74 54 50.86 E, 539 m], *P. Hari Krishna & R. Kumar* 37310 (BSJO); near Meghpura watch tower area [24 59 38.71 N, 74 48 02.88 E, 575 m], *P. Hari Krishna & R. Kumar* 37393 (BSJO); near Bhungiria [24 57 20.79 N, 74 48 10.49 E, 454 m], *P. Hari Krishna & R. Kumar* 38351 (BSJO).

27. *Melanocenchris* Nees

Melanocenchris jacquemontii Jaub. & Spach. Ill. Pl. Or. 4: 36. t. 325. 1851; Bor, Grass. Burm. Ceyl. Ind. Pak. 473. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1074. 1993. *M. royleana* Nees ex Steud. Syn. Pl. Glum. 1: 218. 1854. *Gracilea royleana* (Nees ex Steud.) Hook.f., Fl. Brit. India 7: 284. 1896. (Plate-31).

Suberect small grass, up to 20 cm high. Leaves 2.5-5 x 0.1-0.25 cm, filiform-linear, acute, convolute-margined, covered with scattered, tubercle-based hairs. Spikes 3-6 cm long, filiform, recurved, flexuous, rachis filiform. Spikelets in clusters, 6-8 mm long including awns, green with purplish tinge, 2-flowered. Caryopsis 1.4-2.6 mm long, elliptic, obtuse, brown.

Fl. & Fr.: August - November.

Fairly common in rocky-gravelly and dry sandy soils.

Specimens examined: Jhaleswar Mahadev gate [25 1 21.99 N, 74 48 30.65 E, 424 m], *P. Hari Krishna & R. Kumar* 35161 (BSJO); Near Fathepura [24 56 29.39 N, 74 54 17.56 E, 509 m], *P. Hari Krishna & R. Kumar* 35729 (BSJO).

28. *Ophiuros* Gaertn.

Ophiuros exaltatus (L.) O. Ktze., Rev. Gen. Pl. 2:780.1891; Bor, Grass. Burm. Ceyl. Ind. Pak. 199. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1076. 1993. *Aegilops exaltata* L., Mant. Pl. 2:575.1771. *Ophiuros corymbosus* C.F. Gaertn., Suppl. Carp. Fruct. 3: 4.t.181.f.3a.1805; Hook.f., Fl. Brit. India 7: 160. 1896.

Perennial grass, up to 1.5 m high. Leaves linear-lanceolate, flat. Inflorescence a panicle corymbose, with many racemes, axillary or terminal. Each raceme 4-10 cm long, cylindrical, curved or straight, spatheate, purplish-green. Spikelets oblong-lanceolate, 2-3 mm, awnless, obtuse. Caryopsis ca. 1.4 mm long, ovate-oblong, pale-brownish.

Fl. & Fr.: October - January

Occasional found along water courses and forests.

Specimen examined: Crocodile view point-Bassi dam [25 00 35.97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35117(BSJO).

29. *Oplismenus* P. Beauv.

Oplismenus burmanni (Retz.) P. Beauv. Ess. Agrost. 54, 168, 169. 1812; Hook.f., Fl. Brit. India 7: 68. 1896; Bor, Grass. Burm. Ceyl. Ind. Pak. 317. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1076. 1993. *Panicum burmannii* Retz. Obs. Bot. 3: 10. 1783.

Annuals, procumbent or trailing grass, up to 40 cm high. Leaves ovate to elliptic-lanceolate, base amplexicaul, apex acuminate. Panicles up to 5 cm long, terminal, with alternate racemes. Spikelets 2.5 - 3 mm long, elliptic-ovate, pedicellate, pubescent, greenish-yellow, awned. Caryopsis 0.70-1.20 mm long, elliptic-oblong, depressed or canal-like on the other side, brownish.

Fl. & Fr.: August-December.

Common, found in moist and shady habitats in the forests.

Specimens examined: Bichhor forest area [25 04 12.2 N, 74 54 37.36 E, 447 m], *P. Hari Krishna & R. Kumar* 35405(BSJO); near Taleti [24 58 26.04 N, 74 52 37.97 E, 543 m], *P. Hari Krishna & R. Kumar* 35671(BSJO).

Uses: Used as very good fodder.

30. *Oropetium* Trin.

Oropetium thomaeum (L.f.) Trin., Fund. Agrost. 98. t.3. 1820; Hook.f., Fl. Brit. India 7: 366. 1896; Bor, Grass. Burm. Ceyl. Ind. Pak. 474. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1078. 1993. *Nardus thomaea* L.f., Suppl. Pl. 105. 1781. (Plate-32).

Small grass, 4-10 cm high, with fibrous, capillary roots. Leaves filiform, rolled, acute, floccosely hairy. Spikes 4 cm long, solitary, terminal, curved or staright, rachis 4-gonous. Spikelets sessile, deeply embedded in the distichous cavity of rachis. Caryopsis 0.4-0.70 mm long, obovate-oblong, base narrowed, brown.

Fl. & Fr.: August - December.

Occasionally found in sandy to gravelly plains.

Specimens examined: Jhaleswar Mahadev gate [25 01 21.99 N, 74 48 30.65 E, 424 m], *P. Hari Krishna & R. Kumar* 35165 (BSJO); near Niliya [25 00 09.11 N, 74 53 20.65 E, 550 m], *P. Hari Krishna & R. Kumar* 35699

(BSJO); near Muroli [25 03 32.24 N, 74 56 04.36 E, 430 m], *P. Hari Krishna & R. Kumar* 38414 (BSJO).

31. *Oryza* L.

Oryza rufipogon Griff., Notul. 3: 5. 1851 & Icon. Pl. As. 3: t. 144. f. 2. 1851; Bor, Grass. Burm. Ceyl. Ind. Pak. 605. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1079. 1993. *O. nivara* Sharma & Shastri in Ind. J. Gen. & Pl. Breed. 25 : 161. 1965.

Tufted, marshy or aquatic, stoloniferous grass, up to 75 cm high, with glabrous nodes. Leaves linear-lanceolate, acute to acuminate, rounded or shallowly cordate at base, flat. Panicles up to 25 cm, up to 25 cm long, lax. Spikelets deciduous, 6-7 mm long, oblong, compressed, dull yellow to greenish. Caryopsis ca. 3.5 mm long, elliptic or oblong, shape and size highly variable.

Fl. & Fr.: October- December .

Rare, grows in inundated low lands, pools and ditches.

Specimens examined: near Kevdiya Chowki [24 59 38.89 N, 74 05 0 05.49 E, 444 m], *P. Hari Krishna & R. Kumar* 35463(BSJO); near Muroli forest area [25 02 58.59 N, 74 55 34.46 E, 440 m], *P. Hari Krishna & R. Kumar* 35777(BSJO); Savarna lake [24 59 51.19 N, 74 45 21.63 E, 489 m], *P. Hari Krishna & R. Kumar* 37390(BSJO).

Uses: Tribals used as a food.

32. *Phalaris* L.

Phalaris minor Retz., Observ. Bot. 3: 8. 1783; Bor, Grass. Burm. Ceyl. Ind. Pak. 616. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1097. 1993. (Plate-32).

Annual herb, up to 80 cm high. Leaves flat, linear-lanceolate, 4-10 mm long. Panicle contracted, 1.5 -6 x 1.2- 2 cm, ovate-oblong. Spikelets c. 4 mm long, acute laterally strongly compressed. Sterile floret, 1.3 mm long or very short and only 0.2-0.3 mm long, glabrous. Caryopsis closely invested by the indurated lammas and paleas

Fl. & Fr.: December - March.

Common in cultivated fields and wastelands.

Specimens examined: Nal Bada Anikat [25 05 28.85 N, 74 56 40.59 E, 439 m], *P. Hari Krishna & R. Kumar* 35594 (BSJO); Near Kevdiya Chowki [25 01 20.92 N, 74 49 27.49 E, 443 m], *P. Hari Krishna & R. Kumar* 35619(BSJO); Near keljar [24 58 27.01 N, 74 48 47.99 E, 442 m], *P. Hari Krishna & R. Kumar* 38323(BSJO).

33. Phragmites Adans.

Phragmites karka (Retz.) Trin. ex Steud. Nom. Bot. ed. 2. 2 : 324. 1841; Hook.f., Fl. Brit. India 7: 304. 1896; Bor, Grass. Burm. Ceyl. Ind. Pak. 416. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1098. 1993. *Arundo karka* Retz. Obs. Bot. 4: 21. 1786.

An erect herb, up to 2.5 m high, culms fistular, with creeping rhizomes. Leaves linear-lanceolate, acuminate, rounded or subcordate at base, glabrous above, scabrid beneath; sheaths loose, throat hairy; ligule a ciliate rim. Panicles up to 50 cm long, lax, open, decomposed; branches filiform, scabrid, rachilla fragile. Spikelets up to 3 cm long, linear to lanceolate, 4 to 6-flowered; rachilla densely silky-villous. Caryopsis narrowly elliptic-oblong, purplish.

Fl. & Fr.: August - December.

Occasional along streams in forests and perennial depressions in low lands.

Specimens examined: Near Devalgarh [24 58 6.33 N, 74 50 38.50 E, 408 m], *P. Hari Krishna & R. Kumar* 38389(BSJO).

34. Polypogon Adanson

Polypogon monspeliensis (L.) Desf., Fl. Atlant. 1: 67. 1798; Hook.f., Fl. Brit. India 7: 245. 1896; Bor, Grass. Burm. Ceyl. Ind. Pak. 403. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1099. 1993. *Alopecurus monspeliensis* L., Sp. Pl. 1: 61. 1753. 'Malar'

Erect or decumbent, annual grass, 20-60 cm high. Leaves flat, linear-lanceolate acute, scabridulous on margins; ligule an oblong, membranous rim. Panicles 4-12 cm long, dense, cylindrical, bristly, pale yellowish-green, silky. Spikelets up to 4 mm long, equal, broadly winged, pale greenish-yellow. Caryopsis c. 1.5 mm long, ellipsoid-ovoid, yellowish-brown.

Fl. & Fr.: August - March.

Common in wastelands and cultivated fields.

Specimens examined: Jharia Mahadev [25 01 51.29 N, 74 53 01.91 E, 469 m], *P. Hari Krishna & R. Kumar* 35513(BSJO); Mahudia-Maheshra [25 02 36.95 N, 74 52 09.32 E, 430 m], *P. Hari Krishna & R. Kumar* 35607(BSJO); Near keljar [24 58 27.01 N, 74 48 47.99 E, 442 m], *P. Hari Krishna & R. Kumar* 38324 (BSJO); Near Devalgarh [25 0 42.28 N, 74 51 21.36 E, 440 m], *P. Hari Krishna & R. Kumar* 38382(BSJO); Fatehpur Near forest [25 3 31.07 N, 74 56 5.72 E, 433 m], *P. Hari Krishna & R. Kumar* 38412(BSJO).

35. *Pseudopogonatherum* A. Camus

Pseudopogonatherum trispicatum (Schult.) Ohwi in Bull. Tokyo Sci. Mus. 18: 3. 1947. *Eulalia trispicata* (Schult.) Henrard in Blumea 3: 453. 1940; Bor, Grass. Burm. Ceyl. Ind. Pak. 157. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1056. 1993. *Andropogon trispicatus* Schult., Mant. 2: 452. 1824. *Eulalia tristachya* Kuntze, Revis. Gen. Pl. 2: 775. 1891. *Andropogon tristachyus* Roxb., Fl. Ind. 1: 261. 1820, non Kunth 1816..

Tufted perennial herb, nodes bearded with white hairs. Leaf blade linear-lanceolate, brownish green, glabrous. Racemes 3-7 digitate or subdigitate. Spikelets elliptic to lanceolate, 3.5 - 4.5 x ca. 0.6 mm, acute at apex, yellowish to brownish. Sessile spikelets 2-keeled, hairy below the middle. Pedicelled spikelets similar to sessile one. Caryopsis oblong.

Fl. & Fr.: August - December.

Occasionally found in grasslands and near cultivated fields.

Specimen examined: Watch tower road [25 00 46.44 N, 74 48 39.57 E, 484 m], *P. Hari Krishna & R. Kumar* 35152 (BSJO).

36. *Saccharum* L.

Saccharum spontaneum L., Mant. Pl. 2: 183. 1771; Hook.f., Fl. Brit. India 7: 118. 1896; Bor, Grass. Burm. Ceyl. Ind. Pak. 214. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1104. 1993. (Plate-32).

Erect, rhizomatous, perennial grass, 1-3 m tall. Leaves rigid, glaucous, linear, flat or convolute, base narrowed, margin scaberulous, apex acuminate, coriaceous, glabrous, margins scabrid. Panicles 15 - 60 cm long, conical-oblong in outline, purplish, silky silvery hairy. Spikelets 3.2 - 4.8 mm long, ovate-lanceolate, in pairs, awnless, all alike, each 1-flowered; callus hairs silky-white. Caryopsis oblong, brownish.

Fl. & Fr.: August - December.

Occasional, in moist localities along water channels and marshy habitats.

Specimens examined: near Sarana Talab [25 00 23.89 N, 74 04 8 34.31 E, 500 m], *P. Hari Krishna & R. Kumar* 35443(BSJO); Sarana Talab [24 59 53.09 N, 74 48 23.70 E, 487 m], *P. Hari Krishna & R. Kumar* 35633(BSJO).

Uses: The root system is good sand binder.

37. *Schoenefeldia* Kunth

Schoenefeldia gracilis Kunth, Rev. Gram. 1: 283. t. 53. 1830; Bor, Grass. Burm. Ceyl. Ind. Pak. 474. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1105. 1993. *Schoenefeldia pallida* Edgew. in J. Asiat. Soc. Bengal 21: 183. 1852. *Chloris pallida* (Edgew.) Hook.f., Fl. Brit. India 7: 289. 1896.

Erect ascending, annual grass, 20-40 cm high. Leaves 15-25 cm long, narrowly linear, acute, flaccid, glabrescent, ligule hairy. Spikes 1-3, 4-12.5 cm long, erect, digitate, terminal, bright golden yellow, with closely pectinate, straight, awned spikelets. Spikelets 1.4-2.5 mm long, one-flowered, 1-sided, subsessile. Caryopsis c. 2.20 mm long, linear, acute, yellowish-pale.

Fl. & Fr.: August - December .

Common in grasslands and open forests.

Specimens examined: Near Umar ki Khal [24 59 44.63 N, 74 54 48.55 E, 492 m], *P. Hari Krishna & R. Kumar* 35529(BSJO); Near Niliya [25 00 06.69 N, 74 53 25.03 E, 550 m], *P. Hari Krishna & R. Kumar* 35695(BSJO); Near Mahesara [25 03 28.87 N, 74 53 19.19 E, 410 m], *P. Hari Krishna & R. Kumar* 35746(BSJO); Near Muroli forest area [25 02 58.67 N, 74 55 34.69 E, 440 m], *P. Hari Krishna & R. Kumar* 35779(BSJO); Near Sarana [24 59 51.76 N, 74 48 21.97 E], *P. Hari Krishna & R. Kumar* 38387 (BSJO).

38. **Sehima** Forssk.

Sehima nervosa (Rottler) Stapf in Prain, Fl. Trop. Africa 9: 36. 1917; Bor, Grass. Burm. Ceyl. Ind. Pak. 218.1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1108. 1993. *Andropogon nervosus* Rottl. ex Willd., in Verh. Ges. Naturf. Freunde Berlin Neue Schr. 4: 218. 1803. *Ischaemum laxum* R. Br., Prodr. 205.1810, *p.p*; Hook.f., Fl. Brit. India 7: 136. 1896. (Plate-32).

Tufted, erect perennials up to 1 m tall, with, brown nodes. Leaves 8 - 20 x 0.5-0.70 cm, linear, flat, coriaceous, base rounded, acuminate. Racemes 6-12 cm long, solitary, erect, terminal, densely ciliate along the anfls, rachis jointed fragile. Spikelets in pairs, one sessile, the other pedicellate. Sessile spikelets laterally, narrowly lanceolate. Pedicellate spikelets 6-12 mm long, narrowly ovoid-lanceolate. Caryopsis linear-oblong, obscurely trigonous, straw coloured.

Fl. & Fr.: August - November.

Common in grasslands and open forests.

Specimens examined: Near Jariya Mahadev forest area [25 02 05.93 N, 74 53 3.79 E, 489 m], *P. Hari Krishna & R. Kumar* 35361(BSJO); Meghpura Chowki [25 01 36.6 N, 74 04 8 49.2 E, 410 m], *P. Hari Krishna & R. Kumar* 35456(BSJO); Near Muroli forest area [25 02 58.55 N, 74 55 32.80

E, 444 m], *P. Hari Krishna & R. Kumar* 35778(BSJO); Near Nelia Kamal Enclosure [24 59 51.57 N, 74 54 50.86 E, 539 m], *P. Hari Krishna & R. Kumar* 37312(BSJO); Enclosure Jhariya Mahadev [25 02 24.50 N, 74 52 54.91 E, 494 m], *P. Hari Krishna & R. Kumar* 37354(BSJO).

39. *Setaria* P. Beauv.

Key to the species

- 1a. Involucral bristles present 2
 b. Involucral bristles absent 1 ***S. flavida***
 2a. Involucral bristles retrorsely barbellate. 3. ***S. verticillata***
 b. Involucral bristles antrorsely barbellate. 2. ***S. pumila***

1. *Setaria flavida* (Retz.) Veldkamp in Blumea 39: 376. 1994. *Paspalidium flavidum* (Retz.) A. Camus in Lecomte, Fl. Indo-Chine 7: 419. 1922; Bor, Grass. Burm. Ceyl. Ind. Pak. 333. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1088. 1993. *Panicum flavidum* Retz. Obs. Bot. 4: 15. 1786; Hook.f., Fl. Brit. India 7: 28. 1896. (Plate-32).

Tufted annual herb, 20-80 cm high. Leaves 6-20 x 0.4-1 cm, linear-lanceolate, flat, obtuse, rounded or shallowly cordate at base, margin scaberulous, apex acuminate, slightly pubescent. Panicles of 5 to 10, distantly arranged racemes; rachis narrowly winged. Spikelets ca. 3.5 mm long, ovate-elliptic, greenish, with purple spotted. Caryopsis ca. 1.6 mm long, ovoid, greenish-white, tightly enclosed in the hardened lemma and palea.

Fl. & Fr.: August - November.

Common in moist habitats.

Specimens examined: Jamunia [25 00 45.47 N, 74 48 00.9 E, 466 m], *P. Hari Krishna & R. Kumar* 35204 (BSJO); Kevdiya forest chowki [24 59 15.85 N, 74 49 47.22 E, 412 m], *P. Hari Krishna & R. Kumar* 35240(BSJO); near Ram Mandir-Bassi [25 00 01.16 N, 74 47 09.02 E, 435 m], *P. Hari Krishna & R. Kumar* 35306(BSJO).

2. *Setaria pumila* (Poir.) Roem. & Schult., Syst. Veg. ed. 2 : 891. 1817; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1113. 1993. *Panicum pumilum* Poir. in Lam. Encycl. Suppl. 4: 273. 1816. *P. pallide-fuscum* Schum. in Schum. & Thonn. Beskr. Guin. Pl. 58. 1827. *Setaria pallide - fusca* (Schum.) Stapf & C.E. Hubb. in Kew Bull. 1930: 259. 1930. *S. glaucum* non (L.) P. Beauv 1812; sensu Hook.f., Fl. Brit. India 7: 78. 1896. '*Markangni*'

Annual, tufted grass, upto 70 cm high. Leaves 4-15 x 0.6 - 0.70 cm, linear-lanceolate, flat, base cordate, apex acuminate, glabrous or sparsely hairy on surfaces. Panicles up to 8 cm long, cylindrical, spiciform. Spikelets

2.20-2.70 mm long, solitary, ovate-globose, enclosed in an involucre of 6-8, rigid, antrorsely barbellate bristles. Bristles 4-8, persistent, slender, rigid. Caryopsis oblong-ovoid, plano-convex, rugose, straw-coloured.

Fl. & Fr.: August - October.

Occasional, in plains and on hill slopes.

Specimens examined: Crocodile view point-Bassi dam [25 00 35.97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35107(BSJO); Near Panduria [24 58 31.31 N, 74 53 20.19 E, 312 m], *P. Hari Krishna & R. Kumar* 35340(BSJO); Near Fathepura [24 56 29.39 N, 74 54 17.56 E, 509 m], *P. Hari Krishna & R. Kumar* 35728(BSJO).

3. *Setaria verticillata* (L.) P. Beauv., Ess. Agrostogr. 51, 178. 1812; Duthie, Fodder Grasses 15.1888; Hook.f., Fl. Brit. India 7: 80. 1896; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1114. 1993. *Panicum verticillatum* L., Sp. Pl. ed.2.1: 82. 1762.

Erect or decumbent, annual grass, 40-60 cm high, often rooting at the lower nodes. Leaves 4-25 x 0.70-2.70 cm, elliptic-lanceolate, acuminate, scabrid, flat. Panicles 6-15 cm long, solitary, terminal, spiciform, cylindrical to oblong. Spikelets 1.8 -2.25 mm long, to oblong-ellipsoidal, subacute, pedicellate, enclosed in an involucres. Caryopsis broadly elliptic, stipitate, greenish-yellow to brownish.

Fl. & Fr.: August - December .

Occasional, in moist shaded places in the forests.

Specimens examined: Near Niliya [25 01 37.76 N, 74 48 43.97 E, 410 m], *P. Hari Krishna & R. Kumar* 35697(BSJO); Near Modiya Mahadev area [24 59 37.55 N, 74 52 30.47 E, 491 m], *P. Hari Krishna & R. Kumar* 35725(BSJO); Kevdiya forest chowki [24 59 15.85 N, 74 49 47.22 E, 412 m], *P. Hari Krishna & R. Kumar* 35239(BSJO); Near salaria [24 58 59.28 N, 74 51 7.29 E, 429 m], *P. Hari Krishna & R. Kumar* 35321(BSJO).

Uses: Very good fodder grass.

40. *Sorghum* Moench

Sorghum halepense (L.) Pers., Syn. Pl. 1 : 101. 1805; Bor, Grass. Burm. Ceyl. Ind. Pak. 222. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1115. 1993. *Holcus halepensis* L., Sp. Pl. 2: 1047. 1753. *Andropogon halepensis* (L.) Brot., Fl. Lusit. 1: 89. 1804; Hook.f., Fl. Brit. India 7: 182. 1896. *A. miliaceus* Roxb., Fl. Ind. 1: 276. 1820. *Sorghum miliaceus* (Roxb.) Snowden in J. Linn. Soc. Bot. 5: 207. 1955. 'Baru Ghas'

Erect perennial herb, up to 2 m high. Leaves 15-40 x 1.2-3.6 cm, linear-lanceolate, acuminate, base cordate, ligule a ciliate memberane. Panicles lax, up to 30 cm long, effuse, open, pyramidal, with whorled lower branches, purplish-brown. Spikelets purplish, 5 mm long. Sessile spikelets 3.5-6 mm long, elliptic-lanceolate or ovoid-lanceolate. Pedicelled spikelets: similar to sessile spikelet, but narrowly lanceolate, awnless, male. Caryopsis ovoid or subglobose, dark brown.

Fl. & Fr.: August - November.

Occasional in open wastelands and along water streams.

Specimens examined: Near Ram Mandir-Bassi [25 00 01.16 N, 74 47 09.02 E, 435 m], *P. Hari Krishna & R. Kumar* 35304(BSJO); Near Nal forest area [25 05 15.84 N, 74 56 56.64 E, 414 m], *P. Hari Krishna & R. Kumar* 35771(BSJO); On way to Kevdiya [24 58 27.01 N, 74 48 47.99 E, 442 m], *P. Hari Krishna & R. Kumar* 38329(BSJO).

Uses: Very good fodder grass.

41. *Sporobolus* R.Br.

Key to the species

- 1a. Upper glume as long as or longer than the lemma **1. *S. coromandelianus***
- b. Upper glume shorter than the lemma **2**
- 2a. Stamens 2. **2. *S. diandrus***
- b. Stamens 3 **3. *S. tenuissimus***

1. *Sporobolus coromandelianus* (Retz.) Kunth, Revis. Gramin. 1: 68. 1829; Hook.f., Fl. Brit. India 7:252. 1896; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1119. 1993. *Agrostis coromandeliana* Retz., Obs. Bot. 4: 19. 1786. *Vilfa coromandeliana* (Retz.) P. Beauv., Ess. Agrost. 16, 147. 1812.

Annual, erect or ascending grass, up to 15 cm high. Leaves linear-lanceolate, margins cartilaginous; ligule white, membranous. Panicles 5 cm long, pyramidal or ovoid. Spikelets 1.2 -2.6 mm long, pedicelled, olive green, lanceolate, scale-like. Caryopsis c. 0.65-0.75 mm, ovoid-oblong, reddish-brown.

Fl. & Fr.: August - December.

Common in moist clayey and near the waterbodies.

Specimens examined: Near Bhungiria [24 57 20.80 N, 74 48 10.50 E, 455 m], *P. Hari Krishna & R. Kumar* 38347(BSJO); Near sarana talab [24 59 53.09 N, 74 48 23.70 E, 487 m], *P. Hari Krishna & R. Kumar* 35639(BSJO);

Muroli forest area [25 3 31.46 N, 74 56 5.46 E, 429 m], *P. Hari Krishna & R. Kumar* 38411(BSJO).

2. *Sporobolus diandrus* (Retz.) P. Beauv., Ess. Agrost. 26,147,178.1821; Hook.f., Fl. Brit. India 7: 247. 1896; Bor, Grass. Burm. Ceyl. Ind. Pak. 629. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1120. 1993. *Agrostis diandra* Retz. Obs. Bot. 5: 19. 1789. *Vilfia retzii* Steud. Nom. Bot. ed. 2,2: 768. 1841.

Rhizomatous perennial grass, 30-60 cm high, with glabrous nodes. Leaves flat or convolute, acute, smooth, strongly nerved, sheaths smooth, ribbed, ligule a ciliate rim. Panicle pyramidal or lanceolate, loose, up to 15 cm long; rachis slender. Spikelets 1.3- 1.6 mm long, 1-flowered, hermaphrodite, pedicels very short. Glumes ovate to lanceolate. Caryopsis elliptic - oblong, flattened, truncate at the top, reddish-brown.

Fl. & Fr.: August - October.

Occasional found in grasslands near moist localities.

Specimen examined: Near Taleti [24 58 42.68 N, 74 52 50.71 E, 547 m], *P. Hari Krishna & R. Kumar* 35661(BSJO).

3. *Sporobolus tenuissimus* (Mart. ex Schrank) Kuntze, Rev. Gen. Pl. 3: 369. 1898; Bor, Grass. Burm. Ceyl. Ind. Pak. 633. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1123. 1993. *Panicum tenuissimum* Schrank in Denkschr. Bot. Ges. Regensb. 2: 26. 1822. *Vilfia minutiflora* Trin. Diss. Bot 158. 1824. *Sporobolus minutiflorus* (Trin.) Link, Hort. Berol. 1: 88. 1827; Hook.f., Fl. Brit. India 7: 247. 1896.

Tufted annuals, up to 30 cm high. Leaves linear-lanceolate, glabrous, hairy, acuminate to attenuate at apex, rounded at base. Panicles effuse, subspiciform, lax. Spikelets elliptic-lanceolate, articulate. Upper glumes linear-lanceolate. Stamens 3. Caryopsis obovate to ellipsoid, truncate at apex with retuse depression, acute at base, granulate, greenish.

Fl. & Fr.: August - December.

Occasional in moist shady localities.

Specimens examined: Crocodile view point-Bassi dam [25 00 35.97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35102(BSJO); Jhaleswar Mahadev gate [25 01 21.99 N, 74 48 30.65 E, 424 m], *P. Hari Krishna & R. Kumar* 35164(BSJO).

42. *Tetrapogon* Desf.

Tetrapogon tenellus (Koen. ex Roxb.) Chiov., in Ann. R. Ist. Bot. Roma 8: 352. 1908; Bor, Grass. Ind. 475. 1960; Pandey in Shetty & Singh

(eds.), Fl. Rajasthan 3: 1127. 1993. *Chloris tenella* Koen. ex Roxb., Fl. Ind. 1: 330. 1820; Hook.f., Fl. Brit. India 7:290. 1896. (Plate-32).

Erect or ascending, tufted, annuals, up to 40 cm high. Leaves 4-10 x 0.26 - 0.6 cm, lanceolate, flaccid, linear-lanceolate, acuminate, undersurface with long hairs, margins ciliate, ligule membranous. Spikes flat, solitary or paired. Spikelets 3-6 mm long, mostly 3 to 6-flowered, cuneate, bifarious, 3-awned. Caryopsis 1.6-2.5 mm long, oblong, brownish-straw.

Fl. & Fr.: August - November.

Common in sandy habitats on hill-slopes and in flat terrain.

Specimens examined: Kevdiya forest chowki [24 59 15.85 N, 74 49 47.22 E, 412 m], *P. Hari Krishna & R. Kumar* 35243(BSJO); Near Jariya Mahadev forest area [25 02 05.93 N, 74 53 03.79 E, 489 m], *P. Hari Krishna & R. Kumar* 35376(BSJO).

Uses: Very good fodder grass.

43. *Themeda* Forssk.

Key to the species

- 1a. Involucral spikelets up to 7mm long, sessile spikelets up to 4.5 mm long..... **1. *T. quadrivalvis***
- b. Involucral spikelets 7- 12 mm long, sessile spikelet 5.5-7 cm long.
..... **2. *T. triandra***

1. *Themeda quadrivalvis* (L.) O. Ktze. Rev. Gen. Pl. 2: 794. 1891; Bor, Grass. Burm. Ceyl. Ind. Pak. 252. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1130. 1993. *Andropogon quadrivalvis* L. in Murr. Syst. Veg. ed. 13. 758. 1774. *Anthistiria ciliata* L.f., Suppl. 113. 1781; Hook.f., Fl. Brit. India 7: 213. 1896. *Themeda ciliata* (L. f.) Hack. in DC. Monogr. Phan. 6: 664. 1889.

Erect or decumbent, perennial grass, up to 1 m high. Leaves 15-30 cm long, linear-lanceolate, acute; sheaths loose, glabrous, mouth hairy, margins serrulate, ligule membranous. Panicles dense, leafy, up to 20 cm long; lower branches 1-3-nate. Involucral spikelets 3.5- 6 mm long, 2-paired, whorled, sessile, reddish-brown. Pedicelltae spikelets c. 3.5 mm long, glabrous, similar to involucral ones. Caryopsis linear-subcylindrical, brown.

Fl. & Fr.: August - December.

Occasional grows along the streams in the forests and grasslands.

Specimen examined: Near Nelia Kamal Enclosure [24 59 51.57 N, 74 54 50.86 E, 539 m], *P. Hari Krishna & R. Kumar* 37308(BSJO).

2. Themeda triandra Forssk., Fl. Aegypt.-Arab. 123 & 178. 1775; Bor, Grass. Ind. 254. f. 27. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1130. 1993. *Anthistria imberbis* Retz., Obs. Bot. 3: 11. 1783; Hook.f., Fl. Brit. India 7: 211. 1896.

Tufted perennial herb, up to 1.5 m. Leaves oblong to linear-lanceolate, flat, alternate or acuminate, margins serrulate. Panicles 6-14 cm long, with spathaceous racemes of 2-8 clusters from each spathe. Spathe boat-shaped, with base whitish pubescent, raceme consists of 4 sessile homogamous involucrel male spikelets, 1 sessile awned bisexual spikelet and 2 pedicelled male spikelets. Involucrel spikelets narrowly elliptic-lanceolate, acute at apex, 1-flowered, male, epaleate, more or less at same level, unawned, persistent. Caryopsis subcylindric or oblong, acute, brownish-straw.

Fl. & Fr.: August - December.

Occasional in hilly slope areas and sandy soils in plains.

Specimens examined: Nandwai to Amla route [25 00 37.49 N, 74 56 55.58 E, 432 m], *P. Hari Krishna & R. Kumar* 35255(BSJO); Near Bhungiria [24 57 20.80 N, 74 48 10.50 E, 455 m], *P. Hari Krishna & R. Kumar* 38349(BSJO).

44. *Tragus* Hall.

Tragus mongolorum Ohwi in Acta Phytotax. Geobot. 10: 268. 1941. *Tragus roxburghii* Panigrahi in Kew Bull. 29: 495. 1974; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1131. 1993. (Plate-32).

Annual grass, up to 20 cm high, branched from the base and rooting at lower nodes. Leaves 0.6- 3.5 x 0.20-0.40 cm, linear-lanceolate, acuminate, margins undulate. Inflorescence 2.5- 6 cm long, cylindrical, loose, spike-like panicle; peduncle whitish hairy throughout. Spikelets 3 - 5 mm long, in pairs, brownish-green, ovate-lanceolate. Caryopsis c. 1.3 mm long, oblong to ovate-elliptic, acutish at both ends, slightly compressed, light brown.

Fl. & Fr.: August - December.

Common in rocky and sandy habitats.

Specimen examined: Jhaleshwar Mahadev gate [25 01 21.99 N, 74 48 30.65 E, 424 m], *P. Hari Krishna & R. Kumar* 35163(BSJO).

45. *Tripogon* Roem. & Schult.

Key to the Species

- 1a. Perennials with wiry roots forming tufts, leaves glabrous
..... 1. **T. jacquemontii**
- b. Perennials with fibrous roots, forming a close tuft, leaves covered with
matted white hairs 2. **T. purpurascence**

1. Tripogon jacquemontii Stapf in Kew Bull. 1892: 85. 1892; Hook.f.,
Fl. Brit. India 7: 286. 1896; Bor, Grass. Ind. 522. 1960; Pandey in Shetty &
Singh (eds.), Fl. Rajasthan 3: 1132. 1993.

Tufted perennial, erect grass, 20-40 cm high. Leaves 6-20 x 0.16-0.20
cm, filiform, narrowly lanceolate, acute to attenuate at apex, glaucous,
scabrelate, sheath purplish-brown. Spikes up to 15 cm long, spiciform,
solitary, rachis flat to triquetrous, glabrous, scabrid along margins. Spikelets
appressed, solitary, oblong to linear-lanceolate, yellowish-brown, yellowish
white to brownish. Caryopsis 1.5 -3 mm long, linear-oblong, acute at apex,
terete, brownish.

Fl. & Fr.: August - December .

Occasionally found in rocky habitats and open grasslands.

Specimens examined: Near Kevdiya Chowki [24 59 38.89 N, 74 05 0
05.49 E, 444 m], *P. Hari Krishna & R. Kumar* 35465(BSJO).

2. Tripogon purpurascens Duthie in Ann. Roy. Bot. Gard. (Calcutta)
9: 74. 1901; Bor, Grasses Burma, Ceylon, India & Pakistan 522. 1960;
Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 1133. 1993. (Plate-32).

Tufted, caespitose perennials, upto 40 cm high, often with fibrous
roots. Leaves basal and cauline, upto 15 cm long. Racemes 3-12 cm long,
solitary, linear. Spikelets 3-5mm long, narrow. Lower glume 0.5-1 x 0.3-0.5
mm, 1 nerved; upper one 1-2.5 x 0.6-1 mm, lanceolate, 1 nerved. Lowest
lemma with a minute median awn. Caryopsis oblong-elliptic.

Fl. & Fr.: August - November.

Rare in sandy and dry habitats.

Specimens examined: Near Sagarani [24 55 30.79 N, 74 52 43.22 E,
489 m], *P. Hari Krishna & R. Kumar* 35657(BSJO); Near Niliya [25 02 06.67
N, 74 54 05.87 E, 526 m], *P. Hari Krishna & R. Kumar* 35698(BSJO).

46. **Urochloa** P.Beauv.

Key to the species

- 1a. Rachis more or less flat, winged or ribbon-like, with margins scabrous...
..... 1. **U. distachyos**

- b. Rachis triquetrous, filiform, with margins smooth or softly hairy..... 2
- 2a. Spikelets 2.0-2.5 mm long; lower glume nerveless and truncate 3. **U. reptans**
- b. Spikelets 2.75- 4.5 mm long or more; lower glume nerved and acute or mucronate..... 2. **U. ramosa**

1. Urochloa distachyos (L.) Nguyen in Novosti Sist. Vyssh. Rast. 1966: 13. 1966. *Brachiaria distachyos* (L.) Stapf in Prain, Fl. Trop. Africa 9: 565. 1919; Bor, Grass. Burm. Ceyl. Ind. Pak. 281. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 987. 1993. *Digitaria distachyos* (L.) Pers., Syn. Pl. 1: 85. 1805. *Panicum distachyon* L., Mant. Pl. 183. 1767; Hook.f., Fl. Brit. India 7: 37. 1896.

Creeping or ascending herbs, up to 50 cm high. Leaves linear - lanceolate, acute to acuminate, amplexicaul at base, pubescent, ligule a hairy ring. Inflorescence of usually 3, spreading racemes; each racemes up to 4 cm long. Spikelets ellipsoid, solitary, glabrous. Anthers 3, yellow. Caryopsis ovoid, compressed, pale yellow.

Fl. & Fr.: August - December.

Common in wastelands and cultivated fields.

Specimens examined: Bijaypur road-Bassi [25 09.56 N, 74 47 2.55 E, 421 m], *P. Hari Krishna & R. Kumar* 35231(BSJO); Near Niliya [25 00 09.11 N, 74 53 20.65 E, 550 m], *P. Hari Krishna & R. Kumar* 35693(BSJO).

2. Urochloa ramosa (L.) Nguyen in Nov., Sist. Vyssh. Rast. 1966: 13. 1966. *Brachiaria ramosa* (L.) Stapf in Prain, Fl. Trop. Fl. Trop. Africa 9: 542. 1919; Bor, Grass. Burm. Ceyl. Ind. Pak. 284. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 990. 1993. *Panicum ramosum* L., Mant. Pl. 1: 29. 1767; Hook.f., Fl. Brit. India 7: 36. 1896.

Much branched annual grass, up to 60 cm. Leaves linear-lanceolate acuminate, rounded at base, sharply scabrid on margins; ligule a line of short, white hairs. Panicles distant, suberect, spike-like racemes up to 5 cm long, oblong. Spikelets ellipsoid, alternate, often in pairs, sessile or pedicellate. Anthers 3, yellow. Caryopsis up to 3 mm long, ovoid-elliptic, straw-coloured or yellowish.

Fl. & Fr.: July - December.

Common in open forests and wastelands.

Specimens examined: Near Savrna Talab [24 59 53.09 N, 74 48 23.70 E, 487 m], *P. Hari Krishna & R. Kumar* 35628 (BSJO); Near Niliya [25 00 06.69 N, 74 53 25.03 E, 550 m], *P. Hari Krishna & R. Kumar* 35696

(BSJO); Near Nal forest area [25 05 29.41 N, 74 56 43.24 E, 420 m], *P. Hari Krishna* & *R. Kumar* 35769 (BSJO).

3. *Urochloa reptans* (L.) Stapf in Prain, Fl. Trop. Africa 9: 601. 1920. *Brachiaria reptans* (L.) C.A. Gardner & C.E. Hubb. in Hook. Ic. Pl. 34. sub. t. 3363. p. 3. 1938; Bor, Grass. Burm. Ceyl. Ind. Pak. 285. 1960; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 3: 991. 1993. *Panicum reptans* L., Syst. Nat. ed. 10. 870. 1759. *P. prostratum* Lam., Tab. Encycl. 1: 171. 1791; Hook.f., Fl. Brit. India 7: 33. 1896.

Tufted, erect grass, 15-40 cm high, with pubescent nodes. Leaves flat, ovate-lanceolate or linear-lanceolate, acute to acuminate. Panicle of 5-9 racemes, spikelets densely crowded on trigonous rachis. Spikelets oblong-ellipsoid, glabrous, paired, shortly pedicelled. Caryopsis broadly oblong, rugose, straw coloured.

Fl. & Fr.: July - November.

Common in sandy habitats and cultivated fields.

Specimens examined: Near Niliya [25 00 06.69 N, 74 53 25.03 E, 550 m], *P. Hari Krishna* & *R. Kumar* 35656 (BSJO).

EUDICOTS

Order: Ranunculales Juss. ex Bercht. & J.Presl

PAPAVERACEAE Juss.

Key to the genera

- 1a. Perianth zygomorphic, spurred or saccate at the base; leaf blades finely divided into narrow segments **2. *Fumaria***
- b. Perianth actinomorphic, without a nectary spur; leaf blades lobed **1. *Argemone***

1. *Argemone* L.

Key to species

- 1a. Flowers yellow; stigma shallowly dissected, capsules oblong- ellipsoid or subfusiform **1. *A. mexicana***
- b. Flowers whitish, turning pale yellow with age, stigma deeply dissected.. **2. *A. ochroleuca***

1. *Argemone mexicana* L., Sp. Pl. 1: 508. 1753; Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 117. 1872; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 66. 1987; Debnath & M.P. Nayer in B.D. Sharma & N.P. Balakr., Fl. India 2:3. 1993. (Plate-8).
'*Satyanasi*'

Annual prickly herbs, up to 1 m high, with yellow latex. Leaves sessile, pinnatifid, elliptic-obovate, spinulose-dentate, cordate at base. Flowers bright yellow, solitary, terminal or axillary, sessile. Capsules ellipsoid, 3 to 6-valved, prickly spines, dehiscing by terminal openings. Seeds numerous, deeply reticulate, suborbiculate, blackish-brown.

Fl. & Fr.: February - May.

Common weed of cultivated fields and wastelands.

Specimen examined: Near Orai dam [25 00 16.12 N, 74 51 14.09 E, 405 m], *P. Hari Krishna & R. h Kumar* 35502 (BSJO).

2. Argemone ochroleuca Sweet, Brit. Fl. Gard. 3: t. 242. 1828; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 67. 1987; N.C. Nair in Rec. Bot. Surv. India 21(1): 7-8. 1978; Debnath & Nayar in B.D. Sharma & al., Fl. India 2: 5. 1993. *A. mexicana* L. var. *ochroleuca* (Sweet) Lindl. Bot. Reg. 1343. 1830. (Plate-8). 'Dholi Satayanasi'

Annual, prickly herbs. Leaves 6-8 cm long, prickles on nerves, lower leaves in a rosette, upper ones are sessile, pinnatifid. Flowers sessile, solitary, terminal, pale yellow-creamy. Capsules with spines. Seeds small, black.

Fl. & Fr.: February - June.

Common weed of cultivated fields and wastelands.

Specimen examined: Orai dam [24 59 01.05 N, 74 51 50.61 E, 420 m], *P. Hari Krishna & R. Kumar* 35503(BSJO); Paat village [25 00 42.28 N, 74 51 21.36 E, 431 m], *P. Hari Krishna & R. Kumar* 38380(BSJO).

2.Fumaria L.

Fumaria indica (Hausk.) Pugsley in J. Linn. Soc. Bot. 44: 313. 1919; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 64. 1987; J.L. Ellis & N.P. Balakr. in B.D. Sharma & al., Fl. India 2: 84. 1993. *F. vaillantii* Loisel. var. *indica* Hausk. in Flora 56: 443. 1873. *F. parviflora* Lam. subsp. *vaillantii* (Loisel.) Hook.f. & Thomson, Fl. Ind. 258. 1855 & in Hook.f., Fl. Brit. India 1: 128. 1872, *p.p.* 'Pitpapa'

Erect, annual herbs. Leaves pinnatisect, linear-oblongate, flat, apiculate, entire. Flowers in leaf opposed racemes, purplish-pink. Fruit suborbicular, rugose. Nutlets c. 2.6 mm across, rounded, pale brown.

Fl. & Fr.: March - June.

Common weed of cultivated fields and wast lands.

Specimen examined: Near Kelzar [24 58 27.01 N, 74 48 47.99 E, 442 m], P. Hari Krishna & R. Kumar 38328 (BSJO).

Uses: Entire plant used as fodder.

MENISPERMACEAE Juss.

Key to the genera

- 1a. Leaves not peltate; stamens free 2
- b. Leaves peltate; stamens connate..... 1. **Cissampelos**
- 2a. Leaves deeply cordate; seeds horse-shoe shaped3. **Tinospora**
- b. Leaves acute, obtuse or subcordate at base; seed not as above2. **Cocculus**

1.Cissampelos L.

Cissampelos pareira L. in Sp. Pl.: 1031.1753. *Cissampelos pareira* L. var. *hirsuta* (Buch.-Ham. ex DC.) Forman in Kew Bull. 22: 356. 1968; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 60. 1987. (Plate-6).

Dioecious twining shrubs, branchlets hairy. Leaves alternate, suborbicular to reniform, peltate, truncate or cordate at base, obtuse, apiculate or mucronate at apex, entire. Flowers greenish-yellow. Male flowers in axillary, pendulous, subcorymbose cymes. Female flowers in thyrsoid, pendulous racemes, bracts ovate, foliaceous, persistent. Drupes obovoid or subglobose, red when ripe. Seeds, dark-brown.

Fl. & Fr.: July - October.

Occasional found in forests.

Specimen examined: Kelzar village road [24 58 43.23N, 74 46 54.13E, 450 m], P. Hari Krishna & R. Kumar 35226(BSJO).

Uses: The leaves and roots are used to cure diarrhea.

2.Cocculus DC.

Cocculus hirsutus (L.) W.Theob. in F. Mason, Burmah & Mabb. in Taxon ed. 3.2: 657. 1860; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 61. 1987. *Menispermum hirsutum* L., Sp. Pl. 1: 341. 1753. *M. villosum* Lam., Encycl. 4: 97. 1797. *Cocculus villosus* (Lam.) DC., Syst. Nat. 1: 525. 1817; Hook.f., & Thomson in Hook.f., Fl. Brit. India 1: 101. 1872. (Plate-6).

'Jal-jamini'

Climbing, evergreen, hirsute shrubs. Leaves ovate-oblong, tomentose, mucronate at apex, base rounded or cuneate, entire. Male flowers yellowish-green, in small, axillary, cymose panicles. Female flowers in axillary

racemes up to 2 cm long. Drupes, smooth, rounded, laterally compressed, reddish-purple, Seeds dark purple.

Fl. & Fr.: August - May.

Common, climber in scrublands and fringes of forests.

Specimens examined: Umarthana forest area [25 00 49.75N, 74 54 50.59E, 510 m], *P. Hari Krishna & R. Kumar* 35500(BSJO); near Shivpura [25 02 5.66N, 74 54 36.28E, 498 m], *P. Hari Krishna & R. Kumar* 38392 (BSJO).

Uses: Juice of fruits use as bluish colour ink.

3. *Tinospora* Miers.

Tinospora cordifolia (Willd.) Miers in Ann. Mag. Nat. Hist. Ser. 2.7: 38. 1851; Hook.f., & Thomson, Fl. Ind. 1: 184. 1855 & in Hook.f., Fl. Brit. India 1: 97. 1872; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 62. 1987. *Menispermum cordifolium* Willd. Sp. Pl. 4: 826. 1806. (Plate-6). '*Neem-goloe*'

Woody climbers. Stems shining, lenticellate, bark light grey, papery. Leaves 6 - 10 x 4 - 10 cm, ovate-cordate, acute or acuminate, entire. Flowers greenish yellow in axillary, racemes on leafless branchlets. Male flowers in fascicles. Female flowers in soliraty. Drupes 3-6 mm in diam, ovoid, crimson red.

Fl. & Fr.: March -June.

Occasional, along hedges of cultivated fields and fringes of forests.

Specimen examined: Aamjria [25 00 13.68N, 74 51 13.33E, 422 m], *P. Hari Krishna & R. Kumar* 35567 (BSJO).

Uses: Stem juice used to cure fever and also applied to cure skin disease.

NELUMBONACEAE A.Rich.

Nelumbo Adans.

Nelumbo nucifera Gaertn., Fruct. Sem. Pl. 1: 73. t. 19. f. 2. 1788; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 64. 1987; R.L. Mitra in B.D. Sharma & al., Fl. India 1: 441. 1993. *Nelumbium speciosum* Willd., Sp. Pl. 1258.1799; Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 116. 1872. (Plate-7). '*Kamal*'

Perennial aquatic herbs with milky juice. Leaves simple, stipulate, long petiolate, 50-80 cm across, flat, suborbicular, glabrous, papery, glaucous on both surfaces, water repellent, entire. Flowers showy, rose pink or light red,

large, solitary. Fruit oblong-ovoid, glabrous. Nuts ripening above water. Seeds rounded, glabrous, dark brown.

Fl. & Fr.: March- October.

Rare in shallow lakes and ponds.

Specimens examined: Sarana Talab [24 59 51.46 N, 74 48 19.85 E, 486 m], *P. Hari Krishna & R. Kumar* 35449(BSJO).

Uses: Rhizome and seeds are edible.

VITACEAE Juss.

Key to the genera

- 1a. Leaves simple, entire or lobed; inflorescence bearing tendrils.
.....**1. Ampelocissus**
- b. Leaves 3-foliolate; inflorescence not bearing tendrils..... **2. Causonis**

1.Ampelocissus Planch.

Ampelocissus latifolia (Roxb.) Planch. in J. Vigne Amer. 374. 1884 & in DC. Monogr. Phan. 5(2) : 370. 1887; Parmer, in Shetty & Singh (eds.), Fl. Rajasthan 1: 188. 1987; B.V. Shetty & P. Singh in N.P. Singh & al., Fl. India 5: 256. 2000. *Vitis latifolia* Roxb., Fl. Ind. 2: 474. 1824; M.A. Lawson in Hook.f., Fl. Brit. India 1: 652. 1875. (Plate-14). *'Bechuti'*

Climbing shrubs; branches reddish-purple. Leaves simple entire or often 3 to 5-lobed, 6-12 x 9-21 cm, broadly ovate-orbicular, margins dentate-serrate or serrulate. Flowers reddish- brown. Berries 2 to 4-seeded, red or black when ripe. Seeds elliptic-oblong, margins crenate.

Fl. & Fr.: July - October.

Occasional in dry deciduous forests.

Specimens examined: Near Sagarani [24 55 32.13 N, 74 52 30.64 E, 491 m], *P. Hari Krishna & R. Kumar* 35285(BSJO); Fatehpura [24 56 29.39 N, 74 54 17.56 E, 502 m], *P. Hari Krishna & R. Kumar* 35732(BSJO).

Uses: It is used to cure toothache and ulcers.

2.Causonis Raf.

Causonis trifolia (L.) Mabb. & J.Wen in Mabblerley's Pl.-Book, ed. 4: 1101. 2017. *Cayratia trifolia* (L.) Domin in Biblioth., Bot. 89: 371. 1927; Parmer, in Shetty & Singh (eds.), Fl. Rajasthan 1: 188. 1987; B.V. Shetty & P. Singh in N.P. Singh & al., Fl. India 5: 275. 2000. (Plate-14). *'Ama bel'*

Slender, herbaceous climbers, somewhat woody at base, glabrous or puberulous, tendrils wiry, branched. Leaves 3-foliolate; leaflets 3 - 6 x 2 - 3 cm, broadly ovate-elliptic or obovate, dentate-serrate margins. Flowers pale greenish-white. Berries purple when ripe. Seeds triangular, rugose.

Fl. & Fr.: July - December.

Common in moist places and forests.

Specimen examined: Bijaypur road Bassi [25 0 9.56 N, 74 47 2.55 E, 421 m], *P. Hari Krishna & R. Kumar* 35211(BSJO).

Order: Zygothyllales Link

ZYGOPHYLLACEAE R.Br.

Key to the genera

- 1a. Perennial trees **1. Balanites**
b. Herbs **2. Tribulus**

1. Balanites Delile

Balanites roxburghii Planch. in Ann. Sc. Nat. Bot. ser. 4. 2 : 258. 1854; Bennett in Hook.f., Fl. Brit. India 1: 522. 1875; Singh & Singh in Hajra & al. Fl. India 4 : 40. 1997. *B. aegyptiaca* auct. plur, non (L.) Del. 1813; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 176. 1987. *B. aegyptiaca* (L.) Del. var. *roxburghii* (Planch.) Duthie, Fl. Gangetic Plain 1: 145. 1903. (Plate-13).
'Hingot'

Spiny trees, up to 4 m high. Leaves 2-foliolate; leaflets 1 - 5 x 1 - 2 cm, elliptic-oblong, obovate-oblong, obtuse to acute at apex, rounded or cuneate at base, coriaceous, pubescent. Flowers greenish-yellow, in few-flowered, axillary, fascicled cymes. Fruits ovoid or subspherical yellowish-green when ripe, stony. Seeds solitary, stony.

Fl. & Fr.: March - June.

Occasional in scrub forests.

Specimen examined: Near Mevasa Phatak [25 00 44.59 N, 74 48 37.54 E, 479 m], *P. Hari Krishna & R. Kumar* 35643 (BSJO).

2. Tribulus Tourn. ex L.

Tribulus terrestris L., Sp. Pl. 1: 387. 1753; Edgew. & Hook.f., in Hook.f., Fl. Brit. India 1: 423. 1874; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 166. 1987; P. Singh & V. Singh in Hajra & al., Fl. India 4: 55. 1997. *'Gokharu'*

Pubescent, annual herbs, branches silky villous when young, hirsute at age. Leaves paripinnate, 4-6 cm long, opposite or sometimes alternate. Flowers yellow, solitary, axillary or leaf-opposed. Fruits 1- 1.5 cm across, tuberculate,mericarps with 4 spines; the 2 lateral, divergent, acute, inserted about the middle and 2 shorter spines near the base; basal pair of spines sometimes reduced to tubercles.

Fl. & Fr.: Augst- October.

Rare in dry deciduous forests.

Specimen examined: Semaldhar [24 58 43 N, 74 52 34.52 E, 541 m],
P. Hari Krishna & R. Kumar 37304(BSJO).

Order: Fabales Bromhead

FABACEAE Lindl.

Key to the genera

- 1a. Flowers zygomorphic, usually in lax racemes, rarely heads 2
- b. Flowers actinomorphic, usually in dense heads, rarely spike**28**
- 2a. Petals not papilionaceous, upper one innermost; stamens free **3**
- b. Petals papilionaceous, upper one outermost; stamens united **8**
- 3a. Leaves simple or unipinnate, entire or lobed 4
- b. Leaves bipinnate **17. Guilandina**
- 4a. Leaves simple, deeply divided in the middle into 2 lobes..... **5. Bauhinia**
- b. Leaves 1-pinnate 5
- 5a. Anthers dehiscing longitudinally by slits. **32. Tamarindus**
- b. Anthers dehiscing by terminal pores. 6
- 6a. Bracteoles absent..... **30. Senna**
- 4b. Bracteoles present. 7
- 7a. Stomata present on the abaxial surface of leaflets only; filaments of three abaxial antisepalous stamens sigmoidly curved.**8. Cassia**
- 5b. Stomata present on both surfaces of leaflets; filaments of all stamens straight or simply Incurved **9. Chamaecrista**
- 8a. Plants erect, suberect or prostrate but not climbing (except *Clitoria*) 9
- b. Plants climbing or twining **22**

9a. Trees.	10
b. Shrubs, climbers or twinners, undershrubs or herbs.	14
10a. Leaves 3-foliolate	11
b. Leaves 5 - many foliolate	13
11a. Plants armed; pods turgid, torulose	14. Erythrina
b. Plants unarmed; pods flat, not torulose	11
12a. Flowers orange-red or scarlet coloured.	6. Butea
b. Flowers white or pink	24. Ougeinia
13a. Leaflets alternate	11. Dalbergia
b. Leaflets opposite	27. Pongamia
14a. Flowers pure yellow, creamy yellow, white or purple spotted	15
b. Flowers red, reddish-purple, bluish-purple, mauve or blue	18
15a. Pod joints 2-6, echinate	37. Zornia
b. Pod joints 1-2, not echinate	16
16a. Leaves 3-foliolate	20. Medicago
b. Leaves more than 3-foliolate	17
17a. Pods long (upto 20 cm), narrowly linear, septate between seeds, but not jointed.....	31. Sesbania
b. Pods relatively much shorter, often jointed, if not jointed, pods turgid	2. Aeschynomene
18a. Pods jointed.	19
b. Pods not jointed.	20
19a. Joints of pods turgid.	4. Alysicarpus
b. Joints of pods flattened.	35
20a. Pods flat	10. Clitoria
b. Pods not flat	21
21a. Anthers apiculate.	18. Indigofera
b. Anthers muticous or obtuse.	33. Tephrosia
22a. Stamens monadelphous.	23
b. Stamens diadelphous.	24
23a. Leaves paripinnate, stamens 9	1. Abrus

- b. Leaves imparipinntae, stamens 10 **34. Teramnus**
- 24a. Flowers yellow or tinged red **25**
 - b. Flowers white, rosy-purple, reddish mauve, purple, violet or blue... **27**
- 25a. Leaves gland dotted beneath **26**
 - b. Leaves not gland dotted beneath **36. Vigna**
- 26a. Corolla up to 1.5 cm, pods 2.sedded **28. Rhynchosia**
 - b. Corolla more then 1.5 cm long, pods 3 or more seeded **7. Cajanus**
- 27a. Racemes lax drooping, flowers dark purple, pods clothed with hairy bristles..... **22. Mucuna**
 - b. Racemes erect, flowers blue or purple-pink, pods not as above **15. Galactia**
- 28a. Stamens definite. **29**
 - b. Stamens indefinite. **32**
- 29a. Flowers in head. **30**
 - b. Flowers in elongated spikes or racemes. **31**
- 30a. Pods jointed, curved **21. Mimosa**
 - b. Pods not jointed, straight **19. Leucaena**
- 31a. Inflorescence bicoloured, yellow and pink..... **13. Dichrostachys**
 - b. Inflorescence single coloured, yellow. **23. Neltuma**
- 32a. Plants unarmed. **3. Albizia**
 - b. Plants armed with prickles or spines **33**
- 33a. Filaments more or less connate at base; pods coiled.....
 - **25. Pithecellobium**
 - b. Filaments free to the base; pods not coiled **34**
- 34a. Plants with long straight spines **35. Vachellia**
 - b. Plants with short recurved spines **29. Senegalia**
- 35a. One terminal leaflet only..... **26. Pleurolobus**
 - b. More than one terminal leaflets **36**
- 36a. Stipules present and free..... **12. Desmodium**
 - b. Stipules absent or fused with the petiole **16. Grona**

1.Abrus Adans.

Abrus precatorius L., Syst. Nat. ed. 12: 472. 1767; Baker in Hook.f., Fl. Brit. India 2: 175. 1876; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 201. 1987; Duthie, Fl. Gangetic Plain 1: 262. 1903; Sanjappa, Legum. Inida: 74. 1992. *Glycine abrus* L., Sp. Pl. 2: 753. 1753. (Plate-15). 'Chirmi'

Perennial herbs; stem slender; branches terete. Leaves 6-10 cm long; leaflets 10-20 pairs, 0.4 - 1.5 x 0.3 - 0.8 cm, opposite, oblong or elliptic-oblong, Flowers pinkish- purple or lilac . Pods oblong, turgid, pubescent. Seeds white with black spot.

Fl. & Fr.: August -February.

Common in dry deciduous forests and in wastelands.

Specimen examined: Salariya [24 59 08.22 N, 74 51 03.53 E, 423 m], P. Hari Krishna & R. Kumar 35313(BSJO).

Uses: The leaves are used to cure fever and cough.

2. **Aeschynomene** L.

Aeschynomene indica L., Sp. Pl. 2: 713. 1753; Baker in Hook.f., Fl. Brit. India 2: 151. 1876; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 202. 1987. 'Chhumui'

Much-branched, undershrubs, up to 1.5 m high. Leaves 5-15 cm long, imparipinnate; leaflets 15-45, alternate, 0.4-0.7 x 0.2-0.3 cm, linear to linear-oblong. Flowers pale to creamy yellow, in few-flowered, axillary, viscid racemes. Pods joints 4-10, slightly papillose. Seeds black, smooth, hooked at one end.

Fl. & Fr.: August - November.

Common in moist-shaded places in deciduous forests.

Specimens examined: Sarna talab[24 59 51.46 N, 74 8 19.85 E, 486 m], P. Hari Krishna & R. Kumar 35450 (BSJO); Muroli forest area [25 02 58.57 N, 74 55 34.63 E, 440 m], P. Hari Krishna & R. Kumar 35780(BSJO).

3. **Albizia** Durazz.

Key to the species

- 1a. Flowers pedicelled; pods straw coloured. 1. **A. lebeck**
- b. Flowers sessile; pods red to brown. 2
- 2a. Leaflets ovate to oblong, midrib near the lower edge, petiolule to 3 mm
..... 3. **A. procera**
- b. Leaflets oblique oblong, midrib near the upper surface, petiolule 0-1 mm.

..... 2. *A. odoratissima*

1. *Albizia lebbeck* (L.) Benth. in Hook., Lond. J. Bot. 3: 87. 1844, *p.p.* ('*lebbek*'); Baker in Hook.f., Fl. Brit. India 2: 298. 1878; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 301. 1987. *Mimosa lebbeck* L., Sp. Pl. 1: 516. 1753. (Plate-19). 'Siris'

Trees up to 12 m high, with greyish- pale brown bark. Leaves 2-pinnate, 20-30 cm long, with a large gland at the base of petiole; pinnae 2-4 pairs; leaflets subsessile, 4-10 pairs, 1.2 - 5.2 x 0.7 - 2 cm, lateral leaflets elliptic, broadly oblong. Flowers pedicelled, white-cream to yellow. Pods up to 35 x 5 cm, linear-oblong, flat, reticulately veined, straw-coloured, 8 to 12-seeded. Seeds pale brown.

Fl. & Fr.: August - February.

Common, usually found in dry deciduous forests.

Specimen examined: Kotha Block [25 4 21.99 N, 74 52 10.42 E, 419 m.], *P. Hari Krishna & R. Kumar* 38402(BSJO).

2. *Albizia odoratissima* (L. f.) Benth. in Hook., Lond. J. Bot. 3: 88. 1844; Baker in Hook.f., Fl. Brit. India 2: 299. 1878; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 302. 1987. *Mimosa odoratissima* L.f., Suppl. 437. 1782. *Albizia odoratissima* (L. f.) Benth. var. *mollis* Benth. ex Baker in Hook.f., Fl. Brit. Inda 2: 229. 1878. 'Kalo Siris'

Trees, up to 15 m tall. Leaves bipinnate, 15-20 cm long, brown tomentose. Petiole gland near base; rachis with gland between uppermost pairs of pinnae. Pinnae 2-4 pairs, each 5-10 cm long; leaflets 8-15 pairs, 1.6 - 3 x 0.6 - 1.4 cm, elliptic-oblong, margins entire. Flower heads white or pale-yellow. Pods linear-oblong, flat, 5 to 12-seeded, reddish brown. Seeds smooth, glabrous, brown.

Fl. & Fr.: April - December.

Frequently found in dry deciduous forests.

Specimens examined: Near Umar ki Khal [24 58 34.88 N, 74 54 00.86 E, 512 m], *P. Hari Krishna & R. Kumar* 35538 (BSJO); Ambapani [24 58 12 N, 74 52 03 E, 430 m], *P. Hari Krishna & R. Kumar* 35554 (BSJO); Kevdia [25 01 20.92 N, 74 49 27.49 E, 443 m], *P. Hari Krishna & R. Kumar* 35521(BSJO); Nilia [25 00 34.60 N, 74 52 59.84 E, 556 m], *P. Hari Krishna & R. Kumar* 35690 (BSJO).

3. *Albizia procera* (Roxb.) Benth. in Hook., Lond. J. Bot. 3: 89. 1844; Baker in Hook.f., Fl. Brit. India 2: 299. 1878; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 302. 1987; Sanjappa, Legum. India: 58. 1992. *Mimosa*

procera Roxb., Pl. Coromandal 2: 12. t. 121. 1799. *Albizia procera* (Roxb.) Benth. var. *elata* (Roxb.) Baker in Hook.f., Fl. Brit. Inda 2: 299. 1878. *Mimosa elata* Roxb., Fl. ind. 2: 546. 1832. (Plate-19). 'Gurar'

Large trees, 10-20 m tall; bark greyish-white. Leaves 10-20 cm long; pinnae 2-6 pairs, leaflets 6-12 pairs, 0.6-4 x 0.5-3 cm, ovate-oblong or elliptic-oblong, margins entire. Flowers sessile, pale white. Pods 8 - 12 x 1.4 - 2.5 cm, linear-oblong. Seeds 5-10, smooth, glabrous.

Fl. & Fr.: April - October .

Frequently found in dry deciduous forests.

Specimen examined: Near Umarthoona - Neliya [24 57 39.12 N, 74 54 25.55 E, 513 m], *P. Hari Krishna & R. Kumar* 35727(BSJO).

4. *Alysicarpus* Desv.

Key to the species

- 1a. Calyx shorter or slightly longer than the first joint of pod. 2
- b. Calyx much longer than the first joint of pod. 3
- 2a. Pods moniliform, smooth, veinless..... **2. *A. monilifer***
- b. Pods indented on both sutures. **1. *A. hamosus***
- 3a. Flowers pink to buff-coloured in lax racemes. **3. *A. ovalifolius***
- b. Flowers violate, in dense racemes. **4. *A. vaginalis***

1. *Alysicarpus hamosus* Edgew. in J. Asiat. Soc. Bengal 21: 171. 1853; Baker in Hook.f., Fl. Brit. India 2: 157. 1876; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 204. 1987. *Hedysarum procumbens* Roxb., Fl. Ind. 3: 345. 1832, non Mill., 1768. *Alysicarpus procumbens* (Roxb.) Schindl. in Fedde, Repert. 21: 11. 1925.

Annual herbs, with long hairs. Leaves unifoliolate. Leaflets ca 1.5-2 cm in diam., broadly ovate-oblong or suborbicular. Flowers in axillary, few-flowered racemes, purple, paired along the peduncles. Flowers bright reddish-purple. Pods ca 3 cm long, linear, mucronate, flat, 3 to 7-jointed. Seeds brown, glabrous.

Fl. & Fr.: August - October.

Common in open forests.

Specimen examined: Near Taleti [24 58 20.64 N, 74 52 35.80 E, 539 m], *P. Hari Krishna & R. Kumar* 35669(BSJO).

2. *Alysicarpus monilifer* (L.) DC., Prod. 2: 353. 1825; Baker in Hook.f., Fl. Brit. India 2: 157. 1876; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 206. 1987. *Hedysarum moniliferum* L., Mant. Pl. 1: 102. 1767.

Prostrate herbs, clothed with hairs. Leaves unifoliolate, 0.6 - 2 x 0.4 - 1.2 cm, obovate or elliptic, oblong to suborbicular. Flowers in axillary and terminal, 4 to 8-flowered racemes longer than leaves, violet or pink. Pods moniliform, 4 to 8-jointed. Seeds smooth, brown.

Fl. & Fr.: August - December.

Common in open forest area.

Specimens examined: Jogideh dam side [24 59 33.86 N, 74 49 20.8 E, 410 m], *P. Hari Krishna & R. Kumar* 33125 (BSJO); Bijaypur road bassi [24 59 14.60 N, 74 46 56.05 E, 441 m], *P. Hari Krishna & R. Kumar* 35218 (BSJO); Kevdia [24 59 58.2 N, 74 9 57.9 E, 419 m], *P. Hari Krishna & R. Kumar* 35476 (BSJO); Sonar ki Kudi [25 00 58.45 N, 74 54 46.63 E, 493 m], *P. Hari Krishna & R. Kumar* 35795 (BSJO); Kotha block [25 04 21.99 N, 74 52 10.42 E, 413 m], *P. Hari Krishna & R. Kumar* 38403 (BSJO).

3. *Alysicarpus ovalifolius* (Schumach. & Thonn.) J. Leonard in Bull. Jard. Bot. Estat 24: 88. 1954; Sanjappa & Bhatt in J. Bombay Nat. Hist. Soc. 75: 254. 1978. Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 206. 1987; Sanjappa, Legum. Inida: 79. 1992. *Hedysarum ovalifolium* Schumach. & Thonn., Beskr. Guin. Pl. 359. 1827. *Desmodium ovalifolium* (Schumach.) Walp., Repert. Bot. Syst. 1:737. 1842.

Erect herbs; branches rooting at nodes. Leaves unifoliolate, 1 - 6 x 0.5 - 1.6 cm, elliptic or oblong to narrowly lanceolate. Flowers orange to pink. Pods 1.6-2.4 cm long, 5 to 8-jointed, not moniliform. Seeds reddish-black.

Fl. & Fr.: September - November.

Common in open forests.

Specimens examined: Near Taleti [24 58 18.98 N, 74 52 36.26 E, 533 m], *P. Hari Krishna & R. Kumar* 35668 (BSJO); Dewalgarh forest area [24 58 27.14 N, 74 50 57.14 E, 442 m], *P. Hari Krishna & R. Kumar* 37339 (BSJO); Modia mahadev [24 59 37.47 N, 74 52 31.45 E, 498 m], *P. Hari Krishna & R. Kumar* 35720 (BSJO).

4. *Alysicarpus vaginalis* (L.) DC., Prod. 2: 353. 1825; Baker in Hook.f., Fl. Brit. India 2: 158. 1876; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 208. 1987. *Hedysarum vaginae* L., Sp. Pl. 2: 746. 1753. *H. nummularifolium* auct. non L., 1753; Willd., Sp. Pl. 3: 1173. 1802.

Prostrate herbs; stems with scattered hairs. Leaves unifoliolate, 0.6 - 5 x 0.6 - 3 cm, lanceolate, oblong or ovate-oblong. Flowers purple or violet, in terminal and axillary. Pods 1.4-2.6 cm long, slender, 4 to 8-jointed. Seeds smooth, brown.

Fl. & Fr.: September - December.

Common as weed in moist places.

Specimens examined: Jhaleswar [25 00 56.90 N, 74 4759.43 E, 421 m], *P. Hari Krishna & R. Kumar* 35194(BSJO); Kedia Chowki [24 59 38.89 N, 74 05.49 E, 444 m], *P. Hari Krishna & R. Kumar* 35468(BSJO).

5. *Bauhinia* L.

Bauhinia racemosa Lam., *Encycl.* 1 (2) : 390. 1785; Singh in Shetty & Singh (eds.), *Fl. Rajasthan* 1: 279. 1987; Baker in Hook.f., *Fl. Brit. India* 2: 276. 1878. *B. parviflora* Vahl, *Symb. Bot.* 3: 55. 1794. *Piliostigma racemosa* (Lam.) Benth. in Miq., *Pl. Jungh.*: 262.1852. 'Seta'

Small trees, up to 6 m high, with dark-brown bark. Leaves 3 - 5 x 2 - 7 cm, cordate at base. Flowers white or pale yellow, in 5-7 cm long, terminal. Pods stalked, 16 - 20 x 1.5 - 2.5 cm, linear-oblong, glabrous. Seeds oblong, black.

Fl. & Fr.: May - November.

Common in deciduous and scrub forests.

Specimens examined: Crocodile view point-Bassi dam [25 0 35.97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35113(BSJO).

Uses: Leaves are used to make beedi.

6. *Butea* Roxb. ex Willd.

Butea monosperma (Lam.) Taub., in Engler & Prantl, *Pflanzenfam.* 3 (3): 366. 1894; Singh in Shetty & Singh (eds.), *Fl. Rajasthan* 1: 211. 1987. *Erythrina monosperma* Lam., *Encycl.* 2: 391. 1785. *Butea frondosa* Roxb. ex Willd. *Sp. Pl.* 3: 917. 1802; Baker, in Hook.f., *Fl. Brit. Ind.* 2: 194. 1876. (Plate-15).

Key to the varieties

- 1a. Flower buds flame coloured; flowers flame coloured
.....var. **monosperma**
- b. Flower buds ivory-white; flowers bright yellow var. **lutea**

Butea monosperma (Lam.) Taub. var. **monosperma** 'Palas'

Large tree, young branches tomentose. Leaf pinnately trifoliolate, stipellate; leaflets up to 25 cm in diam., terminal leaflet broadly ovate, obtuse; lateral leaflet obliquely ovate. Inflorescence an axillary or terminal raceme. Flowers orange-red or flame colour, showy, up to 8 cm long, in terminal and lateral, 10-20 cm long racemes. Fruit silky, 1 seeded at the apex, oblong. Seeds subreniform, flat, smooth, brown.

Fl. & Fr.: March - June.

Common throughout the Sanctuary area.

Specimen examined: Near Mahesara [25 03 52.99 N, 74 51 30.74 E, 398 m], *P. Hari Krishna & R. Kumar* 38458 (BSJO).

Uses: Gum extracted from the plant is used for making laddos.

Butea monosperma (Lam.) Taub. var. **lutea** (Witt.) Mahesh. in Bull. Bot. Surv. India 3: 92. 1962; Sant. in Rec. Bot. Surv. India 16: 66. 1967. '*Pela palas*'

It differs from well-known *Butea monosperma* var. *monosperma* in having charismatic ivory-white flower buds and bright yellow flowers.

Fl. & Fr.: March - June.

Very rare, in open forests.

Specimen examined: Near Bassi, *P. Hari Krishna & R. Kumar* 35733 (BSJO).

7. **Cajanus** DC.

Cajanus scarabaeoides (L.) Thours, Diet. Sci. Nat. 6:617.1817 ('*Cajan scarabaeoides*'); Maesen, Agric. Univ. Wageningen Pap. 85.4:183.1985. *Dolichos scarabaeoides* L., Sp. Pl. 726. 1753. *Atylosia scarabaeoides* (L.) Benth. in Miq. Pl. Jungh. 242.1852; Baker in Hook.f., Fl. Brit. India 2 : 215. 1876; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 210. 1987.

Fl. & Fr. August-November.

Common in open forests and wastelands.

Specimen examined: Near Nandwas [24 58 10.33 N, 74 54 56.54 E, 482m], *P. Hari Krishna & R. Kumar* 38434(BSJO).

8. **Cassia** L.

Cassia fistula L., Sp. Pl. 1: 377. 1753; Baker in Hook.f., Fl. Brit. India 2: 261. 1878; Parmer, in Shetty & Singh (eds.), Fl. Rajasthan 1: 283. 1987;

Sanjappa, Legum. India: 15. 1992. V. Singh Monograph Indian *Cassiinae*: 25. 2001. 'Amaltash'

Medium-sized trees, up to 15 m high, with grey bark. Leaves 12-40 cm long; leaflets 3-8 pairs, 5 - 20 x 3 - 8.5 cm, ovate or elliptic-ovate. Racemes 1-5 together, axillary, 15-50 cm long, pendulous, lax; pedicels 2-5 cm long. Flowers showily, yellow or bright yellow. Pods pendulous, 25 - 42 x 2 - 2.5 cm, cylindrical, terete, blackish-brown. Seeds flat, glossy brown.

Fl. & Fr.: March - May.

Common in deciduous forests.

Specimens examined: Jamunia [25 00 45.47 N, 74 48 0.9 E, 466 m], P. Hari Krishna & R. Kumar 35205(BSJO).

9. *Chamaecrista* Moench.

Key to the species

- 1a. Leaflets 2 pairs; pods covered with viscid glandular hairs; foliar glands stipitate, Peltate **1. C. absus**
- b. Leaflets 20-30 pairs; pods pubescent, without glandular hairs; foliar glands sessile..... **2. C. pumila**

1. *Chamaecrista absus* (L.) Irwin & Barneby in Mem. New York Bot. Gard. 35 (2): 664. 1982; V. Singh, Monograph Indian *Cassiinae*: 55. 2001. *Cassia absus* L., Sp. Pl. 1: 376. 1753; Baker in Hook.f., Fl. Brit. India 2: 265. 1878; Parmer, in Shetty & Singh (eds.), Fl. Rajasthan 1: 282. 1987. (Plate-18). 'Chaksi'

Erect herbs with viscid glandular hairs. Leaflets 2 pairs, 0.6 - 4 x 0.7 - 3 cm, ovate-oblong or ovate-elliptic. Racemes short, terminal or axillary. Flowers yellow, pink or white. Pods oblique, covered with stiff glandular hairs, 5-8seeded. Seeds rhomboid to obovate, flat, black.

Fl. & Fr.: August - December.

Common in moist places.

Specimens examined: Kelzar [24 58 54.71 N, 74 46 54.5 E, 431 m], P. Hari Krishna & R. Kumar 35233 (BSJO); Semadhahar [25 00 23.89 N, 74 8 34.31 E, 552 m], P. Hari Krishna & R. Kumar 35357(BSJO); Devalgadhd forest area [24 58 20.36 N, 74 50 45.33 E, 415 m], P. Hari Krishna & R. Kumar 37329 (BSJO).

2. *Chamaecrista pumila* (Lam.) Singh in J. Econ. Taxon. Bot. 16 (3) : 600. 1992 & Monogr. Indian subtribe Cassinae 84. 2001. K. Larsen, Nordic. J.

Bot. 13(13)4: 404. 1993. *Cassia pumila* Lam., Encycl. 1 (2): 651. 1785; Baker in Hook.f., Fl. Brit. India 2: 266. 1878; Parmer, in Shetty & Singh (eds.), Fl. Rajasthan 1: 285. 1987. *Senna prostrata* Roxb., Fl. Ind. 2: 352. 1824. (Plate-18).

Prostrate herbs. Leaves 4-8 cm long ; leaflets sessile, 11-30 pairs, 0.6 - 1.5 x 0.15 - 0.35 cm, linear-oblong, aristat. Flowers yellow, in 1 to 3-flowered, short pedunculate, axillary or supra-axillary racemes. Pods flat, pubescent, 10-14 seeded, brown. Seeds rhomboid or obovate-oblong, compressed, black.

Fl. & Fr. August - November.

Common in open forests.

Specimens examined: Mahudia-Jhaleshwar [25 01 15.75 N, 74 48 14.93 E, 418 m], *P. Hari Krishna & R. Kumar* 35180(BSJO); Jharia Mahadev [25 02 05.93 N, 74 53 3.79 E, 489 m], *P. Hari Krishna & R. Kumar* 35377(BSJO).

10. *Clitoria* L.

Clitoria ternatea L., Sp. Pl. 2: 753. 1753; Baker in Hook.f., Fl. Brit. India 2: 208. 1876; Duthie, Fl. Gangetic Plain 1: 230. 1903; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 213. 1987; Sanjappa, Legum. Inida: 114. 1992. (Plate-15). ‘Gokarni’

Slender herbs. Leaves imparipinnate, 4-6 cm long, alternate; leaflets 5-7-9 , 2.4 - 6 x 1.3 - 2.6 cm, elliptic-oblong or ovate-oblong. Flowers bright blue or white, axillary. Pods 6-10 cm long, linear-oblong, pubescent. Seeds 6-10, glabrous, yellowish-brown.

Fl. & Fr.: August - December.

Common in open forests.

Specimen examined: Near Bassi [25 01 47.76 N, 74 50.72 E, 405 m], *P. Hari Krishna & R. Kumar* 35428(BSJO).

11. *Dalbergia* L.f.

Key to the species

- 1a. Leaflets 2 pairs. **2. *D. sissoo***
b. Leaflets 9 -13, oblong-obovate **1. *D. lanceolaria* subsp. *paniculata***

1. *Dalbergia lanceolaria* L.f. subsp. ***paniculata*** (Roxb.) Thoth. in Bull. Bot. Surv. India 25: 171. 1985. *Dalbergia paniculata* Roxb., Pl. Corom. 2: 8. t. 114. 1799; Baker in Hook.f., Fl. Brit. India 2: 236. 1876; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 223. 1987. ‘Dobin, Sisum’

Deciduous trees, up to 12 m high. Leaves imparipinnate, 8-18 cm long; leaflets 9-13, 2 - 6 x 0.9 - 3.5 cm, elliptic or oblong, obtuse or emarginate at apex. Flowers white, in axillary and terminal. Pods 1.5-6 cm long, oblong, narrowed at both ends, glabrous, 1 to 2-seeded.

Fl. & Fr.: March - August.

Rare, at the foot of the hills in dry deciduous forests.

Specimen examined: Kelzar on road [24 58 43.23 N, 74 46 54.13 E, 450 m], *P. Hari Krishna & R. Kumar* 35225(BSJO).

Uses: Bark is used in diarrhoea, indigestion and as vermifuge.

2. Dalbergia sissoo Roxb. ex DC., Fl. Ind. 3: 223. 1832; Baker, in Hook.f., Fl. Brit. Ind. 2: 231. 1876; Bhandari, Fl. Indian Desert 104. 1978; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 224. 1987; Duthie, Fl. Gangetic Plain 1: 264. 1903; Sanjappa, Legum. India: 140. 1992. (Plate-15).
'Sisam'

Medium-sized trees, up to 10 m high, with greyish-black bark. Leaves, imparipinnate; leaflets 3-5, 2.5 - 5 x 2 - 4.5 cm, suborbicular, cuneate or rounded at base, acuminate at apex. Flowers pale yellow, sessile, in axillary panicles. Pods 3 - 5 x 0.5 - 1.3 cm, oblong, flat, glabrous, 1 to 4 seeded. Seeds reniform, flattened.

Fl. & Fr.: March- August .

Occasionally found in wastelands.

Specimen examined: Nandwi to Amalda [25 00 37.49 N, 74 56 55.58 E, 432 m], *P. Hari Krishna & R. Kumar* 35256 (BSJO).

Uses: The wood is used in furniture making.

12. *Desmodium* Desv.

Desmodium procumbens (Mill.) Hitch. in Ann. Mo. Bot. Gard. 4: 76. 1893; Singh in B.V. Shetty & V. Singh Fl. Rajasthan 227. 1987. *Hedysarum procumbens* Mill., Gard. Dict. ed. 8. no. 10. 1768. *H. spirale* Sw., Prod. Veg. Ind. Occ. 1723. 1806. *Desmodium spirale* (Sw.) DC., Prod. 2: 332. 1825; Baker in Hook.f., Fl. Brit. India 2: 164. 1876.

Pubescent, herbs, up to 50 cm high; stems glabrous. Leaves 3-foliolate; leaflets membranous, 1.5 - 3 x 0.5 - 2 cm, ovate or ovate-lanceolate. Flowers red, in simple or branched racemes. Pods 1-2 cm long, flat, 4 to 6-jointed joints rhomboid, pubescent, with strongly involute and revolute margins, giving the pod a spirally twisted appearance.

Fl. & Fr.: August- October.

Occasional found in moist places .

Specimens examined: Bichhore [25 04 12.2 N, 74 54 37.36 E, 447 m], *P. Hari Krishna & R. Kumar* 35406(BSJO); Semaldhar [24 59 37.69 N, 74 52 31.35 E, 493 m], *P. Hari Krishna & R. Kumar* 35705 (BSJO); Dewalgarh [24 58 27.14 N, 74 50 57.14 E, 442 m], *P. Hari Krishna & R. Kumar* 37337(BSJO).

13. *Dichrostachys* (DC.) Wight & Arn.

Dichrostachys cinerea (L.) Wight & Arn., Prodr. Fl. Ind. Orient. : 271. 1834; Baker in Hook.f., Fl. Brit. India 2: 288. 1878; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 303. 1987. *Mimosa cinerea* L., Sp. Pl. 1: 520. 1753. (Plate-19). 'Goya- Khair'

Shrubs or small trees, 2-5 m high, with grey or greyish- white bark. Leaves 2-pinnate; leaflets sessile, 10-20 pairs, 0.3 - 0.6 x 0.2 - 0.3 cm, linear-oblong. Flowers axillary or extra-axillary spikes. Pods 3 - 5 x 0.5 - 1.2 cm, linear-falcate, dark brown. Seeds 6-10, reddish-brown.

Fl. & Fr.: May - February.

Frequently found in dry deciduous forests.

Specimens examined: Near Crocodile view point [25 00 20.36 N, 74 49 10.33 E, 418 m], *P. Hari Krishna & R. Kumar* 35118 (BSJO); Near Shivpura [25 01.59.45 N, 74 54 55.22 E, 474 m], *P. Hari Krishna & R. Kumar* 35654(BSJO).

14. *Erythrina* L.

Erythrina suberosa Roxb., Fl. Ind. 3: 253. 1832; Baker in Hook.f., Fl. Brit. India 2: 189. 1876; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 231. 1987. *E. sublobata* Roxb., Fl. Ind. 3: 254. 1832. *E. suberosa* Roxb. var. *sublobata* (Roxb.) Baker in Baker in Hook.f., Fl. Brit. India 2: 190. 1876. *E. suberosa* var. *glabrescens* Prain, J. Asiatic. Soc. Bengal, Pt. 2, Nat. Hist. 66: 410. 1897. (Plate-15). 'Dhorokhankharo'

Trees, up to 4-6 m tall, with yellowish-white prickles. Leaves pinnately 3-foliolate. Leaflets 9 - 12 x 11 - 13 cm, rhomboid-ovate. Flowers scarlet, in 3-5 cm long, capitate racemes gathered at the end of branchlets. Pods stalked, 12-15 cm long, subterete, torulose, beaked, 2 to 5-seeded. Seeds oblong, glabrous.

Fl. & Fr.: March - September.

Rare, in dry and deciduous forests.

Specimen examined: near Jharia Mahadev temple [25 15 9.57 N, 74 52 56.29 E, 451 m], *P. Hari Krishna & R. Kumar* 35651(BSJO).

15. *Galactia* P. Browne

Galactia striata* var. *villosa (Wight & Arn.) Verdc. in Fl. Zambes. 3(5): 42. 2001. *G. tenuiflora* (Klein ex Willd.) Wight & Arn., Prod. 206. 1834; Baker in Hook.f., Fl. Brit. India 2: 192. 1876; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 233-234. 1987. *Glycine tenuiflora* Klein ex Willd., Sp. Pl. 1059. 1802.

Twinning Herbs; stem pubescent. Leaves 3-foliolate; leaflets membranous, 2.6- 4.5 x 1.6 - 3 cm, elliptic- oblong or oblong-lanceolate. Flowers bluish-purple, Pods, flat, many seeded. Seeds dark-brown.

Fl. & Fr.: August - September.

Common in dry deciduous forests.

Specimens examined: Panduria [24 58 31.31 N, 74 53 20.19 E, 512 m], *P. Hari Krishna & R. Kumar* 35341 (BSJO); Modia Mahadev [24 59 32.0 N, 74 52 31 E, 506 m], *P. Hari Krishna & R. Kumar* 35352 (BSJO); Mevasa gate [24 59 29.91 N, 74 48 52.83 E, 423 m], *P. Hari Krishna & R. Kumar* 35133(BSJO).

16. *Grona* Lour.

Grona triflora (L.) H.Ohashi & K.Ohashi in J. Jap. Bot. 93: 117. 2018. *Desmodium triflorum* (L.) DC., Prod. 2: 334. 1825; Baker in Hook.f., Fl. Brit. India 2: 173. 1876; Singh in B.V. Shetty & V. Singh Fl. Rajasthan 228. 1987. *Hedysarum triflorum* L., Sp. Pl. 2: 749. 1753. *Desmodium triflorum* var. *minus* Wight & Arn. & var. *villosum* Wight & Arn., Prodr. Fl. Ind. Orient.: 229. 1834. (Plate-15).

Glabrous or sparsely hirsute herbs, rooting at the lower nodes. Leaves 3-foliolate; leaflets membranous, 0.5 - 1.6 x 0.4 - 0.6 cm, obovate, truncate or eamrginate at the apex. Flowers pink or white, axillary, in axillary 1 to 5-flowered fascicles. Pods linear, laterally compressed, falcate, 3 to 5-jointed. Seeds subquadrate, smooth, greenish-brown.

Fl. & Fr.: September- November.

Common in moist - shaded places in dry deciduous forests.

Specimens examined: Mahudia- Jhaleshwar [25 01 14.56 N, 74 48 16.12 E, 421 m], *P. Hari Krishna & R. Kumar* 35173(BSJO); near Taleti [24 58 20.69 N, 74 52 35.76 E, 539 m], *P. Hari Krishna & R. Kumar* 35674 (BSJO).

17. *Guilandina* L.

Guilandina bonduc L., Sp. Pl. 1: 381. 1753. *Caesalpinia bonduc* (L.) Roxb., Fl. Ind. 2: 362. 1824, *p.p.* excl. pl. descr. emend. Dandy & Exell in J.

Bot. 76: 179. 1938; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 279. 1987. (Plate-18). 'Kanthar'

Scandent, armed shrubs. Leaves bipinnate, 12-15 cm long, prickly; pinnae 4-8 pairs, elliptic-oblong, obtuse. Flowers yellow, terminal and axillary racemes. Pods ovoid-oblong, flattened, densely armed with wiry prickles, 1-2 seeded. Seeds oblong, smooth, shining, lead coloured.

Fl. & Fr.: September - December.

Common in dry deciduous forest.

Specimens examined: Anoop pura [24 56 28.91 N, 74 53 31.64 E, 507 m], *P. Hari Krishna & R. Kumar* 35269 (BSJO); Gopalpura [25 2 27.08 N, 74 50 23.54 E, 383 m], *P. Hari Krishna & R. Kumar* 38366 (BSJO).

Uses: It is used in diarrhoea and jaundice.

18. Indigofera L.

Key to the species

- 1a. Leaves simple or unifoliolate. 2
- b. Leaves compound, imparipinnate. 3
- 2a. Leaves linear, flowers in axillary racemes; pods glabrous, 1-seeded. **6. I. linifolia**
- b. Leaves broadly ovate to cordate; flowers axillary, solitary or in fascicles of 4-8; pods cylindrical, 2-seeded. **3. I. cordifolia**
- 3a. Leaflets 3. 4
- b. Leaflets more than 3. 5
- 4a. Pods flat, curved, papery, appressedly hairy. **5. I. hochstetteri**
- b. Pods tetragonal. **8. I. tirta**
- 5a. Leaflets opposite or sub-opposite. 6
- b. Leaflets alternate. 8
- 6a. Plants densely hairy, pods 4 to 6-seeded; seeds punctate... **1. I. argentea**
- b. Plants not densely hairy. 7
- 7a. Peduncle less than 2 cm long; pods usually white hairy. **2. I. astragalina**
- b. Peduncle over 2.5 cm long; pods usually brown hairy. **4. I. hirsuta**
- 8a. Flowers in axillary raceme, pods glabrous. **7. I. tinctoria**

b. Flowers in axillary sessile heads. 9. *I. tsiangiana*

1. *Indigofera argentea* Burm.f., Fl. Ind. 171. 1768, non L. 1771; *I. semitrijuga* auct. non Forssk. 1775; Baker in Hook.f., Fl. Brit. India 2: 98. 1876. Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 237. 1987.

Diffusely undershrubs, up to 40 cm high. Leaves 1.6-3 cm long; leaflets 3-9, opposite, 0.30 - 5 x 0.3 - 0.45 cm, orbiculate or obovate. Flowers reddish, in 6 to 12-flowered, axillary racemes. Pods 0.6-1 cm long, linear or slightly curved. Seeds 4-6 (8), c. 0.16 cm across, orbicular or ovoid, smooth, reddish-brown.

Fl. & Fr.: August - October.

Rare, in dry deciduous forests.

Specimen examined: Ambapani [24 58 53.34 N, 74 51 16.42 E, 433 m], *P. Hari Krishna & R. Kumar* 35573(BSJO).

2. *Indigofera astragalina* DC., Prod. 2: 228. 1825; Sanjappa, Legum. India: 185. 1992. *I. hirsuta* auct. non L. 1753; Baker in Hook.f., Fl. Brit. India 2: 98. 1876. (Plate-16).

Pubescent herbs, up to 2 m high; stem and branches terete. Leaves 9-12 cm long; leaflets 7-12, opposite, 1 - 3 x 1 - 3 cm, obovate, elliptic or elliptic-oblong. Flowers light pink, axillary racemes. Pods 1 - 2 x 0.5 - 0.4 cm, hirsute. Seeds 3-6, brown.

Fl. & Fr.: August - October.

Rare in open forests and wastelands.

Specimens examined: Jamunia [25 00 45.47 N, 74 48 0.9 E, 466 m], *P. Hari Krishna & R. Kumar* 35203 (BSJO); Modia Mahadev area [24 59 38.09 N, 74 52 29.80 E, 492 m], *P. Hari Krishna & R. Kumar* 35710(BSJO).

3. *Indigofera cordifolia* Heyne ex Roth, Nov. Pl., Sp. 357. 1821; Baker in Hook.f., Fl. Brit. India 2: 93. 1876; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 239-240. 1987. *Heylandia cordifolia* Graham in Wall., Numer. List: 5343. 1831. (Plate-16).

Prostrate herbs; branches tomentose. Leaves simple, 0.6 - 2 x 0.6 - 1.2 cm, ovate-cordate, acute to rounded at apex, dense hairy on both surfaces. Flowers bright red, sessile, 4 to 10-flowered, axillary racemes. Pods cylindrical-oblong, 1 to 2 seeded, pubescent. Seeds ovoid or globose, yellowish-brown.

Fl. & Fr.: August - December.

Common in dry deciduous forests.

Specimens examined: Mahudia-Jhaleshwar [25 01 15.75 N, 74 48 14.93 E, 418 m], *P. Hari Krishna & R. Kumar* 35178 (BSJO); Jharia Mahadev area [25 02 05.93 N, 74 53 3.79 E, 489 m], *P. Hari Krishna & R. Kumar* 35364(BSJO).

4. Indigofera hirsuta L., Sp. Pl. 2: 751. 1753; Baker in Hook.f., Fl. Brit. India 2: 98. 1876; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 241. 1987. *I. ferruginea* Schumach. & Thonn., Beskr. Guin. Pl. : 370.1827.

Annuals, spreading herbs, up to 1m high. Stem and branches angular, hirsute, brown. Leaf imparipinnately compound. Leaflets 5-7, 2-4.5 x 1.2-3 cm, elliptic-obovate to elliptic-oblong, rounded at apex. Flowers pink, in axillary racemes. Pods tetragonous, covered with brown hairs, ca 10-20 cm long, up to 6 seeded. Seeds squarish, pitted, brown.

Fl. & Fr.: August - October.

Common in open forests.

Specimens examined: Sagarani [24 55 30.79 N, 74 52 43.22 E, 489 m], *P. Hari Krishna & R. Kumar* 35276(BSJO); Jharia Mahadev forest area [25 02 05.93 N, 74 53 3.79 E, 489 m], *P. Hari Krishna & R. Kumar* 35371(BSJO).

5. Indigofera hochstetteri Baker in Oliver, Fl. Trop. Afr. 2: 101. 1871; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 241. 1987; Sanjappa, Legum. India: 191. 1992. *I. anabaptista* Steud. ex Baker in Hook.f., Fl. Brit. India 2: 102. 1876.(Plate-16). ‘Bagdo’

Annual herbs. Leaves, opposite, c. 1.2 x 0.6 cm, oblanceolate-elliptic. Flowers red-pink, in 1-2 cm long, dense, 8 to 15-flowered, axillary racemes, shorter than leaves; pedicels up to 1.5 mm long. Pods flat, papery, hairy, 5 to 8-seeded. Seeds reddish brown.

Fl. & Fr.: August - November.

Common in dry deciduous forests.

Specimens examined: Kevdia side [24 58 47.35 N, 74 49 41.44 E, 419 m], *P. Hari Krishna & R. Kumar* 35247 (BSJO); Semaldhar [24 58 42.28 N, 74 52 34.52 E, 541 m], *P. Hari Krishna & R. Kumar* 37302 (BSJO); Jariya Mahadev water fall area [25 01 59.29 N, 74 53 1.91 E, 469 m], *P. Hari Krishna & R. Kumar* 35393(BSJO).

6. Indigofera linifolia (L.f.) Retz., Obs. Bot. 4: 29. 1786; Baker in Hook.f., Fl. Brit. India 2: 92. 1876; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 242. 1987. *Hedysarum linifolium* L.f., Suppl. 331. 1782. *Indigofera linifolia* (L.f.) Retz. var. *campbelli* Wight ex Baker in Hook.f., Fl. Brit. India 2: 92. 1876. (Plate-16).

Annuals or perennial herbs. Leaves simple, alternate, 0.5-4 cm long, linear, elliptic, obovate or orbicular.. Flowers salmon- red or pinkish- red, in axillary, 6 to 20- flowered racemes shorter than the leaves. Pods ca 0.2 cm in diam., globose, beaked, adpressed white silky hairy, 1-seeded. Seeds c. 0.1 cm across, globose, dark brown.

Fl. & Fr.: July - December.

Common in open forests.

Specimens examined: Near Palka [24 59 22.18 N, 74 46 57.50 E, 438 m], *P. Hari Krishna & R. Kumar* 38341(BSJO); Sarna talab [25 00 23.89 N, 74 8 34.31 E, 500 m], *P. Hari Krishna & R. Kumar* 35446 (BSJO).

7. Indigofera tinctoria L., Sp. Pl. 2: 751. 1753; Baker in Hook.f., Fl. Brit. India 2: 99. 1876; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 244. 1987; Duthie, Fl. Gangetic Plain 1: 154. 1903; Sanjappa, Legum. India: 196. 1992. 'Neel'

Undershrubs, up to 1 m high. Leaves imparipinnate; leaflets 7-13, opposite, 1-2 x 0.6-1 cm, obovate or oblanceolate. Racemes axillary, many-flowered, shorter than leaves. Flowers red, axillary. Pods 3 - 3.5 cm long glabrous 6 to 12 seeded. Seeds yellowish to reddish brown.

Fl. & Fr.: August - November.

Occasional in open forests.

Specimens examined: Kevdia forest area [24 59 24.81 N, 74 50 04.08 E, 442 m], *P. Hari Krishna & R. Kumar* 35234 (BSJO); Kevdia chowki [24 59 38.89 N, 74 50 05.49 E, 444 m], *P. Hari Krishna & R. Kumar* 35467(BSJO); Maheshra [25 02 57.80 N, 74 53 00.24 E, 428 m], *P. Hari Krishna & R. Kumar* 37375(BSJO).

Uses: It is used in fever and stomach pain.

8. Indigofera trita L. f., Suppl. 335. 1782; Baker in Hook.f., Fl. Brit. India 2: 96. 1876; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 245. 1987; Duthie, Fl. Gangetic Plain 1: 252. 1903; Sanjappa, Legum. India: 196. 1992.

Erect, woody undershrubs, up to 1 m high, branches pinkish to light green. Leaves pinnately trifoliate; leaflets rarely 5, opposite, 1 - 4.5 x 0.8 - 3 cm, obovate-oblong or elliptic. Flowers brick- red, in 15 to 20-flowered, spicate racemes shorter than leaves. Pods 1.5-3 cm long, linear, patent, deflexed to spreading, straight, 6 to 10-seeded. Seeds ca 0.2 x 0.15 cm, subtetragonous, dark-brown, smooth.

Fl. & Fr.: August- February.

Common in open forests.

Specimens examined: Amba pani [24 58 50.13 N, 74 51 31.54 E, 446 m], *P. Hari Krishna & R. Kumar* 35327(BSJO); Sonar ki Kudi [25 00 57.23 N, 74 55 11.36 E, 462 m], *P. Hari Krishna & R. Kumar* 35797 (BSJO); Maheshra [25 03 07.54 N, 74 52 53.86 E, 427 m], *P. Hari Krishna & R. Kumar* 37359(BSJO).

9. Indigofera tsiangiana Metcalf in Sunyatsenia 4: 156. 1940. *I. linnaei* Ali in Bot. Not. 111: 549. 1958; ; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 242-243. 1987. *I. enneaphylla* auct. non L. 1771, *nom illeg*; Baker in Hook.f., Fl. Brit. India 2: 94. 1876. (Plate-16).

Prostrate herbs; stem yellowish green, hairs. Leaves sessile, leaflets 5-11, alternate, 0.5 - 1.2 x 0.2 - 0.5 cm, ovate to obovate. Flowers pinkish-red, in dense, axillary, 10 to 20-flowered, silvery pubescent, spicate racemes shorter than the leaves. Pod globose to oblong, 2 to 3 seeded. Seeds dark green to light brown.

Fl. & Fr.: August - November.

Common in open forests.

Specimens examined: Bichhor forest area [25 04 12.2 N, 74 54 37.36 E, 447 m], *P. Hari Krishna & R. Kumar* 35407(BSJO); Meghpura watch tower [24 59 34.02 N, 74 48 01.33 E, 557 m], *P. Hari Krishna & R. Kumar* 37394 (BSJO); Mahudia-Jhaleswar [25 01 15.75 N, 74 48 14.93 E, 418 m], *P. Hari Krishna & R. Kumar* 35183(BSJO).

19. *Leucaena* Benth.

Leucaena leucocephala (Lam.) De Wit, Taxon 10:53.1961. *Mimosa leucocephala* Lam., Encycl. 1:12.1783. *Leucaena glauca* auct. non Benth. 1842; Baker in Hook, f., Fl. Brit. India 2:290.1878; Gamble, Fl. Madras 1:419.1919; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 303. 1987. 'Subabul'

Shrubs or small trees, 5-8 m tall. Leaves 15-20 cm long, 2-pinnate; pinnae 3-8 pairs; leaflets 7-15 pairs, 0.6 - 1.6 x 0.3 - 0.4 cm, linear-oblong, margin entire. Flowers in globose heads, white, often in pairs. Pods 12 - 15 x 1 - 2 cm, flat, pale to dark brown. Seeds 15-25, dark brown.

Fl. & Fr.: September - February.

Frequently found near habitations and along the hedges of cultivated fields.

Specimens examined: Muroli forest area [25 03 03.34 N, 74 55 51.72 E, 433 m], *P. Hari Krishna & R. Kumar* 35597(BSJO).

20. Medicago L.

Medicago monantha (C.A.Mey.) Trautv. in Index Seminum (KIEV, Kioviensi) 1840: vi.1841. *Trigonella monantha* subsp. *incisa* (Royle ex Benth.) Elenevsky & Kupat. in Biol. Zhurn. Armenii 21(6): 69. 1968; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 269. 1987. (Plate-18).

Prostrate, annual herbs. Leaflets 0.4-1 x 0.3-0.6 cm, oblong to cordate, dentate or pinnatifid, stipules semisagittate, denticulate. Inflorescence pedunculate, 1-3 flowered. Corolla yellow. Pods reticulately netted, many-seeded.

Fl. & Fr.: January - April.

Common weed in cultivated fields.

Specimen examined: Near bassi dam [24 59 32.32 N, 74 49 27.88 E, 410 m], *P. Hari Krishna & R. Kumar* 38306(BSJO).

21. Mimosa L.

Key to the species

- 1a. Leaf-rachis upto 6 cm long; pinnae 3- 6 pairs. pods with prickly sutures, pubescent **1. M. hamata**
- b. Leaf-rachis more than 10 cm long; pinnae 5- 12 pairs. pods with smooth sutures, glabrous..... **2. M. rubicaulis** subsp. **himalayana**

1. Mimosa hamata Willd., Sp. Pl. 4: 1033. 1806; Baker in Hook.f., Fl. Brit. India 2: 291. 1878; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 304. 1987. *Mimosa armata* Rottler ex Spreng., Syst. Veg. 2: 206.1825. (Plate-20). *'Arati'*

Prickly undershrubs, up to 2 m tall, with brownish bark; prickles curved or straight. Leaves bipinnate; pinnae 3-6 pairs, 1-2 cm long; leaflets sessile, 6-10 pairs, 0.5 - 0.8 x 0.3 - 0.5 cm, obovate-oblong. Flowers in axillary and extra-axillary, drooping spikes, fragrant, yellow and fertile in the upper part and pink and sterile in the lower part. Pods 4 - 7 x 1.5 - 2.5 cm, flat, reddish-brown. Seeds smooth, light reddish-brown.

Fl. & Fr.: August - March.

Frequently found in open forests.

Specimen examined: Jhaleshwar Mahadev gate [25 01 21.99 N, 74 48 30.65 E, 424 m], *P. Hari Krishna & R. Kumar* 35158(BSJO).

2. Mimosa rubicaulis subsp. **himalayana** (Gamble) H. Ohashi in Enum. Fl. Pl. Nepal 2: 126. 1979. *M. himalayana* Gamble in Bull. Misc.

Inform. Kew 1920: 4. 1920; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 304. 1987. (Plate-20). 'Narkanta'

Prickly shrubs, with closely ribbed branches. Leaves 2-pinnate, 10-20 cm long; pinnae 8-12 pairs, 4-6 cm long; leaflets 16-20 pairs, 2.6 - 8 x 2 - 3 mm, oblong, margin ciliate. Flowers rose-pink, in axillary, pedunculate, globose heads. Pods 8 - 12 x 1 1.25 cm, slightly curved.

Fl. & Fr.: August - November.

Frequently found in open forests.

Specimens examined: Bijaypur road Bassi [24 59 14.60 N, 74 46 56.05 E, 441 m], *P. Hari Krishna & R. Kumar* 35216(BSJO); Muroli forest area [25 03 03.34 N, 74 55 51.72E, 433 m], *P. Hari Krishna & R. Kumar* 35590(BSJO).

22. *Mucuna* Adans.

Mucuna pruriens (L.) DC., Prod. 2: 405. 1825 & Syst. Nat, ed. 10.1162. 1759; Baker in Hook.f., Fl. Brit. India 2: 187. 1876; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 250-251. 1987. *Dolichos pruriens* L. in Stickman Herb. Amboin. 23. 1754. (Plate-17). 'Kauanch'

Extensively twining, slender, hirsute, annual herbs. Leaves 3-foliolate; leaflets membranous, 5 - 9 x 3- 7.5 cm, rhomboid-ovate, Flowers dark- purple, in axillary, many-flowered, drooping racemes. Pods 5-9 x 1-2.5 cm, 5 to 6-seeded. Seeds elliptic, smooth, compressed, glabrous, dark-brown.

Fl. & Fr.: November - March.

Common in open forests.

Specimens examined: Muroli [25 03 03.34 N, 74 55 51.72 E, 433 m], *P. Hari Krishna & R. Kumar* 35599 (BSJO); Near Chandpuria [25 04 19.78 N, 74 51 21.86 E, 384 m], *P. Hari Krishna & R. Kumar* 35785(BSJO).

23. *Neltuma* Raf.

Neltuma juliflora (Sw.) Raf. in Sylva Tellur.: 119. 1838. *Prosopis juliflora* (Sw.) DC., Prod. 2: 447. 1825; Burkart in J. Arnold Arb. 57: 499. 1976; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 307. 1987. *Mimosa juliflora* Sw., Prod. 85. 1788. 'Vilayati Babul'

Shrubs or small trees, 3-6 m high; spines solitary or paired. Leaves 1-3 at each node, 2-pinnate, up to 7 cm long; pinnae 2 pairs; leaflets sessile, 0.4 - 1.2 x 0.2 - 0.3 cm, obliquely oblong, obtuse. Flowers greenish-white to yellow, in drooping, axillary spikes. Pods 8- 12 x 0.6 - 1.3 cm, linear, falcate,

pendulous, compressed, yellow. Seeds 10-15, ovoid, compressed, glossy, brown.

Fl. & Fr.: Almost throughout the year.

Common in open forests.

Specimen examined: Amalda forest area [24 57 48.90N, 74 54 02.93E, 504 m], *P. Hari Krishna & R. Kumar* 35645 (BSJO).

24. *Ougeinia* Benth.

Ougeinia oojeinensis (Roxb.) Hochr., Ann. Cons. Jard. Bot. Geneve 13 & 14: 51. 1909; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 251. 1987. *Dalbergia oojeinensis* Roxb., Fl. Ind. 3: 220. 1832. *Ougeinia dalbergioides* Benth. in Miq., Pl. Jungh. 216. 1852; Baker in Hook.f., Fl. Brit. India 2: 161. 1876. *Desmodium oojeinense* (Roxb.) H. Ohashi in Ginkgoana 1: 117. 1973. 'Tinsa'

Trees, up to 10 m tall, with dark- brown bark. Leaves pinnately 3-foliolate, leaflets rigidly coriaceous, 6.5 - 18 x 4.5 - 15 cm terminal one broadly ovate or suborbicular, lateral one obliquely ovate-cordate. Flowers white or rose-coloured, in short, fascicled racemes. Pods 5-7.5 cm long, jointed.

Fl. & Fr.: February - May.

Rare found in dry deciduous forests.

Specimen examined: Semaldhar to Taleti way [24 58 42.28 N, 74 52 34.52 E, 541 m], *P. Hari Krishna & R. Kumar* 37301 (BSJO).

25. *Pithecellobium* Mart.

Pithecellobium dulce (Roxb.) Benth. in Hook., Lond. J. Bot. 3: 199. 1844; Baker in Hook.f., Fl. Brit. India 2: 302. 1878; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 306. 1987. *Mimosa dulcis* Roxb., Pl. Coromandel. 1: 67. t. 99. 1798. 'Jungle-jalebi'

Moderate-sized, thorny trees, up to 9 m tall, with greyish-black bark. Leaves bi-pinnate; leaflets 1.6 - 4 x 0.6 - 3 cm, oblong or ovate-oblong. Flowers pale green, in narrow heads arranged in terminal and axillary panicles. Pods torulose, circinately coiled, velvety pubescent, 6 to 8-seeded. Seeds reddish-white.

Fl. & Fr.: March - August.

Occasional, planted along road-sides and fences of fields.

Specimen examined: Near Tukra Mata Mandir [25 01 51.81N, 74 49 13.85 E, 411 m], *P. Hari Krishna & R. Kumar* 35579 (BSJO).

Uses: The bark and pulp are used to treat toothache and bleeding.

26. Pleurolobus J.St.-Hil.

Pleurolobus gangeticus (L.) J.St.-Hil. ex H.Ohashi & K.Ohashi in J. Jap. Bot. 93: 184. 2018. *Desmodium gangeticum* (L.) DC., Prod. 2: 327. 1825; Baker in Hook.f., Fl. Brit. India 2: 168. 1876, incl. var. *maculatum* (L.) Baker Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 226. 1987. 'Salpiani, Kareti'

Undershrubs with hairy branches. Leaves 1-foliolate, linear subulate; leaflets membranous 3 - 10 x 1 - 6 cm, ovate-oblong, rounded at base, acute at apex. Flowers purple-pink, axillary and terminal racemes. Pods 6 to 8-jointed, linear, flat, falcate, compressed. Seeds smooth, brown.

Fl. & Fr.: August - November.

Common in dry deciduous forests.

Specimens examined: Mahudia-Jhaleshwar [25 01 14.56 N, 74 48 16.12 E, 421 m], *P. Hari Krishna & R. Kumar* 35174 (BSJO); Jharia Mahadev [25 01 59.29 N, 74 53 1.91 E, 469 m], *P. Hari Krishna & R. Kumar* 35395 (BSJO); Modiya Mahave [24 59 38.09 N, 74 52 29.80 E, 492 m], *P. Hari Krishna & R. Kumar* 35711 (BSJO); Dewalgarh [24 58 27.14 N, 74 50 57.14 E, 442 m], *P. Hari Krishna & R. Kumar* 37338 (BSJO).

27. Pongamia Vent.

Pongamia pinnata (L.) Pierre, Fl. For. Cochinch. 5: t. 385. 1899; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 277. 1987. *Cytisus pinnatus* L., Sp. Pl. 2: 741. 1753. *Pongamia glabra* Vent. Jard. Malm. 1: 28. t. 1803; Baker, in Hook.f., Fl. Brit. Ind. 2: 240. 1876. 'Karanj'

Medium sized trees, up to 12 m tall, with light-brown bark. Leaves imparipinnate, pale green; Leaflets opposite, 5-9 , 3 - 9 x 3 - 5 cm , elliptic or ovate-oblong. Flowers pinkish-white, axillary racemes. Pods obliquely oblong, narrowed at base, shortly mucronate at apex, compressed, woody, indehiscent, glabrous. Seeds 1-2, reniform, dirty white with brown streaks.

Fl. & Fr.: March - June.

Often planted in forests along the roadsides and near habitations.

Specimen examined: Bhungadia [24 58 11.99 N, 74 49 19.67 E, 416 m], *P. Hari Krishna & R. Kumar* 35459 (BSJO).

Uses: It is used in skin disease.

28. Rhynchosia Lour.

Key to the species

- 1a. Leaflets glabrous above, pubescent on nerves beneath; pods glabrescent **1. R. minima**

b. Terminal leaflets rhomboid, silky on both sides **2. R. pulverulenta**

1. Rhynchosia minima (L.) DC., Prod. 2: 385. 1825; Baker in Hook.f., Fl. Brit. India 2: 223. 1876; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 255. 1987; *Dolichos minimus* L., Sp. Pl. 2: 726. 1753. *Rhynchosia minima* (L.) DC. var. *laxiflora* (Camb.) Baker in Hook.f., l.c. 2: 223. 1876.

Annual climbing herbs; branches pubescent. Leaves 3-foliolate; leaflets 1-5 cm long, rhomboid or rhomboid-ovate to obovate, cuneate at base, glabrous above, pubescent on the nerves and dotted beneath. Flowers yellow, in axillary, 6 to 12-flowered, lax racemes usually exceeding the leaves. Pods 2-4 cm long, linear, flat, 2-seeded. Seeds black.

Fl. & Fr.: August - November.

Common in open forests.

Specimens examined: Kevdia [24 58 47.35 N, 74 49 41.44 E, 419 m], *P. Hari Krishna & R. Kumar* 35248 (BSJO); Ambapani [24 58 50.13 N, 74 51 31.54 E, 446 m], *P. Hari Krishna & R. Kumar* 35330 (BSJO); Jharia mahadev [25 02 05.93 N, 74 53 3.79 E, 489 m], *P. Hari Krishna & R. Kumar* 35382 (BSJO).

2. Rhynchosia pulverulenta Stocks in Hooker's J. Bot. Kew Gard. Misc. 4: 147. 1852; Verdc. in Kew Bull. 25: 105. 1971. Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 255. 1987; Sanjappa, Legum. India: 240. 1992. *R. memnonia* auct. non (Delile) DC. 1825; Baker in Hook.f., Fl. Brit. India 2: 223. 1876. *R. rhombifolia* Blatter & Hallb. in Journ. Bombay Nat. Hist. Soc. 26: 242. 1918, non (Willd.) DC. 1825.

Perennial herbs; branches tomentose. Leaves 3-foliolate; petiole up to 3 cm long; terminal leaflet 0.4 - 3 x 0.6 - 4 cm, transversely elliptic to rhomboid; lateral ones smaller, obliquely ovate, velvety pubescent and gland-dotted on both surfaces. Flowers pale yellow, in axillary. Pods 1.6-2 x c. 0.5 cm, densely pubescent, 2-seeded.

Fl. & Fr.: July - October .

Rare in forests.

Specimen examined. Dewalgarh [24 58 20.32 N, 74 51 04.41 E, 491 m], *P. Hari Krishna & R. Kumar* 37347 (BSJO).

29. Senegalia Raf.

Key to the species

- 1a. Pinnae more than 10 pairs; Stipular spines paired. **1. S. catechu**
b. Pinnae 5 pairs or lower; Stipular spines 3. **2. S. senegal**

1. *Senegalia catechu* (L.f.) P.J.H.Hurter & Mabb. in D.J.Mabberley, Plant-book, ed. 3: 1021. 2008. *Acacia catechu* (L.f.) Willd., Sp. Pl. 4: 1079. 1806; Baker in Hook.f., Fl. Brit. India 2: 295. 1878; Parmer, in Shetty & Singh (eds.), Fl. Rajasthan 1: 289. 1987. *Mimosa catechu* L.f., Suppl. 439. 1781. (Plate-19). 'Khair'

Medium sized thorny trees, up to 6 m high; bark brown. Leaves 2-pinnate, with a large gland above the middle on the petiole and many small glands between the pinnae; leaf-rachis prickly, covered with grey tomentum; pinnae 10-30 pairs; leaflets 20-40 pairs, up to 15 cm long, linear-oblong. Flowers sessile, creamish to yellowish-white, fragrant, in cylindrical spikes. Pods flat, dark brown, beaked. Seeds 5 to 10.

Fl. & Fr.: May - September.

Common found in forests.

Specimen examined: Jogideh Dam side-Bassi dam [24 59 51.67 N, 74 49 10.12 E, 417 m], *P. Hari Krishna & R. Kumar* 35122(BSJO).

2. *Senegalia senegal* (L.) Britton in N.L.Britton & P.Wilson, Sci. Surv. Porto Rico & Virgin Islands 6: 538. 1930. *Acacia senegal* (L.) Willd., Sp. Pl. 4: 1077. 1806; Baker in Hook.f., Fl. Brit. India 2: 295. 1878; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 300. 1987. *Mimosa senegal* L., Sp. Pl. 1: 521. 1753. (Plate-19). 'Kumatio'

Small trees, 3 -6.5 m high; bark whitish grey or pale brown; stipular prickles three. Leaves 3-4 cm long; leaflets subsessile, 8-15 pairs, 0.3-0.5 x 0.2 cm, linear to elliptic-oblong. Flowers white to creamy, fragrant, in axillary, peduncled spikes. Pods oblong, flat, pale brown, 4 to 6-seeded. Seeds disc-like, with a horse-shoe-shaped depression on either side.

Fl. & Fr.: July - February.

Occasional found in dry deciduous forests.

Specimen examined. Bichhor forest area [25 04 12.2 N, 74 54 37.36 E, 447 m], *P. Hari Krishna & R. Kumar* 35401(BSJO).

Uses: Gum is used for making laddos. Seeds are used for making curries.

30.Senna Mill.

Key to the species

- 1a. Trees **2. *S. siamea***
 1b. Herbs or shrubs. **2**

- 2a. Pods subcompressed, up to 4 cm long **4. S. uniflora**
b. Pods linear cylindric to linear subquadrangular, up to 15 cm long **3**
3a. Gland 1, between the lowest pair of leaflets. **1. S. obtusifolia**
b. Glands 2, one each between lowest 2 pairs of leaflets. **3. S. tora**

1. Senna obtusifolia (L.) Irwin & Barneby in Mem. New York Bot. Gard. 35 (1): 252. 1982; V. Singh, Monogr. Indian subtribe Cassiinae. 164. 2001. *Cassia obtusifolia* L., Sp. Pl. 1: 377. 1753; Sanjappa, Legum. India: 19. 1992. *C. tora* sensu Benth. in Trans. Linn. Soc. London 27: 532. 1871, *p.p* non. L., 1753; Baker in Hook.f., Fl. Brit. India 2: 263. 1878. 'Puadia'

Herbs or undershrubs, up to 1 m high. Leaves up to 6 cm long, with a single, subulate gland between the lowest pair of leaflets. Leaflets 3 pairs, 1.5 - 3.5 x 0.5 - 2 cm, obovate or obovate-oblong. Flowers yellow, in axillary racemes. Pods terete, linear-cylindric, up to 20 cm long, beaked, slightly falcate. Seeds rhomboid or obovate, smooth, shining, dark brown.

Fl. & Fr.: August- November.

Common in deciduous forests.

Specimens examined: Meghpura [25 0 35.97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35111(BSJO); Bhungadia [24 58 11.99 N, 74 9 19.67 E, 416 m], *P. Hari Krishna & R. Kumar* 35461(BSJO).

2. Senna siamea (Lam.) H.S. Irwin & Barneby in Mem. New York Bot. Gard. 35(1) : 1982 ; V. Singh, Monogr. Indian subtribe Cassiinae 193. 2001. *Cassia siamia* Lamk., Encycl. Meth. 1:684.1785 ; Benth. in Trans. Linn. Soc. London 27: 549. 1871; Baker in Hook.f., Fl. Brit. India 2: 264. 1878; Parmer, in Shetty & Singh (eds.), Fl. Rajasthan 1: 285. 1987; Sanjappa, Legum. India: 20. 1992. 'Kasod'

Medium sized tree with dark brown branches. Leaves 12-25 cm long, leaflets 4-15 pairs, oblong to ovate- oblong, rounded or emarginate at apex. Flowers light yellow, in terminal panical of corymbose racemes. Pods 16-25 x 1-1.6 cm, strap-shaped, flat, thickened on the suture, depressed between the seeds, 20 to 30-seeded. Seeds oblong, flate, light brown.

Fl. & Fr :Almost throughout the year.

Common in dry deciduous forests.

Specimen examined: Tukra Mata Mandir [25 01 51.21 N, 74 9 14.81 E, 409 m], *P. Hari Krishna & R. Kumar* 35490 (BSJO).

3. Senna tora (L.) Roxb., Fl. Ind. 2: 340. 1832; Randell in J. Adelaide Bot. Gard. 11: 45. 1988; Singh, Monogr. Indian subtribe Cassinae 222. 2001.

Cassia tora L., Sp. Pl. 1: 376. 1753; Baker in Hook f. Fl. Brit. India 2: 263. 1878; Parmer, in Shetty & Singh (eds.), Fl. Rajasthan 1: 286. 1987; Sanjappa, Legum. India: 22. 1992. 'Fumphadia'

Annual, suffruticose herbs or undershrubs, up to 1 m high. Leaflets sessile, 3 pairs, obovate or obovate-oblong, obtuse, mucronate, membranous, oblique at base. Glands linear-cylindric or fusiform, between two lowest pairs of leaflets. Flowers yellow, axillary, solitary or in 1 to 3-flowered racemes. Pods linear-cylindric, subtetragonous, more or less falcate, beaked, 15 to 35-seeded. Seeds rhomboidal, glossy, dark coloured.

Fl. & Fr.: August - December.

Common weed in throughout the sanctuary.

Specimen examined: Near Shivpura [25 01 57.17 N, 74 54 38.08 E, 493 m], *P. Hari Krishna & R. Kumar* 35786(BSJO).

4. *Senna uniflora* (Mill.) Irwin & Barneby in Mem. New York Bot. Gard. 35 (1): 258. 1982; V. Singh, Monogr. Indian subtribe Cassine: 228. 2001. Meena & Yadav, in Nat. Prodr. Radiance 8 (5) 525 - 527. 2009. *Cassia uniflora* Mill., Gard. Dict. ed. 8. No. 2. 1768.

Annual herbs up to 1 m high. Leaves 5-10 cm long; leaflets (-2) 3-5 pairs, 3 - 4 x 1.3 - 2 cm, obovate, obovate-oblong or elliptic. Flowers yellow, axillary. Pods 2.5 - 4 x 0.3 - 0.5 cm, linear, 6 to 10-seeded. Seeds glabrous.

Fl. & Fr.: August - December.

Common weed in throughout the Sanctuary area.

Specimen examined: Near Shivpura [25 01 57.17 N, 74 54 38.08 E, 494 m], *P. Hari Krishna & R. Kumar* 35787(BSJO).

31. *Sesbania* Scop.

Sesbania bispinosa (Jacq.) Wight in U. S. Dept. Agric. Bur. Pl. Industr. Bull. 137: 15. 1909; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 257. 1987. *Aeschynomene bispinosa* Jacq., Ic. Pl. Rar. 3: 13. t. 564. 1792. *Sesbania aculeata* (Willd.) Poir. in Lam. Encycl. 7: 128. 1806 as *Sesban aculeatus*, nom. Illegit.; Baker in Hook.f., Fl. Brit. India 2: 114. 1876. *Sesbania aculeata* (Willd.) Pers., Syn. Pl. 2: 316. 243. 1903; Sanjappa, Legum. India: 242. 1992, excl. vars. *Aeschynomene spinulosa* Roxb., Fl. Ind. 3:333.1932. 'Dadhan'

Prickly herbs or undershrubs, up to 2 m tall. Leaflets sessile, 10-50 pairs, 0.6-2 x 0.3-0.6 cm, linear-oblong, or elliptic-oblong, obtuse and mucronate at apex, glabrous. Flowers yellow, in axillary or terminal racemes.

Pods linear, slightly falcate, torulose, glabrous. Seeds oblong, greenish-brown.

Fl. & Fr.: August- October.

Common weed in open moist places.

Specimen examined. Bhungadia [24 58 11.99 N, 74 49 19.67 E, 416 m], *P. Hari Krishna & R. Kumar* 38453 (BSJO)

Uses: It is used in hemp for rope.

32. *Tamarindus* L.

Tamarindus indica L., Sp. Pl. 1: 34. 1753; Baker in Hook.f., Fl. Brit. India 2: 273. 1878; Parmer, in Shetty & Singh (eds.), Fl. Rajasthan 1: 289. 1987; Sanjappa, Legum. India: 36. 1992. *'Imli'*

Large trees, up to 15 m high, with dark grey bark. Leaves 5-8 cm long ; leaflets, 10-20 pairs, 1.5 - 1.6 x 0.4 - 0.4 cm, linear-oblong. Flowers yellowish with pink stripes. Pods 8 - 10 x 2 - 3 cm, linear-oblong, 3 to 12-seeded. Seeds dark brown, glabrous.

Fl. & Fr.: March - November.

Occasionally found in mixed dry deciduous forests.

Specimen examined: Bichhore forest area [25 03 38.54 N, 74 52 15.64 E, 408 m], *P. Hari Krishna & R. Kumar* 35418(BSJO).

Uses: Almost all parts of the plant are used.

33. *Tephrosia* Pers.

Key to the species

- 1a. Flowers axillary fascicles 2
- 1b. Flowers in racemes 4
- 2a. Leaves simple. **3. *T. strigosa***
- 2b. Leaves pinnately compound, imparipinnate. 3
- 3a. Flowers axillary, solitary or in pairs. **4. *T. uniflora* subsp. *petrosa***
 - b. Racemes 1 to 3-flowered, short, terminal or leaf opposed ... **1. *T. pumila***
- 4a. Pods densely velvety tomentose. **5. *T. villosa***
- b. Pods glabrous or thinly hairy. **2. *T. purpurea***

1. *Tephrosia pumila* (Lam.) Pers., Syn. Pl. 2: 330. 1807; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 264. 1987. *Galega pumila* Lam., Encycl. 2: 599. 1786. *G. procumbens* Buch.-Ham. in Trans. Linn. Soc. London

13(2): 547. 1822. *Tephrosia purpurea* (L.) Pers. var. *pumila* (Lam.) Baker in Hook.f., Fl. Brit. India 2: 113. 1876. (Plate-17).

Perennial suffruticose herbs, with pilose branches. Leaves 1-5 cm long. Leaflets 5-11, 0.5 - 3 x 0.4 - 0.9 cm, ovate-oblong or oblanceolate. Flowers pink to bright rosy purple. Pods linear, pubescent, 8 to 14-seeded. Seeds blackish-brown.

Fl. & Fr.: Most part of the year.

Occasional, in dry rocky open forests.

Specimen examined: Modia Mahadev [24 59 32.0 N, 74 52 31 E, 506 m], *P. Hari Krishna & R. Kumar* 35351(BSJO).

2. *Tephrosia purpurea* (L.) Pers., Syn. Pl. 2: 329. 1807; Baker in Hook.f., Fl. Brit. India 2: 251. 1876; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 264. 1987. *Cracca purpurea* L., Sp. Pl. 2: 752. 1753. (Plate-17).

Herbs or undershrubs, up to 1.5 m high; stem pubescent. Leaflets 11-21, 1.6 -3.2 x 0.5 - 2 cm, elliptic to lanceolate or obovate. Flowers bright pink to purplish. Pods glabrous, 2 to 9-seeded. Seeds blackish-brown.

Fl. & Fr.: July - October .

Common in open forest.

Specimens examined: Bijaypur road Bassi [25 0 9.56 N, 74 47 2.55 E, 421 m], *P. Hari Krishna & R. Kumar* 35212 (BSJO); Ambapani [24 58 53.34 N, 74 51 16.42 E, 434 m], *P. Hari Krishna & R. Kumar* 35570 (BSJO).

3. *Tephrosia strigosa* (Dalzell) Santapau & Mahesh. in J. Bombay Nat. Hist. Soc. 54 (3): 805. 1956; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 265. 1987. *Macronyx strigosa* Dalzell in Hooker's J. Bot. Kew Gard. Misc. 2: 35. 1850. *Tephrosia tenuis* Wall. ex Dalzell & A. Gibson, Bombay Fl. 61. 1861; Baker in Hook.f., Fl. Brit. India 2: 111. 1876.

Annual, erect or suberect herbs, up to 30 cm high. Leaves 1.5 - 4.5 x 0.2 - 0.8 cm, linear to linear-lanceolate, apiculate. Stipules subulate. Flowers bluish-yellow, solitary or few in leaf-opposed racemes. Calyx-teeth shorter than the tube. Pods 1 - 3.5 x 0.2 - 0.5 cm, linear, flat, compressed, more or less hairy, 6 to 10-seeded. Seeds roundish, glabrous.

Fl. & Fr.: August - October.

Common in open forest.

Specimens examined: Neemgatti [25 02 45.56 N, 74 50 37.33 E, 408 m], *P. Hari Krishna & R. Kumar* 37323 (BSJO); Jhaleshwar [25 00 53.58 N, 74 47 56.99 E, 456 m], *P. Hari Krishna & R. Kumar* 35202(BSJO).

4. *Tephrosia uniflora* Pers. subsp. **petrosa** (Blatt. & Hallb.) Gillett & Ali in Kew Bull. 13: 114. 1958; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 266. 1987. *T. petrosa* Blatt. & Hallb. in J. Bombay Nat. Hist. Soc. 26: 239. 1918.

Perennial, suberect or diffuse, suffrutescent herbs; stem and branches clothed with appressed silky hairs. Leaflets 5-11, 3 - 8 x 1 - 1.5 cm, obovate to oblanceolate or elliptic, acute or obtuse. Flowers reddish- purple, axillary solitary or in pairs. Pods 3.5 - 5 x 0.4 - 0.6 cm, linear, flat, appressed pubescent, 5 to 8-seeded. Seeds nearly spherical, smooth, greenish-yellow.

Fl. & Fr.: August - November.

Rare in wastelands, particularly in dry rocky habitats.

Specimen examined. Near Modiya Mahadev [24 59 32.99 N, 74 52 32.18 E, 499 m], *P. Hari Krishna & R. Kumar* 35789(BSJO).

5. *Tephrosia villosa* (L.) Pers., Syn. Pl. 2: 329. 1807; Baker in Hook.f., Fl. Brit. India 2: 113. 1876; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 266. 1987. *Cracca villosa* L., Sp. Pl. 2: 752. 1753. *Tephrosia villosa* (L.) Pers. var. *incana* (Roxb.) Baker in Hook.f., Fl. Brit. India 2: 113. 1876. (Plate-17).

Annual or perennial herbs or undershrubs. Leaves imparipinnate, subsessile; leaflets 11-17, 1-2 x 0.5-1.2 cm, obovate-cuneate or oblanceolate, emarginate and mucronate at apex. Flowers pink, in fascicled or paired in spicate racemes. Pods 2.5 - 5 x 0.5 - 0.8 cm, linear-oblong, falcate, persistently velvety tomentose with spreading hairs, 6 to 9-seeded. Seeds oblong, brownish-black.

Fl. & Fr.: July -November.

Common in wastelands and open forests.

Specimens examined: Dewalgarh [24 58 23.47 N, 74 50 47.65 E, 422 m], *P. Hari Krishna & R. Kumar* 37332 (BSJO); Kelzar [24 58 54.11 N, 74 46 54.5 E, 450 m], *P. Hari Krishna & R. Kumar* 35228(BSJO); Kevdia [24 59 38.89 N, 74 05 05.49 E, 444 m], *P. Hari Krishna & R. Kumar* 35469(BSJO).

34. *Teramnus* P.Br.

Teramnus labialis (L.f.) Spreng., Syst. Veg. 3: 235. 1826; Baker in Hook.f., Fl. Brit. India 2: 184. 1876; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 266. 1987. *Glycine labialis* L.f., Suppl. 325. 1781. (Plate-18).

Twinning herbs, clothed hairs. Leaves 3-foliolate; leaflets 1.6 - 9 x 0.9 - 4 cm, membranous, ovate-elliptic or oblong, acute or subobtuse. Flowers

violet-purple. Pods 3-6 cm long, linear, black when ripe, 8 to 12-seeded. Seeds reddish-dark brown.

Fl. & Fr.: October - March.

Common in open forests.

Specimen examined: Dewalgarh [25 00 42.28 N, 74 51 21.36 E, 436 m], *P. Hari Krishna & R. Kumar* 38381(BSJO).

35. *Vachellia* Wight & Arn.

Key to the Species

- 1a. Heads axillary, solitary or fascicled; pods moniliform.
..... **2. *V. nilotica* subsp. *indica***
- b. Heads in terminal panicles; pods not moniliform **1. *V. leucophloea***

1. *Vachellia leucophloea* (Roxb.) Maslin, Seigler & Ebinger in *Blumea* 58: 42. 2013. *Acacia leucophloea* (Roxb.) Willd., *Sp. Pl.* 4: 1083. 1806; Baker in Hook.f., *Fl. Brit. India* 2: 294. 1878; Parmer, in Shetty & Singh (eds.), *Fl. Rajasthan* 1: 297. 1987. *Mimosa leucophloea* Roxb., *Pl. Cor.* 2: 27. t. 150. 1800. *'Khejra'*

Medium sized trees, up to 8 m high; bark yellowish. Leaves 2-pinnate; pinnae 5-13 pairs, with a gland between each pair; leaflets 10-25 pairs, crowded, sessile, 3-6 mm long, 0.3 - 0.6 x 0.2 - 0.3 cm, linear-oblong. Floral heads pale yellow, in large, terminal, leafless, densely tomentose panicles. Pods sessile, flat, linear-oblong, yellowish-brown, 10 to 20-seeded. Seeds angular, pale brown.

Fl. & Fr.: August - January.

Common in wastelands and open forests.

Specimens examined: Sarna Lake [24 59 51.17 N, 74 48 22.95 E, 491 m], *P. Hari Krishna & R. Kumar*, 35142(BSJO).

2. *Vachellia nilotica* subsp. *indica* (Benth.) Kyal. & Boatwr. in *Bot. J. Linn. Soc.* 172: 515. 2013. *Acacia nilotica* (L.) Willd. ex Del. subsp. *indica* (Benth.) Brenan in *Kew Bull.* 12: 84. 1957; Pandey in Shetty & Singh (eds.), *Fl. Rajasthan* 1: 299. 1987. *A. nilotica* (L.) Willd. ex Del. var. *indica* (Benth.) A. F. Hill., *Bot. Mus. Leafl. Harvard Univ.* 99. 1940. (Plate-19). *'Kikar'*

Medium sized trees, up to 10 m high; bark dark grey or brown; branches with stipular spines in pairs. Leaves 2-pinnate, 6-10 cm long; leaflets subsessile, 7-25 pairs, 2.6 - 7 x 1.5 - 2 mm, linear-oblong. Flowers yellow, in globose heads up to 1.5 cm in diam.; peduncles axillary. Pods

distinctly stalked, grey pubescent, moniliform, whitish, up to 15-seeded. Seeds blackish- brown.

Fl. & Fr.: September - March .

Occasional found in dry deciduous forests

Specimens examined: Bijaypur road Bassi [24 59 14.60 N, 74 46 56.05 E, 441 m] *P. Hari Krishna & R. Kumar* 35217 (BSJO); Naal [25 05 29.69 N, 74 56 41.65 E, 424 m], *P. Hari Krishna & R. Kumar* 35761 (BSJO); Bichhore forest area [25 05 29.49 N, 74 56 41.25 E, 420 m], *P. Hari Krishna & R. Kumar* 35641 (BSJO).

36. *Vigna* Savi

Key to the species

- 1a. Pods glabrous or minutely puberulous 2
b. Pods more or less hirsute 1. ***V. radiata***
2a. Leaflets ovate, pods cylindric. 2. ***V. trilobata***
b. Leaflets ovate-ellipric to rhomboid, pods more or less compressed
..... 3. ***V. umbellata***

1. *Vigna radiata* (L.) Wilczek, Fl. Congo Belg. Ruanda-Uru. 6: 386. 1954; Vedic. in Kew Bull. 24: 558. 1970, excl. vars. *glabra* & *sublobata*; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 266. 1987. *Phaseolus radiatus* L., Sp. Pl. 2: 725. 1753; Duthie, Fl. Gangetic Plain 1: 233. 1903. *P. mungo* L. var. *radiatus* (L.) Baker in Hook.f., Fl. Brit. India 2: 203. 1876.

Much-branched herbs. Leaves 3-foliolate; leaflets 6-9 x 3-6 cm, ovate, ovate-rhomboid. Flowers yellow, in capitate racemes, peduncles 1.5-8 cm long, 4-8-flowered. Pods linear-cylindric, bristly hairy, 8 to 15-seeded. Seeds green - pale yellow.

Fl. & Fr.: July - November.

Occasionally found in open forests as escaped from cultivated fields.

Specimen examined: Jharia mahadev [25 02 05.93 N, 74 53 3.79 E, 489 m], *P. Hari Krishna & R. Kumar* 35384 (BSJO).

2. *Vigna trilobata* (L.) Verdc. in Taxon 17: 172. 1968 & Kew Bull. 24: 560. 1970; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 274. 1987. *Dolichos trilobatus* L., Mant. Pl. 1: 101. 1767. *Phaseolus trilobus* (L.) Schreb., Nova Acta Acad. Caes. Leop-Carol. German. Nat. Curr. 4: 132. 1770.

Annual, prostrate or trailing, herbs. Leaves 3-foliolate; leaflets 1.5 - 5 x 0.6 - 6 cm, ovate, oblong or rhomboid, deeply 3-lobed. Flowers yellow, in

few-flowered, axillary racemes. Pods terete, 3 - 5.5 cm long, linear-cylindric, 6 to 12-seeded. Seeds c. 3 mm long, oblong, rounded on both ends, reticulate, papillose, brown.

Fl. & Fr.: August - September.

Common in dry deciduous forests.

Specimens examined: Near Nelia Kamal Enclosure [24 59 52.70 N, 74 54 31.16 E, 536 m], *P. Hari Krishna & R. Kumar* 37314(BSJO).

3. *Vigna umbellata* (Thunb.) Ohwi & Ohashi in J. Jap. Bot. 44: 31. 1969; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 274. 1987. *Dolichos umbellatus* Thunb. in Trans. Linn. Soc. London 2: 339. 1794. *Phaseolus calcaratus* Roxb., Fl. Ind. 3: 289. 1832; Baker in Hook.f., Fl. Brit. India 2: 203. 1876. 'Mar-mung'

Twining herbs, densely hairy. Leaf pinnately trifoliate, leaflets 4 - 12 x 3.5 - 8 cm, ovate-deltoid or ovate-elliptic, entire. Stipules ovate-lanceolate. Flowers yellow, in lax, long racemes. Pods glabrous, 8 to 12-seeded. Seeds dark green.

Fl. & Fr.: September - November.

Occasional found in the forests and grasslands.

Specimens examined: Dewalgarh [24 58 20.32 N, 74 51 04.41 E, 491 m], *P. Hari Krishna & R. Kumar* 37345(BSJO).

37. *Zornia* J.F.Gmel.

Zornia gibbosa Span in Linnaea 15 : 192. 1841; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1 : 275. 1987. *Z. diphylla auct. plur.* non Pers. 1807; Baker in Hook.f., Fl. Brit. India 2: 147. 1876. *Z. angustifolia* Sm. in Rees, Cyclop. 39 : 200. 1819 *nom. illeg.* *Z. graminea* Span in Linnaea 15 : 192. 1841.

Prostrate herbs. Leaves 2-foliolate; leaflets, 0.6 – 3.2 x 0.3 – 1.5 cm, sparsely pubescent, linear-lanceolate, lanceolate to ovate-lanceolate. Flowers yellow, axillary and terminal. Pods 1 to 6-jointed. Seeds yellowish brown.

Fl. & Fr.: August- October.

Common in open forests.

Specimen examined. Paat village [25 02 14.93 N, 74 05 1 03.63 E, 424 m], *P. Hari Krishna & R. Kumar* 35429(BSJO).

POLYGALACEAE Hoffmanns. & Link

Polygala L.

Polygala arvensis Willd., Sp. Pl. 3: 876. 1802; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 95. 1987; R.N. Banerjee in B.D. Sharma & al., Fl. India 2: 460. 1993. *P. chinensis* auct. non L., 1753: A.W. Benn. in Hook.f., Fl. Brit. India 1: 204. 1872, p.p. *P. chinensis* var. *linarifolia* sensu Mukerjee in Bull. Bot. Soc. Bengal 12: 40. 1958, non (Willd.) Chodat 1893.
'Miradu'

Annual herbs. Leaves glabrous, ciliate at margin, obtuse, mucronate, entire, obtuse-apiculate, pubescent. Racemes axillary or lateral. Flowers yellow. Capsules oblong-ovoid, ciliate at margin. Seeds ellipsoid, silky-pilose.

Fl. & Fr.: August- October.

Common in wastelands and open forests.

Specimens examined: Modia Mahadev [24 59 32.0 N, 74 52 31 E, 506 m], *P. Hari Krishna & R. Kumar* 35350(BSJO); Bichhore [25 04 12.2 N, 74 54 37.36 E, 447 m], *P. Hari Krishna & R. Kumar* 35403(BSJO); Fatehpura [25 04 31.19 N, 74 53 39.19, 398 m], *P. Hari Krishna & R. Kumar* 37316 (BSJO).

Order: Rosales Bercht. & J.Presl

ROSACEAE Juss.

Potentilla L.

Potentilla supina L., Sp. Pl. 1: 497. 1753; Hook.f., Fl. Brit. India 2: 359. 1878; Duthie, Fl. Gangetic Plain 1: 327. 1903; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 308. 1987.

Annual, much-branched, diffuse or procumbent herbs. Leaves digitately or pinnately 3 to 9-foliolate, densely hairy; leaflets opposite or alternate, obovate, 3-lobulate or incised-serrate; upper cauline leaves short petiolate, lower ones with long petiole. Flowers solitary, axillary, up to 6 mm across, yellow. Petals 5, 3-4 mm long, oblong. Achenes small, numerous, smooth; receptacles globose, villous.

Fl. & Fr.: November - March.

Commonly found on moist bed, sandy river banks and reservoirs.

Specimen examined: Near Badapani area [25 04 54.41 N, 74 55 18.94 E, 434 m], *P. Hari Krishna & R. Kumar* 38372 (BSJO).

RHAMNACEAE Juss.

Ziziphus Mill.

Key to the species

- 1a. Unarmed trees 1. **Z. glabrata**
b. Armed trees or shrubs. 2
2a. Styles 3; drupes hard, stony. 5. **Z. xylopyrus**
b. Styles 2; drupes fleshy. 3
3a. Drupes more than 1.5 cm across. 2. **Z. mauritiana**
b. Drupes less than 1.5 cm across. 4
4a. Leaves tomentose on both surfaces. 3. **Z. nummularia**
b. Leaves clothed with silky hairs beneath. 4. **Z. oenoplia**

1. Ziziphus glabrata Heyne ex Roth, Nov. PL., Sp. 159. 1821; Lawson in Hook.f., Fl. Brit. India 1: 633. 1875; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 184. 1987; Bhandari & Bhansali in N.P. Singh & al., Fl. India 5: 229. 2000. *Z. trinervia* Roxb., Fl. Ind. 1: 606. 1832, non Poir. 1813. 'Bor'

Unarmed, small trees, up to 5 m high; branches glabrous, bark greyish-white. Leaves alternate, 3 - 7 x 2-3.5cm, ovate-elliptic, rounded, margins serrate. Flowers greenish-yellow, in axillary cymes. Drupes yellow when ripe. Seeds brownish.

Fl. & Fr.: September - January.

Occasionally found in open forests.

Specimen examined: Jogideh dam side [24 59 51.67 N, 74 49 10.12 E, 417 m], *P. Hari Krishna & R. Kumar* 35121(BSJO).

2. Ziziphus mauritiana Lam. Encycl. 3 : 319. 1789; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 185. 1987; Bhandari & Bhansali in Singh & al. Fl. India 5 : 233. 2000. *Rhamnus jujuba* L., Sp. Pl. 1: 194. 1753. *Ziziphus jujuba* Lam. Encycl. 3 : 318. 1789, non Mill. 1768; Lawson in Hook.f., Fl. Brit. India 1: 632. 1875. (Plate-14). 'Bor'

Much branched, small trees, 2-10 m high, prickles straight. Leaves alternate, 3 - 7 x 1.5 - 3 cm, broadly ovate-elliptic to suborbicular, obtuse, oblique at base, serrulate or entire, glabrous above, densely white villous beneath, basally 3-nerved. Flowers greenish-yellow, in axillary cymes or 8 to 11-flowered fascicles. Drupes globose, fleshy, smooth, yellow-orange. Seeds compressed, light brown; stone.

Fl. & Fr.: September - February.

Common in dry deciduous forests.

Specimen examined: Meghpura Hanuman chowraha [24 59 43.59 N, 74 8 39.24 E, 493 m], *P. Hari Krishna & R. Kumar* 35485(BSJO).

Uses: Fruits are edible.

3. *Ziziphus nummularia* (Burm. f.) Wight & Arn. Prodr. 162. 1834; Lawson in Hook.f., Fl. Brit. India 1: 633. 1875; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 185. 1987; Bhandari & Bhansali in Singh & al. Fl. India 5: 236. 2000. *Rhamnus nummularia* Burm. f. Fl. Ind. 61. 1768. *Ziziphus rotundifolia* Lam. Encycl. 3: 319. 1789. *'Bordi'*

Straggling or erect thorny shrubs, stipular spines paired. Leaves alternate, 0.6 - 2 x 0.6 - 1.5 cm, rounded at both ends, petioles 5-10 mm long, tomentose; stipular spines paired, one straight, slender and very sharp, nearly as long as petiole, other much shorter, hooked, bent downwards. Flowers greenish-white, in axillary, pubescent cymes. Drupes globose, black- red. Seeds compressed, black.

Fl. & Fr.: August - January.

Common in dry deciduous and scrub forests.

Specimens examined: Jhaleshwar Mahadev [25 01 21.99 N, 74 48 30.65 E, 424 m], *P. Hari Krishna & R. Kumar* 35160(BSJO); near Sarna talab [25 00 23.89 N, 74 8 34.31 E, 500 m], *P. Hari Krishna & R. Kumar* 35441(BSJO).

4. *Ziziphus oenopia* (L.) Miller, Gard. Dict. ed. 8. no. 3. 1768; M.A. Lawson in Hook.f., Fl. Brit. India 1: 634. 1875; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 186. 1987; Bhandari & Bhansali in N.P. Singh & al., Fl. India 5: 236. 2000. *Rhamnus oenopia* L., Sp. Pl. 1: 194. 1753. *'Bor'*

Scandent or climbing, armed shrubs; branches tomentose; prickles paired, one straight, other recurved. Leaves alternate, 2.5- 8 x 1.5 - 4 cm, 3-nerved at base, fulvous tomentose above, silky pubescent beneath. Flowers greenish-yellow. Drupes globose, 1-3-together on slender pedicels, black, edible.

Fl. & Fr.: September - December.

Occasionally, found in dry forests and scrub areas.

Specimen examined: Sarna talab [25 00 23.89 N, 74 8 34.31 E, 500 m], *P. Hari Krishna & R. Kumar* 35448 (BSJO).

5. *Ziziphus xylopyrus* (Retz.) Willd., Sp. Pl. 1: 1104. 1797 (*xylopyra*); Lawson in Hook.f., Fl. Brit. India 1: 634. 1875; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 187. 1987; Duthie, Fl. Gangetic Plain 1: 165.

1903; Bhandari & Bhansali, in Singh & al. Fl. India 5: 243. 2000. *Rhamnus xylopyrus* Retz. Obs. Bot. 2: 11. 1781. (Plate-14). 'Ghat Bor'

Large shrubs or small trees, up to 6 m high, stipular prickles not frequent, but when present, one straight, other recurved. Leaves 3 - 8 x 2- 6 cm, elliptic-oblong, ovate-oblong or suborbicular, obliquely sub-cordate at base, obtuse with mucro at apex, crenate-serrate on margins, 3-nerved. Flowers creamish-white or greenish-yellow, axillary. Drupes globose, woody, stone thin and hard, inedible. Seeds black.

Fl. & Fr.: November - January.

Occasional found in deciduous forests.

Specimen examined: Jogideh dam side [24 59 51.67 N, 74 49 10.12 E, 417 m], *P. Hari Krishna & R. Kumar* 35120 (BSJO).

ULMACEAE Mirb.

Holoptelea Planch.

Holoptelea integrifolia (Roxb.) Planch. in Ann. Sci. Nat. Bot. ser. 3. 10: 269. 1848; Hook.f., Fl. Brit. India 5: 481. 1888; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 796. 1991. *Ulmus integrifolia* Roxb. Pl. Cor. 1: 56. t. 78. 1796-98. 'Papri'

Deciduous trees, up to 10 m high, with ash-coloured bark. Leaves 6-8 x 2.5-4 cm ovate, subacuminate, rounded at base, entire, glabrous. Flowers sessile, greenish-yellow, in fascicles, male and bisexual mixed. Fruits ca 2 cm in diam., oblong to suborbicular, notched at apex, reticulately veined, winged. Seeds ovate, dark brown.

Fl. & Fr.: December - May.

Common in fringes of forests and near habitations.

Specimen examined: Near Badapani [25 04 54.41 N, 74 55 18.94 E, 434 m], *P. Hari Krishna & R. Kumar* 35581 (BSJO).

MORACEAE Gaudich.

Ficus L.

Key to the species

- 1a. Receptacles distinctly pedunculate..... **2. *F. racemosa***
1b. Receptacles sessile or subsessile. **2**
2a. Leaves caudate-acuminate at apex. **3**

- b. Leaves not as above 4
3a. Petioles longer than blade. 4. **F. rumphii**
b. Petioles shorter than blade. 3. **F. religiosa**
4a. Leaves glabrous beneath 5. **F. virens**
b. Leaves puberulous or tomentose beneath, atleast when young.
..... 1. **F. benghalensis**

1. Ficus benghalensis L., Sp. Pl. 2: 1059. 1753; King in Hook.f., Fl. Brit. India 5: 499. 1888; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 801. 1991. *Urostigma benghalensis* (L.) Gasp. Nov. Gen. Fic. 7. 1844.

'Bargad, Vat vriksh'

Evergreen tall trees, up to 15 m high, with grey-coloured bark and aerial roots which afterwards become the trunks. Leaves 6-10 x 3-6 cm orbicular-ovate or ovate-oblong, entire, coriaceous, glabrous; stipules sheathing. Receptacles sessile, axillary, globose, silky pubescent, red when ripe; basal bracts 3. Female flowers sessile. Gall flowers pedicellate. Achenes globose-ellipsoid

Fl. & Fr.: Almost throughout the year.

Common in wastelands and also planted near habitations.

Specimen examined: Nandwai to Amla [25 00 37.49 N, 74 56 55.58 E, 432 m], *P. Hari Krishna & R. Kumar* 35259(BSJO).

2. Ficus racemosa L., Sp. Pl. 2: 1060. 1753; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 804. 1991. *F. glomerata* Roxb., Pl. Coromandel 2: 13.t.123. 1798; King in Hook.f., Fl. Brit. India 5: 535. 1888; Duthie, Fl. Gangetic Plain 3: 160. 1915. 'Gular'

Large trees, up to 10 m high, with whitish brown bark and few short aerial roots. Leaves alternate, 4-8 x 3-6cm, elliptic-ovate, obtuse, entire, glabrous. Receptacles on short, warted, leafless branchlets, distinctly pedunculate, tomentose, green, red with age. Gall flowers long pedicellate. Achenes obovoid, reddish-brown.

Fl. & Fr.: Almost throughout the year.

Common along the streams in deciduous forests and outskirts of forests.

Specimens examined: Jhaleshwar Mahadev [25 00 56.90 N, 74 4759.43 E, 421 m], *P. Hari Krishna & R. Kumar* 35195(BSJO); Near Devalgarh [24 58 21.45 N, 74 50 46.42 E, 409 m], *P. Hari Krishna & R. Kumar* 38386(BSJO).

3. *Ficus religiosa* L., Sp. Pl. 2: 1059. 1753; King in Hook.f., Fl. Brit. India 5: 513. 1888; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 804. 1991. *Urostigma religiosum* (L.) Gasp. Ric. Caprif. 82.t. 7. f. 1-5. 1845. '*Pipal*'

Trees, up to 15 m high, with greyish brown bark. Leaves 5-18 x 6-10 cm, ovate to ovate-suborbicular, entire, caudate-acuminate at apex, subtruncate or cordate at base. Receptacles globose, in axillary pairs, reddish-purple when ripe. Gall flowers sessile, with 3-lobed perianth. Achenes smooth.

Fl. & Fr.: Most part of the year.

Commonly planted near pilgrimage sites.

Specimen examined: Devalgarh [24 58 21.45 N, 74 50 46.42 E, 409 m], *P. Hari Krishna & R. Kumar* 38464 (BSJO).

4. *Ficus rumphii* Blume, Bijdr. 437. 1825; King in Hook.f., Fl. Brit. India 5: 512. 1888; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 805. 1991. *F. cordifolia* Roxb., Fl. Ind. ed. 1832, 3: 548. 1832, non Blume, 1825. '*Paras Pipli*'

Deciduous trees, up to 8 m tall. Leaves sub coracious, alternate 7-15 x 4-10 cm, broadly ovate, acuminate at apex, margin entire. Receptacles axillary, shortly peduncled in pairs, whitish, black when ripe. Femal flowers sessile, tepals 3. Gall flowers sessile. Achenes minutely tuberculate.

Fl. & Fr.: March - June.

Frequently found in deciduous forests.

Specimen examined: Near Sarana Talab [24 59 53.09 N, 74 48 23.70 E, 487 m], *P. Hari Krishna & R. Kumar* 35629(BSJO).

5. *Ficus virens* Ait. Hort. Kew. 3: 451. 1789; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 805. 1991. *F. infectoria sensu* Roxb. Fl. Ind. 3: 551. 1832, non Willd. 1806; King in Hook.f., Fl. Brit. India 5: 515. 1888. '*Pilkhan, Pakur*'

Medium-sized, deciduous trees, up to 8 m high, with grey bark and aerial roots from the branches. Leaves alternate, 4-8 x 3.5-7 cm ovate, oblong-ovate or oblong-elliptic, entire, glabrous. Receptacles subsessile, in axillary pairs, globose, creamy-white. Female flowers sessile. Gall and fertile flowers with 3-4, linear-lanceolate lobes. Achenes smooth.

Fl. & Fr.: October - June.

Rare, in dry deciduous forests.

Specimen examined: Near Devalgarh [24 58 08.56 N, 74 50 42.77 E, 419 m], *P. Hari Krishna & R. Kumar* 35600(BSJO).

Order: Cucurbitales Juss. ex Bercht. & J.Presl

CUCURBITACEAE Juss.

Key to the genera

- 1a. Petals fimbriate on margins. 6. **Trichosanthes**
b. Petals not fimbriate on margins; corolla-lobes entire or crenate-dentate
..... 2
2a.. Bracts ciliate1. **Blastania**
b. Bracts glabrous. 3
3a. Male flowers with 2-3 scales at bas..... 5. **Momordica**
b. Male flowers without scales 4
4a. Tendrils simple. Corolla rotate..... 3. **Cucumis**
b. Tendrils branched or rarely simple. 5
5a. Male flowers solitary 2. **Coccinia**
b. Male flowers clustered 4. **Diplocyclos**

1. Blastania Kotschy & Peyr.

Blastania garcinii (Burm.f.) Cogn. in DC., Monogr. 3: 629. 1881; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 332. 1987. *Ctenolepis garcinii* (Burm.f.) Naud. in Ann. Sci. Nat. Ser. 5. 6: 13. 1867; C.B. Clarke in Hook.f., Fl. Brit. India 2: 629. 1879.

Climbing herbs. Leaves 1.6 - 5 x 2 - 4 cm, deeply 3 to 5-lobed, obovate or ovate, margin denticulate. Male flowers creamish-yellow or white. Female flowers solitary. Fruiting peduncles 2-4 mm long, filiform; pedicels 1-2 mm long. Bracts stipuliform, subsessile, ovate. Fruits inversely subreniform, smooth, reddish, 1 to 2-seeded. Seeds dark grey-yellow.

Fl. & Fr.: Setember - December .

Common climber in open forests.

Specimen examined: Parsoli Chowki area [25 06 30.37 N, 74 52 43.42 E, 405 m], *P. Hari Krishna & R. Kumar* 35250(BSJO).

2. Coccinia Wight et Arn.

Coccinia grandis (L.) J.O. Voigt, Hort. Suburb. Calc. 59. 1845; Chakrav in Fasc. Fl. India 11: 24, f. 1-9.1982; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 335. 1987. *Bryonia grandis* L., Mant. Pl. 1: 126. 1767.

Coccinia indica Wight & Arn., Prodr. Fl. Ind. Orient.1: 347. 1834. *Cephalandra indica* (Wight. & Arn.) Naud. in Ann. Sci. Nat. ser. 5. 5: 16. 1859; C.B. Clarke in Hook.f., Fl. Brit. India 2: 621. 1879. (Plate-21). 'Tindori'

Perennial shrubs. Leaves 4 - 10 x 2 - 8 cm, palmately lobed, margin minutely denticulate or sinuate-toothed. Female flowers glabrous, stigma densely papillose. Berry 3 - 4 x 3 - 5 cm, white when young, scarlet when ripe. Seeds smooth, yellowish-grey.

Fl. & Fr.: Almost throughout the year.

Common in open forests.

Specimens examined: Near Mahesara forest area [25 03 06.67 N, 74 52 57.34 E, 422 m], *P. Hari Krishna & R. Kumar 37372*(BSJO); Near salaria [24 58 59.28 N, 74 51 7.29 E, 429 m], *P. Hari Krishna & R. Kumar 35322*(BSJO); Near Mahesara forest area [25 02 57.80 N, 74 53 00.24 E, 428 m], *P. Hari Krishna & R. Kumar 37376* (BSJO).

Uses: It is used to reduce high blood pressure.

3.Cucumis L.

Key to the species

- 1a. Fruits bristly (setose)..... **2. C. setosus**
b. Fruits smooth or pubescent **1. C. melo**

1. Cucumis melo L. in Sp. Pl.: 1011. 1753. *C. callosus* (Rottl.) Cogn. in Engl. Das. Pflanzenr. 88: 129. 1924; Chakravarty in Jain & al. Fl. India Fasc. 11: 31. 1982; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 337. 1987. 'Kachri'

Perennial herbs. Leaves alternate, ovate-suborbicular in outline, entire or shallowly 3-lobed, apex apiculate, base cordate, margins denticulate, petiolate. Flowers solitary, axillary, yellow. Fruits obovoid or rounded, longitudinally variegated, fleshy, many-seeded. Seeds oblong, compressed, white, margined.

Fl. & Fr.: August - November.

Common in outskirts of the forests, usually creeping on the ground.

Specimen examined: Near Paat village [25 02 14.93 N, 75 51 03.63 E, 424 m], *P. Hari Krishna & R. Kumar 35434*(BSJO).

2. Cucumis setosus Cong. in DC., Monogr. 3: 491. 1881; Chakravarty, Fl. India Fasc. 11: 38. 1982. Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 340. 1987.

Climbing herbs. Leaves 4 - 6 x 2 - 5 cm, membranous, ovate-triangular, 3-lobed. Tendrils simple, Male flowers fasciculate or sub-solitary. Fruits 3 - 3.5 x 1.2 - 1.6 cm, oblong. Seeds smooth, faintly margined.

Fl. & Fr.: August - November.

Rare in open forests.

Specimen examined: Near Nelia Kamal Enclosure [24 59 51.57 N, 74 54 50.86 E, 539 m], *P. Hari Krishna & R. Kumar* 37309(BSJO).

4. *Diplocyclos* (Endl.) Post & Kuntze

Diplocyclos palmatus (L.) C. Jeffrey in Kew Bull. 15 : 352. 1962; Chakrav. in Fasc. Fl. India 11: 48. 1982. Pandey, in Shetty & Singh (eds.), Fl. Rajasthan 1: 341. 1987. *Bryonia palmata* L., Sp. Pl. 2: 1012. 1753. (Plate-21). ‘Bon-kakra’

Glabrous, climbing herbs. Leaves palmately 3 to 7-lobed; base broadly sinuate or cordate; tendrils usually bifid. Flowers small, fasciculate. Calyx-tube 5-lobed, campanulate. Corolla campanulate, 5-partite, white. Fruits globose or ovoid, vertically variegated. Seeds ovate, attenuate at the base, conspicuously belted with a partition wall, the central portion surrounded by belt is somewhat raised on both sides.

Fl. & Fr.: August - December.

Common in open forests.

Specimens examined: Near Mahesara [25 03 28.87 N, 74 53 19.19 E, 410 m], *P. Hari Krishna & R. Kumar* 35744 (BSJO); Near Mahesara forest area [25 03 06.67 N, 74 52 57.34 E, 422 m], *P. Hari Krishna & R. Kumar* 37369(BSJO); Bhungadiya [24 58 11.99 N, 74 4 9 19.67 E, 416 m], *P. Hari Krishna & R. Kumar* 35460(BSJO).

5. *Momordica* L.

Momordica dioica Roxb. ex Willd., Sp. Pl. 4: 605. 1805; C.B. Clarke in Hook.f., Fl. Brit. India 2: 617. 1879, *excl. syn.*; Chakrav. in Fasc. Fl. India 11: 94 .1982. Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 347. 1987. (Plate-21). ‘Kinkoro’

Climbing glabrous herbs, with tuberous roots. Leaves 4 - 9.5 x 2.6 - 8 cm, ovate, emarginate at base, smooth, entire or 3 to 5-lobed. Male flowers axillary, solitary. Corolla yellow; lobes oblong, obtuse. Female flowers ebracteate. Fruits with soft spines. Seeds pale yellow.

Fl. & Fr.: August - November.

Common in open forests.

Specimen examined: Bijaypur road Bassi [25 0 9.56 N, 74 47 2.55 E, 421 m], *P. Hari Krishna & R. Kumar* 35210(BSJO).

6. *Trichosanthes* L.

***Trichosanthes cucumerina* L.**, Sp. Pl. 2: 1008. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 2: 609. 1879; Chakrav. in Fasc. Fl. India 11 : 112 .1982; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 349. 1987. (Plate-21).

‘*Jangli Chichinda*’

Annual climbers. Leaves 6-10 x 4-10 cm, orbicular-reniform or broadly ovate, denticulate, deeply 5 to 7-lobed. Male flowers in 10 to 15-flowered racemes, white, minutely bracteate. Female flowers axillary, solitary. Corolla white. Fruits 8 to 10-seeded. Seeds ovate-oblong.

Fl. & Fr.: August - November.

Common in open forests.

Specimens examined: Kevdiya forest chowki [24 59 24.81 N, 74 50 04.08 E, 442 m], *P. Hari Krishna & R. Kumar* 35235(BSJO); near Jariya Mahadev forest area [25 02 05.93 N, 74 53 3.79 E, 489 m], *P. Hari Krishna & R. Kumar* 35368(BSJO); near Mahesara [25 03 28.87 N, 74 53 19.19 E, 410 m], *P. Hari Krishna & R. Kumar* 35745(BSJO).

Order: Celastrales Link

CELASTRACEAE R.Br.

Celastrus L.

***Celastrus paniculatus* Willd.**, Sp. Pl. 1: 1125. 1797; Wight, Icon. 1: t. 158. 1839; M.A. Lawson in Hook.f., Fl. Brit. India 1: 617. 1875; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 182. 1987; Ramam. in N.P. Singh & al., Fl. India 5: 87. 2000.

‘*Malkangni*’

Climbing shrubs; stems dark pink. Leaves 3- 12. x 2 – 6.5 cm, elliptic-ovate or obovate, acuminate, margins crenate-serrate. Flowers greenish-yellow, in 7-20 cm long, terminal and axillary racemes. Capsules subglobose or ovoid, red or orange. Seeds ovoid, ribbed, brown.

Fl. & Fr.: April - June.

Occasionally found in dry deciduous forests.

Specimen examined: Near Mahesara forest area [25 03 06.67 N, 74 52 57.34 E, 422 m], *P. Hari Krishna & R. Kumar* 37378 (BSJO).

Order: Oxalidales Bercht. & J.Presl

OXALIDACEAE R.Br.

Oxalis L.

Oxalis corniculata L., Sp. Pl. 1: 435. 1753; Edgew. & Hook.f., in Hook.f., Fl. Brit. India 1: 436. 1874; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 170. 1987; Manna in Hajra & al., Fl. India 4: 242. 1997. *O. corniculata* L. var. *hispida* Blatt. in J. Bombay Nat. Hist. Soc. 34: 898. 1931. (Plate-12). ‘Kharto’

Small herbs, with hairy branches. Leaves 3-foliolate, leaflets subsessile, 0.5 - 1.5 x 0.5 - 1 cm, membranous. Flowers yellow. Capsules 1 - 1.6 x 0.3 - 0.4 cm, oblong, glabrescent. Seeds ovoid, brown or reddish-brown.

Fl. & Fr.: Almost throughout the year.

Rare in dry deciduous forests.

Specimens examined: Ambapani [24 58 53.34 N, 74 51 16.42 E, 433 m], *P. Hari Krishna & R. Kumar* 35572 (BSJO); near Gopalpura [25 02 24.60 N, 74 50 33.56 E, 599 m], *P. Hari Krishna & R. Kumar* 38363 (BSJO).

Order: Malpighiales Juss. ex Bercht. & J.Presl

ELATINACEAE Dumort.

Bergia L.

Bergia ammannioides Roxb. ex Roth, Nov. PL., Sp. 219. 1821; Dyer in Hook.f., Fl. Brit. India 1: 251. 1874; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 107-108. 1987; Bhattacharya in B.D. Sharma & al., Fl. India 3: 33. 1993. *Elatin ammannioides* (Roxb. ex Roth) Wight & Arn., Prodr. Fl. Ind. Orient.: 41. 1834. (Plate-9). ‘Jal bhangra’

Annual herbs, up to 30 cm high. Branches pinkish or reddish-purple. Leaves opposite, petiolate, oblanceolate, elliptic-oblong. Flowers in dense, axillary cymes, reddish-pink, slender, pubescent. Capsules c. 4 mm long, ovoid, reddish. Seeds many, minute, dark brown.

Fl. & Fr.: August - December.

Common in marshy and swampy habitats.

Specimen examined: Bassi Dam area [25 00 35 .97 N, 74 49 14.59 E, 409 m] *P. Hari Krishna & R. Kumar* 35519(BSJO).

VIOLACEAE Batsch

Pigea Ging.

Pigea enneasperma (L.) P.I.Forst. in *Austrobaileya* 11: 29. 2021.
Hybanthus enneaspermus (L.) F.V. Muell. in *Fragm. Phyt. Austr.* 10: 81.
1876; Parmar in Shetty & Singh (eds.), *Fl. Rajasthan* 1: 91. 1987.

'Ratanpurus'

Erect, perennial herbs, up to 25 cm high. Leaves 0.40 - 4 x 0.25 - 1.70 cm, linear-lanceolate, oblong-lanceolate to elliptic-lanceolate, crenate-serrate, entire. Flowers pinkish-purple to red, solitary. Seeds ellipsoid or ovoid, yellowish-white.

Fl. & Fr.: June - November.

Common in grasslands and moist wastelands.

Specimens examined: Jhaleswar Mahadev [25 01 21.64 N, 74 48 20.12 E, 423 m], *P. Hari Krishna & R. Kumar* 35169(BSJO); Panduria [24 58 31.31 N, 74 53 20.19 E, 512 m], *P. Hari Krishna & R. Kumar* 35338(BSJO).

SALICACEAE Mirb.

Flacourtia L. Herit.

Flacourtia indica (Burm.f.) Merr., *Interpret. Rumph. Herb. Amboina* 377. 1917; Parmar in Shetty & Singh (eds.), *Fl. Rajasthan* 1: 94. 1987; R.L. Mitra in B.D. Sharma & al., *Fl. India* 2: 402. 1993. *Gmelina indica* Burm. f., *Fl. Ind.* 132. t. 39. f. 5. 1768. *Flacourtia ramontchi* L"Her., *Strip. Nov.* 3: 59. t. 30 & 30B. 1785; Wight, *Icon.* 1: t. 85. 1838; Hook.f. & Thomson in Hook.f., *Fl. Brit. India* 1: 193. 1872; excl. var. *latifolia* Hook.f. & Thoms. 'Kanker'

Small trees, up to 6 m high. Leaves, obovate, ovate-elliptic, margins crenate, glabrous or softly tomentose on both surfaces. Flowers greenish-yellow, male flowers solitary or few, in axillary racemes, female flowers solitary or in pairs. Berries ellipsoid-subglobose, dark purple to red. Seeds yellowish-brown.

Fl. & Fr.: January - May.

Common in forests.

Specimens examined: Kelzar [24 58 43.23 N, 74 46 54.13 E, 450 m], *P. Hari Krishna & R. Kumar* 35232(BSJO); Bichhore [25 03 27 N, 74 53 5.9 E, 426 m], *P. Hari Krishna & R. Kumar* 35420 (BSJO); Umarthuna [25 00 52.66 N, 74 54 44.80 E, 523 m], *P. Hari Krishna & R. Kumar* 35498(BSJO); Bobla kalan [24 59 21.76 N, 74 47 20.84 E, 435 m], *P. Hari Krishna & R. Kumar* 38343 (BSJO); Kadmali dam [24 57 59.94 N, 74 54 4.84 E, 524 m], *P. Hari Krishna & R. Kumar* 38423 (BSJO).

Uses: Fruits are used as digestive.

EUPHORBIACEAE Juss.

Key to the genera

- 1a. Flowers arranged in cyathia..... **4. Euphorbia**
- 1b. Flowers not arranged in cyathia..... **2**
- 2a. Petals present atleast in male flowers **3**
- b. Petals absent **4**
- 3a. Herbs **3. Chrozophora**
- b. Shrubs **5. Jatropha**
- 4a. Plants with stringent hairs. **7. Tragia**
- b. Plants without stringent hairs. **5**
- 5a. Trees **6. Mallotus**
- b. Herbs, shrubs or undershrubs **6**
- 6a. Female flowers with acresent leafy bracts. **1. Acalypha**
- b. Female flowers without leafy bracts. **2. Baliospermum**

1.Acalypha L.

Acalypha ciliata Forssk., Fl. Aegypt.-Arab. 162. 1775; Hook.f., Fl. Brit. India 5: 417. 1887; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 763. 1991. *A. rubra* Wall. Cat. 7781. 1847.

Annual, erect herbs, up to 60 cm high; stem with hairs. Leaves 3-5 x 1.5 -2.5 cm ovate-elliptic, acuminate, serrate . Flowers in axillary, ca 1.6 cm long spikes. Male flowers ebracteate, sessile; stamens 8. Female flowers many, crowded in lower part of the spikes. Seeds 1.2 -1.6 mm across, minutely pitted.

Fl. & Fr.: August - February.

Common weed in moist-wet places.

Specimen examined: Bichhor forest area [25 04 12.2 N, 74 54 37.36 E, 447 m], *P. Hari Krishna & R. Kumar* 35410(BSJO).

2.Baliospermum Blume

Baliospermum solanifolium (Burm.) Suresh in D.H.Nicolson & al., Interpr. Van Rheede's Hort. Malab.: 106. 1988. *B. montanum* (Willd.) Muell.-

Arg. in DC. Prodr. 15 (2): 1125. 1866; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 766. 1991.

Undershrubs. Leaves 4-18 x 1.3-12 cm, broadly ovate, ovate-lanceolate or elliptic to sub-pandurate, entire. Flowers axillary or terminal, greenish - yellow. Capsule ovoid, smooth. Seeds oblong, smooth, glabrous, creamy - white, black.

Fl. & Fr.: August - March.

Occasional in open forests.

Specimen examined: Orai dam [25 00 14.63 N, 74 51 14.06 E, 411 m], *P. Hari Krishna & R. Kumar* 35571(BSJO).

3.Chrozophora A.H.L. Juss

Chrozophora rottleri (Geis.) A. Juss. ex Spreng. Syst. Veg. 3: 850. 1826; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 771.1991. *Croton rottleri* Geis. *Crot. Monogr.* 54. 1807. *Chrozophora tinctoria* non A. Juss. 1824; Hook.f., Fl. Brit. India 5: 408. 1887, *p. p. C. plicata* (Vahl.) Juss. ex Spreng. var. *rottleri* (Geis.) Mull. - Arg. in DC., Prodr. 15(2):747.1866.

Tomentose, erect herbs, up to 40 cm high. Leaves 3.5-8 x 2.5 -5 cm broadly ovate or suborbicular. Flowers in axillary racemes, yellow. Capsules 5-7 mm across, purplish, stellate-tomentose. Seeds ca 3.5 mm across, globose, grey or ash-coloured.

Fl. & Fr.: August - May.

Common weed in moist habitats.

Specimen examined: Near Shivpura [25 00 57.73 N, 74 54 56.80 E, 472 m], *P. Hari Krishna & R. Kumar* 35504(BSJO).

4.Euphorbia L.

Key to the genera

- 1a. Shrubs or trees, armed with spines. 2
- b. Herbs, unarmed. 3
- 2a. Branches terete; tubercles scattered. Leaves less than 2 cm long. Styles 2-fid..... 1. **E. caducifolia**
- b. Branches angular; tubercles in 5 rows. Leaves more than 3 cm long. Style simple..... 6. **E. neriifolia**
- 3a. Leaves alternate below and opposite in flowering region..... 4 **E. heterophylla**
- b. Levae opposite throughout. 4

- 4a. Involucre glands with a conspicuous petaloid limb.... **7. E. pycnostegia**
b. Involucre glands without a petaloid limb. **5**
- 5a. Leaves more than 1 cm long. **5. E. hirta**
b. Leaves less than 1 cm long.. **6**
- 6a. Capsules hairy only along the keels **2. E. chamaesyce**
b. Capsules hairy throughout. **7**
- 7a. Leaves entire. **3. E. granulata**
b. Leaves crenulated. **8. E. thymifolia**

1. Euphorbia caducifolia Haines in Indian For. 40: 154. 1914; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2 : 775. 1991. *E. neriifolia* auct. plur., non L. 1753, nec. Roxb. 1832. 'Danda-thor'

Perennial, dendroid shrubs, up to 2.5 m high; branches many from the base, cylindrical, with distant, small, non-confluent tubercles, each tubercle with a black areole bearing a pair of divergent, pointed spines. Leaves fleshy, arising singly from the areoles, deciduous before anthesis, ovate, ovate-oblong or suborbicular, acute. Cyathia usually in triad, red; central one usually male; laterals hermaphrodite. Capsules sharply 3-lobed, glabrous. Seeds 3, globose, smooth, greyish-brown.

Fl. & Fr.: December - March.

Occasional, grows in the rocky habitats on exposed hills up to tops.

Specimen examined: Aamjharia [24 59 24.24 N, 74 51 05.74 E, 422 m], *P. Hari Krishna & R. Kumar* 38465(BSJO).

2. Euphorbia chamaesyce L., Sp. Pl. 1: 455. 1753; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 776.1991. *E. prostrate* Aiton. Hort. Kew. 2139. 1879; Hook.f., Fl. Brit. India 5: 266. 1887. *Chamaesyce prostrate* (Aiton) Small. Fl. S.E.U.S. 713.1903.

Annual herb with hairy branches. Leaves opposite, 2.5 x 1.2 - 4 cm, oblong, obovate - oblong or elliptic-oblong. Cyathia single, axillary white. Capsules subglobose, 3-angular. Seeds ovoid- tetragonal yellow.

Fl. & Fr.: Almost throughout the year.

Common in moist areas and open forests.

Specimens examined: Parsoli Chowki [25 06 30.37 N, 74 52 43.42 E, 405 m], *P. Hari Krishna & R. Kumar* 35249(BSJO); Badapani-Bichhor area [25 04 54.41 N, 74 55 18.94 E, 434 m], *P. Hari Krishna & R. Kumar*

35580(BSJO); near Meghpura watch tower area [24 59 42.90 N, 74 45 02.70 E, 564 m], *P. Hari Krishna & R. Kumar* 37396(BSJO).

3. *Euphorbia granulata* Forssk., Boiss, in DC. Prodr. 15(2) :34.1862; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 779. 1991. *E. granulata* Forsk. var. *glabra* Blatt. & Hallb. in Journ. Bombay Nat. Hist. Soc. 26(4): 97. 1920. 'Dudheli'

Prostrate herbs. Leaves opposite, 2.5 -5 x 1.2 - 3 mm, ovate, obtuse or rounded at apex, entire. Cyathia axillary, solitary. Involucral glands transversely ovate, yellowish or reddish, with unequal, subentire white or pink appendages. Capsules puberulent all over. Seeds ovoid-cylindrical, rugose, pinkishgrey.

Fl. & Fr.: August - March.

Common in cultivated fields and open forests.

Specimens examined: Nar Orai Dam area tower area [25 01 56.68 N, 74 51 1.90 E, 417 m], *P. Hari Krishna & R. Kumar* 35658(BSJO); Near Savrna Talab [24 59 53.09 N, 74 48 23.70 E, 487 m], *P. Hari Krishna & R. Kumar* 35636(BSJO).

4. *Euphorbia heterophylla* L., Sp. Pl. 1: 453. 1753. Tripathi & al., Fl. Elem. Madhya Pradesh 183.1994. *E. geniculata* Ortega in Nov. Pl. Rar. Descr. Dec. 2: 18. 1797. *E. prunifolia* Jacq., Pl. Hort. Schoenbr. 3: 15. 1798; Hook.f., Fl. Brit. India 5: 266. 1887.

Annual herbs. Leaves ovate - oblong, upper leaves green with a bright red base. Cyathia 5 to 7 -lobed. Male flowers in fascicles of 5-6 flowered. Female flowers with glabrous ovary. Capsules trilobite, glabrous. Seeds oblong-ovoid, dark brown.

Fl. & Fr.: September - December .

Common in cultivated fields and along road sides.

Specimens examined: Near Ram Mandir [25 00 01.16 N, 74 47 09.02 E, 435 m], *P. Hari Krishna & R. Kumar* 35294(BSJO); Bassi [25 05 26.53 N, 74 56 49.02 E, 421 m], *P. Hari Krishna & R. Kumar* 35774 (BSJO); Near Nal forest area [24 58 27.01 N, 74 48 47.99 E, 442 m], *P. Hari Krishna & R. Kumar* 38333(BSJO); Near Palka Mahuria-Jhaleshwar Nala [25 1 15.75 N, 74 48 14.93 E, 418 m], *P. Hari Krishna & R. Kumar* 35185(BSJO).

5. *Euphorbia hirta* L., Sp. Pl. 1: 454. 1753; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 780. 1991. *E. pilulifera* auct. plur. non L. 1753; Hook.f., Fl. Brit. India 5: 250. 1887. 'Dudhi'

Procumbent herbs, up to 35 cm high; stem and branches hairy. Leaves opposite, 2.1 -3.5 x 0.4-1.6 cm obliquely ovate-lanceolate or rhomboid-oblong, serrate, puberulent on both surfaces. Cyathia in axillary and terminal, pedunculate cymes. Involucre cup-like, stalked, with 4-glands and 5, acute, pink. Seeds ca 0.6 mm long, ovoid to ellipsoid, reddish-brown.

Fl. & Fr.: Almost throughout the year.

Common in open forests.

Specimens examined: Sarna Lake [24 59 51.17 N, 74 48 22.95 E, 491 m], *P. Hari Krishna & R. Kumar* 35524(BSJO); Near Maheshra Forest [25 03 01.61 N, 74 52 23.74 E, 443 m], *P. Hari Krishna & R. Kumar* 35524(BSJO).

6. Euphorbia neriifolia L., Sp. Pl. 1: 451. 1753; Hook.f., Fl. Brit. India 5: 255. 1887; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 781-782. 1991. *E. ligularia* Roxb., Fl. India 2. 465. 1832. 'Danda-Thor'

Much-branched shrubs, up to 2.5 m high. Leaves alternate, crowded towards the end of branches, 12-18 x 4-8 cm obovate-oblong. Involucre yellowish. Capsules c. 1.2 cm across, yellowish-brown. Seeds 3-5 mm across, smooth.

Fl. & Fr.: March - July.

Occasional in dry deciduous forests.

Specimen examined: Aamjharia [25 00 46.86 N, 74 51 12.96 E, 422 m], *P. Hari Krishna & R. Kumar* 35564(BSJO).

7. Euphorbia pycnostegia Boiss., Cent. Euphor. 9. 1860; Hook.f., Fl. Brit. India 5: 246. 1887; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 782. 1991.

Erect slender herbs. Stem terete, smooth, tinged with purple. Leaves opposite, sessile, 3- 4 x 1.2 - 1.6 cm, oblong, obtuse, entire, serrulate. Involucre axillary, solitary. Capsules glabrous, cocci obtusely keeled. Seeds 4-gonous, tuberculate.

Fl. & Fr.: July - February.

2in dry deciduous forests.

Specimen examined: Crocodile view point-Bassi dam [25 0 35.97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35110(BSJO).

8. Euphorbia thymifolia L., Sp. Pl. 1: 454. 1753; Hook.f., Fl. Brit. India 5: 252. 1887; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 783. 1991. *E. prostrata* Graham, Cat. 179. 1839, non Ait. 1789.

Prostrate, small herbs. Leaves opposite, 0.3-1.2 x 0.2-0.6cm, oblong or obovate-oblong, crenulate. Involucre axillary, solitary or 2 to 3 - together, hairy. Capsules pubescent. Seeds quadrangular, bluntly pointed.

Fl. & Fr.: July - December.

Common in deciduous forests.

Specimens examined: Near Maheshra Forest [25 03 01.61 N, 74 52 23.74 E, 443 m], *P. Hari Krishna & R. Kumar* 35526(BSJO); Near Gopalpura [25 03 01.61 N, 74 52 23.74 E, 443 m], *P. Hari Krishna & R. Kumar* 38365(BSJO); Amalda Naka [25 02 24.44 N, 74 50 33.76 E, 397 m], *P. Hari Krishna & R. Kumar* 38448(BSJO).

5. *Jatropha* L.

Jatropha curcas L., Sp. Pl. 2: 1006. 1753; Hook.f., Fl. Brit. India 5: 383. 1887; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 784. 1991.

Deciduous shrubs or small trees. Leaves 3.5 -12 x 5.5-12 cm, ovate-cordate to nearly Orbicular. Flowers in 5-8 cm, long terminal, greenish-yellow. Capsules globose, ovoid, smooth, yellow when ripe. Seeds oblong.

Fl. & Fr.: Throughout the year.

Commonly grown as forest outskirts.

Specimen examined: Anoop Pura-Javdiya [24 56 28.91 N, 74 53 31.64 E, 507 m], *P. Hari Krishna & R. Kumar* 35270 (BSJO).

Uses: The oil extract is used as an antihelmeintic agent.

6. *Mallotus* Lour.

Mallotus philippensis (Lam.) Muell.-Arg. in Linnaea 34: 196. 1865; Hook.f., Fl. Brit. India 5: 442. 1887; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 785. 1991. *Croton philippense* Lam. Encycl. 2: 206. 1786.

Sinduri'

Medium sized trees, up to 8 m high. Leaves alternate, 5-10 x 2.5-5 cm ovate-lanceolate, acute to acuminate at apex, entire or slightly toothed. Male flowers whitish-yellow, subsessile. Female flowers reddish. Capsules globose, 3-lobed, covered with red granules. Seeds, subglobose, smooth, black.

Fl. & Fr.: November - March.

Rare, found in deciduous forests.

Specimen examined: Near Sagarani temple [24 55 30.79 N, 74 52 43.22 E, 489 m], *P. Hari Krishna & R. Kumar* 35272(BSJO).

7. *Tragia* L.

Tragia plukenetii L., Radcl.-Sm. in Kew Bull. 37: 688. 1983; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 793. 1991. *T. cannabina* L.f., Suppl. 415. 1782, nom illegit. *T. involucrata* L. var. *cannabina* Mull.-Arg. in DC., Prodr. 15(2): 944. 1866; Hook.f., Fl. Brit. India 5: 465. 1888. *T. hildebrandtii* Muell.-Arg. in Bremen Abh. 7: 26. 1880.

Annual hispid, undershrubs, clothed with hairs. Leaves palmatifid, 3-6 x 0.4 -3.2 cm, the middle-lobes much larger, truncate, obscurely pinnatifid, apex acute. Flowers in terminal and axillary racemes. Capsules 3-lobed, hispid. Seeds globose, glabrous, brown.

Fl. & Fr.: May - September.

Occasional found in wastelands, hedges and on forest outskirts.

Specimen examined: Near Kelzar village [24 58 54.11 N, 74 46 54.5 E, 450 m], *P. Hari Krishna & R. Kumar* 35229(BSJO).

PHYLLANTHACEAE Martinov.

Key to the genera

- 1a. Sepals imbricate; petals absent, if present usually as long as sepals..... 2
- b. Sepals valvate; petals present, usually shorter than sepals..... **1. *Bridelia***

- 2a. Plants dioecious; leaf-base usually symmetric; sepals 5; pistillode present; stamens free **2. *Flueggea***
- b. Plants monoecious; leaf-base usually asymmetric; sepals usually 6; pistillode absent; stamens united..... **3. *Phyllanthus***

1. *Bridelia* Willd.

Bridelia retusa (L.) Spreng. Syst. Veg. 3 : 48. 1826; Hook.f., Fl. Brit. India 5: 268. 1887, excl. vars.; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 767. 1991. *Cluytia retusa* L., Sp. Pl. 2: 1042. 1753. *Bridelia spinosa* (Roxb.) Willd., Sp. Pl. 4: 979. 1805. (Plate-29). ‘*Khasa*’

Large, deciduous trees, up to 10 m high. Leaves elliptic-oblong, 6-12 x 2.5-5.5cm, glabrous and bright green. Flowers axillary or terminal panicles. Male and female flowers creamy-white. Drupes c. 6 mm across, purplish-black.

Fl. & Fr.: July - December.

Rare in forests.

Specimens examined: Sarna Lake [24 59 51.17 N, 74 48 22.95 E, 491 m], *P. Hari Krishna & R. Kumar* 35141(BSJO); Mahudia- Maheshra [25 02 36.95 N, 74 52 09.32 E, 430 m], *P. Hari Krishna & R. Kumar* 35602(BSJO).

2. *Flueggea* Willd.

Flueggea leucopyrus Willd. Sp. Pl. 4: 757. 1806; Hook.f., Fl. Brit. India 5: 328. 1887. *Securinga leucopyrus* (Willd.) Muel.-Arg. in DC. Prodr. 15(2): 451. 1866; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 791. 1991. (Plate-29).

Much branched shrubs. Branchlets terete, stiff, thorn like, bearing leaves and flowers. Leaves 1.6 -2.5 x 1.3-1.5 cm, ovate-lanceolate, obcordate or rotundate. Flowers axillary fascicles, greenish- yellow, solitary. Fruits globose, white when ripe. Seeds smooth, pale - brown.

Fl. & Fr.: June - September.

Occasional found in scrub forests on the hedges and in dry deciduous forests.

Specimens examined: Jhaleshwar Mahadev gate [25 1 21.99 N, 74 48 30.65 E, 424 m], *P. Hari Krishna & R. Kumar* 35168(BSJO); Muroli forest area [23 03 30.96 N, 74 56 05.72E, 434 m], *P. Hari Krishna & R. Kumar* 38416(BSJO).

3. *Phyllanthus* L.

Key to the species

- 1a. Trees **1. *P. emblica***
- b. Herbs or undershrubs **2**
- 2a. Stipules simple, not peltate **2. *P. fraternus***
- b. Stipules peltate **3. *P. virgatus***

1. *Phyllanthus emblica* L., Sp. Pl. 2: 982. 1753; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 788. 1991. *Emblica officinalis* Gaertn. Fruct. 2: 122.t. 108. 1791. 'Aamla'

Deciduous trees, up to 12 m high. Leaves oblong, 1.2 - 1.6 x 0.3- 0.5 cm, truncate to subcordate, apex apiculate. Flowers in axillary fascicles; male and female flowers mixed or often male flowers many in upper axils and female flowers few in lower axils. Drupes globose. Seeds trigonous.

Fl. & Fr.: March - November.

Occasional in forests and cultivated fields.

Specimens examined: Near Panduria [24 58 31.31 N, 74 53 20.19 E, 512 m], *P. Hari Krishna & R. Kumar* 35337(BSJO); Near Umar ki Khal [24 58 36.47 N, 74 53 08.26 E, 524 m], *P. Hari Krishna & R. Kumar* 35537(BSJO).

Uses: It has antioxidant activity.

2. *Phyllanthus fraternus* Webster Contr. Gray Herb. 176: 53. 1955; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 788. 1991. *P. niruri* auct. plur. non L. 1753; Hook.f., Fl. Brit. India 5: 298. 1887. *P. asperulatus* auct. plur. non Hutch. 1920. 'Bhumi amla'

Glabrous herbs, up to 45 cm high. Leaves, 0.8-1 x 0.4-0.5 cm, oblong, glabrous, lanceolate, truncate at base. Flowers axillary, hidden under the leaves, yellowish-green. Capsules depressed-globose, smooth, brown. Seeds c. 1.2 mm long, trigonous, light brown.

Fl. & Fr.: August - December.

Common, found in moist shaded habitats in sanctuary area.

Specimen examined: Near Sagarani [24 55 32.13 N, 74 52 30.64 E, 491 m], *P. Hari Krishna & R. Kumar* 35286(BSJO).

3. *Phyllanthus virgatus* Forst.f., Insul. Austr. Prodr. 65. 1786; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 790. 1991. *P. simplex* Retz. Obs. Bot. 5: 29. 1788; Hook.f., Fl. Brit. India 5: 295. 1887.

Perennial herbs, 20-40 cm high. Leaves 2-2.5 x 0.3 - 0.6 cm linear-oblong, entire. Flowers axillary, solitary, unisexual, greenish-yellow. Capsules globose, slightly 3-lobed, warty. Seeds 3-angled, dark-brown.

Fl. & Fr.: August - December.

Common in forests and mixed habitats.

Specimens examined: Jogideh dam side-Meghpura [24 59 51.67 N, 74 49 10.12 E, 417 m], *P. Hari Krishna & R. Kumar* 35123(BSJO); near Taleti [24 58 24.57 N, 74 52 36.76 E, 540 m], *P. Hari Krishna & R. Kumar* 35673(BSJO); Devalgad forest area [24 58 27.43 N, 74 50 55.81 E, 433 m], *P. Hari Krishna & R. Kumar* 37333(BSJO).

Order: **Myrtales** Juss. ex Bercht. & J.Presl

COMBRETACEAE R.Br.

Terminalia L.

Key to the species

- 1a. Flowers in globose heads. 4
- b. Flowers in terminal spikes. 2
- 2a. Flowers in panical of spikes; fruits winged 3
- b. Flowers in simple spikes; fruits not winged. **3. T. bellirica**
- 3a. Bark smooth, pale greenish to white; fruits with short, hard wings
 **2. T. arjuna**
- b. Bark rough, grey; fruits with long thin wings **5. T. elliptica**
- 4a. Calyx-cup glabrous or pubescent only at the base. 5
- b. Calyx-cup completely pubescent outside. **4. T. coronata**
- 5a. Flower-heads racemose, glabrous or sparsely tomentose; fruits
 orbicular, glabrous. **1. T. anogeissiana**
- b. Flower-heads solitary, densely tomentose; fruits broader than long,
 often pubescent. **6. T. pendula**

1. Terminalia anogeissiana Gere & Boatwr. in Bot. J. Linn. Soc. 184: 319. 2017. *Anogeissus latifolia* (Roxb. ex DC.) Wall. ex Guill. & Perr., Fl. Seneg. Tent. 1(7): 280. 1832; C.B. Clarke in Hook.f., Fl. Brit. India 2: 450. 1878; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 313. 1987. *Conocarpus latifolia* Roxb. ex DC. Prod. 3: 16. 1828. (Plate-20). 'Dhavdo'

Large trees, up to 20 m high, with white-grey bark. Leaves alternate or subopposite, 3 - 12 x 2.5 - 7 cm, elliptic or oblong-elliptic. Flowers sessile, 2-5 in small dense heads, yellow. Fruits 0.5 - 0.8 x 0.5 - 0.8 cm, glabrous, orbicular. Seeds pale-brown.

Fl. & Fr.: March - July.

Common in dry deciduous forests.

Specimens examined: near Panduria [24 58 31.31 N, 74 53 20.19 E, 512 m], *P. Hari Krishna & R. Kumar* 35334 (BSJO); near kadmali Dam [24 58 7.37 N, 74 54 5.63 E, 528 m], *P. Hari Krishna & R. Kumar* 38419 (BSJO).

2. Terminalia arjuna (Roxb. ex DC.) Wight & Arn., Prodr. Fl. Ind. Orient.: 314. 1834 ; C.B. Clarke in Hook.f., Fl. Brit. India 2: 447. 1878; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 314. 1987. *Pentaptera arjuna* Roxb.

ex DC., Prodr. 3:14.1828. *Terminalia glabra* Wight & Arn. Prodr. Fl. Ind. Orient.: 314.1834. 'Arjuna'

Large trees. Leaves spiral to sub opposite, oblong or obovate-oblongate, 6-12 x 3-5 cm, crenate -serrate. Spikes axillary, in panicles. Flowers yellowish white, sessile. Fruits ovoid-oblong, 5-winged, 5-7 x 3-4 cm, wings striated with 5 ascending veins, apex notched.

Fl. & Fr.: March - October .

Common in the dry mixed deciduous forests.

Specimen examined: Near Phusaria [24 58 00.31 N, 74 8 52.02 E, 443 m], *P. Hari Krishna & R. Kumar* 35454(BSJO).

3. Terminalia bellirica (Gaertn.) Roxb., Pl. Corom. 2: 54. t. 198. 1805; C.B. Clarke in Hook.f., Fl. Brit. India 2: 445. 1878; Duthie ,Fl. Gangetic Plain 1(1): 335. 1903.; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 316. 1987. *Myrobalanus bellirica* Gaertn., Fruct. Sem. Pl. 2: 90. t. 97. 1790.

'Behda'

Large trees, up to 20 m high; bark ashy - greyish-brown, fissured bark. Leaves alternate 6 - 25 x 2.6 - 15 cm, broadly obovate. Spikes axillary, solitary or clustered. Flowers greenish-yellow or creamy- white. Fruits ovate or elliptic, 5-ridged, grey-velvety; stone very thick, indistinctly 5-angled, brown.

Fl. & Fr.: January - August.

Common in the dry mixed deciduous forests.

Specimen examined: Ambapani Nala [24 58 50.13 N, 74 51 31.54 E, 446 m], *P. Hari Krishna & R. Kumar* 35328(BSJO).

Uses: It is used in liver and respiratory problems.

4. Terminalia coronata (Stapf) Gere & Boatwr. in Bot. J. Linn. Soc. 184: 319. 2017. *Anogeissus sericea* Brandis var. *nummularia* King ex Duthie, A.J. Scott in Kew Bull. 33(4): 559. 1979; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 314 - 315. 1987. (Plate-20). 'Indrok'

Small trees, up to 7 m high, young leaves rusty-silky pubescent. Leaves 0.8 - 2 x 1 - 1.9 cm, broadly obovate, rounded, obtuse, truncate or subacute at base, obtuse, obcordate or mucronulate at apex, coriaceous, tomentellous, pale green when dry; lateral nerves 4-6; petioles 0.1-0.3 cm long. Flowers yellow to brownish-yellow. Fruits 0.4 cm long, brown, wings undulate.

Fl. & Fr.: September - January.

Rare in forests.

Specimen examined . near Meghpura [25 02 38.29 N, 74 48 30.14 E, 387 m], *P. Hari Krishna & R. Kumar* 37398(BSJO).

Uses: It used in skin disease.

5. Terminalia elliptica Willd., Sp. Pl. 4: 969. 1806. *T. alata* Roth, Nov. Sp. Pl. 379. 1821. *T. crenulata* Roth, Nov. Sp. Pl. 380. 1821; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 317. 1987. *T. tomentosa* (Roxb. ex DC.) Wight & Arn., Prod. 314. 1834; C.B. Clarke in Hook.f., Fl. Brit. India 2: 447. 1878, incl. var. *crenulata* & *coriacea*.

Deciduous trees, up to 20 m high; bark dark grey to black, rough. Upper leaves alternate, lower opposite to subopposite, elliptic to obovate, obtuse to retuse at apex, unequal at base, serrulate to subentire at margins. Flowers white or dull yellow. Fruits 2.5- 5 cm long, glabrous with 5- broad wings, dark brown.

Fl. & Fr.: May - December.

Common in the dry deciduous forests.

Specimen examined. Near keljar [24 58 24.82 N, 74 48 39.83 E, 454 m.], *P. Hari Krishna & R. Kumar* 38337 (BSJO).

Uses: Leaves are used as a fodder. Stem bark is used in boils, diabees and leaves in swelling. The wood is used in agricultural and household articles.

6. Terminalia pendula (Edgew.) Gere & Boatwr. in Bot. J. Linn. Soc. 184: 321. 2017. *Anogeissus pendula* Edgew. in J. Asiat. Soc. Bengal 21: 171. 1853; C.B. Clarke in Hook.f., Fl. Brit. India 2: 451. 1878; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 313. 1987. 'Dhok'

Trees, up to 8 m high, bar. Leaves alternate and sub-opposite, 1.6-4.(-6)x 0.6-1.6(-2.5) cm, alternate and subopposite. Flowers yellow, solitary, axillary and terminal. Fruits 0.5-0.7 x 0.4-0.6 cm, beaked, glabrous except at the apex, winged; wings narrow, jagged at the apex.

Fl. & Fr.: July - November .

Common in dry deciduous forest.

Specimen examined: Crocodile view point, Bassi dam [25 0 35.97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35104(BSJO)

LYTHRACEAE J.St.-Hil.

Key to the genera

- 1a. Shrubs or small trees 3
b. Herbs..... 2

- 2a. Flowers solitary or sub solitary3. **Rotala**
b. Flowers in axillary cymes or umbels1. **Ammannia**
3a. Flowers zygomorphic; calyx tube bent 4. **Woodfordia**
b. Flowers not zygomorphic; calyx tube straight2. **Lawsonia**

1. Ammannia L.

Key to the species

- 1a. Petals 4; cymes pedunculate, lax; style distinct.....2. **A. multiflora**
b. Petals absent; cymes subsessile, compact; style absent or nearly so
..... 1. **A. baccifera**

1. Ammannia baccifera L., Sp. Pl. 1: 120. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 2: 569. 1879; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 321. 1987. *A. salicifolia* auct. non Blume, 1856; C. B. Clarke in Hook.f., Fl. Brit. India 2: 569. 1879.

Annual herbs, 15-20 cm high; stem opposite. Leaves sessile, opposite, 3 - 6 x 0.1.2 - 2 cm, oblong-elliptic or oblanceolate. Flowers pinkish, sessile or subsessile, in short, dichasial, axillary cymes; pedicels 1-2 mm long. Capsules pinkish. Seeds many, ovoid, minute, blackish-brown.

Fl. & Fr.: Almost round the year.

Common, found near water courses in marshy places.

Specimens examined: Jariya Mahadev water fall area [25 01 59.29 N, 74 53 1.91 E, 469 m], *P. Hari Krishna & R. Kumar* 35387 (BSJO); Ambapani area [24 58 53 N, 74 51 17 E, 430 m], *P. Hari Krishna & R. Kumar* 35752(BSJO); Naal [24 05 32.59 N, 74 56 37.82 E, 414 m], *P. Hari Krishna & R. Kumar* 35560 (BSJO); Badpani area [25 04 46.09 N, 74 55 24.82 E, 417 m], *P. Hari Krishna & R. Kumar* 38404(BSJO).

2. Ammannia multiflora Roxb. Fl. Ind. 1: 447. 1820; C.B. Clarke in Hook.f., Fl. Brit. India 2: 570. 1879; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 322. 1987.

Erect, glabrous herbs, up to 30 cm high; branches numerous, sharply quadrangular. Leaves sessile, opposite, 0.8-2.5 x 0.25-0.3 cm, lanceolate-oblong. Flowers purple, small, solitary or in 3 to many-flowered, peduncled, axillary cymes; peduncles and pedicels variable in length. Seeds numerous, obovoid, pointed at one end

Fl. & Fr.: Almost round the year.

Common, found near water courses in marshy places.

Specimen examined: Near Naal [24 05 32.59 N, 74 56 37.82 E, 414 m], *P. Hari Krishna & R. Kumar* 35752 (BSJO).

2. Lawsonia L.

Lawsonia inermis L., Sp. Pl. 1: 349.1753; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 327. 1987. *L. alba* Lam., Encycl. 3 : 106.1789; C. B. Clarke in Hook.f., Fl. Brit. India 2: 573. 1879. 'Mehndi'

Perennial shrubs, up to 3 m tall. Leaves opposite, lanceolate or oblanceolate. Flowers ca 5 mm across, creamy, fragrant, in terminal, paniced cymes. Sepals 4, ovate, persistent. Petals 4, ca 4 mm long, orbicular or obovate, yellowish. Fruits depressed-globose, reddish-brown, tipped with persistent style, irregularly breaking up. Seeds numerous, minute, smooth, angular, brown.

Fl. & Fr.: Almost round the year.

Commonly grown near habitations for ornamental purposes.

Specimen examined. Near Ram Mandir [25 00 01.16 N, 74 47 09.02 E, 435 m], *P. Hari Krishna & R. Kumar* 35293(BSJO).

Uses: It is a colouring agent.

3. Rotala L.

Rotala serpyllifolia (Roth) Bremek. in Acta Bot. Neerl. 3 (1) : 149. 1954; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 325. 1987. *Micranthus serpyllifolius* Roth, Nov. PL., Sp. 282. 1821. *Ameletia tenuis* Wight, Icon. Pl. Orient.: t. 257. 1840. *Ammannia tenuis* (Wight) C.B. Clarke in Hook.f., Fl. Brit. India 2: 567. 1879.

Annual, glabrous herbs. Leaves sessile, 0.4 - 0.12 x 0.3 - 0.5 cm, broadly ovate to elliptic. Flowers in dense, terminal, bracteates, spike-like racemes, reddish-pink; pedicels very short. Corolla obovate. Seeds pink-yellow.

Fl. & Fr.: August - November.

Common near water streams.

Specimen examined. Jharia Mahadev [25 01 51.29 N, 74 53 01.91 E, 469 m], *P. Hari Krishna & R. Kumar* 35511 (BSJO).

4. Woodfordia Salisb.

Woodfordia fruticosa (L.) Kuntze in J. Asiat. Soc. Bengal 40 (2) : 56. 1871; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 326. 1987. *Lythrum fruticosum* L., Syst. ed. 10. 1045. 1759. *Woodfordia floribunda* Salisb., Parad. Lond. t. 42. 1806; C.B. Clarke in Hook.f., Fl. Brit. India 2: 572. 1879. 'Dhawi'

Large shrubs, with spreading branches; bark reddish, peeling off in fibres. Leaves 1.6 - 10.5 x 0.6 - 3 cm, oblong-lanceolate, base rounded, entire, acuminate. Flowers in axillary or extra-axillary clusters on slender pedicels. Calyx bright red. Petals white. Capsules enclosed within the persistent calyx tube. Seeds, pale brown.

Fl. & Fr.: January - May.

Occasional found in dry deciduous forests.

Specimens examined: Bichhor forest area [25 03 51.9 N, 74 54 14.7 E, 428 m], *P. Hari Krishna & R. Kumar* 35414 (BSJO).

ONAGRACEAE Juss.

Ludwigia L.

Key to the species

- 1a. Stamens 4; capsules oblong, stout. **2. *L. perennis***
b. Stamens 8; capsules narrowly linear. **1. *L. hyssopifolia***

1. *Ludwigia hyssopifolia* (G. Don) Exell in Garcia de Orta 5: 471. 1957; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 328. 1987. *Jussiaea hyssopifolia* G. Don, Gen. Syst. 2: 693. 1832. *J. fissendocarpa* haines in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 15: 313. 1920. *Fissendocarpa linifolia* (Vahl) Bennet in J. Bombay Nat. Hist. Soc. 67: 126. 1970.

Annual erect herbs. Leaves 1.5 - 8 x 0.5 - 3 cm, lanceolate or elliptic, entire. Flowers solitary, axillary, yellow. Capsules cylindric, subterete, finely puberulus, light pink-red. Seeds in inflated upper capsules in 2 or more rows per locule, free, pale brown, ovoid, raphe narrow, brown.

Fl. & Fr.: August -November.

Occasionally found in moist places.

Specimens examined: Near Nal forest area [24 05 32.59 N, 74 56 37.82 E, 414 m], *P. Hari Krishna & R. Kumar* 35757(BSJO); Savarna lake [24 59 51.19 N, 74 45 21.63 E, 489 m], *P. Hari Krishna & R. Kumar* 37392(BSJO).

2. *Ludwigia perennis* L., Sp. Pl. 1: 119. 1753; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 329. 1987. *L. parviflora* Roxb., Hort. Bengal: 11. 1814 & Fl. Ind. (Carey & Wall. ed.) 1: 440. 1820; C.B. Clarke in Hook.f., Fl. Brit. India 2: 588. 1879.

Herbs up to 60 cm. Leaves 3 - 7.5 x 0.6 - 1.8 cm, lanceolate or elliptic-lanceolate, entire. Flowers solitary, axillary, yellowish with white

patches. Capsules subterete, 0.5 - 1 cm, thin walled, 4- ribbed, glabrous, pale brown. Seeds glabrous, brownish.

Fl. & Fr.: August - January.

Common in moist - marshy places.

Specimen examined: Kevdiya forest area [24 59 58.2 N, 74 9 57.9 E, 419 m], *P. Hari Krishna & R. Kumar* 35474(BSJO).

MYRTACEAE Juss.

Key to the genera

- 1a. fruit capsule..... **1.Eucalyptus**
b. fruit berry..... **2.Syzygium**

1.Eucalyptus L'Hér.

Eucalyptus camaldulensis Dehnh. Cat. Pl. Horti Camald., ed. 2: 20. 1832; ; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 320. 1987.

Tall trees, smooth bark, white or ash colour, decorticating in rounded plates. Leaves lanceolate, falcate, 10- 16 x 1-2 cm. Flowers whitish, in axillary 3-12- flowered umbels. Fruit rim convex, valves exserted.

Fl. & Fr.: November-Jan.

Specimen examined: Near Paat village [25 02 14.93 N, 7 0 5 1 03.63 E, 424 m], *P. Hari Krishna & R. Kumar* 35438 (BSJO).

2.Syzygium Gaertn.

Key to the species

- 1a. Large trees; petioles 1.5-2.5 cm long; leaves elliptic-oblong **1. S. cumini**
b. Shrubs or small trees; petioles upto 1 cm long; leaves narrow, oblong **2. S. salicifolium**

1. Syzygium cumini (L.) Skeels in Pl. U.S. Dept. Agr. Bur. Pl. Industr. Bull. 248: 25. 1912; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 318. 1987. *Myrtus cumini* L., Sp. Pl. 1: 471. 1753. *Eugenia jambolana* Lam., Encycl. 3: 198. 1789; Duthie in Hook.f., Fl. Brit. India 2: 499. 1879. 'Jamun'

Large trees, up to 13 m high; bark smooth, ash-brown. Leaves 8 - 12.5 x 3 - 5 cm, oblong, elliptic-oblong or ovate-lanceolate, acute to acuminate at apex. Flowers pale greenish-white, fragrant, sessile, mostly in threes, in trichotomous panicles. Berries dark green. Seeds solitary, with thick, fleshy cotyledons closely appressed on their inner faces.

Fl. & Fr.: February -July .

Occasional, in the valleys, along water courses and low lying areas in forests.

Specimen examined: Mahudia Nala-bandh [25 02 35.21 N, 74 52 16.76 E, 436 m], *P. Hari Krishna & R. Kumar* 35613(BSJO).

Uses: Fruits are edible.

2. *Syzygium salicifolium* J.Graham in Cat. Pl. Bombay: 73. 1839. *Syzygium heyneanum* Wall. ex Wight & Arn., Prodr. Fl. Ind. Orient.:329.1834; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 318. 1987. *Eugenia heyneana* Duthie in Hook.f., Fl. Brit. India 2: 500. 1879. 'Jamuni'

Shrubs or small trees with smooth, ash-coloured bark. Leaves 7 - 14 x 1.7 - 2.5 cm, opposite, oblong-lanceolate to elliptic-lanceolate, subcoriaceous, acute at apex, tapering at base, glabrous and shining, main nervous very numerous; petioles 0.3-0.9 cm long. Flowers on leafless branches, in umbellate cymes, creamish-white. Calyx externally rugulose, funnel-shaped. Corolla calyptrate. Berries oblong or ellipsoid, pale-purple, glabrous.

Fl. & Fr.: February - July.

Occasional found moist places in the Sanctuary area.

Specimen examined: Ambapani area [24 58 53.34 N, 74 51 16.42 E, 433 m], *P. Hari Krishna & R. Kumar* 35569(BSJO).

Order: Sapindales Juss. ex Bercht. & J.Presl

BURSERACEAE Kunth

Boswellia Roxb. ex Colebr.

Boswellia serrata Roxb. ex Colebr. in Asiat. Res. 9: 379. t. 5. 1807; A.W. Benn. in Hook.f., Fl. Brit. India 1: 528. 1875; Chithra & Henry, in Hajra & al. Fl. India 4: 432 - 433. 1997; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 177. 1987. *B. glabra* Roxb. Pl. Corom. 3: 4. t. 207. 1811. (Plate-13). 'Salar'

Trees, up to 15 m high. Leaves alternate, 15-25 cm long, imparipinnate; leaflets 9-31, sessile, 2 - 6 x 1 - 2.5 cm, subopposite, oblong-ovate, obliquely cuneate or rounded at base, acute, obtuse or retuse and mucronate at apex, crenate-serrate, coriaceous. Flowers in 8-20 cm long, axillary racemes. Petals oblong-ovate, obtuse, inflexed at apex, pinkish-white. Capsules 3-gonous, retuse at the end.

Fl. & Fr.: December - April.

Occasionally found in dense forests on hill tops and slopes.

Specimen examined: Panduria [24 58 36.47 N, 74 53 08.26 E, 524 m], P. Hari Krishna & R. Kumar 35528(BSJO).

Uses: Gums is used for lighting by tribals, leaves are used as a fooder.

ANACARDIACEAE R.Br.

Key to the genera

- 1a. Leaves pinnately compound. 1. **Lannea**
b. Leaves simple. 2. **Mangifera**

1.Lannea A. Rich.

Lannea coromandelica (Houtt.) Merrill in J. Arnold Arbor 19: 353. 1938; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 194. 1987; Chandra & Mukherjee, in Singh & al. Fl. India 5: 463. 2000; Karthik. & al., Fl. Pl. India 1: 79. 2009. *Dialium coromandelicum* Houtt., Nat. Hist. 2: 39. t. 5. f. 2. 1774. *Odina wodier* Roxb., Fl. Ind. 2: 293. 1832; Hook.f., Fl. Brit. Ind. 2: 29. 1876.
‘Godal’

Trees, 8-10 m high, with smooth, ash-coloured, lenticelled bark. Leaves ca 26 cm long, petiolate; leaflets 5-11, 2 - 12 x 1 - 3 cm, ovate-oblong or elliptic-oblong. Flowers minute, sessile, yellow tinged with red, in panicles at the end of leafless branches, unisexual. Drupes pyriform.

Fl. & Fr.: January- July.

Common in dry deciduous forests.

Specimens examined: Umarthuna [25 00 52.66 N, 74 54 44.80 E, 523 m], P. Hari Krishna & R. Kumar 35497(BSJO); Kadmali dam [24 58 6.19 N, 74 54 5.04 E, 528 m], P. Hari Krishna & R. Kumar 38422(BSJO).

Uses: The boiled leaves are applied for body pains.

2.Mangifera L.

Mangifera indica L., Sp. Pl. 1: 200. 1753; Hook.f., Fl. Brit. India 2: 13. 1876; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 194-195. 1987; D. Chandra & Mukh. in N.P. Singh & al., Fl. India 5: 466. 2000. ‘Amba’

Evergreen Trees, 15-25 m high, with light-black bark. Leaves 5 - 30 x 2.5 - 7 cm, oblong or oblong-lanceolate. Flowers yellowish-green, small, numerous, in long terminal or rarely axillary panicles. Drupes reddish-yellow. Seeds glabrous, smooth.

Fl. & Fr.: December - July.

Common near habitations, agricultural fields and some times in riverine forests.

Specimens examined: Ambapani [24 58 49 N, 74 51 25 E, 430 m], *P. Hari Krishna & R. Kumar* 35553(BSJO).

Uses: Fruits are edible. Timber for making agricultural implements.

SAPINDACEAE Juss.

Cardiospermum L.

Cardiospermum halicacabum L., Sp. Pl. 1: 366. 1753; Hiern in Hook.f., Fl. Brit. India 1: 670. 1875; Parmer, in Shetty & Singh (eds.), Fl. Rajasthan 1: 191. 1987; P.C. Pant in Singh & al., Fl. India 5: 356. 2000. (Plate-14). *'Lataphatkari'*

Annual or perennial climbing herbs. Stem and branches furrowed. Leaves petiolate; leaflets 0.6 - 7 x 0.4 - 1.5 cm, ovate to ovate-lanceolate. Flowers white, in extra-axillary, long pedunculate, umbellate peduncles up to 15 cm long. Capsules shortly stalked, subglobose or broadly pyriform, winged, truncate at top. Seeds globose, black.

Fl. & Fr.: July - January.

Common in dry deciduous forests fringes.

Specimens examined: Jogideh dam side [24 59 33.86 N, 74 49 20.8 E, 410 m], *P. Hari Krishna & R. Kumar* 35126(BSJO); Naal forest area [25 05 15.41 N, 74 56 55.34 E, 412 m], *P. Hari Krishna & R. Kumar* 35767(BSJO).

RUTACEAE Juss.

Key to the genera

- 1a. Plants unarmed. **2. Bergera**
- b. Plants armed with spines. **2**
- 2a. Leaves pinnately trifoliolate; petioles slender; stamens many **1. Aegle**
- b. Leaves imparipinnate, leaflets more than 3; petioles narrowly winged; stamens 8-10 or 12 **3**
- 3a. Leaflets obovate, cuneate at base; petals 5, pale yellow. **3. Limonia**
- b. Leaflets ovate-elliptic or oblanceolate, oblique and acute at base; petals 4, white. **4. Naringi**

1. *Aegle* Corr.

Aegle marmelos (L.) Correa in Trans. Linn. Soc. London 5: 223. 1800; Hook.f., Fl. Brit. India 1: 516. 1875; Parmer, in Shetty & Singh (eds.), Fl. Rajasthan 1: 172. 1987. *Crateva marmelos* L., Sp. Pl. 1: 444. 1753. *Aegle marmelos* (L.) Correa var. *mahurensis* Zate in Indian J. For. 5: 36. 1982. (Plate-12). 'Beel'

Thorny trees, 5-12 m tall. Leaves alternate; leaflets 1.6 - 9 x 0.6 - 5 cm, ovate-elliptic or elliptic-lanceolate, crenate-serrulate. Flowers greenish or creamish-white, in axillary. Berries 5-10 cm across, globose or subglobose. Seeds, pale brown, glabrous.

Fl. & Fr.: January - July.

Common in dry deciduous forests.

Specimens examined: Hanuman chowraha [24 59 43.59 N, 74 8 39.24 E, 493 m], *P. Hari Krishna & R. Kumar* 35486 (BSJO); Niliya [25 00 33.48 N, 74 53 00.67 E, 559 m], *P. Hari Krishna & R. Kumar* 35691 (BSJO).

Uses: Fruit is edible.

2. *Bergera* J.Koenig

Bergera koenigii L., Mant. Pl. 1: 563. 1771. *Murraya koenigii* (L.) Spreng., Syst. Veg. 2: 315. 1825; Hook.f., Fl. Brit. India 1: 503. 1875; Parmer, in Shetty & Singh (eds.), Fl. Rajasthan 1: 175. 1987; K.N. Nair & M.P. Nayar in Hajra & al., Fl. India 4: 351. 1997. 'Meethaneem'

Shrubs or small trees. Leaves, imparipinnate, 6-15 cm long; leaflets 11-25, alternate, ovate-lanceolate or somewhat ovate-rhomboid. Flowers creamy-white. Berries purplish to black when ripe.

Fl. & Fr.: April - June.

Frequently found in moist open places and usually planted near habitations.

Specimen examined: Near Ram-Mandir [25 00 01.16 N, 74 47 09.02 E, 435 m], *P. Hari Krishna & R. Kumar* 35298 (BSJO).

Uses: Bark and roots used skin eruption.

3. *Limonia* L.

Limonia acidissima L., Sp. Pl. ed. 2. 1: 554. 1762; K.N. Nair & M.P. Nayar in Hajra & al., Fl. India 4: 294. 1997. *Feronia limonia* (L.) Swingle in J. Wash. Acad. Sci. 4: 328. 1914 & Citrus Ind. 1: 416. 1967; Parmer, in Shetty & Singh (eds.), Fl. Rajasthan 1: 175. 1987. *Limonia elephantum* (Correa) Panigrahi in Taxon 26: 576. 1977. (Plate-12). 'Khatori'

Small trees, 5-10 m tall, branches greyish-brown, rough. Leaves alternate, 3-5 cm long; leaflets 3-9, opposite, 1 - 5 x 1.5 - 2.5 cm, obovate, entire, glabrous. Flowers, yellowish green tinged with red. Berries globose, with greenish-white or pale yellow rind.

Fl. & Fr.: March - December.

Rare in dry or moist deciduous forests.

Specimen examined: Near Bichhore [25 06. 27 N, 74 56 .721 E, 362 m], *P. Hari Krishna & R. Kumar* 38400 (BSJO).

Uses: Fruits are used in diarrhea.

4.Naringi Adanson

Naringi crenulata (Roxb.) Nicholson in C.J. Saldanha & Nicholson, Fl. Hassan Dist. 387. 1976; Panigrahi in Bull. Bot. Surv. India 17: 196. 1978; Parmer, in Shetty & Singh (eds.), Fl. Rajasthan 1: 174. 1987; K.N. Nair & M.P. Nayar in Hajra & al., Fl. India 4: 302. 1997. *Limonia crenulata* Roxb., Pl. Cor. 1: 60.t .86. 1798. *Hesperuthusa crenulenta* (Roxb.) M.Roem. in Fam. Nat. Syn. Monogr. 1:38.1846. *Limonia acidissima* auct. non L., 1762; Hook.f., Fl. Brit. India 1: 507. 1875.

Small trees, up to 8 m high; branchlets, angular; spines solitary or in pairs. Leaves up to 12 cm long; leaflets usually 5 or 7. Flowers white, axillary or sometimes terminal. Berries, globose, bluish- black. Seeds brownish.

Fl. & Fr.: April - June.

Occasionally found in deciduous forests .

Specimen examined: Near Pal village [25 0 41.75 N, 74 51 35.06 E, 421 m], *P. Hari Krishna & R. Kumar* 38375(BSJO).

Uses: Leaves are used in ulcer.

SIMAROUBACEAE DC.

Ailanthus Desf.

Ailanthus excelsa Roxb., Pl. Corom. 1: 24. t. 23. 1795; A.W. Benn. in Hook.f., Fl. Brit. India 1: 518. 1875; Parmer, in Shetty & Singh (eds.), Fl. Rajasthan 1: 176. 1987. (Plate-12). 'Ardu'

Trees, 8-15 m high. Leaves pinnate, leaflets 8-14 pairs, alternate or subopposite, 6 - 15 x 2.5 - 4 cm, ovate-lanceolate. Flowers, greenish-yellow, pedicels long, slender. Seeds solitary in the centre of the samara, oblong, glabrous.

Fl. & Fr.: November - May.

Occasional found in forest fringes usually planted.

Specimen examined: Paat Village [24 59 45.62 N, 74 51 7.98 E, 403 m], P. Hari Krishna & R. Kumar 38385(BSJO).

MELIACEAE Juss.

Key to the genera

- 1a. Leaves entire. Fruit a capsule; seeds winged. **3. Soyimida**
- b. Leaves serrate or crenate; fruit a drupe; seeds not winged. **2**
- 2 a. Leaves 1-pinnate; flowers white or greenish-white. **1. Azadirachta**
- b. Leaves 2-3-pinnate; flowers lilac..... **2. Melia**

1. Azadirachta A.Juss.

Azadirachta indica A. Juss., in Mem. Mus. Hist. Nat. Par. 19: 221. t. 13. f. 5. 1830; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 179. 1987; Jain & Bennet, in Hajra & al. Fl. India 4: 478. 1997. 'Neem'

Trees, up to 20 m high. Leaves imparipinnate, 15-30 cm long; leaflets 7-17, subopposite or alternate, 4 - 6 x 1 - 2 cm, ovate-lanceolate, oblique at base, acuminate at apex, coarsely crenate-serrate along margins, glabrous. Flowers white, fragrant, in glabrous panicles shorter than the leaves. Drupes ovoid-oblong, smooth, glabrous, 1-seeded, immature green, yellow when ripe. Seeds ellipsoid, glabrous, whitish-brown, hard.

Fl. & Fr.: December - June.

Common in near forest fringes and wastelands.

Specimen examined: Meghpura [25 01 48.46 N, 74 48 41.67 E, 428 m], P. Hari Krishna & R. Kumar 35644(BSJO).

Uses: All parts of the plants are used for medicinal purpose.

2. Melia L.

Melia azedarach L., Sp. Pl. 1: 384. 1753; Wight, Icon. t. 160. 1839; Hiern in Hook.f., Fl. Brit. India 1: 544. 1875; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 179 -180. 1987. (Plate-13). 'Bakan'

Trees, 6-10 m high. Leaves opposite or alternate, 20-40 cm long, 1-3 pinnate; leaflets subsessile, 3-13, 1.6 - 6 x 1 - 2 cm, ovate-lanceolate, acuminate at apex, oblique or slightly inequilateral at base, toothed or lobed along margins, glabrous. Flowers bisexual and male on the same plant, in long peduncled, many-flowered, axillary panicles. Drupes ellipsoid-oblong, yellow.

Fl. & Fr.: March - May.

Occasionally found near habitations and boundaries of cultivated fields.

Specimen examined: Near Shivpura [25 01 27.22 N, 74 56 49.57 E, 417 m], *P. Hari Krishna & R. Kumar* 38393 (BSJO).

3. *Soymida* A. Juss.

Soymida febrifuga (Roxb.) A. Juss. Mem. Mus. Hist. Nat. Paris 19: 251. t. 22. f. 26. 1830; Beddome, Fl. Sylv. S. India t. 8. 1869; Hiern in Hook.f., Fl. Brit. India 1: 567. 1875; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 180. 1987. *Swietenia febrifuga* Roxb. Pl. Cor. t. 17. 1795 & Fl. Ind. 2:398.1832. (Plate-13). *'Rohan'*

Large trees, 5-15 m tall. Leaves 20-40 cm long, dark-green; leaflets sessile or subsessile, subopposite or alternate, 7-13, 3 - 15 x 1 -10 cm, elliptic or oblong, crenate-serrate. Flowers greenish-white, in 15-30 cm long, axillary and terminal panicles. Fruit a septifragal, ovoid, woody, reddish-purple capsule. Seeds compressed.

Fl. & Fr.: February - June.

Occasionally found in deciduous forests.

Specimen examined: Near Modiya Mahadv [24 59 06.22 N, 74 52 28.42 E, 528 m], *P. Hari Krishna & R. Kumar* 35552(BSJO).

Order: Malvales Juss. ex Bercht. & J.Presl

MALVACEAE Juss.

Key to the genera

- 1a. Stamens monadelphous with monothealous anthers 2
- b. Stamens polyadelphous, in phalanges or free 6
- 2a. Trunk armed with spines; stamens polyadelphous; pollens smooth; pericarp of fruit pithy or woolly **1. Bombax**
- b. Trunk or stem unarmed; stamens 1-adelphous; pollens rough; pericarp of fruit normal, neither pithy nor woolly 3
- 3 a. Fruit capsule, dehiscent. **6. Hibiscus**
- b. Fruit Schizcarpic , carpels usually separating 4
- 4a. Epicalyx present 5
- b. Epicalyx abscent. **11. Sida**
- 5a. Epicalyx segments 3. **7. Malvastrum**

- b. Epicalyx segments 5 or more. 10. **Pavonia**
- 6a. Stamens distinctly 1-adelphous. 7
- b. Stamens slightly connate at the base. 12
- 7a. Trees. 8
- b. Herbs or Shrubs. 9
- 8a. Leaves palmately lobed, petals absent 12. **Sterculia**
- b. Leaves simple, petals present. 3. **Eriolaena**
- 9a. Shrubs, fruit of 5 spirally twisted follicles 5. **Helicteres**
- b. Herbs or undershrubs, fruit a capsule. 10
- 10a. Style solitary, capsules 2-valved 14. **Waltheria**
- b. Styles 5 or 5-fid, capsules 5-valved. 11
- 11a. Glabrous herbs. corolla pink or white, in subsessile dense clusters.
..... 9. **Melochia**
- b. Tomentose undershrubs. corolla orange-yellow, calyx-tube deeply 5-
partite 8. **Melhania**
- 12a. Capsules covered with hooked bristles or spines 13. **Triumfetta**
- b. Capsules neither spiny nor bristly 13
- 13a. Trees or shrubs. petals glandular, Fruit a drupe, indehiscent.
..... 4. **Grewia**
- b. Herbs or undershrubs, petals eglandular, fruit a capsule, dehiscent.
..... 2. **Corchorus**

1. Bombax L.

Bombax ceiba L., Sp. Pl. 1: 511. 1753, *p.p.*; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 137. 1987; Nayar & Biswas in B.D. Sharma & al., Fl. India 3: 398.1993. *B. malabaricum* DC., Prod. 1: 479. 1824; Masters in Hook.f., Fl. Brit. India 1: 349. 1874. (Plate-10) 'Simal'

Large trees, 15-30 m tall, trunk with prickles. Leaves 10-20 cm long, ovate-lanceolate, elliptic-lanceolate or elliptic, entire. Flowers bright red to yellowish or white. Capsules ovoid-oblong. Seeds, brownish, embedded in creamy-white silky long fibers.

Fl. & Fr.: December-March.

Common in scrub forests.

Specimen examined: Muroli [25 03 03.34 N, 74 55 51.72 E, 433 m],
P. Hari Krishna & R. Kumar 35589 (BSJO).

2. *Corchorus* L.

Key to the species

- 1a. Beak straight, entire. **3**
b. Beak ending in three, 2-fid points. **2**
2a. Stamens 12-30, capsules elongate, 6 angled **1. C. aestuans**
b. Stamens 10, capsules cylindrical **4. C. tridens**
3a. Capsules 5-valved, 10-ribbed, not terminating in to divided spreading tips
..... **3. C. olitorius**
b. Plants prostrate, capsules glabrous. **2.C. depressus**

1. *Corchorus aestuans* L., Syst. Nat. ed. 10. 1079. 1759; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 146. 1987; P. Daniel & Chandrab. in B.D. Sharma & al., Fl. India 3: 485. 1993. *C. acutangulus* Lam., Encycl. 2: 104. 1786; Masters in Hook.f., Fl. Brit. India 1: 398. 1874. '*Hade ka khat*'

Prostrate annual herbs, up to 50 cm high; branches reddish or purple. Leaves simple, ovate-oblong or ovate-lanceolate, serrate. Flowers golden yellow, solitary, 2-3 in leaf-opposed, short, pedunculate cymes. Capsules cylindric, 6-angled, solitary. Seeds rough, numerous, truncate at both ends, dark brown.

Fl. & Fr.: August - October.

Common weed in wastelands and moist locations.

Specimens examined: Jhaleshawar Mahadev [25 00 56.90 N, 74 4759.43 E, 421 m], *P. Hari Krishna & R. Kumar* 35199(BSJO); Modia Mahadev [24 59 35.73 N, 74 52 30.62 E, 502 m], *P. Hari Krishna & R. Kumar* 35343(BSJO); Jharia Mahadev [25 01 59.29 N, 74 53 1.91 E, 469 m], *P. Hari Krishna & R. Kumar* 35392(BSJO); Mahudia-Maheshra [25 02 36.95 N, 74 52 09.32 E, 430 m], *P. Hari Krishna & R. Kumar* 35605(BSJO).

2. *Corchorus depressus* (L.) Vicary in J. Asiat. Soc. Bengal 16: 1160. 1847; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 147. 1987; P. Daniel & Chandrab. in B.D. Sharma & al., Fl. India 3: 486. 1993. *Antichorus depressus* L., Mant. Pl. 1: 64. 1767. *Corchorus antichorus* Raeusch., Nom. ed. 3. 158. 1797; Masters in Hook.f., Fl. Brit. India 1: 398. 1874. '*Chamghash*'

Perennial, herbs. Leaves simple, 0.4 -0.5 x 0.4 - 1 cm, oblong-elliptic crenate-serrate. Flowers 2-4 in leaf-opposed cymes, yellow, subsessile. Capsules 1.5-4 cm long, cylindrical, straight or slightly curved, glabrescent. Seeds truncate, black.

Fl. & Fr.: August - March.

Common in open mixed forest.

Specimen examined: Ambapani [24 58 53.34, 74 51 16.42 E, 433 m], *P. Hari Krishna & R. Kumar* 35578(BSJO).

3. Corchorus olitorius L., Sp. Pl. 1: 529. 1753; Masters in Hook.f., Fl. Brit. India 1: 397. 1874; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 148. 1987; Daniel & Chandrab. in B.D. Sharma & al., Fl. India 3: 487. 1993. (Plate-11). ‘Chamghas’

Large herbs, up to 1.5 m high; branchlets glabrous. Leaves simple, 4 - 9 x 2.5 - 4 cm, ovate to ovate-lanceolate, acute at apex, rounded at base, serrate. Flowers 1-2, in leaf-opposed cymes, subsessile, yellow, solitary. Capsules 3-6 cm long, subcylindric, 10-ribbed, glabrous. Seeds blackish-brown, smooth.

Fl. & Fr.: August - November.

Common weed in wastlands.

Specimens examined: Bassi Rammandir [25 00 01.16 N, 74 47 09.02 E, 435 m], *P. Hari Krishna & R. Kumar* 35295(BSJO); Maheshra [25 03 07.21 N, 74 52 56.89 E, 420 m], *P. Hari Krishna & R. Kumar* 37364(BSJO); Nandwas [24 58 10.21 N, 74 54 52.61 E, 405 m], *P. Hari Krishna & R. Kumar* 38431(BSJO).

4. Corchorus tridens L., Mant. Pl. App. 566. 1771; Masters in Hook.f., Fl. Brit. India 1: 398. 1874; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 148. 1987; P. Daniel & Chandrab. in B.D. Sharma & al., Fl. India 3: 488. 1993. ‘Kag-nasha’

Glabrous herbs, up to 50 cm high. Leaves simple, 5 - 7 x 1.2 - 2.5 cm, linear-oblong or lanceolate, acute at apex, serrate on margins. Flowers yellow, subsessile, in leaf-opposed, one to few-flowered, shortly pedunculate, corymbose cymes. Capsules cylindrical, terminating into 3, 2-bifid tips. Seeds truncate at both ends, brownish-black.

Fl. & Fr.: August - December.

Common in wastelands.

Specimen examined: Meghpura chowki [25 01 36.6 N, 74 8 49.2 E, 410 m], *P. Hari Krishna & R. Kumar* 35458(BSJO).

3. Eriolaena DC.

Eriolaena hookeriana Wight & Arn., Prod. Fl. Ind. Orient. 1: 70. 1834; Masters in Hook.f., Fl. Brit. India 1: 370. 1874; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 138. 1987; Malick in B.D. Sharma & al., Fl. India 3: 415. 1993. (Plate-10). 'Buti'

Small trees, up to 8 m tall. Leaves up to 11 x 13 cm, broadly ovate, crenate-dentate. Flowers yellow, in many-flowered pedunculate cymes. Capsules up to 3.6 x 2 cm, ovoid to pyriform, pointed, woody, loculicidal, 10-valved; downy, tubercled or smooth. Seeds winged, brown.

Fl. & Fr.: March -May.

Rare in forests.

Specimen examined: Modia Mahadev [24 59 38.98 N, 74 52 20.34 E, 483 m], *P. Hari Krishna & R. Kumar* 38424 (BSJO).

4. Grewia L.

Key to the species

- 1a. Peduncles leaf-opposed; flowers white. **2. G. tenax**
- b. Peduncles axillary or extra-axillary; flowers yellow. **2**
- 2a. Leaves 3-nerved at the base. **1. G. flavescens**
- b. Leaves 4 to 7-nerved at the base; nuts 3-celled. **3. G. tiliifolia**

1. Grewia flavescens A. Juss. in Ann. Mus. Natl. Hist. Nat. 4: 91. 1804; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 152. 1987; P. Daniel & Chandrab. in B.D. Sharma & al., Fl. India 3: 498. 1993. *G. pilosa* auct non Lam., 1789; Mast. in Hook.f., Fl. Brit. India 1: 388. 1874. (Plate-11). 'Pirigangechi'

Large shrubs, up to 3 m tall. Leaves, 1.5-6 x 1-3 cm, ovate-elliptic or ovate-oblong, crenate-serrate. Flowers yellow, in short, axillary racemes, 3-flowered. Corolla up to 1 cm long, spatulate or linear-oblong, 2-fid, glands c. 3 mm long, oblong. Drupes 2 to 4-lobed, yellowish-brown. Seeds stony.

Fl. & Fr.: July - November.

Common on the hilly area.

Specimens examined: Crocodile view point [25 00 35.97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35103(BSJO); Muroli forest area [25 05 15.46 N, 74 56 55.72 E, 412 m], *P. Hari Krishna & R. Kumar* 35776(BSJO); Shivpura [25 01 57.61N, 74 54 33.66 E, 478 m], *P. Hari Krishna & R. Kumar* 38394(BSJO).

2. *Grewia tenax* (Forssk.) Fiori in Bos. Plante Legn. Eritr. 246. 1909 & in Agric. Colon. 5: suppl. 23. 1912; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 155. 1987. P. Daniel & Chandrab. in B.D. Sharma & al., Fl. India 3: 511. 1993. *Chadara tenax* Forssk., Fl. Aegypt.-Arab. 105. 1775. *Grewia populifolia* Vahl, Symb. Bot. 1: 33. 1790; Mast. in Hook.f., Fl. Brit. India 1: 385. 1874.(Plate-11).

'Kango'

Shrubs, 1-2 m high. Leaves alternate, 2 - 6 x 1-2.5 cm, ovate-obovate, rounded to cordate at the base, acute or obtuse at apex, crenate-dentate. Flowers white, in axillary or leaf-opposed, 2 to 3-flowered. Drupes 1.2 -1.5 cm across, deeply 2 to 4-lobed, glabrous, orange-coloured when ripe.

Fl. & Fr.: August - October.

Common in semi- arid plains and open forests.

Specimen examined: Semadhar area [24 57 39.73 N, 74 54 16.97 E, 492 m], *P. Hari Krishna & R. Kumar* 37306 (BSJO).

3. *Grewia tiliifolia* Vahl, Symb. Bot. 1: 35. 1790; Masters in Hook.f., Fl. Brit. India 1: 386. 1874; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 155. 1987; P. Daniel & Chandrab. in B.D. Sharma & al., Fl. India 3: 511. 1993.

'Dhamni'

Pubescent, trees up to 7 m high. Leaves alternate, 3 - 12 x 2.5 - 10 cm, ovate to suborbicular or elliptic-ovate, obliquely cordate at base, rounded or acuminate at apex, sometimes obscurely lobed, serrate to crenate-serrate. Flower yellow, 3-6, in axillary cymes; peduncles up to 2 cm long. Drupes up to 0.6 cm across, entire pubescent, black. Nuts 2.

Fl. & Fr.: May- July.

Occasional, found in dry deciduous forests.

Specimens examined: Kevdia [25 01 20.92 N, 74 49 27.49 E, 443 m], *P. Hari Krishna & R. Kumar* 35620 (BSJO); Ambapani [24 58 50.13 N, 74 51 31.54 E, 446 m], *P. Hari Krishna & R. Kumar* 35326 (BSJO); Panduria [24 58 31.31 N, 74 53 20.19 E, 512 m], *P. Hari Krishna & R. Kumar* 35333(BSJO).

5. *Helicteres* Pluk. ex L.

Helicteres isora L., Sp. Pl. 2: 963. 1753; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 140. 1987; Masters in Hook.f., Fl. Brit. India 1: 365. 1874 *incl. vars.*; Malick in B.D. Sharma & al., Fl. India 3: 426. 1993. (Plate-10).

'Marodfali'

Shrubs or small trees. Leaves 4 - 15 x 3 - 11 cm, broadly elliptic-oblong. Flowers 4 cm long, axillary, solitary or in fascicles of 2-6, bright red.

Follicles woody, cylindrical, spirally twisted with an apical beak. Seeds many, angular, tomentose.

Fl. & Fr.: July - December.

Common in dry and mixed deciduous forests.

Specimens examined: Kankaria Nala [25 0 9.05 N, 74 48 34.65 E, 499 m], *P. Hari Krishna & R. Kumar* 35148 (BSJO); Devalgarh [24 58 20.32 N, 74 51 04.41 E, 491 m], *P. Hari Krishna & R. Kumar* 37346 (BSJO).

6. *Hibiscus* L.

Key to the species

1a. Leaves simple, basal leaves orbicular-ovate; upper ones 3-lobed.
..... **2. *H. lobatus***

b. Leaves palmately 3-5 partite. **1. *H. caesius***

1. *Hibiscus caesius* Garcke in Oesterr. Bot. Z. 7: 850. 1849; Parmar in Shetty & Singh (eds.), *Fl. Rajasthan* 1: 121. 1987; T.K. Paul in B.D. Sharma & al., *Fl. India* 3: 334. 1993. *H. gibsonii* Stocks ex Harv. & Sond., *Fl. Capensis* 2: 587. 1862; Masters in Hook.f., *Fl. Brit. India* 1: 339. 1874.

Herbs or undershrubs. Stems terete, often covered with prickles. Leaves palmately 3-5 partite, leaflets elliptic - lanceolate, serrate. Flowers solitary, yellow with purple centre. Capsules ovoid, yellow or brown. Seeds pilose, dark-brown.

Fl. & Fr.: Almost throughout the year.

Common in open forests and fringes of the forests.

Specimen examined: Near Hanuman Chowraha [24 59 43.59 N, 74 8 39.24 E, 493 m], *P. Hari Krishna & R. Kumar* 35479 (BSJO).

2. *Hibiscus lobatus* (Murray) O. Kuntze, *Rev. Gen. Pl.* 3 (3): 19. 1898; Parmar in Shetty & Singh (eds.), *Fl. Rajasthan* 1: 121-122. 1987; T.K. Paul in B.D. Sharma & al., *Fl. India* 3: 336. 1993. *Solandra lobata* Murray in *Commentat. Soc. Regiae Sci. Gott.* 6: 20. t. 1. 1785. *Hibiscus solandra* L Hèr., *Strip. Nov.* 1: 103. t. 49. 1788, nom. illeg.; Masters in Hook.f., *Fl. Brit. India* 1: 336. 1874.

Annual herbs, up to 1 m high, stems hairy. Basal leaves orbicular-ovate, upper ones 3-lobed or lanceolate, 2 - 10 x 1 - 6 cm, linear-lanceolate. Flowers solitary, white, pink. Capsules ovoid, slightly wrinkled, pubescent. Seeds light brown.

Fl. & Fr.: August - December.

Common in rocky habitats and wastelands.

Specimens examined: Jhaleshwar Mahadev [25 01 20.41 N, 74 48 26.32 E, 414 m], *P. Hari Krishna & R. Kumar* 35190(BSJO); Nandawai on Way [25 00 37.49 N, 74 56 55.58 E, 432 m], *P. Hari Krishna & R. Kumar* 35261(BSJO); Amarpura [25 04 41.69 N, 74 54 08.38 E, 394 m] *P. Hari Krishna & R. Kumar* 35741(BSJO).

7. *Malvastrum* A. Gray.

Malvastrum coromandelianum (L.) Garcke in Bonplandia 5: 295. 1857; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 126-127. 1987; T.K. Paul in B.D. Sharma & al., Fl. India 3: 277. 1993. *Malva coromandeliana* L., Sp. Pl. 2: 687. 1753. *Malvastrum tricuspdatum* (R. Br.) A. Gray, Pl. Wright 1: 16. 1852; Masters, in Hook.f., Fl. Brit. India 1: 321. 1874.

Herbs or undershrubs, up to 80 cm high. Leaves ovate to oblong or lanceolate, serrate-dentate, hairy. Flowers axillary, solitary or in clusters of 2-4 in terminal clusters, sessile, yellow. Schizocarps globular, mericarps 5-10, reniform. Seeds glabrous, brownish-black.

Fl. & Fr.: August-December.

Common in sandy and black soils.

Specimens examined: Palka [24 59 22.18 N, 74 46 57.50 E, 438 m], *P. Hari Krishna & R. Kumar* 38340(BSJO); Gopalpura [25 0 42.82 N, 74 51 33.66 E, 417 m], *P. Hari Krishna & R. Kumar* 38367 (BSJO); Maheshra [25 03 01.70 N, 74 53 02.23 E, 429 m], *P. Hari Krishna & R. Kumar* 38497(BSJO); Rammandir [25 00 01.16 N, 74 47 09.02 E, 435 m], *P. Hari Krishna & R. Kumar* 35291(BSJO).

8. *Melhania* Forssk.

Melhania futteyporensis Munro ex Masters in Hook.f., Fl. Brit India 1: 373. 1874; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 141. 1987; R. Dutta in B.D. Sharma & al., Fl. India 3: 438. 1993. *M. tomentosa* Stocks ex Masters in Hook.f., l.c. 1: 373. 1874; *M. tomentosa* Stocks ex Masters var. *major* Blatt. & Hallb. in J. Bombay Nat. Hist. Soc. 26: 228. 1818. (Plate-10).

Erect, pubescent shrubs, up to 1.5 m tall. Leaves 4 - 9.5 x 3 - 6.5 cm, ovate-oblong, serrate. Flowers axillary and terminal peduncled cymes, yellow to pale-orange. Involucral bracts 3, ovate-oblong, acuminate, equalling sepals. Capsules oblong or sub-globose. Seeds muriculate.

Fl. & Fr.: August - December.

Rare in dry deciduous forests.

Specimen examined: Jogideh dam side [25 0 20.36 N, 74 49 10.33 E, 418 m], *P. Hari Krishna & R. Kumar* 35119 (BSJO)

9. *Melochia* L.

Melochia corchorifolia L., Sp. Pl. 2: 675. 1753; Masters in Hook.f., Fl. Brit India 1: 374. 1874; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 142. 1987; R. Dutta in B.D. Sharma & al., Fl. India 3: 441. 1993. (Plate-10).

Herbs or undershrubs. Leaves ovate-oblong or serrate, glabrous. Flowers in densely crowded terminal and axillary clusters, white or pink. Capsules ca 0.6 cm in diam., globose, hispid, loculicidally 5-valved. Seeds, trigonous, smooth, brown.

Fl. & Fr.: August - October.

Common in open moist places.

Specimens examined: Sarna talab [25 00 23.89 N, 70 48 34.31 E, 500 m], *P. Hari Krishna & R. Kumar* 35444(BSJO); Taleti [24 58 28.20 N, 74 52 43.89 E, 553 m], *P. Hari Krishna & R. Kumar* 36676 (BSJO); Modia Mahadev [24 59 37.55 N, 74 52 30.47 E, 491 m], *P. Hari Krishna & R. Kumar* 35723 (BSJO).

10. *Pavonia* Cav.

Pavonia zeylanica (L.) Cav., Diss. 3: 134. t. 48. f. 2. 1787; Masters in Hook.f., Fl. Brit. India 1: 331. 1874; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 129-130. 1987; T.K. Paul in B.D. Sharma & al., Fl. India 3: 377. 1993. *Hibiscus zeylanicus* L., Sp. Pl. 2: 699. 1753. (Plate-9).

Herbs or undershrubs, up to 1.5 m high. Leaves 3-lobed, orbicular-ovate, sparsely hirsute, apex acuminate. Flowers axillary, solitary, white to pale pink. Fruit pubescent, mericarps 5, winged. Seeds brown, ribbed on dorsal surface, pubescent.

Fl. & Fr.: August - December.

Common in open fields and fallow lands.

Specimens examined: Jhariya Mahadev [25 02 24.50 N, 74 52 54.91 E, 489 m], *P. Hari Krishna & R. Kumar* 37355(BSJO); Jhariya Mahadev Forest area [25 02 05.93 N, 74 53 3.79 E, 533 m], *P. Hari Krishna & R. Kumar* 35379(BSJO); near Dewalgarh [24 58 20.68 N, 74 50 59.41 E, 494 m], *P. Hari Krishna & R. Kumar* 37341(BSJO).

11. *Sida* L.

Key to the species

1a. Mericarps 5 2

- b. Mericarps more than 5.3
- 2a. Plants without spines. 1. **S. cordata**
- b. Plants with spiny structures. 3. **S. spinosa**
- 3a. Mericarps usually 8-12, dehiscent..... 2. **S. cordifolia**
- b. Mericarps usually 6-8, indehiscent 4. **S. tiagii**

1. Sida cordata (Burm. f.) Borss. in Blumea 14: 182. 1966; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 131. 1987; T.K. Paul in B.D. Sharma & al., Fl. India 3: 283.1993. *Melochia cordata* Burm. f., Fl. Ind. 143. 1768. *Sida veronicifolia* Lam., Encycl. 1: 5. 1783; *S. humilis* Cav., Diss. 5: 277. t. 134. f. 2. 1788; Masters in Hook.f., Fl. Brit. India 1: 322. 1874. *S. humilis* var. *veronicifolia* (Lam.) Masters in Hook.f., Fl. Brit. India 1: 322. 1874. (Plate-9).

Annual, prostrate or suberect herbs, up to 1 m high. Leaves ovate to orbicular, acute to acuminate, crenate - dentate or serrate. Flowers axillary, solitary or in few-flowered racemes, yellow. Schizocarps globose, enclosed within the calyx, mericarps 5. Seeds glabrous, brownish- black.

Fl. & Fr.: August - December.

Common on exposed hills and in open forests.

Specimens examined: Bassi Rammandir [25 00 01.16 N, 74 47 09.02 E, 435 m], *P. Hari Krishna & R. Kumar* 35292(BSJO); Sarna Talab [25 00 23.89 N, 74 8 34.31 E, 500 m], *P. Hari Krishna & R. Kumar* 35447(BSJO).

2. Sida cordifolia L., Sp. Pl. 2: 684. 1753; Mast. in Hook.f. Fl. Brit. India 1: 324. 1874; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 131. 1987; Paul in Sharma & Sanjappa, Fl. India 3: 285. 1993. *S. rotundifolia* Lam., Encycl. 1 : 5. 1783. (Plate-9).

Perennial, erect undershrubs, up to 1 m high. Leaves ovate-oblong or orbicular, rounded or cordate at base, obtuse to acute at apex, crenate-serrate at margins. Flowers axillary, solitary or in clusters of 2-5 flowers. Fruits 5-9 cm across, pubescent. Mericarps tetrahedral 8-10, 2-awned. Seeds reniform, brownish-black.

Fl. & Fr.: August - December.

Common in wastelands and open forests.

Specimen examined: near Taleti [24 58 41.58 N, 74 52 51.05 E, 552 m], *P. Hari Krishna & R. Kumar* 35666(BSJO).

3. Sida spinosa L., Sp. Pl. 2: 683. 1753; Masters in Hook.f., Fl. Brit. India 1: 323. 1874; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 133. 1987; T.K. Paul in B.D. Sharma & al., Fl. India 3: 292. 1993. *S. alba* L., Sp. Pl.

ed. 2:960.1763; T.K. Paul in B.D. Sharma & al., Fl. India 3: 283. 1993. *S. alnifolia* L. var. *obovata* Hu, Fl. China, Fam. 153. 22, t. 16, f., 5.1995, non *S. rhombifolia* L. var. *obovata* Wall. ex Masters in Hook.f., Fl. Brit. India 1: 324. 1874. 'Kantiobal'

Erect herbs. Stems with spines at node blunt, 1 or 2. Leaves ovate to oblong, obtuse-rounded or acute, serrate. Flowers axillary, solitary, yellowish-white. Schizocarps wrinkled, enclosed in calyx, mericarps 5, trigonous. Seeds brownish-black.

Fl. & Fr.: August - November.

Common in wastelands .

Specimens examined: Modia Mahadev forest area [24 59 37.65 N, 74 52 28.27 E, 492 m], *P. Hari Krishna & R. Kumar* 35721(BSJO); Near Dewalgarh [24 58 23.19 N, 74 51 02.68 E, 473 m], *P. Hari Krishna & R. Kumar* 37342(BSJO).

4. *Sida tiagii* Bhandari in Ann. Arid Zone 16: 455. 1977; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 133. 1987.

Perennial undershrubs, densely stellate tomentose. Leaves 1- 2.5 x 1 - 1.5 cm, ovate-oblong to obovate, rounded or truncate at apex, entire. Flowers pale yellow in axillary, solitary. Schizocarps enclosed by calyx; mericarps woody, 7-8. Seeds black, glabrous.

Fl. & Fr.: August - November.

Specimens examined: Near Sarna Talab [25 00 23.89 N, 70 4 8 34.31 E, 500 m], *P. Hari Krishna & R. Kumar* 35439 (BSJO).

12. *Sterculia* L.

Sterculia urens Roxb., Pl. Corom. 1: 25. t. 24. 1795 & Fl. Ind. 3: 145. 1832; Masters in Hook.f., Fl. Brit. India 1: 355. 1874; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 144. 1987; S.K. Chandra in B.D. Sharma & al., Fl. India 3: 470. 1993. *Kavalama urens* (Roxb.) Raf., Sylva Tellur.: 72. 1838. (Plate-11). 'Kadaya'

Trees, soft-wooded with papery bark. Leaves 21-28 cm in diam, cordate at base. Flowers yellow, numerous in terminal panicles, glandular pubescent, appearing before the leaves at the end of branchlets. Follicles oblong to ovoid- oblong, pubescent. Seeds oblong, black.

Fl. & Fr.: December - February.

Common at the top of hills in mixed deciduous forests.

Specimen examined: Modia Mahadev [25 59 06.22 N, 74 52 28.42 E, 521 m], *P. Hari Krishna & R. Kumar* 35527 (BSJO).

Uses: Gum is used in cosmetics.

13. *Triumfetta* L.

Key to the species

- 1a. Stamens more than 5; leaves lanceolate; spines on capsule glabrous at apex, hispid at base **2. *T. pilosa***
- b. Stamens 5; leaves lobed, ovate, acute; prickles on capsule ciliate at proximal end and glabrous at distal end. **1. *T. pentandra***

1. *Triumfetta pentandra* A. Rich. in Guill. & Perr., *Fl. Seneg. Tent.* 93. t. 19. 1831; Singh in Shetty & Singh (eds.), *Fl. Rajasthan* 1: 157. 1987; P. Daniel & Chandrab. in B.D. Sharma & al., *Fl. India* 3: 519. 1993. *T. neglecta* Wight & Arn., *Prod.* 75. 1834; Mast. in Hook.f., *Fl. Brit. India* 1: 396. 1874.

Erect herbs, 30-60 cm tall; branches hairy. Leaves alternate, 1.3 - 6 x 0.6 - 7 cm; basal ones rounded-ovate, entire or 3 to 5-palmately lobed, serrate, sparsely hairy; upper ones rhomboid or ovate-lanceolate, acute or acuminate at apex, serrate. Flowers yellow, in leaf-opposed, shortly pedunculate, extra-axillary cymes. Capsules ovoid or ovoid-oblong. Seeds reddish-brown, glabrous.

Fl. & Fr.: July - November.

Common in open forests and wastelands.

Specimens examined: Kevdia [24 59 15.85 N, 74 49 47.22 E, 412 m], *P. Hari Krishna & R. Kumar* 35244 (BSJO); Jharia Mahadev [25 02 05.93 N, 74 53 3.79 E, 489 m], *P. Hari Krishna & R. Kumar* 35380 (BSJO).

2. *Triumfetta pilosa* Roth, *Nov. PL.*, Sp. 233. 1821; Singh in Shetty & Singh (eds.), *Fl. Rajasthan* 1: 157. 1987; Mast. in Hook.f., *Fl. Brit. India* 1: 394. 1874; P. Daniel & Chandrab. in B.D. Sharma & al., *Fl. India* 3: 519. 1993. *T. bogotensis* DC., *Prodr.* 1:506. 1824.

Undershrubs, up to 2 m high. Leaves 5 - 10 x 2.5 - 4.5 cm, ovate-lanceolate, acute or acuminate at apex, subcordate or rounded at base, coarsely serrate. Flowers yellow, in many-flowered, axillary or leaf-opposed, shortly pedunculate cymes. Capsules subglobose, 4-celled, 4-seeded, densely hairy, spines hooked. Seeds black-dark brown.

Fl. & Fr.: September - December.

Frequent in dry deciduous forests.

Specimen examined: Taleti [24 58 40.03 N, 74 52 50.67 E, 554 m], *P. Hari Krishna & R. Kumar* 35677 (BSJO).

14. *Waltheria* L.

Waltheria indica L., Sp. Pl. 2: 673. 1753; Masters in Hook.f., Fl. Brit India 1: 374. 1874; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 1: 145. 1987; S.K. Chandra in B.D. Sharma & al., Fl. India 3: 473. 1993. (Plate-11).

Herbs or undershrubs. Leaves 2-6.5 x 1.5-4.5 cm, ovate, elliptic or oblong, rounded or cordate at base, acute or rounded at apex, serrate-dentate. Flowers sessile, yellow, in dense axillary and terminal clusters. Capsules obovoid, enclosed. Seeds ovate or obovate, glabrous, black.

Fl. & Fr.: August - November.

Common in open forests.

Specimens examined: Kankaria nala [25 0 9.05 N, 74 48 34.65 E, 499 m], *P. Hari Krishna & R. Kumar* 35149(BSJO); Sarna talab [24 59 51.76 N, 74 48 21.97 E, 486 m], *P. Hari Krishna & R. Kumar* 38388(BSJO).

Order: Brassicales Bromhead

CAPPARACEAE Juss.

Key to the genera

- 1a. Climbing or straggling shrubs, sepals fused at base, forming a distinct calyx-tube **3. Maerua**
- b. Shrubs or trees, sepals distinct. **2**
- 2a. Leaves simple, mostly with a pairs of stipular spines. **1. Capparis**
- b. Leaves 3-foliolate, sepals uniseriate. **2. Creteva**

1. *Capparis* L.

Capparis sepiaria L., Syst. Nat. ed.10. 2: 1071. 1759; Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 176. 1872; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 85-86. 1987; Sundararagh., in B.D. Sharma & al., Fl. India 2: 289. 1993. *'Khantar'*

Erect or scandent, armed shrubs. Stem terete. Thorns recurved. Leaves 2-5 x 0.5-3 cm, ovate-lanceolate, subcordate at base, acute, emarginate or retuse at apex, pubescent. Flowers white, in terminal or short lateral corymbose umbels. Berries dark purple. Seeds discoid, light brown.

Fl. & Fr.: March - October.

Occasional in dry deciduous forest.

Specimens examined: Kevidiya-Sarana [25 01 21.30 N, 74 49 27.60 E, 424 m], *P. Hari Krishna & R. Kumar* 35623(BSJO); Near Bichore Watch tower [25 05 40.49 N, 74 56 31.06 E, 408 m] , *P. Hari Krishna & R. Kumar* 35751 (BSJO).

Uses: Used as hedge plant as fringes of forests and cultivated fields.

2.Crateva L.

Crateva adansonii DC. subsp. **odora** (Buch.-Ham.) Jacobs in Blumea 12: 198. 1964; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 87-88. 1987; Sundararagh., in B.D. Sharma & al., Fl. India 2: 322. 1993. *C. odora* Buch.-Ham. in Trans. Linn. Soc. London 15: 118. 1827. *C. religiosa* var. *roxburghii* (R. Br.) Hook.f. & Thoms., in Fl. Brit. India 1: 172. 1872. (Plate-8). 'Barna'

Large deciduous trees, 5 - 12 m tall. Leaves trifoliate, elliptic-lanceolate, acuminate, narrowed towards the base. Inflorescence corymbs 12 - 30-flowered. Flowers, greenish-white turning yellow after opening. Fruit globose, yellow. Seeds ellipsoid, smooth, brown.

Fl. & Fr.: April - August.

Rare in dry deciduous forests.

Specimen examined: Near Kevidiya chowki [25 01 20.92 N, 74 49 27.49 E, 443 m], *P. Hari Krishna & R. Kumar* 35618(BSJO).

3.Maerua Forssk.

Maerua oblongifolia (Forssk.) A. Rich. in Guill. & Perr., Fl. Seneg. Tent. 1: 32. t.5. 1831; Sundararagh., in B.D. Sharma & al., Fl. India 2: 331. 1993. *Capparis oblongifolia* Forssk., Fl. Aeg.-Arab. 99. 1775. *Niebuhria arenaria* DC., Prodr. 1: 244. 1824. *Maerua arenaria* (DC.) Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 171. 1872; Bhandari, Fl. Indian Desert 42. 1978; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 87. 1987.(Plate-8). 'Orapa'

Climbing shrubs. Leaves ovate to lanceolate, 3-5 x 1-3 cm, margin entire. Flowers in dense-flowered corymbs or rarely solitary, axillary, white or greenish-yellow. Berries cylindric or moniliform, pale brown, glabrous. Seeds globose, brown, minutely tuberculate.

Fl. & Fr.: January - May.

Occasional in forests and scrublands.

Specimen examined: Near Meghpura chowki [24 01 37.66 N, 74 48 45.64 E, 401 m], *P. Hari Krishna & R. Kumar* 38437 (BSJO).

Uses: Leaf extract used to cure skin infections.

CLEOMACEAE Bercht. & J.Presl

Cleome L.

Key to the species

- 1a. Leaves simple, flowers purple to pink. 1. **C. simplicifolia**
b. Leaves compound, flowers yellow. 2. **C. viscosa**

1. Cleome simplicifolia (Camb.) Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 169. 1872; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 82-83. 1987; Raghavan in B.D. Sharma & al., Fl. India 2: 314. 1993. *Polanisia simplicifolia* Camb. in Jacq., Voy. Bot. 4: 20. t. 20. 1844. *P. burtporensis* Munro in Wight, Ic. 3 (4) : 5. t. 1072. 1846. *Cleome asperrima* Blatt. in J. Asiat Soc. Bengal n.s. 26: 340. 1937.

Erect annual herbs. Stem furrowed. Leaves simple, 1.5 - 6 x 0.80 - 2.25 cm, obovate, oblong or elliptic-oblong, scabrid, base truncate, entire, tip acute. Flowers bright purplish to pink, solitary. Capsules beaked, glabrous, spindle-shaped. Seeds many, brownish-black.

Fl. & Fr.: July - September.

Frequent in open waste places.

Specimens examined: Near Jhariya Mahadev [25 01 19.28 N, 74 52 58.51 E, 532 m] *P. Hari Krishna & R. Kumar* 35684(BSJO).

2. Cleome viscosa L., Sp. Pl. 2: 672. 1753; Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 170. 1872; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 82-83. 1987. ‘Bagro’

Erect annual herbs, up to 1 m high. Stem woody, sparsely branched, tomentose. Leaves 3 to 7-foliolate, elliptic-oblong, entire, cuneate at base, acute or subacute at apex, glandular pubescent. Flowers up to 1.6 cm across, solitary in axils of upper leaves. Capsules oblong-cylindric, tapering at both ends. Seeds many, reniform, subglobose, dark brownish-black.

Fl. & Fr.: July -September .

Common in open wastelands.

Specimen examined: Jogideh dam side [24 59 33.86 N, 74 49 20.8 E, 410 m], *P. Hari Krishna & R. Kumar* 35127 (BSJO).

Order: Santalales R.Br. ex Bercht. & J.Presl

SANTALACEAE R.Br.

Santalum L.

Santalum album L., Sp. Pl. 1: 349. 1753; Hook.f., Fl. Brit. India 5: 231. 1886; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 761. 1991.

'Chandan'

Small, glabrous, evergreen trees, with blackish-brown, rough bark. Leaves 2.5 - 5 x 1.5 - 3 cm, ovate-lanceolate or elliptic-lanceolate, entire. Flowers in axillary and terminal paniculate cymes, reddish - brown. Drupes globose, purplish- black, beaked with the basal part of style.

Fl. & Fr.: March - October.

Usually introduced in the gardens.

Specimen examined: Meghpura forest Chowki [25 01 36.6 N 74, 04 8 49.2 E, 410 m], *P. Hari Krishna & R. Kumar* 35421(BSJO).

LORANTHACEAE Juss.

Dendrophthoe Mart.

Dendrophthoe falcata (L.f.) Etting. in Denkschr., Akad. Wiss. Math.-Naturwise. 32: 52-53, 58. t. 13. f. 14. 1872; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 759. 1991. *Loranthus falcatus* L.f. Suppl. 211. 1781. *L. longiflorus* Desr. in Lam. Encycl. 3: 598. 1972; Hook.f., Fl. Brit. India 5: 214. 1886, incl. var. *falcata* (L.f.) Kurz & var. *amplexifolia* (DC.) Thw. 'Dudhibel'

Perennial, partial stem parasite, with twiggy and woody branches. Leaves sub-sessile or shortly petioled, opposite, 3-15 x 2.5-8 cm, elliptic - oblong, obovate or ovate - lanceolate, glabrous. Flowers in 5-15 cm long, racemes, yellowish - red. Berries globose or ovoid, bright red.

Fl. & Fr.: August - May.

Rare in deciduous forests.

Specimen examined: Near Semla dhar [24 55 30.79 N, 74 52 43.22 E, 552 m], *P. Hari Krishna & R. Kumar* 35353(BSJO).

Order: Caryophyllales Juss. ex Bercht. & J.Presl

PLUMBAGINACEAE Juss.

Plumbago L.

Plumbago zeylanica L., Sp. Pl. 1: 151. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 3: 480. 1882; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 201.1991. 'Chitrak'

Olivaceous-green herbs, up to 1.5 m high; stems terete, glabrous. Leaves 2.5-9 x 1.2 -5 cm, thin, entire, glabrous, ovate. Flowers white. Calyx

tubular, persistent. Corolla slender, tubular. Capsules 0.6 cm long, oblong. Seeds oblong, glabrous.

Fl. & Fr.: December - October.

Common in moist places in dry deciduous forests.

Specimen examined: near Modiya Mahadev area [24 59 37.79 N, 74 52 30.50 E, 492 m], *P. Hari Krishna & R. Kumar* 35350(BSJO).

Uses: It is used for skin diseases.

POLYGONACEAE Juss.

Key to the genera

- 1a. Perianth lobes 5, stigma capitate **1. Polygonum**
b. Perianth lobes 6, stigma fimbriate **2. Rumex**

1. Polygonum L.

Polygonum plebeium R. Br. Prodr. 420. 1810, '*plebejum*'; Hook.f., Fl. Brit. India 5: 27. 1886; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 750. 1991. (Plate-29).

Prostrate herbs; stems purplish -green, white hairy. Leaves sessile or shortly petiolate, 6-15 mm long, linear-lanceolate or oblong. Flowers sessile or subsessile, axillary, solitary or 2-3 in a cluster, pink; pedicels short. Nutlets rhomboid-trigonus, smooth, brown.

Fl. & Fr.: August - March.

Common in wet and dried beds of reservoirs.

Specimens examined: Near Bassi dam area [25 00 35 .97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35515(BSJO); Bassi dam area [25 00 35 .97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35520(BSJO); Bassi dam [24 59 34.64 N, 74 49 26.54 E, 393 m], *P. Hari Krishna & R. Kumar* 38312(BSJO).

2. Rumex L.

Rumex dentatus L. subsp. **klotzschianus** (Meissm.) Rech.f. Bot. Centralb. 49: 19. 1932 & in Candollea 12: 119. 1949; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 754. 1991. *R. klotzschianus* Meissn. in DC. Prodr. 14: 57. 1856. *R. dentatus* auct. non L. 1771; Hook.f., Fl. Brit. India 5: 59. 1886 non. L. 1771.

Erect, glabrous herbs; stem purplish. Leaves radical and cauline; lower leaves long petioled, 6-10 x 1.5 -3.5 cm, linear-lanceolate to oblong or

elliptic - oblong. Flowers green to greenish - white. Nuts 1.5 -2.5 x 1.5 - 5 mm, trigonus, smooth.

Fl. & Fr.: January - April.

Occasional near water channels and margins of ponds.

Specimens examined: near Bassi dam area [24 58 53.34 N, 74 51 16.42 E, 433 m], *P. Hari Krishna & R. Kumar* 35515(BSJO); Bassi dam [24 59 53.09 N, 74 48 23.70 E, 487 m] *P. Hari Krishna & R. Kumar* 35520(BSJO).

CARYOPHYLLACEAE Juss.

Spergularia (Pers.) J.Presl & C.Presl

Spergularia flaccida (Madden) I.M.Turner in Willdenowia 47: 214. 2017. *Spergula fallax* (Lowe) E.H.L. Krause in Sturm, Deutsch. Fl. ed. 2: 5: 21. 1901; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 100. 1987; Majumdar in B.D. Sharma & al., Fl. India 2: 578. 1993. '*Hiyaroo bagdo*'

Erect, annual herbs. Leaves opposite linear-subulate, obtuse, entire. Flowers white, in lax, terminal cymes. Capsules *ca* 5 mm long, ovoid or subglobose, greenish-brown. Seeds 1.5- 2 mm across, shining, winged, black.

Fl. & Fr.: December-March.

Common in open moist-shaded places and along water channels.

Specimens examined: Kelzar [24 58 27.01 N, 74 48 47.99 E, 442 m], *P. Hari Krishna & R. Kumar* 38326(BSJO); Nandwas [25 2 27.14 N, 74 50 23.55 E, 384 m], *P. Hari Krishna & R. Kumar* 38364(BSJO) Gopalpura [24 58 10.33 N, 74 54 56.54 E, 482 m], *P. Hari Krishna & R. Kumar* 38433(BSJO).

AMARANTHACEAE Juss.

Key to the genera

- 1a. All leaves alternate or fascicled 2
- b. All leaves opposite or at least lower leaves. 6
- 2a. Inflorescence densely cottony tomentose **2. Aerva**
- b. Inflorescence not as above 3
- 3a. Fertile flowers are subtended by many sterile flowers **8. Digera**
- b. Fertile flowers not as above 4
- 4a. Ovary multiovuled **5. Celosia**
- b. Ovary uniovuled 5

- 5a. Plants aromatic 9
b. Plants not aromatic 4. **Amaranthus**
- 6a. Anthers 1-celled. 7
b. Anthers 2-celled..... 8
- 7a. Flowers in axillary, sessile, head-like spikes; stigma 1, capitate
..... 3. **Alternanthera**
b. Flowers in peduncled, long, terminal spikes; stigma 2-fid.....
..... 9. **Gomphrena**
- 8a. Inflorescence and fruits covered with recurved sticky hooks 10. **Pupalia**
b. Inflorescence and fruits are not as above. 1. **Achyranthes**
- 9a. Seeds smooth, shining black..... 6. **Chenopodium**
b. Seeds rugose, dull black 7. **Chenopodium**

1. Achyranthes L.

Achyranthes aspera L., Sp. Pl. 1: 204. 1753; Hook.f., Fl. Brit. India 4: 730. 1885; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 718.1991.

Key to the varieties

- 1a. Leaves silvery silky beneath. var. **argentea**
b. Leaves other than silky. var. **aspera**

Achyranthes aspera L. var. **aspera**

'Andhi Jhara'

Annual herbs, up to 1 m high; stem quadrangular, hairy. Leaves opposite, 2.5-6 x 1.3-5 cm elliptic to ovate or obovate, acute to acuminate or rounded at apex, obtuse at base. Flowers greenish-white, in terminal or axillary peduncle cyme. Perianth-lobes 3-5 mm long. Ovary obovoid; style 1, filiform; stigmas 2, capitate. Seeds subcylindric, truncate at apex, black.

Fl. & Fr.: Almost throughout the year.

Common in wastelands and road sides.

Specimen examined: Jariya Mahadev water fall area [25 01 59.29 N, 74 53 1.91 E, 469 m], *P. Hari Krishna & R. Kumar* 35397(BSJO).

Achyranthes aspera L. var. **argentea** (Thw.) Hook.f., Fl. Brit. India 4: 730. 1885; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 719 .1991. *Achyranthes argentea* Thw. Enum. Pl. Zeyl. 249. 1864.

Erect herbs, stem hairy. Leaves obovate, 3.5-10 x 2-3.5 cm, base rounded, entire, acuminate, densely hairy, silky with gland dots. Inflorescence

terminal, long spikes, bracts and bracteoles spinescent. Capsule 1-3 mm. Seed cylindrical.

Fl. & Fr.: Almost throughout the year.

Common in open forests.

Specimen examined: Near Modiya Mahadev area [24 59 37.59 N, 74 52 31.36 E, 494 m], *P. Hari Krishna & R. Kumar* 35714(BSJO).

2. *Aerva* Forssk.

Aerva lanata (L.) Juss. ex Schult. in Ann. Mus. Hist. Nat. Paris 11: 131. 1808 & Syst. Veg. ed. 15.5: 546. 1819; Hook.f., Fl. Brit. India 4: 728. 1885; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 722. 1991. *Achyranthes lanata* L., Sp. Pl. 1: 204. 1753.

Erect or straggling herbs, up to 50 cm high. Leaves 2.5 -5 x 0.6-2.5 cm elliptic-lanceolate, cuneate at base, obtuse to acute, entire. Flowers sessile, in 1-1.5 cm long, axillary and terminal, cylindric spikes, greenish - white. Tepals 5, creamish-white. Anthers yellow. Seeds reniform, black.

Fl. & Fr.: Almost round the year.

Common in moist - shaded localities of the sanctuary.

Specimens examined: Near Ram Mandir [25 00 01.16 N, 74 47 09.02 E, 435 m], *P. Hari Krishna & R. Kumar* 35299(BSJO); Bassi [25 01 59.29 N, 74 53 1.91 E, 469 m], *P. Hari Krishna & R. Kumar* 35389 (BSJO); Jariya Mahadev water fall area [24 58 53.34 N, 74 51 16.42 E, 433 m.], *P. Hari Krishna & R. Kumar* 35577(BSJO); Ambapani [25 05 26.76 N, 74 56 47.37 E, 419 m], *P. Hari Krishna & R. Kumar* 35764 (BSJO); Near Nal forest area [25 05 52.72 N, 74 53 17.94 E, 385 m], *P. Hari Krishna & R. Kumar* 37321(BSJO); Near Nargarh forest area [24 59 37.56 N, 74 52 14.72 E, 474 m], *P. Hari Krishna & R. Kumar* 38418(BSJO).

3. *Alternanthera* Forssk.

Alternanthera sessilis (L.) R. Br. ex DC., Cat. Pl. Hort. Bot. Monsp. 4: 77. 1813; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 725. 1991; Hook.f., Fl. Brit. India 4: 728. 1885; Hook.f., Fl. Brit. India 4: 731. 1885. *Gomphrena sessilis* L., Sp. Pl. 1: 225. 1753. *Illecebrum sessile* L., Sp. Pl. ed. 2: 300. 1762. *Alternanthera triandra* Lam. Encycl. 1: 95. 1783.

Prostrate or decumbent herbs; stem rooting at lower nodes. Leaves 2.5-5 x 0.2-1.5 cm linear-lanceolate to linear-oblong or elliptic-obovate, entire or obscurely denticulate. Flowers white, in axillary, sessile, oblong or subglobose heads. Tepals ovate-elliptic, scarious, shortly acuminate. Seeds discoid, reddish-brown.

Fl. & Fr.: Throughout the year.

Common in marshy habitats.

Specimens examined: Jharia Mahadev [25 01 51.29 N, 74 53 01.91 E, 469 m], *P. Hari Krishna & R. Kumar* 35512(BSJO); Near Jhaleshwar Mahadev [25 00 51.86 N, 74 47 54.11 E, 436 m], *P. Hari Krishna & R. Kumar* 35201 (BSJO); Near Hanuman Choraya [24 59 43.59 N, 74 48 39.24 E, 493 m], *P. Hari Krishna & R. Kumar* 35488(BSJO).

4. *Amaranthus* L.

Key to the species

- 1a. Plants armed tepals. **1. *A. spinosus***
b. Plants unarmed. **2. *A. viridis***

1. *Amaranthus spinosus* L., Sp. Pl. 2: 991. 1753; Hook.f., Fl. Brit. India 4: 718. 1885; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 729. 1991.

Erect annual herbs; stem much branched, angular, glabrous. Leaves 1.3-3.1 x 0.4-1.3 cm, ovate to rhomboid - ovate or elliptic. Flowers in axillary or aggregated into terminal panicles, to 15 cm. Seeds black, shining, faintly reticulated.

Fl. & Fr.: Almost throughout the year.

Common weed in open forests and wastelands.

Specimens examined: Kevdiya forest chowki [24 59 15.85 N, 74 49 47.22 E, 412 m], *P. Hari Krishna & R. Kumar* 35241(BSJO); Near Mahesara forest area [25 03 07.21 N, 74 52 56.89 E, 420 m], *P. Hari Krishna & R. Kumar* 37366(BSJO).

2. *Amaranthus viridis* L., Sp. Pl. ed. 2. 1405. 1763; Hook.f., Fl. Brit. India 4: 720. 1885; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 731. 1991. *A. gracilis* Desf. Tabl. Ecol. Bot. 43. 1804. 'Arak chuli'

Ascending herbs, up to 60 cm high. Leaves 2.5-6 x 1.6-5.5 cm deltoid - ovate to rhomboid-ovate. Flowers green, in slender, axillary or terminal panicles, pandulous. Seeds rounded, more or less compressed, with blunt margins, dark brown.

Fl. & Fr.: February - September.

Common weed in cultivated fields.

Specimen examined: Near Ram Mandir- Bassi [25 05 26.86 N, 74 56 41.64 E, 418 m], *P. Hari Krishna & R. Kumar* 35296(BSJO).

5. *Celosia* L.

***Celosia argentea* L.**, Sp. Pl. 1: 205. 1753; Hook.f., Fl. Brit. India 4: 714. 1885; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 731. 1991. *C. cristata* L. *l.c.* 205. 1753; Hook.f., *l.c.* 4: 715. 1885. *C. coccinea* L., Sp. Pl. ed. 2. 297. 1762. 'Safed murgha'

Annual, erect herbs, up to 60 cm high. Leaves alternate, 3-12 x 0.4-5 cm ovate-elliptic to linear-lanceolate, acute or acuminate at apex, slightly narrowed at base. Flowers white with pink tip, in pedunculate, cylindrical, terminal spikes. Seeds ca 1.3 mm in diam., shining, reddish-brown.

Fl. & Fr.: August - November.

Common weed in open forests and wastelands.

Specimens examined: Near Nal forest area [25 05 26.86 N, 74 56 41.64 E, 418 m], *P. Hari Krishna & R. Kumar* 35772(BSJO); Near Shipuriya [25 01 42.62 N, 74 54 13.21 E, 543 m], *P. Hari Krishna & R. Kumar* 35788(BSJO).

6. *Chenopodium* S.Fuentes, Uotila & Borsch

***Chenopodium murale* (L.) S.Fuentes, Uotila & Borsch** in Willdenowia 42: 14. 2012. *Chenopodium murale* L., Sp. Pl. 1: 219. 1753; Hook.f., Fl. Brit. India 5: 4. 1886; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 738. 1991. 'Jangli-bathua, Moti-sil'

Erect or decumbent herbs, up to 70 cm high. Leaves 2.2-7 x 0.5-2.5 cm, deltoid-ovate or elliptic, obtuse at apex, cuneate at base, irregularly and coarsely toothed. Flowers in axillary and terminal, cymose clusters combined into spikes forming a panicle. Seeds orbicular, with acute margins, black, finely papillate.

Fl. & Fr.: December - March.

Common, in fallow lands and wet habitats.

Specimen examined: Near Palka [24 58 27.01 N, 74 48 47.99 E, 442 m], *P. Hari Krishna & R. Kumar* 38332(BSJO).

7. *Chenopodium* L.

***Chenopodium album* L.**, Sp. Pl. 1: 219. 1753; Hook.f., Fl. Brit. India 5: 3. 1886; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 737. 1991. 'Bathua, sil'

Erect or decumbent herbs, stem angular, ribbed, densely clothed with white powdery vesicles. Leaves 1.6 - 4.5 x 0.4 -2.5 cm ovate-rhomboid to

oblong-lanceolate or elliptic-lanceolate. Flowers pale green, bisexual, in clusters borne in lax, paniculate, ebracteate spikes. Seeds orbicular, compressed, smooth, lenticular, shining, brownish-black.

Fl. & Fr.: October - February .

Common weed in cultivated fields, sometimes met within the outskirts of forests.

Specimen examined: Near Palka [24 58 27.01 N, 74 48 47.99 E, 442 m], *P. Hari Krishna & R. Kumar* 38336(BSJO).

8. *Digera* Forssk.

Digera muricata (L.) Mart., Beitr. Amar. 77. no. 2. 1825 & Nov. Act. Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur. 13 (1): 285. 1826; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 732. 1991. *Achyranthes muricata* L., Sp. Pl. ed. 2. 295. 1762. *Digera arvensis* Forssk., Fl. Aegypt.-Arab. 65. 1775; Hook.f., Fl. Brit. India 4: 717. 1885.

Erect, annual herbs, up to 45 cm high. Leaves 2.5-6 x 0.6-1.4 cm elliptic or ovate. Flowers pink, in axillary, lax, up to 30 cm long racemes. Perianth-lobes 5; outer 2 lobes 4 -5.5 mm long, 5 to 7-nerved, green with pink border. Seeds minute, subglobose, yellowish-brown.

Fl. & Fr.: August - December.

Common in wastelands and open forests.

Specimens examined: Near Mahesara forest area [25 03 01.70 N, 74 53 02.23 E, 429 m], *P. Hari Krishna & R. Kumar* 37373(BSJO); Near Amalda [24 59 18.26 N, 74 56 45.14 E, 456 m], *P. Hari Krishna & R. Kumar* 35264(BSJO).

9. *Gomphrena* L.

Gomphrena celosioides Mart., Beitr. Amar. 93. 1825 *et* Nov. Act. Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur. 13 (1): 301. 1826; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 732. 1991.

Decumbent, perennial herbs; stem much-branched from the base. Leaves sessile, 2.5- 3.5 x 1.5-2 cm, narrowly oblong to oblong-elliptic or oblong-lanceolate. Flowers in sessile, terminal subglobose spikes, white. Tepals lanceolate; outer 3 more or less flat; inner 2 sigmoid, slightly longer than the outer. Utricles shortly compressed, pyriform. Seeds ovoid, compressed, brown.

Fl. & Fr.: December - March.

Common, in dry sandy areas and along road-sides.

Specimen examined: Near Amalda [24 59 18.26 N, 74 56 45.14 E, 456 m], *P. Hari Krishna & R. Kumar* 35266(BSJO).

10.Pupalia Juss.

Pupalia lappacea (L.) Juss., in Ann. Mus. Hist. Nat. Paris 2: 132. 1803; Hook.f., Fl. Brit. India 4: 724. 1885; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 734. 1991. *Achyranthes lappacea* L., Sp. Pl. 1: 204. 1753. *A. atropurpurea* Lam. Encycl. 1: 546. 1785. *Pupalia atropurpurea* (Lam.) Moq. in DC. Prodr. 13 (2): 331. 1849; Hook.f., l.c. 4: 724. 1885.

Much-branched, herbs, up to 1 m high; branches straggling, tinged with purple, finally pubescent. Leaves 2.5-4 x 0.6-0.8 cm, ovate-oblong or elliptic-lanceolate. Flowers in sessile clusters borne in lax, pedunculate, terminal spikes. Tepals pale green. Seeds oblong-ellipsoid, subtruncate, brown.

Fl. & Fr.: Almost round the year.

Common in wastelands and the outskirts of forests.

Specimens examined: Crocodile view point-Bassi dam [25 0 35.97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35106(BSJO); Sonar kudi [25 01 05.75 N, 74 54 38.56 E , 529 m], *P. Hari Krishna & R. Kumar* 35791(BSJO).

NYCTAGINACEAE Juss.

Key to the genera

- 1a. Fruits 10-ribbed, with large wart like glands..... **2. Commicarpus**
- 1b. Fruits 5-ribbed, without large wart like glands. **1. Boerhavia**

1.Boerhavia L.

Boerhavia diffusa L., Sp. Pl. 1: 3.1753; Clarke in Hook.f., Fl. Brit. India 4: 175. 1882. Mukerjee in J. Econ. Taxon. Bot. 5: 582. 1984; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 713. 1991. *B. repens* L. var. *diffusa* (L.) Hook.f., Brit. India 4: 709. 1885. ‘Punarnawa’

Prostrate herbs. Leaves opposite or subopposite, 2.5-3.5 x 0.7-0.8 cm broadly ovate or suborbicular, entire, glabrous above. Flowers dark pink, in axillary and terminal cymes. Stamens 3; filaments pink; anther-lobes yellow. Anthocarps 2.5 -4 x 0.8-1.5 mm, fusiform, 5-ribbed, glandular hairs.

Fl. & Fr.: Almost throughout the year.

Common in deciduous forests.

Specimens examined: Muroli forest area [25 03 03.34 N, 74 55 51.72 E, 433 m], *P. Hari Krishna & R. Kumar* 35592(BSJO); Near Modiya Mahadev area [24 59 37.47 N, 74 52 31.45 E, 498 m], *P. Hari Krishna & R. Kumar* 35719(BSJO).

2. *Commicarpus* Standley

Commicarpus chinensis (L.) Heimerl in Engler & Prantl, Nat. Pflanzenf., ed. 2(16c): 117. 1934; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 715. 1991. *Valeriana chinensis* L., Sp. Pl. 1: 33. 1753. *Boerhavia repanda* Willd. Sp. Pl. 1: 22. 1797. *B. chinensis* (L.) Ascher. & Schweinf. Beitr. Fl. Aethiop. 1: 167. 1867.

Glabrescent herbs up to 25 cm. tall. Leaves ovate, 4- 8 x 2.5 - 6 cm , sinuate, acute, base cordate. Flowers pink or purple, in axillary and terminal, slender, long peduncle umbels. Anthocarps club- shaped, viscid - glandular.

Fl. & Fr.: September - January.

Occasionally found in moist-shaded localities of forests.

Specimen examined: Ambapani [24 58 52 N, 74 51 17 E, 430 m], *P. Hari Krishna & R. Kumar* 35561(BSJO).

MOLLUGINACEAE Bartl.

Key to the genera

- 1a. Flowers with staminodes **1. *Glinus***
- b. Flowers without staminodes **2**
- 2a. Leaves linear, filiform **2. *Hypertelis***
- b. Leaves not as above **3**
- 3a. Leaves radical **3. *Paramollugo***
- b. Leaves not radical **4. *Trigastrotheca***

1. *Glinus* L.

Glinus lotoides L., Sp. Pl. 1: 463. 1753. *Mollugo hirta* Thunb., Prod. Fl. Cap.1 : 24. 1794; C.B. Clarke in Hook.f., Fl. Brit. India 2: 662. 1879; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 353. 1987.

Prostrate annual herbs; branches spreading. Leaves or falsely whorled, 1.5 - 2.5 x 0.4 - 0.6 cm, obovate or suborbicular, obtuse or apiculate, cuneate at the base. Flowers greenish-white, in axillary fascicles. Capsules ovoid, 5-valved, enclosed in persistent calyx. Seeds subreniform, dark-brown.

Fl. & Fr.: Almost throughout the year.

Occasionally found in deciduous forests.

Specimens examined: Near Bassi Dam Area [25 00 35.97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35518 (BSJO); Bujrabandh - Bichhor [25 04 54.41 N, 74 55 18.94 E, 434 m], *P. Hari Krishna & R. Kumar* 35534(BSJO); Bassi Dam [24 59 34.28 N, 74 49 30.36 E, 410 m], *P. Hari Krishna & R. Kumar* 38308(BSJO).

2.Hypertelis E.Mey. ex Fenzl

Hypertelis cerviana (L.) Thulin in Taxon 65: 787. 2016. *Mollugo cerviana* (L.) Seringe in DC., Prod. 1: 392. 1824; C.B. Clarke in Hook.f., Fl. Brit. India 2: 663. 1879; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 353. 1987. *Pharnaceum cerviana* L., Sp. Pl. 1: 272. 1753. (Plate-22).

'Chidion ka khet'

Glabrous herbs; stems filiform. Branches umbellate. Leaves sessile, 1.5 - 2 x 0.2 - 0.4 cm, cauline ones in whorls, linear. Flowers in axillary or terminal, trichotomously branched umbellate cymes, white. Seeds glabrous, brown.

Fl. & Fr.: July -November.

Occasionally found in mix deciduous forests.

Specimen examined: Near Neemgatti forest area [25 02 48.05 N, 74 50 38.69 E, 430 m], *P. Hari Krishna & R. Kumar* 37324(BSJO).

3.Paramollugo Thulin

Paramollugo nudicaulis (Lam.) Thulin in Taxon 65: 786. 2016. *Mollugo nudicaulis* Lam., Encycl. 4: 234. 1797; C.B. Clarke in Hook.f., Fl. Brit. India 2: 664. 1879; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 358. 1987.

Herbs, up to 25 cm high. Leaves all radical, 1.6 - 4 x 0.6 - 1.4 cm, oblong-spathulate, entire. lowers white, in terminal, profusely branched cymes; pedicels 1-1.5 cm long. Seeds reniform, muricate, minutely strophiolate, reticulate, brownish-black.

Fl. & Fr.: : July - November.

Occasional, found in sandy -gravelly places.

Specimen examined: Nandwai to Amla route [25 00 37.49 N, 74 56 55.58 E, 432 m], *P. Hari Krishna & R. Kumar* 35257(BSJO).

4.Trigastrotheca F.Muell.

Trigastrotheca pentaphylla (L.) Thulin in Taxon 65: 784. 2016. *Mollugo pentaphylla* L., Sp. Pl. 1: 89. 1753; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 360. 1987..

Annual herbs, up to 15 cm high. Leaves both cauline and radical, sessile; lower ones rosulate, spathulate; upper ones linear-lanceolate, in whorls on nodes. Flowers white, in terminal, lax, paniculate cymes. Seeds many, minute, reniform, dark brown.

Fl. & Fr.: July - October.

Occasional, found in moist places.

Specimen examined: Near Paat village [25 02 14.93 N, 74 05 03.63 E, 424 m], *P. Hari Krishna & R. Kumar* 35431(BSJO).

PORTULACACEAE Juss.

Portulaca L.

Key to the species

- 1a. Pyxis enclosed within thick green calyx; roots fibrous ... **1. *P. oleracea***
- b. Pyxis not enclosed in thick green calyx; roots tuberous fleshy
..... **2. *P. tuberosa***

1. *Portulaca oleracea* L., Sp. Pl. 1: 445. 1753; Dyer in Hook.f., Fl. Brit. India 1: 246. 1874; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 102. 1987; M.K.V. Rao in B.D. Sharma & al., Fl. India 3: 4.1993. (Plate-9).

'Lunaki'

Annual or perennial glabrous herbs, 16-30 cm high. Leaves sessile, alternate or subopposite, entire. Flowers yellow, terminal. Capsules 5-7 mm long, ovoid to obovoid, shining, brownish-yellow, dehiscent above the base. Seeds blackish-brown, tubercled-punctate.

Fl. & Fr.: August - October.

Common in open moist-shaded places.

Specimen examined: Amalda [24 59 18.72 N, 74 56 45.61 E, 451 m], *P. Hari Krishna & R. Kumar* 38427(BSJO).

2. *Portulaca tuberosa* Roxb. Fl. Ind. ed. 1832, 2: 464 1832; *Portulaca pilosa* var. *tuberosa*(Roxb.) Sivar. J. Bombay Nat. Hist. Soc. 78: 259 1981.(Plate-9).

Perennial, tuberous herb, tuber conical to fusiform. Stem sparingly branched sparsely hairy at the nodal portion. Leaves 0.5-2× 0.4-0.5 cm, linear, terete, glabrous. Flowers 1-2 cm across; bright white to light pink. Capsule oblong. Seeds numerous, orbicular, black shiny.

Fl. & Fr.: March - October.

Rare on sand soils and rocky crevices.

Specimen examined: Mahudia-Jhaleswar [25 01 15.75 N, 74 48 14.93 E, 418 m], *P. Hari Krishna & R. Kumar* 35181(BSJO).

CACTACEAE Juss.

Opuntia L.

Opuntia elatior Mill., Gard. Dict. ed. 8. No. 4. 1768; Raizada, Suppl. Fl. Gangatic Plain 83.1976; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 353. 1987. *O. dillenii* auct. non (Ker Gawl.) Haw., 1819; J. Graham., Cat. Bombay Pl. 546. 1839; C.B. Clarke in Hook.f., Fl. Brit. India 2: 657. 1879, *p. p.* (Plate-22). ‘Nagfani’

Large, erect, succulent, spiny shrubs. Stem jointed, flat, joints ovate-oblong. Leaves small, terete, caducous. Flowers solitary, at first yellow, turning to pink or bright red later. Fruits red when ripe, depressed at the top, marked with areoles, but bristles and spines deciduous.

Fl. & Fr.: January - June.

Occasionally found in open open forests in gravel and rocky habitats.

Specimen examined: On way to Amalda [25 04 08.24 N, 74 56 09.78 E, 428 m], *P. Hari Krishna & R. Kumar* 35288(BSJO).

Order: Ericales Bercht. & J.Presl

SAPOTACEAE Juss.

Key to the genera

- 1a. Corolla 6-lobed, fertile stamens 6. **2. Manilkara**
b. Corolla more than 6-lobed, stamens more than 6. **1. Madhuca**

1. Madhuca Buch.- Ham. ex. J.F.Gmel.

Madhuca longifolia (J.Koenig ex L.) J.F.Macbr. A. Chev. in Rep. Bot. Appl. 23:149.1943; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 460.1991. *Madhuca indica* J. F. Gmelin, Syst. Nat. 2(1): 799. 1791. *Bassia latifolia* Roxb., Pl. Coromandel 1:20, t. 19.1795; C.B. Clarke in Hook.f., Fl. Brit. India 3: 544. 1882. ‘Mahua’

A deciduous tree, up to 15 m tall. Inner bark red. Leaves elliptic or elliptic-oblong, 6 -20 x 4 -8 cm, apex acute. Flowers creamy, densely tomentose, in dense clusters at the end of branches below the leaves.

Corolla-tube fleshy, inflated, glabrous. Berries ovoid, yellowish when ripe, 1-2 seeded. Seeds compressed .

Fl. & Fr.: March-July.

Rare, in dry deciduous forests.

Specimen examined: Near Umar ki Khal [24 59 44.63 N, 74 54 48.55 E, 492 m], *P. Hari Krishna & R. Kumar* 35536(BSJO).

2. *Manilkara* Adans.

Manilkara hexandra (Roxb.) Dubard in Ann. Mus. Colon. Marseille, ser. 3, 23: 9 t. 2. 1915; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 460.1991. *Mimusops hexandra* Roxb., Pl. Coromandel. 1: 16. t. 15. 1795; C.B. Clarke in Hook.f., Fl. Brit. India 3: 549. 1882. (Plate-24). '*Khirni*'

Evergreen trees, up to 15 m tall; bark blackish. Leaves 5.5-10 x 2.4-6.5 cm, obovate, or obovate-oblong, dark glossy green. Flowers creamy-white. Berries 1-1.5 cm long, ovoid or, yellowish with plenty of milky latex. Seeds black.

Fl. & Fr.: September - April.

Occasional near habitations.

Specimen examined: near Narsinghpura [25 00 24.64 N, 74 56 59.89 E, 425 m], *P. Hari Krishna & R. Kumar* 38395(BSJO).

EBENACEAE Gurke.

Diospyros L.

Key to the species

- 1a. Corolla of male flowers tubular..... **2. *D. melanoxylon***
b. Corolla of male flowers campanulate or urceolate..... **1. *D. cordifolia***

1. *Diospyros cordifolia* Roxb., Pl. Corom. 1: 38. t. 50. 1795; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 462.1991; Singh, Monogr. Ind. *Diospyros* 73. f.15. 2005. *D. montana* C.B. Clarke in Hook.f., Fl. Brit. India 3: 555. 1882, *p.p.* (Plate-24). '*Vis Tendu*'

Small trees, with spreading branches. Leaves 1.5 -10 x 0.5-4 cm, ovate-lanceolate, oblong-lanceolate, ovate-oblong. Male flowers in bracteate, axillary cymes. Female flowers axillary, solitary; staminodes usually 8-10, inserted at the base of corolla tube. Fruits 3-5 cm in diam, globose, glabrous. Fruiting calyx pubescent. Seeds 4-5, elliptic-oblong.

Fl. & Fr.: Summer and rainy season.

Occasionally found in open forests.

Specimens examined: Jhaleshwar Mahadev [25 00 56.90 N, 74 4759.43 E, 421 m], *P. Hari Krishna & R. Kumar* 35196(BSJO); Mahudia Nalabandh [25 02 35.21 N, 74 52 16.76 E, 436 m], *P. Hari Krishna & R. Kumar* 35615 (BSJO); Near Bhigandi [24 58 14.93 N, 74 49 30.36 E, 437 m], *P. Hari Krishna & R. Kumar* 38301(BSJO).

2. Diospyros melanoxylon Roxb. Pl. Coromandel 1: 36. t. 46. 1795; C.B. Clarke in Hook.f., Fl. Brit. India 3: 564. 1882; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 463.1991; V. Singh, Monogr. Indian *Diospyros* 149. f.36. 2005. (Plate-24).
'Timbru'

Medium sized trees, up to 8 m tall. Leaves opposite, sub opposite or alternate, 4-15 x 1.5-10 cm, ovate-oblong, elliptic-oblong or elliptic-lanceolate. Male flowers in axillary or extra axillary, tomentose. Female flowers axillary, solitary. Calyx larger than males; corolla-lobes. Fruits 2.6-3.4 cm across, globose-ovoid, usually 4-seeded, yellowish. Fruiting calyx thick, flat, disciform. Seeds oval shaped.

Fl. & Fr.: March - October.

Common throughout, in dry deciduous forests.

Specimen examined: Devalgadh forest area [24 58 23.47 N, 74 50 47.65 E, 484 m], *P. Hari Krishna & R. Kumar* 37331(BSJO)

PRIMULACEAE Batsch ex Borkh.

Lysimachia Tourn. ex L.

Lysimachia arvensis (L.) U.Manns & Anderb. in Willdenowia 39: 51. 2009. *Anagallis arvensis* L., Sp. Pl. 1: 211. 1753; Hook.f., Fl. Brit. India 3: 506. 1882. *A. latifolia* L., l.c. 148. 1753. *A. arvensis* L. var. *coerulea* (Schreb.) Gren.&Godr., Fl. France 2: 467. 1852; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 457.1991. (Plate-24).
'Leelo'

Erect or procumbent herbs, up to 40 cm high; stems glabrous. Leaves sessile, 0.5-2.1 x 0.3-1.3 cm, ovate, ovate-lanceolate or ovate-elliptic. Flowers bright blue, axillary, solitary. Corolla-lobes fringed with minute glands. Capsules c. 0.6 cm across, globose or ovoid, brown.

Fl. & Fr.: December -March.

Rare, found in marshy places.

Specimens examined: Near Devjhar [24 58 02.11 N, 74 48 59.92 E, 431 m], *P. Hari Krishna & R. Kumar* 35617(BSJO); Near keljar [24 58 27.01 N, 74 48 47.99 E, 442 m], *P. Hari Krishna & R. Kumar* 38327(BSJO); Near

Pat [25 02 25.40 N, 74 50 31.36 E, 395 m], P. Hari Krishna & R. Kumar 38376(BSJO).

Order: Gentianales Juss. ex Bercht. & J.Presl

RUBIACEAE Juss.

Key to the genera

- 1a. Trees or Shrubs 2
b. Herbs. 5
- 2a. Plants armed with spines..... **2. Cerisoides**
b. Plants not armed with spines. **3**
- 3a. Flowers creamy, in globose heads, style exserted. 4
b. Flowers greenish, in paniculate cymes, style included.
..... **3. Hymenodictyon**
- 4a. Leaf base cordate. **1. Adina**
b. Leaf base truncate-acute. **4. Mitragyna**
- 5a. Ovule solitary in each locule. **6. Spermacoe**
b. Ovules many in each locule **5. Oldenlandia**

1. Adina Salisb.

Adina cordifolia (Roxb.) Hook.f. ex Brandis, For. Fl. 263. t. 33. 1874; Hook.f., Fl. Brit. India 3: 24. 1880; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 368. 1987. *Haldina cordifolia* (Roxb.) Ridsdale in Blumea 24: 361. 1978. *Nauclea cordifolia* Roxb., Pl. Coromandel 1: 40. t.53. 1796. (Plate-22).
'Haldu'

Deciduous trees, up to 15 m tall; bark brownish-grey. Leaves opposite, 5-15 x 5-16 cm, ovate to orbicular-cordate. Flowers sessile or subsessile, in axillary, globose head. Corolla white. Seeds oblong, brown, minutely hairy.

Fl. & Fr.: February - October.

Frequently found in deciduous forests.

Specimens examined: Umarthana forest area [25 00 51.79 N, 74 54 50.25 E, 508 m], P. Hari Krishna & R. Kumar 35495(BSJO); Mahudia-Maheshra [25 02 36.95 N, 74 52 09.32 E, 430 m], P. Hari Krishna & R. Kumar 35601 (BSJO).

2. Cerisoides Tirveng.

Ceriscoides turgida (Roxb.) Tirveng. in Bull. Mus. Natl. Hist. Nat. Ser. 3, Bot. 35: 15.1978; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 373. 1987. *Gardenia turgida* Roxb., Fl. Ind. (Eds. Carey & Wall.) 1 :711.1820; Hook.f., Fl. Brit. India 3: 118.1880.

Shrubs or small trees, 5-9 m tall. Leaves 4-9 x 3-6 cm, oblong, obtuse at apex. Flowers dimorphic; male flowers in fascicles with turbinate; female flowers solitary, with flask shaped calyx. Corolla white. Berries woody. Seeds smooth.

Fl. & Fr.: April - July.

Occasional in moist places.

Specimens examined: Near Nal forest area [24 05 32.59 N, 74 56 37.82 E, 414 m], *P. Hari Krishna & R. Kumar* 35756(BSJO); Near Meghpura Chowki [25 01 38.94 N, 74 48 43.55 E, 410 m], *P. Hari Krishna & R. Kumar* 35290(BSJO).

3.Hymenodictyon Wall.

Hymenodictyon orixense (Roxb.) Mabb. in Taxon 31: 66. 1982; Deb in J. Econ. Taxon. Bot. 13: 679. 1989. *Cinchona orixense* Roxb. Bot. Descr. Swietenia 21. 1793. *Hymenodictyon excelsum* (Roxb.) Wall. in Roxb., Fl. Ind. 2: 149. 1824; Hook.f., Fl. Brit. India 3: 35. 1880; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 374. 1987. 'Lunkhora'

Medium sized trees, 5-12 m high; bark grey-ash coloured. Leaves 8-20 x 5.5-12 cm, elliptic-oblong. Flowers pale greenish-white. Capsules brown when ripe. Seeds winged.

Fl. & Fr. July -January .

Rare, found in hilly tracts in deciduous forests.

Specimen examined: Near Fathepura [24 56 29.39 N, 74 54 17.56 E, 509 m], *P. Hari Krishna & R. Kumar* 35731 (BSJO).

4.Mitragyna Korth.

Mitragyna parvifolia (Roxb.) Korth. Obs. Naocl. Indic. 19. 1839; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 376. 1987. *Nauclea parvifolia* Roxb., Pl. Coromandel 1: 40. t. 52. 1796. *Stephegyna parvifolia* Korth. in Verh. Nat. Gesch. Net. Bezitt. Bot. 161. 1840; Hook.f., Fl. Brit. India 3: 25. 1880. 'Kadam'

Large trees, 10-15 m high; bark grey. Leaves 4-15 x 2-10 cm, elliptic-oblong or ovate to suborbicular. Flowers creamish-yellow in heads. Style white. Capsules ca 3 cm across, oblong. Seeds winged.

Fl. & Fr.: August - January.

Common in deciduous forests.

Specimens examined: Jhaleshwar Mahadev [25 00 56.90 N, 74 4759.43 E, 421 m], *P. Hari Krishna & R. Kumar* 35197(BSJO); Near Amarpura [25 04 50.03 N, 74 54 09.30 E, 395 m], *P. Hari Krishna & R. Kumar* 35735(BSJO).

5. *Oldenlandia* L.

Oldenlandia corymbosa L., Sp. Pl. 1: 119. 1753; Hook.f., Fl. Brit. India 3: 64. 1880; Duthie, Fl. Gangetic Plain 1: 413. 1905; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 379. 1987. *Hedyotis corymbosa* (L.) Lam., Encycl. 1: 272. 1792. 'Parpat'

Herbs up to 20 cm. Stems minutely pubescent. Leaves sessile, whorled, linear - lanceolate, 1.5 - 3.5 x 1.2 - 0.4 cm, margin undulate. Flowers white to pinkish. Corolla ca 2.5 mm long. Capsules 3.5 - 4 mm. Seeds minute, angular, dark brown.

Fl. & Fr.: Throughout the year.

Common in open forests, wastelands and in marshy habitats.

Specimens examined: Bichhor forest area [25 03 52 N, 74 54 14.6 E, 428 m], *P. Hari Krishna & R. Kumar* 35417(BSJO); near Gopalpura [25 02 24.55 N, 74 50 33.81 E, 397 m], *P. Hari Krishna & R. Kumar* 38455 (BSJO).

6. *Spermacoce* L.

Key to the species

- 1a. Erect, slender herbs **2. *S. pusilla***
b. Diffuse or prostrate herbs **1. *S. articularis***

1. *Spermacoce articularis* L.f., Suppl. Pl. 119. 1781; Sivarajan & Vasu in Taxon 35: 363. 1986. *Borreria articularis* (L.f.) F.N. Will. in Bull. Herb. Boiss. Ser. 2. 5: 956. 1905; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 369. 1987.

Annual, prostrate herbs, up to 20 cm high. Stem four-angled, glabrous. Leaves opposite, decussate, elliptic-obovate, 1.5-4 x 1-2 cm, acute-attenuate at base, entire at margin, acute at apex, sessile. Flowers in axillary and terminal fascicles, pinkish white. Capsules globose, hispid. Seeds narrow, oblong; testa reticulate.

Fl. & Fr.: June - February.

Common weed in waste lands, road sides and in moist places.

Specimen examined: Sarna lake [24 59 51.17 N, 74 48 22.95 E, 491 m], *P. Hari Krishna & R. Kumar* 35138(BSJO).

2. Spermaceoce pusilla Wall. in Roxb. Fl. Ind. 1: 379. 1820. *S. stricta* L.f. Suppl. 120. 1781; Hook.f., Fl. Brit. India 3 : 200. 1880; Duthie, Fl. Gangetic Plain 1: 429. 1905. *Borreria pusilla* (Wall.) DC. Prodr. 4: 543. 1830; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 370. 1987. *Borreria stricta* (L. f.) K. Schum. in Engl. & Prantl, Pflanzenfam. 4 (4): 143. 1891, non Meyer 1818.

Annual, erect herbs, up to 20 cm high. Stem 4-angled, scabrid on angles. Leaves opposite, 2.5-3 x 0.5-0.8 cm, linear-lanceolate, acute. Flowers in axillary and terminal, head-like clusters. Corolla campanulate, white or purple. Mericarps obovoid, pubescent. Seeds ellipsoid, smooth, brown.

Fl. & Fr.: August - October.

Common in moist places.

Specimens examined: Near Mevasa Gate [24 59 29.91 N, 74 48 52.83 E, 423 m], *P. Hari Krishna & R. Kumar* 35130(BSJO); Sarna Lake [24 59 51.17 N, 74 48 22.95 E, 491 m], *P. Hari Krishna & R. Kumar* 35138(BSJO).

GENTIANACEAE Juss.

Key to the genera

- 1a. Flowers regular; all stamens perfect. **2. Enicostema**
b. Flowers irregular; only 1 stamen perfect. **1. Canscora**

1.Canscora Lam.

Canscora diffusa (Vahl) R. Br. ex Roem. & Schult., Syst. Veg. 3: Veg. 3:301.1818; C.B. Clarke in Hook.f., Fl. Brit. India 4:103. 1883; Duthie, Fl. Gangetic Plain 2:77.1911; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 493. 1991. *Gentiana diffusa* Vahl, Symb. Bot. 3: 47. 1794.

Much-branched herbs, up to 40 cm high. Leaves sessile, ovate-lanceolate, 3-5 x 2- 4 cm, acute. Flowers pinkish-violet. Anthers dimorphic, oblong-sagittate. Capsules membranous, ca 0.5 x 0.20 cm, linear-oblong, many seeded.

Fl. & Fr.: October - March.

Common found near water courses.

Specimens examined: Near Jharia Mahadev [25 01 51.29 N, 74 53 01.91 E, 469 m], *P. Hari Krishna & R. Kumar* 35509 (BSJO); Near Nal forest area [25 05 29.41 N, 74 56 43.24 E, 420 m], *P. Hari Krishna & R. Kumar*

35567(BSJO); Near Jhaleshwer forest area [25 01 14.45 N, 74 48 10.55 E, 419 m], *P. Hari Krishna & R. Kumar* 37400(BSJO).

2. *Enicostema* Blume

Enicostema axillare (Lam.) Raynal in *Adansonia* 9: 75. 1969; Parmar in Shetty & Singh (eds.), *Fl. Rajasthan* 2: 495. 1991. *Gentiana axillaris* Lam., *Ill. Gen.* 1 (2): 487. 1793. *Exacum hyssopifolium* Willd., *Sp. Pl.* 1: 640. 1798. 'Nava'

Glabrous herbs, 15-40 cm high. Leaves sessile, opposite, up to 5 x 8 cm, linear to linear-lanceolate, or elliptic-oblong. Flowers sessile or subsessile, in axillary, 3-flowered clusters at each node, white. Seeds many, subglobose, brown.

Fl. & Fr.: June - December.

Common in moist or semi-marshy habitat.

Specimens examined: Watch tower road [25 0 46.44 N, 74 48 39.57 E, 484 m], *P. Hari Krishna & R. Kumar* 35150 (BSJO); Near Mahesara [25 03 28.87 N, 74 53 19.19 E, 410 m], *P. Hari Krishna & R. Kumar* 37343(BSJO).

Uses: Leaves are used to cure fever.

LOGANIACEAE R.Br. ex Mart.

Spigelia L.

Spigelia anthelmia L., *Sp. Pl.* 1: 149. 1753; Oomachan & Srivastava in *J. Bombay Nat. Hist. Soc.* 84 (3): 730-732. 1987; Meena & Yadav in *J. Indian Bot. Soc.* 89 (3&4): 258. 2010.

Erect, annual herbs. Stem terete, glabrous. Leaves ovate-lanceolate; the upper ones usually in whorls of 4, one pair larger than the other, 3-8 x 0.8-3 cm. Flowers in cincinni, sessile; cincinni in the axil of upper whorled leaves. Corolla 0.8-10 mm long, hypocrateriform, purplish or white to red, glabrous. Capsules bi-lobed, c. 5 mm in diam., obovoid, squamulate-tuberculate. Seeds ovoid or obliquely ellipsoid, black.

Fl. & Fr.: August - November.

Common weed in deciduous forests, grasslands and wastelands.

Specimens examined: Near Modiya Mahadev area [24 59 35.73 N, 74 52 30.62 E, 502 m], *P. Hari Krishna & R. Kumar* 35342(BSJO); Badapani-Bichhor area [25 04 54.41 N, 74 55 18.94 E, 434 m], *P. Hari Krishna & R. Kumar* 35582 (BSJO), Sonar ki Kudi [25 00 58.45 N, 74 54 46.63 E, 493 m], *P. Hari Krishna & R. Kumar* 35794(BSJO).

APOCYNACEAE Juss.

Key to the genera

- 1a. Stamens adnate to gynoecium to form gynostegium; pollinia and translators present 2
- b. Stamens free; pollinia and translators absent 3
- 2a. Anthers 2-locular; pollinia with waxy surface 6
- b. Anthers 4-locular; pollinia without waxy surface 10
- 3a. Plants armed with spines **2. Carissa**
- b. Plants unarmed. 4
- 4a. Seeds comose 5
- b. Seeds not comose. **3. Catharanthus**
- 5a. Follicles connate throughout or at the tip..... **11. Wrightia**
- b. Follicles not connate. **7. Holarrhena**
- 6a. Plants erect herbs or shrubs. 7
- b. Plants twining or climbing. 8
- 7a. Anthers appendaged; follicles in pairs**1. Calotropis**
- b. Anthers not appendaged; follicles solitary **8. Leptadenia**
- 8a. Leaves deeply cordate 9
- b. Leaves not or shallowly cordate; follicles smooth **4. Ceropegia**
- 9a. Corolla salver shaped; follicles echinate **9. Pergularia**
- b. Corolla rotate; follicles smooth. **10. Stephanotis**
- 10a. Corolla tubular, imbricate **5. Cryptostegia**
- b. Corolla rotate, valvate. **6. Hemidesmus**

1. Calotropis R. Br.

Key to the species

- 1a. Corolla lobes erect, corona-lobes glabrous **2. C. procera**
- b. Corolla lobes spreading, corona-lobes hairy. **1. C. gigantea**

1. Calotropis gigantea (L.) R. Br. in W.T. Aiton, Hortus. Kew. ed. 2, 2: 78. 1811; Hook.f., Fl. Brit. India 4: 17. 1883; Duthie, Fl. Gangetic Plain 2: 48. 1911; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 475. 1991; A.P.

Jagtap & N.P. Singh Fasc. Fl. India 24: 9. 1999. *Asclepias gigentia* L., Sp. Pl. 1: 214. 1753. 'Dholo akro'

Shrubs, with milky latex. Stem woody. Leaves opposite, decussate, 3-10 x 2.5 -6 cm, broadly obovate or elliptic-oblong. Flowers in terminal and lateral umbellate, white or purplish, cottony pubescent. Seeds broadly ovoid.

Fl. & Fr.: Almost throughout the year.

Occasionally in rocky - loamy habitats.

Specimen examined: Parsoli forest area [25 06 30.37 N, 74 52 43.42 E, 405 m], *P. Hari Krishna & R. Kumar* 35646 (BSJO).

Uses: It is used in skin disease.

2. Calotropis procera (Aiton) R. Br. in W.T. Aiton, Hortus. Kew. ed. 2, 2: 78. 1811; Hook.f., Fl. Brit. India 4: 18.1883; Duthie, Fl. Gangetic Plain 2: 48. 1911; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 475. 1991; A.P. Jagtap & N.P. Singh, Fasc. Fl. India 24: 11. 1999. *Asclepias procera* Aiton, Hort. Kew. Ed. 1, 1: 305. 1789. (Plate-25). 'Akado'

Pubescent shrubs, up to 2 m high, with milky latex. Leaves opposite, sessile or shortly petiolate, 4-10 x 1.6-6 cm, broadly ovate or ovate-oblong, entire. Flowers in axillary and terminal, corymbose cymes, purplish or white. Follicles in pairs, ellipsoid or ovoid, recurved, many-seeded. Seeds many, 5-8 mm long, broadly ovate, dull-white, silky, up to 6 cm long.

Fl. & Fr.: Throughout the year.

Common in mixed habitats.

Specimen examined: Near Paat village [25 02 14.93 N, 74 05 1 03.63 E, 424 m], *P. Hari Krishna & R. Kumar* 35437 (BSJO).

2. Carissa L.

Carissa spinarum L. Mant. Pl. 2: 559. 1771; Hook.f., Fl. Brit. India 3: 631. 1832; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 469. 1991. *C. diffusa* Roxb., Fl. Ind. 2: 524. 1824. (Plate-24). 'Karunda'

Large, evergreen shrubs; bark light colored. Leaves 3-5 x 2-4 cm, elliptic or broadly ovate, entire. Flowers terminal and axillary, corymbose cymes, white or tinged with pink. Berries dark-purple at maturity, 4-seeded. Seeds ovate.

Fl. & Fr.: January - July.

Common in scrubs and deciduous forests.

Specimens examined: Jhaleshwar Mahadev gate [25 01 21.99 N, 74 48 30.65 E, 424 m], *P. Hari Krishna & R. Kumar* 35159(BSJO); Umarthana forest area [25 00 51.79 N, 74 54 50.25 E, 508 m], *P. Hari Krishna & R. Kumar* 35499(BSJO); Near kadmali Dam [24 57 59.96 N, 74 54 4.33 E, 527 m], *P. Hari Krishna & R. Kumar* 38421(BSJO).

3. *Catharanthus* G. Don

Catharanthus pusillus (Murray) G. Don., Gen. Hist. 4: 95. 1837. *Vinca pusilla* Murray in Comm. Act. Goett. 3: 66.t. 2. f. l. 1773; Hook.f., Fl. Brit. India 3: 640. 1882; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 468. 1991.

Glabrous herbs, up to 30 cm high. Leaves 3-8 x 0.6-2.5 cm, lanceolate, acute, entire. Flowers axillary, solitary or paired, white. Follicles linear, straight, pointed, ribbed, glabrous. Seeds oblong-cylindric, rounded at both ends, longitudinally muricately ribbed, black.

Fl. & Fr.: July - October.

Common in wastelands and forests.

Specimens examined: Sonar ki Kudi [25 01 05.75 N, 74 54 38.56 E, 529 m], *P. Hari Krishna & R. Kumar* 35792(BSJO); Crocodile view point-Bassi dam [25 0 35.97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35112(BSJO).

4. *Ceropegia* L.

Ceropegia bulbosa Roxb., Pl. Corom. 1: 11, t.7. 1795 & Fl. Ind. 2: 38.1832; Hook.f., Fl. Brit. India 4: 67.1883; Duthie, Fl. Gangetic Plain 2: 66. 1911; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 477.1991; A.P. Jagtap & N.P. Singh, Fasc. Fl. India 24: 217.1999. *C. esculenta* Edgew. in J. Linn. Soc. Bot. 5: 204.1862. *C. bulbosa* var. *esculenta* (Edgew.) Hook.f., Fl. Brit. India l.c. 4: 67. 1883.

Key to the varieties

- 1a. Leaves orbicular to ovate, distinctly petiolate.. **1. *C. bulbosa* var. *bulbosa***
b. Leaves linear to lanceolate, subsessile. **2. *C. bulbosa* var. *lushii***

***Ceropegia bulbosa* Roxb. var. *bulbosa* Roxb. (Plate-25). 'Hedulo'**

Twining herbs. Leaves petiolate, 2.6-5.5 x 3-4.5 cm, orbicular or ovate or elliptic-oblong. Flowers in 6 to 10-flowered, lateral umbellate cymes, yellowish-green or greyish-purple. Corolla-tube curved, inflated at base, narrow in the middle and funnel-shaped at mouth, glabrous within; lobes

linear, hairy within. Follicles 9.5-10 cm long, glabrous, terete. Seeds linear-oblong.

Fl. & Fr.: July - December .

Rare, found in moist gravelly soils in forests.

Specimens examined: Meghpura Chowki [25 01 36.6 N, 74 04 8 49.2 E, 410 m], *P. Hari Krishna & R. Kumar* 35424(BSJO); Near Bheru ji ka Mandir on way to Mahesara [25 03 38.14 N, 74 51 06.64 E, 414 m], *P. Hari Krishna & R. Kumar* 37352 (BSJO); Jhaleshwar Mahadev gate [25 1 21.99 N, 74 48 30.65 E, 424 m], *P. Hari Krishna & R. Kumar* 35166 (BSJO).

Uses: Its tuber is used orally to ease dropping out urinary bladder stones.

Ceropegia bulbosa var. **lushii** (R. Grah.) Hook.f., Fl. Brit. India 4: 68. 1883; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 477.1991; A.P. Jagtap & N.P. Singh, Fasc. Fl. India 24: 218. 1999. *C. lushii* R. Grah. in Bot. Mag. t.3300.1834. *C. acuminata* Roxb., Pl. Corom. 1: 12. t.8.1795; Hook.f., Fl. Brit. India 4: 78.1883. (Plate-25).

Very similar to the *Ceropegia bulbosa* Roxb., but can be easily distinguished by its linear-lanceolate, subsessile leaves. Flowers in axillary cymes. Corolla c. 1 cm long.

Fl. & Fr.: July - November.

Rare, found in moist places in the interior parts of forests.

Specimen examined: Near Jariya Mahadev forest area [25 02 05.93 N, 74 53 3.79 E, 489 m], *P. Hari Krishna & R. Kumar* 35366(BSJO)

5. **Cryptostegia** R. Br.

Cryptostegia grandiflora R. Br. in Edwards, Bot. Reg. 5. t. 435. 1820; Hook.f., Fl. Brit. India 4: 6. 1883; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2 : 489. 1991. *Nerium grandiflorum* Roxb. Fl. Ind. 2 : 10. 1832. 'Chhabuk-chari'

Straggling, evergreen, woody shrubs, with milky sap. Leaves opposite, up to 10 x 5 cm, elliptic-oblong, obtuse. Flowers in terminal, 3 to 5-flowered cymes, showy, fragrant. Corolla pale purple, 4-5 cm across, funnel-shaped; lobes broadly obovate. Follicles boat-shaped, woody, ovoid-oblong, tapering at the apex. Seeds ovate or oblong-ovate, compressed, rugose; coma silky-white.

Fl. & Fr.: April - September.

Common found in fallow lands along the roads, near habitations.

Specimen examined: Near Amalda [24 59 18.26 N, 74 56 45.14 E, 456 m], *P. Hari Krishna & R. Kumar* 35263(BSJO).

6. *Hemidesmus* R.Br.

Hemidesmus indicus (L.) R. Br. in W.T. Aiton, Hortus Kew. Ed. 2, 2: 75. 1811; Hook.f., Fl. Brit. India 4: 5. 1883; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 489- 490.1991; A.P. Jagtap & N. P. Singh, Fasc. Fl. India 24: 301. 1999. *Periploca indica* L., Sp. Pl. 1: 211. 1753. 'Dudhli'

Undershrubs, with woody root-stocks. Leaves opposite, 3-12 x 0.6-5 cm, elliptic-oblong to linear-lanceolate. Flowers in axillary, subsessile cymes, yellow. Corona-coralline, uniseriate. Follicles 6-15 x 0.6-1.5 cm, glabrous. Seeds 0.5-0.8 cm long, ovate-oblong, black, silvery-white.

Fl. & Fr.: Almost throughout the year.

Common in the scrub forests.

Specimens examined: Semaldar to Taleti area [24 57 39.89 N, 74 54 16.15 E, 496 m], *P. Hari Krishna & R. Kumar* 37305(BSJO); Near Nargarh forest area [25 04 26.85 N, 74 53 19.07 E, 418 m], *P. Hari Krishna & R. Kumar* 37319(BSJO); Ambapani Nala [24 58 50.13 N, 74 51 31.54 E, 446 m], *P. Hari Krishna & R. Kumar* 35331(BSJO).

7. *Holarrhena* R.Br.

Holarrhena pubescens (Buch.-Ham.) Wall. ex G. Don, Gen. Hist. 4: 78. 1837. *Echites pubescens* Buch.-Ham. in Trans. Linn. Soc. London Bot. 13: 524. 1822. *Holarrhena antidysenterica* (Roth) Wall. ex A. DC. in DC., Prodr. 8: 413. 1844; Hook.f., Fl. Brit. India 3: 644. 1882; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 470. 1991. 'Akario'

Large shrubs or small tree, up to 8 m high. Leaves 9-4 x 6-14 cm, broadly ovate or elliptic. Flowers white, fragrant, in terminal, corymbose cymes. Corolla-tube 1.2-1.5 cm long, pubescent. Follicles cylindrical, marked with white lenticels. Seeds linear-oblong, light brown.

Fl. & Fr.: May - September.

Occasionally found in deciduous forests.

Specimens examined: Bichhor forest area [25 03 52.1 N, 74 54 14.4 E, 428 m], *P. Hari Krishna & R. Kumar* 35413(BSJO); Near Nandwas [24 58 10.33 N, 74 54 56.54 E, 482 m], *P. Hari Krishna & R. Kumar* 38435(BSJO).

8. *Leptadenia* R. Br.

Key to the species

- 1a. Erect, bushy shrubs; leafless, if present then sessile or subsessile, linear **1. L. pyrotechnica**
- b. Twining shrubs; leaves well developed, petiolate, ovate or ovate-lanceolate **2. L. reticulata**

1. Leptadenia pyrotechnica (Forssk.) Decne. in Ann. Sci. Nat. Bot. Ser.2. 9: 270.1838; Duthie, Fl. Gangetic Plain 2: 63. 1911; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 480. 1991; A.P. Jagtap & N.P. Singh, Fasc. Fl. India 24: 259. 1999. *Cynanchum pyrotechnicum* Forssk., Fl. Aegypt.-Arab. 563. 1775. *Leptadenia spartium* Wight & Arn. in Wight, Contrib. 48. 1834; Hook.f., Fl. Brit. India 4: 64. 1883. (Plate-25). 'Kheerp'

Erect shrubs, up to 70 cm high, with watery sap. Leaves more or less absent, if present, sessile, up to 3.5-6 x 0.3-0.5 cm, linear to linear-lanceolate. Flowers greenish-yellow, in lateral umbellate cymes. Follicle single, 8-15 x 0.6-0.9 cm, lanceolate, terete. Seeds ovate-lanceolate, glabrous.

Fl. & Fr.: July - December.

Occasionally found in dry deciduous forests.

Specimen examined: Near Gopalpura [25 02 22.33 N, 74 49 48.22 E, 405 m], *P. Hari Krishna & R. Kumar* 35251(BSJO).

2. Leptadenia reticulata (Retz.) Wight & Arn. in Wight, Contrib. 47. 1834; Hook.f., Fl. Brit. India 4: 63. 1883; Duthie, Fl. Gangetic Plain 2: 63. 1911; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 481. 1991; A.P. Jagtap & N.P. Singh, Fasc. Fl. India 24: 261. 1999. *Cynanchum reticulatum* Retz., Obs. 2: 15. 1781. (Plate-25). 'Jhumka'

Straggling shrubs. Leaves 1.5 - 9 x 0.4 - 8 cm, broadly ovate to ovate-lanceolate. Flowers in lateral, many-flowered umbellate cymes, greenish. Follicle solitary, 5-10 x 3-5 cm, oblong or broadly lanceolate with a thick, curved beak. Seeds ca 1.5 cm long, narrowly ovoid.

Fl. & Fr.: Almost throughout the year.

Rare in open forests areas on the hedges.

Specimen examined: Near Salaria [24 59 08.22 N, 74 51 03.53 E, 423 m], *P. Hari Krishna & R. Kumar* 35316(BSJO).

9. Pergularia L.

Pergularia daemia (Forssk.) Chiov., Sci. Somalia Ital. 1: 115. 1916; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 484. 1991. *Asclepias daemia* Forssk., Fl. Aegypt.-Arab. 51. 1775. *Daemia extensa* (Jacq.) R. Br. ex Schult., Syst. Veg. 6: 112. 1820; Hook.f., Fl. Brit. India 4: 20. 1883. 'Gadaria ki bel'

Twinning herbs. Leaves 2-8 x 3-6 cm, ovate, acuminate, cordate, pubescent. Flowers pale yellowish-green. Calyx 5-lobed, free; lobes lanceolate, acute, glabrous. Follicles in pairs, 4-7 x 1.5-2 cm, elliptic-lanceolate, tapering to a fine point, echinate all over, reflexed. Seeds ovate, truncate at apex, dentate-margined, velvety; coma white, hairy.

Fl. & Fr.: February - December.

Common throughout in moist-loamy soil.

Specimens examined: Kevdiya forest chowki [24 59 10.74 N, 74 49 57.00 E, 415 m], *P. Hari Krishna & R. Kumar* 35233(BSJO); Near Mahesara forest area [25 03 01.34 N, 74 53 03.24 E, 426 m], *P. Hari Krishna & R. Kumar* 37367 (BSJO); Near Naal [25 03 26.68 N, 74 56 22.67 E, 429 m], *P. Hari Krishna & R. Kumar* 38413(BSJO).

10. *Stephanotis* Thouars

Stephanotis volubilis (L.f.) S.Reuss, Liede & Meve in Taxon 71: 864. 2022. *Dregea volubilis* (L.f.) Benth. ex Hook.f., Fl. Brit. India 4: 46.1883. *Wattakaka volubilis* (L.f.) Stapf. in Curtis, Bot. Mag.(ed. Stapf) 148: sub.t. 8976. 1923; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 487. 1991.

Twining shrubs. Stems pubescent. Leaves 6-16 x 3 -11 cm, broadly ovate or suborbicular. Flowers yellowish-green. Follicles in pairs, ovoid, slightly tapering to a blunt point, fugaciously brown, tomentose. Seeds ovate, pale-yellow to straw coloured.

Fl. & Fr.: April - September.

Common in mix deciduous forests.

Specimens examined: Muroli forest area [25 03 03.34 N, 74 55 51.72 E, 433 m], *P. Hari Krishna & R. Kumar* 35596(BSJO); Sarna Talab [24 59 51.76 N, 74 48 21.97 E, 492 m], *P. Hari Krishna & R. Kumar* 38360(BSJO).

11. *Wrightia* R.Br.

Key to the species

1a. Follicles connate throughout..... **1. *W. arborea***

b. Follicles connate at the tip only..... **2. *W. tinctoria***

1. *Wrightia arborea* (Dennst.) Mabb. in Taxon 26: 533. 1977. *Periploca arborea* Dennst., Schlüssel Hortus. Malab. 13, 23 & 25. 1818. *Wrightia tomentosa* Roem. & Schult., Syst. Veg. 4: 414. 1819; Hook. f., Fl. Brit. India 3: 653. 1882; Duthie, Fl. Gangetic Plain 2:39.1911; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 471.1991. *'Kala kumda'*

Trees, up to 8 m tall, with grey bark. Leaves opposite, up to 11 x 7 cm, elliptic or ovate-oblong. Flowers c. 3 cm or more across, in terminal,

corymbose cymes, creamish-white. Follicles up to 20 x 2 cm, cylindric, laterally compressed, connate throughout, grooved at the junction. Seeds linear-oblong.

Fl. & Fr.: March - September.

Rare, found in hilly tracts of dry deciduous forests.

Specimen examined: Near Panduria [24 58 36.47 N, 74 53 08.26 E, 524 m], *P. Hari Krishna & R. Kumar* 35547(BSJO).

2. *Wrightia tinctoria* R. Br. in Mem. Wern. Nat. Hist. Soc. 1: 74. 1811; Hook.f., Fl. Brit. India 3: 653. 1882; Duthie, Fl. Gangetic Plain 2:38.1911; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 472. 1991. (Plate-24). '*Kerni*'

Small trees, up to 6 m. high, bark grayish-black. Leaves opposite, 5-10 x 3-6 cm, oblong-lanceolate, acuminate at apex, rounded at base, entire, pubescent. Flowers in terminal, dichotomous, umbellate cymes, white, fragrant. Follicles cylindric, drooping, paired, connate at tip, cylindric, longitudinally striated, dark green, white-dotted. Seeds linear-oblong, papillose, pale brown.

Fl. & Fr.: March-August.

Common in the open forests.

Specimens examined: Kelzar village road [24 58 54.71 N, 74 46 54.5 E, 431 m], *P. Hari Krishna & R. Kumar* 35220(BSJO); Sonar ki Kudi [25 01 01.66 N, 74 54 40.05 E, 514 m], *P. Hari Krishna & R. Kumar* 35793(BSJO); Near Jharia Mahadev [25 2 37.72 N, 74 52 50.48 E, 489 m], *P. Hari Krishna & R. Kumar* 38396(BSJO).

Uses: It is used as antipyretic.

Order: Boraginales Juss. ex Bercht. & J.Presl

BORAGINACEAE Juss.

Key to the genera

- 1a. Herbs or shrubs 2
- b. Trees..... **2. Ehretia**
- 2a. Calyx-lobes neither winged nor auricled; flowers white or yellow **3**
- b. Calyx-lobes angled, winged or auricled; flowers blue. .. **4. Trichodesma**
- 3a. Flowers solitary, axillary; petals 4; style 2. 1. **Coldenia**
- b. Flowers in terminal, scorpioid cymes; petals 5; style 1.. **3. Heliotropium**

1. Coldenia L.

Coldenia procumbens L., Sp. Pl. 1: 125. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 4: 144. 1883; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 502. 1991.

Annual procumbent herbs. Leaves alternate, 0.8-1.6 x 0.4-1.5 cm, obovate-oblong, margins coarsely serrate to sub-pinnatifid. Flowers nearly sessile, pale-yellow, solitary, axillary. Fruits c. 2.5 mm long, 4-lobed, pyramidal, beaked, brown, glandular hairy; pyrenes beaked, 1-seeded.

Fl. & Fr.: October - June.

Common in moist places.

Specimens examined: Bujrabandh-Bichhor [25 04 54.41 N, 74 55 18.94 E, 434 m], *P. Hari Krishna & R. Kumar* 35588(BSJO); Bassi dam [24 59 33.29 N, 74 49 30.01 E, 411 m], *P. Hari Krishna & R. Kumar* 38315(BSJO).

2.Ehretia R. Br.

Ehretia aspera Willd. in Phytographia 1: 4. 1794. *E. laevis* Roxb., Pl. Coromandel 1: 42.t.56; C.B. Clarke in Hook.f., Fl. Brit. India 4: 141.1883; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 523.1991.

Medium sized trees, up to 10 m high. Leaves 6-12 x 5-10 cm, elliptic or ovate-elliptic or elliptic-oblong. Flowers sessile, axillary, white and scented. Drupes 2-5 mm across, 4-lobed, yellow or reddish-orange, turning black at maturity.

Fl. & Fr.: February - May.

Common in dry deciduous forests.

Specimen examined: Near Shivpura [25 00 57.73 N, 74 54 56.85 E, 472 m], *P. Hari Krishna & R. Kumar* 35510(BSJO).

3.Heliotropium L.

Key to the species

- 1a. Leaves less than 2.5 cm broad..... **2. H. indicum**
- b. Leaves more than 2.5 cm broad. **2**
- 2a. Fruiting calyx woolly, enveloping drupe. **3. H. supinum**
- b. Fruiting calyx other than woolly, spreading. **1. H. curasavicum**

1. Heliotropium curasavicum L., Sp. Pl. 1: 130. 1753; T.A. Rao & al. in Ind. Forester 96: 672. 1970. Mahesh. & Sharma in Bull. Bot. Surv. India 11: 455. 1972; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 508. 1991.

Glabrous herbs. Leaves fleshy 1.15-3.70 x 0.16-1.2 cm, linear-lanceolate to oblong-lanceolate. Flowers sessile or subsessile, in terminal or

axillary, white. Fruits ca 2.5 mm long, globose, lobed; nutlets 4, ovate-oblong, margin rugulose.

Fl. & Fr.: September - February.

Occasionally found in moist - shaded places.

Specimen examined: Mahuria-Jhaleshwar Nala [25 01 15.75 N, 74 48 14.93 E, 418 m], *P. Hari Krishna & R. Kumar* 35188(BSJO).

2. *Heliotropium indicum* L., Sp. Pl. 1: 130. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 4: 152. 1883; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 509. 1991. *Tiardium indicum* Lehm., Pl. Asperif. Nucif. 14. 1818.

Erect, fistular herbs, 25-70 cm high. Leaves 3-8 .0 x 2.2-5 cm, broadly ovate-elliptic, margins serrulate. Flowers subsessile, extra axillary or terminal spikes. Fruits ovoid or conical, deeply 2-lobed. Nutlets combined in pairs, 3 mm, angled, beaked above, shining brown.

Fl. & Fr.: Almost throughout the year.

Common in gravelly-rocky places.

Specimens examined: Bijaypur road Bassi [25 09.56 N, 74 47 2.55 E, 421 m], *P. Hari Krishna & R. Kumar* 35230(BSJO)

3. *Heliotropium supinum* L., Sp. Pl. 1: 130. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 4: 149. 1883; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 513. 1991. *H. supinum* L. var. *malabarica* (Retz.) C.B. Clarke in Hook.f., l.c. 4: 149. 1883.

Prostrate herbs; with pale-greyish villous branches. Leaves 1.3-2.5.0 x 0.4-1.2 cm, ovate or ovate-elliptic or obovate. Flowers subsessile, white, in uniseriate, simple or forked, villous spikes. Nutlets 4, rounded on the back, obscurely tuberculate, dark brown, enclosed within the calyx.

Fl. & Fr.: August - March.

Common in moist - clayey soil.

Specimens examined: Near Bassi dam area [25 00 35 .97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35517(BSJO); Bassi dam [24 59 34.23 N, 74 49 30.31 E, 410 m], *P. Hari Krishna & R. Kumar* 38307(BSJO).

4. *Trichodesma* R. Br.

***Trichodesma zeylanicum* (Burm.f.) R. Br.,** Prodr. Fl. Nov. Holland. 496. 1810; C.B. Clarke in Hook.f., Fl. Brit. India 4: 154. 1883; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 517. 1991. *Borago zeylanica* Burm.f., Fl. Ind. 41.t.14.f. 2. 1768. ‘*Hetemuria*’

Annual, erect herbs, up to 1m high. Leaves opposite, 1.5-5 x 0.6-1.5 cm, white hirsute below, oblong or oblong-lanceolate. Flowers solitary, axillary, pale to bright blue. Nutlets 3-5 mm long, broadly ovate, finely margined.

Fl. & Fr.: August - January.

Occasional found in open dry deciduous forests.

Specimens examined: Devalgadh forest area [24 58 23.18 N, 74 51 02.66 E, 473 m], *P. Hari Krishna & R. Kumar* 37343(BSJO); Near Jariya Mahadev forest area [25 02 05.93 N, 74 53 03.79 E, 489 m], *P. Hari Krishna & R. Kumar* 35367(BSJO).

Order: Solanales Juss. ex Bercht. & J.Presl

CONVOLVACEAE Juss.

Key to the genera

- 1a. Plants autotrophic 2
- b. Plants parasitic **2. Cuscuta**
- 2a. Pollens echinate **3**
- b. Pollens smooth **4**
- 3a. Fruits with fleshy or thin, fragile wall **5. Ipomoea**
- b. Fruits with woody wall. **Rivea**
- 4a. Styles 2, each 2-fid; stigmas 4. **4. Evolvulus**
- b. Style 1, undivided or slightly 2-lobed at the apex; stigmas 1 or 2. **5**
- 5a. Leaves digitate **3. Distimake**
- b. Leaves not digitate 6
- 6a. Leaves linear-oblong; sepals hairy. **1. Convolvulus**
- b. Leaves reniform to broadly ovate; sepals glabrous **6. Merremia**

1. Convolvulus L.

Convolvulus prostratus Forssk., Fl. Aegypt.-Arab. 203. 1775; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 530. 1991. *C. microphyllus* Sieb. ex Spreng., Syst. Veg. 1: 611. 1825; C.B. Clarke in Hook.f., Fl. Brit. India 4: 218. 1883. *C. pluricaulis* Choisy in Mem. Soc. Phys. Geneve 6: 477. 1834; C.B. Clarke in Hook.f., l.c. 4: 218. 1883, incl. var. *macra*; Duthie, Fl. Gangetic Plain 2:105.1911. ‘Santari’

Perennial herbs. Leaves 1.2 - 6.5 x 0.4-1.6 cm, linear to linear-oblong or oblong-lanceolate. Flowers sessile, clustered in upper leaf-axils and at the

end of peduncles in the axils of lower leaves. Corolla pinkish-white. Capsules c. 0.4 cm in diam., globose, glabrous. Seeds 2-4, brown-black.

Fl. & Fr.: August - December.

Occasionally found in sandy habitats.

Specimens examined: Near Maheshra forest [25 03 01.61 N, 74 52 23.74 E, 443 m], *P. Hari Krishna & R. Kumar* 35522(BSJO); Near Amjariya [24 59 45.73 N, 74 51 7.35 E, 413 m], *P. Hari Krishna & R. Kumar* 38371(BSJO).

2. *Cuscuta* L.

Cuscuta chinensis Lam., *Encycl. Meth. Bot.* 2: 229. 1786; C.B. Clarke in Hook.f., *Fl. Brit. India* 4: 226. 1882. Raizada, *Suppl. Duthie, Fl. Gangetic Plain* 160. 1976; Singh in Shetty & Singh (eds.), *Fl. Rajasthan* 2: 560. 1991. 'Amarbel'

Twining, leafless, parasitic herb. Stems filiform, yellowish. Flowers in dense glomerules sessile or shortly pedicellate, yellow. Corolla acute or obtuse. Capsules thin, depressed-globose, membranous, depressed, enclosed by corolla. Seeds 2-4, in each capsule, pale brown.

Fl. & Fr.: October - January.

Occasional in open forests.

Specimens examined: Near salaria [24 59 08.22 N, 74 51 03.53 E, 423 m], *P. Hari Krishna & R. Kumar* 35315 (BSJO); Aamjharia [25 00 13.68 N, 74 51 13.33 E, 422 m], *P. Hari Krishna & R. Kumar* 35568(BSJO); Near Modiya Mahadev area [24 59 37.93 N, 74 52 29.09 E, 493 m], *P. Hari Krishna & R. Kumar* 35713(BSJO).

3. *Distimake* Raf.

Distimake aegyptius (L.) A.R. Simões & Staples in *Bot. J. Linn. Soc.* 183: 573. 2017. *Merremia aegyptia* (L.) Urban, *Symb. Antill* 4: 505. 1910; Singh in Shetty & Singh (eds.), *Fl. Rajasthan* 2: 552. 1991. *Ipomoea aegyptia* L., *Sp. Pl.* 1: 162. 1753. *Convolvulus pentaphylla* L., *Sp. Pl. ed.* 2: 223. 1762. (Plate-26). 'Rotibel'

Twining herbs; stems terete, clothed with yellow-brown hairs. Leaves palmately compound, pilose; leaflets 5, sessile to subsessile, 2.6-10 x 1.5-7.5 cm, broadly lanceolate, elliptic or elliptic-oblong. Flowers in cymes, white. Capsules subglobose, partially surrounded by the sepals. Seeds 4, glabrous.

Fl. & Fr.: August - November.

Common in the open forests.

Specimen examined: Near Chandpuriya [25 04 19.87 N, 74 51 22.30 E, 391 m], *P. Hari Krishna & R. Kumar* 35782(BSJO).

4. *Evolvulus* L.

Key to the species

- 1a. Leaves lanceolate-oblong, narrowed at base; flowers pale blue.
..... **1. *E. alsinoides***
- b. Leaves orbicular, cordate at base; flowers white.... **2. *E. nummularius***

1. *Evolvulus alsinoides* (L.) L., Sp. Pl. 2: 392. 1762; C.B. Clarke in Hook.f., Fl. Brit. India 4: 220. 1883; Duthie, Fl. Gangetic Plain 2: 104. 1911; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 533. 1991. *Convolvulus alsinoides* L., Sp. Pl. 1: 157. 1753.

Perennial herbs. Leaves 0.6-2.6 x 0.5-1.2 cm, oblong, ovate-oblong, elliptic or spatulate. Flowers pale blue, axillary, solitary. Capsules globular, glabrous. Seeds ovoid, smooth, pale brown to black.

Fl. & Fr.: July - November.

Common in mixed habitats.

Specimen examined: Crocodile view point-Bassi dam [25 0 35.97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35109 (BSJO).

2. *Evolvulus nummularius* (L.) L., Sp. Pl. ed. 2: 391. 1762; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 534. 1991. *Convolvulus nummularius* L., *l.c.* 157. 1753. *Volvulopsis nummularius* (L.) Roberty in Candollea 14: 28. 1952. (Plate-26).

Radially spreading, creeping, perennial herbs, rooting at nodes; stems up to 25 cm long. Leaves alternate, ca 0.6-1.5 cm across, broadly ovate to almost orbicular, rounded to emarginate at apex, obliquely cordate at base. Flowers white, axillary, solitary. Seeds 4 or less, subglobose, slightly muricate, brownish-black.

Fl. & Fr.: March - November.

Common in mixed habitats.

Specimen examined: Near Paat Khurd [25 00 16.67 N, 74 51 14.77 E, 416 m], *P. Hari Krishna & R. Kumar* 35311 (BSJO).

5. *Ipomoea* L.

Key to the species

- 1a. Plants erect shrubs. **1. *I. carnea***

- b. Plants creepers or twiners 2
- 2a. Seeds glabrous..... 5
- b. Seeds puberulous or woolly..... 3
- 3a. Capsule globose, hairy..... 2. *I. eriocarpa*
- b. Capsule subglobose or ovoid, glabrous..... 4
- 4a. Leaves 3-lobed..... 4. *I. nil*
- b. Leaves 5-9 lobed..... 5. *I. pes-tigridis*
- 5a. Stems muricate 3. *I. muricata*
- b. Stems other than muricate. 6. *I. triloba*

1. *Ipomoea carnea* Jacq., Enum. Pl. Carib. 13. 1760; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 539. 1991.

Shrubs, up to to 3 m tall. Leaves 8-20 x 5-7 cm, broadly ovate or ovate-oblong to orbicular, entire. Flowers bright purple or pink, funnel form, in dichotomous, axillary and terminal cymes. Capsule elliptic or oblong-ovoid, c. 2.5 cm in diam., glabrous. Seeds brown.

Fl. & Fr.: Throughout the year.

Common in wastelands and along the roadsides.

Specimen examined. Bijaypur road Bassi [25 0 9.56 N, 74 47 2.55 E, 421 m], *P. Hari Krishna & R. Kumar* 35208 (BSJO).

2. *Ipomoea eriocarpa* R. Br., Prod. 484. 1810; C.B. Clarke in Hook.f., Fl. Brit. India 2: 204. 1883; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 541. 1991. *Convolvulus hispidus* Vahl, Symb. Bot. 3: 29. 1794. *Ipomoea hispida* (Vahl) Roem. & Schult., Syst. Veg. 4: 238. 1819, non Zucc. 1809.

Ipomoea sindica Staf. in Kew Bull. 93: 346. 1894; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 547. 1991. ‘Nakhari’

Twining herbs; stems hairy. Leaves 1.2- 8 x 0.5-6.5 cm, ovate-oblong or ovate-lanceolate, entire. Flowers axillary. Corolla purple, pink or white, pubescent. Capsules 0.4-0.8 cm long, subglobose. Seeds 4, light grayish black to blackish-brown.

Fl. & Fr.: August - January.

Occasionally found in open forests.

Specimen examined: Near Jharia Mahadev [25 01 41.97 N, 74 53 00.74 E, 488 m], *P. Hari Krishna & R. Kumar* 35700 (BSJO).

3. Ipomoea muricata (L.) Jacq., Pl. Hort. Schoenbr. 3: 40. t. 323. 1798. *I. turbinata* Lag., Gen. Sp. Pl. 10. 1816; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 549. 1991. *Convolvulus muricatus* L., Mant. Pl. 44. 1767. 'Pherwana'

Twining herbs, with milky latex and muricated stems. Leaves 3-9 x 2.5-8 cm, broadly ovate to orbicular, entire. Flowers axillary, solitary. Corolla c. 5 cm long, rose-purple or white, streaked with pink. Capsules 1.2-1.8 cm long, ovoid or globose. Seeds ovoid, brown to black, black, glabrous.

Fl. & Fr.: August - November.

Common in wastelands among the bushes.

Specimen examined: Near Nal forest area [25 05 14.77 N, 74 56 55.14 E, 414 m], *P. Hari Krishna & R. Kumar* 35765 (BSJO).

4. Ipomoea nil (L.) Roth, Cat. Bot. 1: 36. 1797; Duthie, Fl. Gangetic Plain 2: 116. 1911; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 543. 1991. *Convolvulus nil* L., Sp. Pl. ed. 2, 1: 219. 1762. *C. hederacea* auct. plur. Non(L.) Jacq., 1760; C.B. Clarke in Hook.f., Fl. Brit. India 4: 199. 1883. *Ipomoea hederacea* (L.) Jacq. var. *integrifolia* C.B. Clarke in Hook.f., l.c. , 4: 200. 1883. var. *nil*. (Plate-26). 'Nil kalmi'

Glabrous twinning herbs. Leaves 2-8.5 x 21.5-9cm, broadly ovate, shallowly to deeply palmately 3-5 lobed, entire. Flowers axillary, umbellate cymes. Corolla pale-blue. Capsules 0.6-1.2 cm across, glabrous. Seeds black, glabrous.

Fl. & Fr.: August - December.

Common on hedges in open forests.

Specimens examined: Bichhor forest area [25 04 12.2 N, 74 54 37.36 E, 447 m], *P. Hari Krishna & R. Kumar* 35408 (BSJO); Near Chandpuriya [25 04 19.87 N, 74 51 22.30 E, 391 m], *P. Hari Krishna & R. Kumar* 35788 (BSJO).

5. Ipomoea pes-tigridis L., Sp. Pl. 1: 162. 1753; C.B. Clarke in Hook., f. Fl. Brit. India 4: 204. 1883; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 545. 1991. *I. hepaticifolia* L., Sp. Pl. 1: 161. 1753. *I. capitellata* Choisy in Mem. Soc. Phys. Geneve 6: 446. 1884. *I. pes-tigridis* L. var. *hepaticaefolia* (L.) C.B. Clarke in Hook., f. l.c. 4: 204. 1883.

Twining herbs. Leaves 2.5-8 cm in diam., cordate to truncate at base, deeply 5-7 lobed; lobes elliptic-oblong, hirsute. Flowers sessile, axillary,

cymose heads. Corolla white, pale pink to purple. Capsules ovoid, glabrous. Seeds 4, triangular, silky.

Fl. & Fr.: August - November.

Common in wastelands and forests.

Specimens examined: Near Chandpuriya [25 04 19.87 N, 74 51 22.30 E, 391 m], *P. Hari Krishna & R. Kumar* 35784(BSJO); Near Tukra Mata temple [25 01 51.21 N, 74 04 9 14.81 E, 409 m], *P. Hari Krishna & R. Kumar* 35492(BSJO).

6. Ipomoea triloba L., Sp. Pl. 1: 161. 1753; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 549. 1991.

Twining herbs. Leaves 2.2-9 x 1.6-9 cm, ovate-triangular to broadly ovate, entire. Flowers in 1-6 flowered, axillary. Corolla 0.6-2.5 cm long, pink-purple with darker throat. Capsules c. 0.5 cm long, glabrous. Seeds glabrous.

Fl. & Fr.: August - November.

Occasionally found in open forests.

Specimen examined: Near Jariya Mahadev forest area [25 02 05.93 N, 74 53 3.79 E, 489 m], *P. Hari Krishna & R. Kumar* 35381(BSJO).

6. *Merremia* Dennst. ex Endl.

Merremia emarginata (Burm.f.) Hall.f., in Engl. Bot. Jahrb. Syst. 16: 552. 1893; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 553. 1991. *Evolvulus emarginatus* Burm. f. Fl. Ind. 77. t.30.f.1. 1768. *Convolvulus reniformis* Roxb. Fl. Ind. 2: 67. 1824 & 1 : 481. 1832. *Ipomoea reniformis* (Roxb.) Choisy in Mem. Soc. Phys. Geneve 6 : 446. 1834; Clarke in Hook.f., Fl. Brit. India 4 : 206. 1883. (Plate-26). *'Hiran paggi'*

Prostrate or creeping herbs, rooting at nodes. Leaves 1-2.4 x 1-2.5 cm, reniform or broadly ovate-cordate, crenate, glabrous. Flowers sessile, yellow, axillary, solitary or in 2 to 3-flowered. Capsules 0.5 cm in diam., glabrous. Seeds 4 or less, chestnut brown, glabrous.

Fl. & Fr.: August - January.

Common in drying moist places.

Specimen examined: Near Taleti [24 58 18.25 N, 74 52 36.02 E, 533 m], *P. Hari Krishna & R. Kumar* 35680(BSJO).

7. *Rivea* Choisy

Rivea hypocrateriformis (Desr.) Choisy in Mem. Soc. Phys. Hist. Nat. Geneve 6: 408. 1834; C.B. Clarke in Hook.f., Fl. Brit. India 4: 184. 1883;

Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 557. 1991. *Convolvulus hypocrateriformis* Desr. in Lam., Encycl. 3: 561. 1799. 'Gwariakakari'

Climbing shrubs. Leaves 3-10 x 2.5-9 cm, ovate-orbicular. Flowers axillary, solitary or rarely 2-3 in cymes. Corolla up to 6.5 cm long, white. Capsules 1.6- 3 cm in diam., globose. Seeds 4 or less, glabrous, brown.

Fl. & Fr.: August - December.

Common on hedges, trees etc.

Specimen examined: Bijaypur road-Bassi [24 59 53.19 N, 74 47 0.16 E, 421 m], *P. Hari Krishna & R. Kumar* 35214(BSJO).

SOLANACEAE Juss.

Key to the genera

- 1a. Fruit a berry. 2
- b. Fruit a capsule 1. **Datura**
- 2a. Berries completely enclosed within the calyx. 2. **Physalis**
- 2b. Berries not enclosed in the calyx. 3. **Solanum**

1. **Datura** L.

Datura stramonium L., Sp. Pl. 1: 179. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 4: 242. 1883; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 565.1991. *D. stramonium* L. var. *tatula* C.B. Clarke in Hook.f., Fl. Brit. India 2: 242. 1883. 'Datura'

Erect herbs. Leaves 5-2.5 x 2.5-8 cm, ovate-oblong or triangular. Calyx 4-5.5 cm long, 5-angular. Corolla 6-12 cm long; teeth 5, linear. Capsules 5-7 cm long, oblong-ovoid, erect, clothed with 0.2-1 cm long prickles.

Fl. & Fr.: November - May.

Occasional in wastelands and roadsides.

Specimen examined: Near Tukra Mata temple [25 01 51.21 N, 74 04 9 14.81 E, 409 m], *P. Hari Krishna & R. Kumar* 35491(BSJO).

Uses: It is used in stomach and intestinal pains.

2. **Physalis** L.

Key to the species

- 1a. Anthers yellow. 1. **P. angulata**
- b. Anthers blue or violet. 2. **P. peruviana**

1. *Physalis angulata* L. in Sp. Pl.: 183. 1753. *P. minima* L., Sp. Pl. 1: 183. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 4: 238. 1883; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 570. 1991. *P. indica* Lam., Encycl. Meth. Bot. 2: 102. 1786. *P. minima* L. var. *indica* (Lam.) C.B. Clarke in Hook.f., l.c. 4: 238. 1883. (Plate-27). 'Papotan'

Erect herbs, up to 60 cm high. Stem angular, hairy. Leaves 3-5 x 1.5-2.5cm, ovate, slightly toothed, subobtuse at apex, subcordate at base, toothed. Flowers axillary, solitary, yellow, pedicels ca 1 cm long, hairy. Anthers yellow. Berries up to 8 mm in diam., globose, enclosed by 10-ribbed, veined, papery, membranous bladder of calyx. Seeds ca 3 mm in diam., discoid or subreniform, muriculate.

Fl. & Fr.: August - December.

Occasional, weed in open forests and waste lands.

Specimens examined: Jhaleswar Mahadev [25 00 56.90 N, 74 47 59.43 E, 421 m], *P. Hari Krishna & R. Kumar* 35200 (BSJO); Semaldar [24 59 37.69 N, 74 52 31.35 E, 493 m], *P. Hari Krishna & R. Kumar* 35704(BSJO); Near Amarpura [25 04 41.77 N, 74 54 08.58 E, 391 m.], *P. Hari Krishna & R. Kumar* 35740(BSJO).

2. *Physalis peruviana* L., Sp. Pl. ed. 2. 1670.1763; C.B. Clarke in Hook.f., Fl. Brit. India 4: 238. 1883; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 570. 1991. 'Badi Papotan'

Erect, viscid, herbs. Leaves 4.5-9 x 3-6.5 cm, ovate, entire or toothed. Flowers solitary, axillary. Corolla hairy inside, pale yellow with 5 purple blue spots at the base. Berries 1.20-1.5 cm in diam., glabrous. Seeds compressed, rounded.

Fl. & Fr.: August - November.

Occasionally found on riverbanks, roadsides and fields.

Specimen examined: Near Mahesara forest area [25 03 07.21 N, 74 52 56.89 E, 420 m], *P. Hari Krishna & R. Kumar* 37362(BSJO).

3. *Solanum* L.

Key to the species

- 1a. Plants unarmed. **2. *S. nigrum***
- b. Plants armed. **2**
- 2a. Prostrate herbs; prickles straight; peduncles solitary...**3. *S. virginianum***
- b. Erect herbs; prickles recurved; peduncles paired. **1. *S. incanum***

1. *Solanum incanum* L., Sp. Pl. 1: 188. 1753; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 573.1991. *S. coagulans* Forssk. Fl. Aeg.-Arab. 47. 1775; C.B. Clarke in Hook.f., Fl. Brit. India 4: 236. 1883. *S. melongena* C.B. Clarke in Hook.f., Fl. Brit. India 4: 235. 1883. (Plate-27). 'Ringani'

Undershrubs, with slightly curved prickles. Leaves 3.5-10.5 x 2.5 -6 cm, ovate-elliptic. Corolla violet-purple. Berries 2.5 -4 cm in diam., globose, yellow when ripe. Seeds pale-brown.

Fl. & Fr.: September - January.

Common in wastelands, open forests.

Specimen examined: Anoop Pura-Javdiya [24 56 28.91 N, 74 53 31.64 E, 507 m], *P. Hari Krishna & R. Kumar* 35271(BSJO).

2. *Solanum nigrum* L., Sp. Pl. 1: 186. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 4: 229. 1883; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 573. 1991.

Erect herbs. Leaves ovate, ovate-oblong, entire, glabrous. Flowers nodding, in umbelliform, extra axillary inflorescences. Corolla white or blue, 3 cm across. Berries globose, glabrous, black or red when ripe. Seeds many, ovate-reniform.

Fl. & Fr.: Throughout the year.

Common weed in wastelands and forests outskirts.

Specimens examined: Near Sagarani [24 55 32.13 N, 74 52 30.64 E, 491 m], *P. Hari Krishna & R. Kumar* 35284 (BSJO); Near Muroli forest area [25 02 46.79 N, 74 55 44.49 E, 443 m], *P. Hari Krishna & R. Kumar* 35775 (BSJO); Near Mahesara forest area [25 03 06.73 N, 74 52 57.20 E, 421 m], *P. Hari Krishna & R. Kumar* 37368 (BSJO); Near Palka [24 58 27.01 N, 74 48 47.99 E, 442 m], *P. Hari Krishna & R. Kumar* 38334(BSJO).

3. *Solanum virginianum* L., Sp. Pl. 1: 187. 1753; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 575. 1991. *S. surattense* Burm. f., Fl. Brit. India 57: 1768; *S. xanthocarpum* Schrad. & Wendl., in Schrad., Sert. Hannov. 1: 8. t. 2. 1795; C.B. Clarke in Hook.f., Fl. Brit. India 4: 236. 1883. (Plate-27).

'Bor-ringni'

Perennial herbs, clothed with yellow prickles. Leaves 4-10 x 2.3.5-5 cm, ovate-elliptic or lanceolate. Flowers extra-axillary, solitar, violet-purple. Corolla-lobes deltoid, acute, pubescent outside. Berries 1.6-2.8 cm in diam, globose, yellow when ripe.

Fl. & Fr.: Most part of the year.

Common in open forests.

Specimens examined: Near Narioya Khalla forest area [25 01 38.04 N, 74 51 02.96 E, 442 m], *P. Hari Krishna & R. Kumar* 37326(BSJO); Bijaypur road-Bassi [25 0 9.56 N, 74 47 2.55 E, 421 m], *P. Hari Krishna & R. Kumar* 35209(BSJO).

Order: Lamiales Bromhead

OLEACEAE Hoffmanns. & Link

Nyctanthes L.

Nyctanthes arbor-tristis L., Sp. Pl. 1: 6. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 3: 603. 1882; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 465.1991.
'Harsingar'

Large shrubs or small trees, branches hairy. Leaves opposite, 5-15 x 3-10 cm, ovate-elliptic or ovate-lanceolate. Flowers sessile, fragrant, white with orange tube. Corolla-lobes unequally obcordate, cuneate. Capsules ca 1.3 x 3 cm, 1-seeded pyrens.

Fl. & Fr.: August - October.

Occasional in dry deciduous forests.

Specimen examined: Watch tower road, [25 00 46.44 N, 74 48 39.57 E, 422 m], *P. Hari Krishna & R. Kumar* 35151(BSJO).

PLANTAGINACEAE Juss.

Key to the genera

- 1a. Plants scapigerous **3. Plantago**
- b. Plants non-scapigerous **2**
- 2a. Fertile stamens 2 **4. Veronica**
- b. Fertile stamens 4 **3**
- 3a. Corolla campanulate, not bilipped; anther cells not stipitate... **1. Bacopa**
- b. Corolla tubular, 2-lipped; anther cells stipitate. **2. Limnophila**

1. Bacopa Aubl.

Bacopa monnieri Wettst. in Engl. & Prantl., Pflanzenfam. 4 (3B): 77. 1891; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 585. 1991. *Lysimachia monnieri* L. in Torner, Cent. Pl. 2: 9. 1756. *Moniera cuneifolia* Michx., Fl. Bor. Amer. 2: 22. 1803. *Herpestis monnieri* (L.) Kunth, Nov. Gen. Sp. 2: 366. 1818; nom. Illeg.; Hook.f., Fl. Brit. India 4: 272. 1883. (Plate-27).

Succulent spreading herbs. Leaves sessile, 0.4-2.6 x 0.3-0.6 cm, obovate-oblong or spatulate, entire. Flowers axillary, solitary pale blue or bright-purple. Corolla c. 0.6 cm long. Capsules c. 0.5 x 0.6 cm ovoid, glabrous. Seeds oblong, striate, brown.

Fl. & Fr.: Throughout the year.

Common in moist and marshy places.

Specimen examined: Near Salaria [24 58 59.28 N, 74 51 7.29 E, 429 m], *P. Hari Krishna & R. Kumar* 35317(BSJO).

2. *Limnophila* R. Br.

Limnophila indica (L.) Druce in Bot. Exch. Club. Brit. Isles. 191. 3420. 191: 1914; Philox in Kew Bull. 24: 115. 1970; Singh in Shetty & Singh (eds.), *Fl. Rajasthan* 2: 591.1991. *Hottonia indica* L., *Syst. Nat.* ed. 10. 991. 1759. *Limnophila gratioides* R. Br., *Prodr.* 442. 1810; Hook.f., *Fl. Brit. India* 4: 271. 1884. (Plate-27).

Aquatic herbs, 8-20 cm high. Stems rooting at lower nodes. Aerial leaves usually in whorled, or sometimes lower 2-3 pairs of opposite, undissected, lobesserrate-dentate, submerged leaves in whorls of 6-12; pinnatisect; lobes linear. Flowers axillary, pale to violet-purple. Corolla c. 6 mm long. Seeds glabrous, smooth.

Fl. & Fr.: August - December.

Common in moist places.

Specimens examined: Sarna Lake [24 59 51.17 N, 74 48 22.95 E, 491 m.], *P. Hari Krishna & R. Kumar* 35143(BSJO); Nandwai to Amla route [25 00 37.49 N, 74 56 55.58 E, 432 m], *P. Hari Krishna & R. Kumar* 35254 (BSJO); Near salaria [24 58 59.28 N, 74 51 7.29 E, 429 m], *P. Hari Krishna & R. Kumar* 35319(BSJO); Near Modiya Mahadev area [25 01 59.29 N, 74 53 1.91 E, 469 m], *P. Hari Krishna & R. Kumar* 35398(BSJO); Jariya Mahadev water fall area [24 59 37.47 N, 74 52 31.45 E, 498 m], *P. Hari Krishna & R. Kumar* 35716(BSJO).

3. *Plantago* L.

Plantago ovata Forssk., *Fl. Aegypt.-Arab.* 31. 1775; Hook.f., *Fl. Brit. India* 4: 707. 1885; Parmar in Shetty & Singh (eds.), *Fl. Rajasthan* 2: 711. 1991. *'Isabgol'*

Annual herbs covered with hairs. Leaves in rosette, 2.5-8 x 0.3-0.7 cm, lineare or filiform, entire or denticulate. Corolla glabrous. Capsules ellipsoid, obtuse, membranous, glabrous, 2-celled. Seeds 2, ovoid-oblong, yellowish-brown.

Fl. & Fr.: January - March.

Occasionally found in open forests.

Specimen examined: Near Nandwasi [24 58 10.21 N, 74 54 52.61 E, 494 m], *P. Hari Krishna & R. Kumar* 38430(BSJO).

Uses: It is used for treatment of constipation and diarrhea.

4. *Veronica* L.

Veronica anagallis-aquatica L., Sp. Pl. 1: 12. 1753. *V. anagallis* Benth., Scroph. Ind. 44. 1835; Hook.f., Fl. Brit. India 4: 294. 1884; Duthie, Fl. Gangetic Plain 2: 154. 1911; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 609. 1991.

Aquatic herbs, 8-20 cm tall. Stems rooting on the nodes towards base. Leaves sessile, 2.6-8.0 x 0.5-2.5.0 cm, oblong-lanceolate, entire or serrulate. Flowers axillary, white or pale pink. Capsules 2-3 x 3-4 mm, orbicular, ciliate, notched at the apex. Seeds ellipsoid-oblong.

Fl. & Fr.: October - April.

Rare, found in moist-marshy habitats.

Specimen examined: Ambapani [24 58 53 N, 74 51 17 E, 430 m], *P. Hari Krishna & R. Kumar* 35558(BSJO).

SCROPHULARIACEAE Juss.

Key to the genera

- 1a. All Leaves alternate. **2. Verbascum**
b. Leaves opposite or whorled, upper ones may be opposite, whorled or alternate..... **1. Jamesbrittenia**

1. Jamesbrittenia Kuntze

Jamesbrittenia dissecta (Delile) Kuntze in Revis. Gen. Pl. 2: 461. 1891. *Sutera dissecta* (Delile) Walp., Report. 3: 271. 1844; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 606- 607. 1991. *Capararia dissecta* Delile, Fl. Egypt. 95. t. 32. f. 2. 1812. *Sutera glandulosa* Roth, Nov. PL., Sp. 291. 1821; Hook.f., Fl. Brit. India 4: 258. 1884.

Suberect or diffuse, herbs, 15-20 cm long. Leaves 0.5- 2.5 x 0.5-1.6 cm, ovate in outline. Flowers subsessile, solitary, axillary, passing into racemes. Corolla tubular, 5-lobed, purplish-yellow. Capsules 3-4 mm long, ellipsoid-oblong. Seeds minute, pitted.

Fl. & Fr.: August - November.

Occasionally found in moist grounds along streams.

Specimen examined: Bujrabandh-Bichhor [25 04 54.41 N, 74 55 18.94 E, 434 m], *P. Hari Krishna & R. Kumar* 35585(BSJO).

2. *Verbascum* L.

Verbascum coromandelianum (Vahl) Hub.-Mor. in *Bauhinia* 5: 11. 1973. *V. chinense* (L.) Santapau, *Fl. Purandhar* 90. 1958 & in *Rec. Bot. Surv. India* 16: 177. 1967; Singh in Shetty & Singh (eds.), *Fl. Rajasthan* 2: 607. 1991. *Scrophularia chinensis* L., *Mant. Pl.* 2: 250. 1771. *Celsia coromandeliana* Vahl, *Symb. Bot.* 3: 79. 1794; Hook.f., *Fl. Brit. India* 4: 251. 1884.

Glandular pubescent herbs, up to 60 cm high. Radical leaves oblong-ovate, lyrate-pinnatifid, petiolate, in rosette; cauline ones ovate, crenate, sessile. Flowers axillary, solitary, yellow. Capsules c. 5 mm in diam., globose, 2-valved, punctate. Seeds minute oblong.

Fl. & Fr.: Throughout the year.

Common in moist localities.

Specimen examined: Ambapani [24 58 49 N, 74 51 25 E, 430 m], *P. Hari Krishna & R. Kumar* 35555(BSJO).

OROBANCHACEAE Vent.

Key to the genera

- 1a. Corolla with long slender abruptly incurved tube **2. *Striga***
- b. Corolla without long slender abruptly incurved tube..... **1. *Lindenbergia***

1. *Lindenbergia* Lehm.

Lindenbergia indica (L.) Vatke. *Oesterr. Bot. Zeitschr.* 25: 10. 1875; Singh in Shetty & Singh (eds.), *Fl. Rajasthan* 2: 592. 1991. *Lindenbergia urticaefolia* Lehm. in Link. & Otto, *Ind. Sem. Hort. Berol.* 5. 1829; Hook.f., *Fl. Brit. India* 4: 262. 1884. *L. polyantha* Royle ex Benth., *Scroph. Ind.* 22. 1835; Hook.f., *l.c.* 4: 262. 1884. *L. abyssinica* Hochst. ex Benth. in DC., *Prod.* 10: 377. 1846. (Plate-28).

Glandular herbs, up to 35cm high. Leaves opposite or subopposite, 3-5 x 1.6-3.2cm, broadly ovate or elliptic, margins crenate-serrate. Flowers in axillary and terminal clusters, yellow. Capsules ca 6 mm long, ovoid, hairy. Seeds pale brown.

Fl. & Fr.: July - March.

Common in ravines.

Specimens examined: Ambapani [24 58 52 N, 74 51 17 E, 430 m], *P. Hari Krishna & R. Kumar* 35562(BSJO); Devalgadh forest area [24 58 21.25 N, 74 50 55.87 E, 544 m], *P. Hari Krishna & R. Kumar* 37349(BSJO).

2. *Striga* L.

Striga angustifolia (D. Don) C.J. Saldhana in Bull. Bot. Surv. India 5: 70. 1963; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 604.1991. *Buchnera angustifolia* D. Don., Prod. Fl. Nep. 91. 1825. *B. euphrasioides* Benth. Scroph. Ind. 41. 1835. *Striga euphrasioides* sensu Benth. in Hook., Companion. Bot. Mag. 1: 364. 1836, *excl. basionym Buchnera euphrasioides* Vahl; Hook.f., Fl. Brit. India 4: 299. 1884.

Erect, annual herbs, up to 30 cm high. Leaves sessile, 1.5 - 3.5 x 0.2 - 0.5 cm, linear to lanceolate, subacute, hispid. Flowers subsessile, white, solitary, axillary, passing into long terminal spikes. Corolla 12-15 mm long; tube exerted, abruptly incurved above the middle, dorsally pubescent on neck; lower lobes much larger than the upper ones. Seeds obovoid, black.

Fl. & Fr.: August - November.

Common, as root parasite in open deciduous forests.

Specimens examined: Near Sagarani Mahadev [24 55 32.13 N, 74 52 30.64 E, 491 m], *P. Hari Krishna & R. Kumar* 35281(BSJO); Near Jariya Mahadev [25 02 05.93 N, 74 53 3.79 E, 489 m], *P. Hari Krishna & R. Kumar* 35383 (BSJO); Near Jharia [25 01 41.97 N, 74 53 00.74 E, 488 m], *P. Hari Krishna & R. Kumar* 35686(BSJO).

LINDERNIACEAE Borsch, Kai Müll. & Eb. Fisch.

Key to the genera

- 1a. Fertile stamens 2 **1. *Bonnaya***
- b. Fertile stamens 4 **2**
- 2a. Plants with condensed underground stem less..... **2. *Craterostigma***
- b. Plants with well developed arial stems **3. *Torenia***

1. *Bonnaya* Link & Otto

Bonnaya ciliata (Colsm.) Spreng. Syst. Veg., ed. 16. 1: 41. 1824. *Lindernia ciliata* (Colsm.) Pennell, Brittonia 2: 182. 1936; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 595.1991. *Gratiola ciliate* Colsm., Prod. Descr. Grat. 14. 1793. *Bonnaya brachiata* Link & Otto, Ic. Pl. Sel. 25. t.11.1820; Hook.f., Fl. Brit. India 4: 284. 1884. (Plate-28).

Annual herbs, up to 20 cm high, with 4-angular stems. Leaves sessile, 1.5 - 3 x 0.5-1.5 cm oblong to elliptic-oblong or obovate. Flowers in terminal

and axillary, bright rosy-purple. Capsules cylindrical, glabrous, smooth. Seeds minute, black, truncate at both ends.

Fl. & Fr.: August - February.

Common in wet-shady localities.

Specimen examined: Near Sagarani [24 55 30.79 N, 74 52 43.22 E, 489 m], *P. Hari Krishna & R. Kumar* 35278(BSJO).

2. *Craterostigma* Hochst.

Craterostigma plantagineum Hochst. in Fl. 24: 669. 1841; Mahesh & Singh, in Bull. Bot. Surv. India 13 (1-2):11.f. 1-9.1973; Singh, in Shetty & Singh (eds.), Fl. Rajasthan 2: 587. 1991. *Torenia plantaginea* Benth. in DC., Prodr. 10: 411. 1846. (Plate-27).

Densely pilose, acaulescent herbs, up to 10 cm high. Leaves in basal rosette, 3-8 in a whorl, variable from ovate to lanceolate, spatulate, entire. Flowers in usually paired or in racemes, violet - purple. Capsules ovoid or oblong, angled, many seeded.

Fl. & Fr.: August - April.

Rare in rocky areas.

Specimen examined: Near Sagarani [24 55 32.13 N, 74 52 30.64 E, 491 m], *P. Hari Krishna & R. Kumar* 35280(BSJO).

3. *Torenia* L.

Torenia crustacea (L.) Cham. & Schltld. in Linnaea 2: 570. 1827. *Lindernia crustacea* (L.) F. Muell., Syst. Census Austr. Pl. 1: 97. 1882; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 596. 1991. *Capraria crustacea* L., Mant. 87. 1767. *Vandellia crustacea* (L.) Benth., Scroph. Ind. 35. 1835; Hook.f., Fl. Brit. India 4: 279. 1884.

Branched herbs, up to 12 cm high, with hairy stems. Leaves subsessile, 1.2-3 x 0.4-1.6 cm, broadly ovate to elliptic. Flowers in axillary, bright bluish-purple or pinkish. Seeds numerous, minute, glabrous and rugose.

Fl. & Fr.: August - January.

Common in open forests.

Specimens examined: Near Panduria [24 58 36.47 N, 74 53 08.26 E, 524 m], *P. Hari Krishna & R. Kumar* 35545(BSJO); Near Amalda [24 59 18.26 N, 74 56 45.14 E, 456 m], *P. Hari Krishna & R. Kumar* 35267(BSJO); Near Modiya Mahadev area [24 59 35.73 N, 74 52 30.62 E, 502 m], *P. Hari Krishna & R. Kumar* 35349(BSJO).

MARTYNIACEAE Horan.

Martynia L.

Martynia annua L., Sp. Pl. 2: 618. 1753; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 625. 1991. *M. diandra* Glox. Bot. Obs. 14, t.1. 1785; C.B. Clarke in Hook.f., Fl. Brit. India 4: 386. 1884. (Plate-28).

Erect, glandular herbs, up to 1 m high. Stem subterete, fistular. Leaves 6-18 x 6-15 cm, broadly ovate-cordate, repend-dentate, sticky. Racemes 7-12 flowered, at the bifurcation of branches. Flowers pinkish-purple, with yellow throat. Drupes woody, crowned by 2, strong, claw-like, sharp hooks, beetle shaped. Seeds oblong.

Fl. & Fr.: July - October.

Occasionally found in mixed habitats of deciduous forests.

Specimens examined: Bijaypur road Bassi [24 59 14.60 N, 74 46 56.05 E, 441 m], *P. Hari Krishna & R. Kumar* 35219(BSJO); Devalgad forest area [24 58 20.36 N, 74 50 45.33 E, 415 m], *P. Hari Krishna & R. Kumar* 37328(BSJO).

PEDALIACEAE R.Br.

Sesamum L.

Sesamum indicum L., Sp. Pl. 2: 634. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 4: 387. 1884; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 625. 1991. *S. orientale* L., Sp. Pl. 2: 634. 1753. *S. mulayanum* Nair in Bull. Bot.Surv.India 5: 251.1963. 'Til'

Annual, pubescent herbs, up to 80 cm high. Stem glandular-pubescent. Leaves 3-12 x 0.6- 4 cm, lower ones opposite, elliptic-lanceolate or oblong, entire. Flowers axillary, solitary, pink-purple or seldomly white. Seeds black or white.

Fl. & Fr.: July - November.

Occasionally found in open forests.

Specimens examined: Kevdia forest area [24 59 37.56 N, 74 49 59.53 E, 432 m], *P. Hari Krishna & R. Kumar* 35649(BSJO); Near Kevdiya Chowki [24 59 38.89 N, 74 05 0 05.49 E, 444 m], *P. Hari Krishna & R. Kumar* 35477(BSJO).

ACANTHACEAE Juss.

Key to the genera

- 1a. Seeds borne on hard retinaculæ 2
b. Seeds not borne on hard retinaculæ. 5. *Elytraria*

- 2a. Corolla with an upper lip, lower lip large expanded, 3-lobed. **3. Blepharis**
 b. Corolla 2-lipped or with 5-subequal lobes **3**
- 3a. Corolla lobes twisted to the left in bud. **4**
 b. Corolla lobes imbricate in bud **6**
- 4a. Ovules more than 2 in each cell. **5**
 b. Ovules 2 in each cell **6. Eranthemum**
- 5a. Corolla distinctly 2-lipped. **8. Hygrophila**
 b. Corolla subsequently 5-lobed. **11. Ruellia**
- 6a. Ovules 3 to many in each locule; capsules 6 or more-seeded. **7**
 b. Ovules 1 to 2 in each locule; capsules 2 to 4-seeded. **8**
- 7a. Flowers in unilateral racemes. **1. Andrographis**
 b. Flowers clustered in midst of axillary cladodes. **7. Haplanthodes**
- 8a. Corolla lobes 5, subequal **2. Barleria**
 b. Corolla distinctly 2-lipped **9**
- 9a. Stamens 4 **9. Lepidagathis**
 b. Stamens 2. **10**
- 10a. Placentae separating elastically from the valves from the base.
 **12. Rungia**
 b. Placentae not separating elastically from the valves. **11**
- 11a. Anther cells with a white basal spur like appendage... **10. Rostellularia**
 b. Anther cells without appendaged at base. **4. Dicliptera**

1. Andrographis Wall. ex Nees

Andrographis echioides (L.) Nees in Wall., Pl. Asiat. Rar. 3: 117. 1832; C.B. Clarke in Hook.f., Fl. Brit. India 4: 505. 1884. *Indoneesiella echioides* (L.) Sreemadh., in Phytologia 16: 466. 1968. Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 652. 1991. *Justicia echioides* L., Sp. Pl. 1: 16. 1753. 'Jodapatta'

Annual, erect herbs, up to 40 cm high. Stem with white hairs. Leaves sessile, 2.5-10 x 1.2-4 cm, elliptic-oblong, obtuse, margins subentire, glabrous above. Flowers pinkish-purple. Capsules c. 0.4 cm long, elliptic-oblong, acute. Seeds glabrous, brown.

Fl. & Fr.: August - November.

Common in moist - shaded localities.

Specimens examined: Jhaleswar Mahadev [25 00 56.90 N, 74 4759.43 E, 421 m], *P. Hari Krishna & R. Kumar* 35192 (BSJO); Near Taleti [24 58 42.65 N, 74 52 50.68 E, 547 m], *P. Hari Krishna & R. Kumar* 35662 (BSJO); Near Nandwas [24 58 10.33 N, 74 54 56.54 E, 482 m], *P. Hari Krishna & R. Kumar* 38432(BSJO).

2. *Barleria* L.

Key to the species

- 1a. Corolla white or light purple. **1. *B. cristata***
b. Corolla yellow..... **2. *B. prionitis***

1. *Barleria cristata* L., Sp. Pl. 2: 636. 1753; Sims in Bot. Mag. 39. t. 1615.1814; C.B. Clarke in Hook.f., Fl. Brit. India 4: 488. 1884; Duthie, Fl. Gangetic Plain 2: 201. 1911; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 632. 1991. (Plate-28).

Undershubs, up to 1 m high. Leaves 4.5-10 x 2.5-5.5 cm, elliptic or elliptic-oblong, acute or acuminate, entire. Flowers in axillary, terminal, blue or white. Capsules, oblong-ovoid, glabrous, 4-seeded. Seeds orbicular, silky hairy, brown.

Fl. & Fr.: September - January.

Occasionally found in mix forest.

Specimens examined: Near Mahesara forest area [25 02 53.80 N, 74 53 04.21 E, 430 m], *P. Hari Krishna & R. Kumar* 37374(BSJO); Devalgad forest area [24 58 27.50 N, 74 50 55.87 E, 437 m], *P. Hari Krishna & R. Kumar* 37335(BSJO).

2. *Barleria prionitis* L., Sp. Pl. 2: 636. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 4: 482. 1884; Duthie, Fl. Gangetic Plain 2: 200. 1911; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 635.1991. (Plate-28).

Undershubs, with whitish bark, armed with 1-2 cm long, sharp, axillary, grayish-white spines. Leaves elliptic or ovate-elliptic, acute or acuminate. Flowers yellow to orange. Filaments pubescent at the base. Capsules ca 1 cm long, ovoid, beaked, glabrous. Seeds suborbicular or ovoid, silky hairy.

Fl. & Fr.: August - February.

Occasional in mixed deciduous forests.

Specimens examined: Ambapani [24 58 52 N, 74 51 17 E, 430 m], *P. Hari Krishna & R. Kumar* 35563(BSJO); Devalgadth forest area [24 58 27.14 N, 74 50 57.14 E, 442 m], *P. Hari Krishna & R. Kumar* 37336(BSJO).

Uses: It is used in toothache and joint pains.

3. *Blepharis* Juss.

Key to the species

- 1a. Leaves petiolate, acute. **2. *B. maderaspatensis***
b. Leaves subsessile, obtuse. **1. *B. integrifolia* var. *integrifolia***

1. *Blepharis integrifolia* var. *integrifolia* (L.f.) E.Mey. & Drège ex Schinz in Vierteljahrsschr. Naturf. Ges. Zürich 60: 416. 1915. *Blepharis repens* (Vahl) Roth, Nov. PL., Sp. 321. 1821; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 637.1991.

Procumbent herbs. Leaves subsessile, narrowly oblong to oblanceolate, 1.6-3 x 0.4-1.5 cm, entire, apex mucronate. Flowers sessile, axillary, solitary, violate or purple. Capsules ellipsoid, glabrous, 2-seeded. Seeds ellipsoid, hairy.

Fl. & Fr.: September - December.

Found in plains to gravelly soils.

Specimens examined: Near Taleti [24 58 26.04 N, 74 52 37.97 E, 543 m], *P. Hari Krishna & R. Kumar* 35672(BSJO); Near Paat village [25 02 14.93 N, 74 05 1 03.63 E, 424 m], *P. Hari Krishna & R. Kumar* 35435(BSJO).

2. *Blepharis maderaspatensis* (L.) Heyne ex Roth, Nov. PL., Sp. 320. 1821; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 637.1991. *Acanthus maderaspatensis* L., Sp. Pl. 2: 639. 1753. *Blepharis boerhaviaefolia* Pers. Syn. Pl. 2: 180. 1806; C.B. Clarke in Hook.f., Fl. Brit. India 4: 478. 1884; Duthie, Fl. Gangetic Plain 2: 183.1911.

Diffuse or suberect, pubescent herbs. Leaves in whorls of 4, 2 smaller and 2 larger at each nodes, 0.70 -8 x 0.6-3.5 cm, elliptic, ovate-lanceolate. Flowers 1.5-1.5 cm long, axillary in 2 to 3-flowered clusters. Corolla pale blue, with a yellow spot inside the lower lip. Capsules ellipsoid, brown, 2-seeded. Seeds suborbicular or ovoid, densely papillose.

Fl. & Fr.: August - January.

Common, in rock- crevices in moist shady places and thickets..

Specimens examined: Watch tower road [25 0 46.44 N, 74 48 39.57 E, 484 m], *P. Hari Krishna & R. Kumar* 35156(BSJO); Near Paat village [25

02 14.93 N, 74 05 1 03.63 E, 424 m], *P. Hari Krishna & R. Kumar* 35433(BSJO).

4. *Dicliptera* Juss.

Dicliptera paniculata (Forssk.) I. Darbysh. in Kew Bull. 62: 122. 2007. *Dianthera paniculata* Forssk., Fl. Aegypt.-Arab. 7. 1775. *Peristrophe paniculata* (Forssk.) Brummitt in Kew Bull. 38: 451. 1983; Pandey & Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 666. 1991.

Much branched, annual herbs, up to 1.5 m high. Stem hairy. Leaves 4-8 x 1.5-4 cm, ovate-lanceolate. Flowers in terminal and axillary, rosy-pink. Corolla 1.2-1.5 cm long, hairy outside. Capsules oblong-ellipsoid. Seeds 4, orbicular, brown.

Fl. & Fr.: September - February.

Common weed in open forests.

Specimens examined: Nandwas [24 58 10.30 N, 74 54 56.54 E, 482 m], *P. Hari Krishna & R. Kumar* 38438(BSJO); Near Taleti area [24 58 28.09 N, 74 52 41.27 E, 553 m], *P. Hari Krishna & R. Kumar* 35670(BSJO).

5. *Elytraria* A. Mich.

Elytraria acaulis (L.f.) Lindau in Engl. & Prantl, Pflanz. Nacht. 1: 304. 1897; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 637. 1991. *Justicia acaulis* L.f., Suppl. Pl. 84. 1781. *Elytraria crenata* Vahl., Enum. Pl. 1: 106. 1804; C.B. Clarke in Hook.f., Fl. Brit. India 4: 394. 1884. *Tubiflora acaulis* (L.f.) Kuntze, Rev. Gen. Pl. 1: 500. 1891; Duthie, Fl. Gangetic Plain 2: 180. 1911.

Erect herbs, up to 15 cm high. Leaves radical in a rosette, subsessile, 7-12 x 2.5-5 cm, obovate to oblanceolate, rounded or obtuse at apex, cuneate at base, dentate-margined, glabrous. Flowers in simple or branched spikes, white. Capsules ovoid, acute, brown. Seeds flattened, papillose, brown.

Fl. & Fr.: April - September.

Common, in moist - shaded localities in dry deciduous forests.

Specimens examined: Mahuria-Jhaleswar Nala [25 1 15.75 N, 74 48 14.93 E, 418 m], *P. Hari Krishna & R. Kumar* 35182 (BSJO); Forest closure Savannah [24 59 49.83 N, 74 54 51.14 E, 494 m], *P. Hari Krishna & R. Kumar* 35653(BSJO); Near Amarpura [25 04 35.56 N, 74 54 06.04 E, 430 m], *P. Hari Krishna & R. Kumar* 35739(BSJO).

Uses: It is used to cure diarrhoea.

6. *Eranthemum* L.

Eranthemum purpurascens Wight ex Nees in Wall., Pl. Asiat. Rar. 3: 106. 1832; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 646. 1991. *Daedalacanthus purpurascens* (Wight ex Nees) T. Anderson in J. Linn. Soc. Bot. 9: 488. 1867; C.B. Clarke in Hook.f., Fl. Brit. India 4: 420. 1884; Duthie, Fl. Gangetic Plain 2: 194. 1911.

Erect herbs, up to 1 m high. Leaves 5.5-7 x 3.5- 4 cm, ovate-elliptic, acuminate, cuneate at base. Flowers in terminal or axillary, dense spikes, blue. Bracts ovate-lanceolate, glandular pubescent. Seeds ellipsoid, densely hairy, brown.

Fl. & Fr.: September - March.

Occasionally found in moist and shady places.

Specimens examined: Near Modiya Mahadev area [24 59 38.96 N, 74 52 22.93 E, 489 m], *P. Hari Krishna & R. Kumar* 35652(BSJO).

7. **Haplanthodes** O. Kuntze

Haplanthodes verticillata (Roxb.) R.B. Majumdar in Bull. Bot. Soc. Bengal 25: 76. 1971; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 647. 1991. *Justicia verticillata* Roxb., Fl. Ind. 1: 135. 1832. *Haplanthus verticillaris* Nees in DC., Prod. 11: 513. 1847; C.B. Clarke in Hook.f., Fl. Brit. India 4: 506. 1884. *Bremekampia verticillata* (Roxb.) Sreemadh. in Bull. Bot. Surv. India 6: 323. 1965.

Annual herbs, up to 60 cm high. Leaves 5-10 x 2-5 cm, ovate, acute or acuminate. Flowers blue, greenish-white inside the throat. Capsules 0.6-1.3 cm long, oblong, acute, grooved, glabrous, whitish. Seeds oblong, yellowish-brown.

Fl. & Fr.: November - March.

Occasional in deciduous forests.

Specimen examined: Near Nal forest area [25 05 26.53 N, 74 56 49.02 E, 421 m], *P. Hari Krishna & R. Kumar* 35773(BSJO).

8. **Hygrophila** R. Br. *emend.* Heine

Key to the species

- 1a. Sepals up to 8 mm long. **1. H. polysperma**
b. Sepals more than 8 mm long. **2. H. serpyllum**

1. Hygrophila polysperma (Roxb.) T. Anderson in J. Linn. Soc. Bot. 9: 456. 1867; C.B. Clarke in Hook.f., Fl. Brit. India 4: 406. 1884; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 647. 1991.

Annual, herbs, suberect or procumbent, pubescent. Stems often rooting at lower nodes. Leaves ovate or elliptic-oblong, entire, subsessile. Flowers in terminal, dense spikes; bracts foliaceous, elliptic-lanceolate, hairy; beacteoles linear, ciliate on margin. Calyx 5-partite; segments linear-lanceolate, scarious and ciliate on margin. Corolla white, pink or bluish purple, c. 7 mm long, hairy. Capsules linear-oblong, c. 7 mm long, pubescent, brown.

Fl. & Fr.: September - March.

Common in marshy habitats.

Specimens examined: Ambapani [24 58 49 N, 74 51 25 E, 430 m], *P. Hari Krishna & Ramesh Kumar* 35557(BSJO); Mahudia- Maheshra [25 02 36.95 N, 74 52 09.32 E, 430 m], *P. Hari Krishna & Ramesh Kumar* 35604(BSJO).

2. *Hygrophila serpyllum* (Nees) T. Anderson in J. Linn. Soc. London Bot. 9: 456. 1867; Pandey in Shetty & Singh (eds.), *Fl. Rajasthan* 2: 652.1991; C.B. Clarke in Hook.f., *Fl. Brit. India* 4: 406. 1884. *Physichilus serpyllum* Nees in *Companion Bot. Mag.* 2: 311. 1837; Duthie, *Fl. Gangetic Plain* 2: 186. 1911.

Procumbent herbs, stem pubescent. Stem rooting at lower nodes. Leaves subsessile, 2 -2.5 x 1-1.4 cm, elliptic to elliptic-lanceolate, acute, entire. Flowers in terminal, leafy spikes, dense, white. Stamens 2, adnate at the throat of corolla. Capsules linear-oblong, many seeded. Seeds ovoid.

Fl. & Fr.: September - February.

Common in moist-marshy places.

Specimen examined: Near Bassi dam area [24 59 33.92 N, 74 49 30.19 E, 411 m], *P. Hari Krishna & R. Kumar* 38319(BSJO).

9. *Lepidagathis* Willd.

Lepidagathis cristata Willd., *Sp. Pl.* 3: 400. 1800; C.B. Clarke in Hook.f., *Fl. Brit. India* 4: 516. 1885; Pandey & Singh in Shetty & Singh (eds.), *Fl. Rajasthan* 2: 662. 1991. 'Aewal kangio'

Procumbent herbs, up to 30 cm high; branches quadrangular, almost winged, glabrous, spreading from a woody root-stock. Leaves sessile, 3-6 x 1.5-2 cm, linear-oblong, spinous-serrulate. Flowers in globose subradical heads borne in the lower parts of leafy branches, white. Capsules ovoid. Seeds 1.5-2.5 mm across, ovoid-oblong.

Fl. & Fr.: October - March.

Common, in rocky - gravelly habitats.

Specimens examined: Near Umar ki Khal [24 58 34.88 N, 74 54 00.86 E, 512 m], *P. Hari Krishna & R. Kumar* 35539 (BSJO); Mahudia Nalabandh [25 02 35.21 N, 74 52 16.76 E, 436 m], *P. Hari Krishna & R. Kumar* 35616 (BSJO); Semaldar to Taleti area [24 58 42.28 N, 74 52 34.52 E, 541 m], *P. Hari Krishna & R. Kumar* 37303(BSJO).

10. *Rostellularia* Rchb.

Key to the species

- 1a. Bracts, bracteoles and calyx-segments acute at apex; calyx-segments much longer than bracts..... **1. *R. diffusa* var. *prostrata***
- b. Bracts, bracteoles and calyx-segments obtuse at apex; calyx-segments slightly longer than bracts **2. *R. quinqueangularis***

1. ***Rostellularia diffusa* var. *prostrata*** (Roxb. ex C.B. Clarke) J.L. Ellis, Bull. Bot. Surv. India 30(1-4): 131. 1990. *Justicia prostrata* (C.B. Clarke) Gamble, Fl. Madras 2 (6): 1081. 1924; Pandey & Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 658. 1991. *J. diffusa* Willd. var. *prostrata* C.B. Clarke in Hook.f., Fl. Brit. India 4: 538. 1885..

Prostrate herbs, with spreading branches. Leaves 1-2 x 0.5-0.8 cm, ovate-elliptic or suborbicular, obtuse at apex, rounded at base, entire. Flowers in axillary and terminal spikes, pink. Capsules oblong-ellipsoid, grooved, beaked. Seeds ovoid-orbicular, black.

Fl. & Fr.: August- March.

Rare, prefers wet places in the forests.

Specimen examined: Near Sagarani [24 55 30.79 N, 74 52 43.22 E, 489 m], *P. Hari Krishna & R. Kumar* 35275(BSJO).

2. ***Rostellularia quinqueangularis*** (Koenig ex Roxb.) Nees in DC. Prodr. 11: 375. 1847. *Justicia quinqueangularis* Koenig ex Roxb. Fl. Ind. 1: 134. 1832; C.B. Clarke in Hook.f., Fl. Brit. India 4: 536. 1885; Duthie, Fl. Gangetic Plain 2: 209. 1911; Pandey & Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 659. 1991..

Glabrous herbs, up to 30 cm high. Leaves 2-2.5 x 0.5-0.8 cm, linear-oblong to elliptic or oblanceolate, entire, glabrous. Flowers in terminal, lax, elongated spikes, pink with purple streak in throat. Capsules oblong, pointed, stalked, glabrous. Seeds reticulately rugose, brown.

Fl. & Fr.: August - October.

Occasional, prefers sandy-loam soils along water channels among grasses.

Specimen examined: Jariya Mahadev water fall area [25 01 59.29 N, 74 53 1.91 E, 469 m], *P. Hari Krishna & R. Kumar* 35391(BSJO).

11. Ruellia Plum. ex L.

Key to the species

- 1a. Plants erect, capsule glabrous **1. R. patula**
b. Plants prostrate, capsule hairy **2. R. prostrata**

1. Ruellia patula Jacq. in Misc. Austriac. 2: 358. 1779. *Dipteracanthus patulus* (Jacq.) Nees var. *alba* (Saxton) Bhandari in Bull. Bot. Surv. India 6: 327. 1965 & Fl. Ind. Desert 301. 1978; Duthie, Fl. Gangetic Plain 2: 188.1911; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 641. 1991.

Pubescent herbs. Leaves 3-5 x 1.5 -3 cm, ovate-elliptic, obtuse, entire, hirsute. Flowers sessile, axillary, solitary. Bracteoles ca 1.5 cm long, elliptic. Corolla 4-5 cm long, white. Seeds suborbicular with white hairs.

Fl. & Fr.: July - November.

Occasionally found in rocky habitates.

Specimens examined: Badapani [25 03 11.82 N, 74 53 28.82 E, 435 m], *P. Hari Krishna & R. Kumar* 35750(BSJO).

2. Ruellia prostrata Poir. in Lam., Encycl. 6: 349. 1804; Clarke in Hook.f., Fl. Brit. India 4: 411. 1884. *Dipteracanthus prostratus* (Poir.) Nees in Wall., Pl. Asiat. Rar. 3: 81. 1832; Pandey & Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 642. 1991.

Prostrate herbs, up to 30 cm. Leaves ovate-elliptic to deltoid, strigose, base truncate to acute, apex subacute to obtuse. Flowers solitary, axillary, blue to violet. Stamens 4. Capsules ovoid to elliptic, beaked, thinly pubescent. Seeds, hygroscopically hairy.

Fl. & Fr.: September - March.

Common, in open forests.

Specimens examined: Watch tower road [25 00 46.44 N, 74 48 39.57 E, 484 m], *P. Hari Krishna & R. Kumar* 35154(BSJO); Jhaleshwar Mahadev gate [25 1 21.64 N, 74 48 20.12 E, 423 m], *P. Hari Krishna & R. Kumar* 35171(BSJO).

12. Rungia Nees

Key to the species

- 1a. Bracts uniform; upper lip of corolla notched at the apex **2. R. repens**

b. Bracts dimorphic; upper lip of corolla acute..... **1. R. pectinata**

1. Rungia pectinata (L.) Nees in DC., Prodr. 11: 469. 1847; Pandey & Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 670. 1991. *Justicia pectinata* L., Cent. Pl. 2: 3. 1756 & Amoen. Acad. 4: 299. 1759. *Rungia parviflora* (Retz.) Nees var. *pectinata* (L.) C.B. Clarke in Hook.f., Fl. Brit. India 4: 550. 1885. *R. parviflora* (Retz.) Nees var. *muralis* C.B. Clarke in Hook.f., l.c. 4: 550. 1885; Duthie, Fl. Gangetic Plain 2: 212. 1911.

Much-branched herbs. Stems pubescent. Leaves subsessile, 3-5 x 1.5 -3 cm, elliptic-lanceolate, serrulate. Flowers in terminal and axillary, dense, unilateral spikes; sterile bracts oblong-lanceolate, bracteoles oblong, scarious-margined. Corolla bi-labiate, blue; upper lip emarginate. Capsules ovoid, acute. Seeds orbicular, yellow.

Fl. & Fr.: September - May.

Common, in moist-shaded localities of forests.

Specimens examined: Modia Mhadev [24 59 06.22 N, 74 52 28.42 E, 528 m], *P. Hari Krishna & R. Kumar* 35542(BSJO); Near keljar [24 58 27.01 N, 74 48 47.99 E, 442 m], *P. Hari Krishna & R. Kumar* 38321(BSJO).

2. Rungia repens (L.) Nees in Wall., Pl. Asiat. Rar. 3: 110. 1832; C.B. Clarke in Hook.f., Fl. Brit. India 4: 549. 1885; Pandey & Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 670. 1991. *Justicia repens* L., Sp. Pl. 1: 15. 1753; Duthie, Fl. Gangetic Plain 2: 211.1911. (Plate-29). 'Kahrmor'

Procumbent herbs, often rooting at base. Leaves subsessile or shortly petiolate, 4 x 2 cm, elliptic-lanceolate, subentire. Flowers in terminal spikes. Bracts ovate-orbicular, foliaceous, pubescent. Corolla rosy-pink. Capsules ovoid-oblong, compressed, pubescent. Seeds ovoid, pale-brown.

Fl. & Fr.: August - November.

Common in open forests.

Specimen examined: Near Taleti [24 58 18 N, 74 52 36 E, 430 m], *P. Hari Krishna & R. Kumar* 35660(BSJO).

BIGNONIACEAE Juss.

Key to the genera

- 1a. Leaves simple..... **2.Tecomella**
 b. Leaves pinnate **1. Dolichandrone**

1.Dolichandrone (Fenzl) N. Seem.

Dolichandrone falcata (Wall. exDC.)Seem. In J. bot. 8:381.1870;C.B. Clarke in Hook.f., Fl. Brit. India 4: 380. 1884, excl. syn. *Bignonia atrovirens* Heyne ex Roth; Duthie, Fl. Gangetic Plain 2: 172. 1911; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 619.1991. *D. falcate* auct. non (Wall. exDC.)Seem. in J. Bot. 8: 381. 1870. *D. lawii* Seem. in J. Bot. 8: 380. 1870.

Small trees, up to 8m high. Leaves 1-pinnate, 6-12 cm long; leaflets 5-7 elliptic to suborbicular, opposite, 2.5- 4 x 1.6-4.0 cm ovate, entire. Flowers in terminal, white. Capsules 1.6-3.0 x 1.2-2.4cm, falcate, 2-valved, glabrous. Seeds broadly 4-angular, winged at both ends.

Fl. & Fr.: February - June.

Rarely found in dry deciduous forest.

Specimens examined: Near Mevasa gate [24 59 29.91 N, 74 48 52.83 E, 423 m], *P. Hari Krishna & R. Kumar* 35131 (BSJO); Near Mevasa [24 59 29.91 N, 74 48 52.83 E, 423 m], *P. Hari Krishna & R. Kumar* 35132(BSJO).

2. *Tecomella* Seem.

Tecomella undulata (Sm.) Seem. in Ann. Mag. Nat. Hist. ser. 3. 10: 30. 1862; & in J. Bot. 1: 18. 1863; Duthie, Fl. Gangetic Plain 2: 159. 1911; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 623. 1991. *Bignonia undulata* Sm., Exot. Bot. 1: 35. t. 19. 1804. *Tecoma undulata* (Roxb.) G. Don., Gen. Hist. 4: 223. 1838; C.B. Clarke in Hook.f., Fl. Brit. India 4: 378. 1884.

'*Rohira, Rohido*'

Small trees, up to 7 m high, with drooping branches and greyish-brown bark. Leaves subopposite, leaflets 5-13, simple, narrowly oblong, entire or undulate margined. Flowers in few-flowered corymbose racemes, orange-yellow. Corolla campanulate; limb 2-lipped. Capsules linear-oblong smooth. Seeds thin, winged.

Fl. & Fr.: December - March.

Rare in open forest areas (introduced).

Specimen examined: Near Sagarani [24 56 23.98 N, 74 52 57.98 E, 504 m], *P. Hari Krishna & R. Kumar* 38461(BSJO).

LENTIBULARIACEAE Rich.

Utricularia L.

Key to the species

- 1a. Peduncles bearing a whorl of spongy floats. **2. U. stellaris**
b. Peduncles without a whorl of spongy floats. **1. U. aurea**

1. Utricularia aurea Lour., Fl. Cochinch. 1: 26. 1790; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 612. 1991. *U. flexuosa* Vahl, Enum. Pl. 1: 198. 1804; C.B. Clarke in Hook.f., Fl. Brit. India 4: 329.1884, *p.p.*; Duthie, Fl. Gangetic Plain 2: 166. 1911.

Aquatic herbs, usually submerged, with much-branched. Leaves 2-6 cm long, usually in whorls of 4, dichotomously branched into linear segments. Traps suborbicular, lateral or at the point of forking. Flowers few, yellow. Capsules c. 3 mm across, globose with a long beak. Seeds prismatic.

Fl. & Fr.: December - March.

Rare, in ponds and lakes.

Specimens examined: Sarana Talab [24 59 51.46 N, 74 48 19.85 E, 486 m], *P. Hari Krishna & R. Kumar* 35452(BSJO); Near Sarana Talab [24 59 53.09 N, 74 48 23.70 E, 484 m], *P. Hari Krishna & R. Kumar* 35632(BSJO).

2. Utricularia stellaris L.f., Suppl. 86. 1781; C.B. Clarke in Hook.f., Fl. Brit. India 4: 328.1884; Duthie, Fl. Gangetic Plain 2: 165. 1911; Subr. Aquatic Ang. 33. f. 23. 1962; Singh in Shetty & Singh (eds.), Fl. Rajasthan 2: 614 .1991. *U. inflexa* Forssk. var. *stellaris* (L.f.) P. Taylor in Mitt. Bot. Staat. Munch. 4: 96. 1961 & in Kew Bull. 18: 189. 1964. (Plate-28).

Aquatic, floating herbs, stolons filiform, terete. Leaves whorled, ovoid, slightly compressed stalked, mouth lateral, upper-lip with 2-branched, appendages. Traps c. 2 mm long, ovoid, oblique. Corolla yellow, 2-lipped, glandular hairy. Capsules c. 4 mm long. Seeds discoid or 4 to 6-angled.

Fl. & Fr.: April - June.

Occasionally found in marshy habitats, lakes and ditches.

Specimens examined: Savarna lake [24 59 51.19 N, 74 45 21.63 E, 489 m], *P. Hari Krishna & R. Kumar* 37385(BSJO); Sarna Talab [24 57 20.79 N, 74 48 10.49 E, 454 m], *P. Hari Krishna & R. Kumar* 38355(BSJO).

VERBENACEAE J.St.Hil.

Key to the genera

- 1a. Shrubs; fruits of fleshy pyrenes, 2-seeded **1. Lantana**
b. Herbs; fruits of dry pyrenes, 1-seeded **2. Phyla**

1.Lantana L.

Key to the species

- 1a. Flowers white, in elongate spikes. **2. L. veronicifolia**
b. Flowers orange-yellow to pink or multicoloured, in condensed spikes.
..... **1. L. camara**

1. Lantana camara L., Sp. Pl. 2: 627. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 4: 562. 1885; Duthie, Fl. Gangetic Plain 2: 216. 1911; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 680. 1991. *L. aculeata* L. l.c. 2: 627. 1753. *L. camara* L. var. *aculeata* (L.) Moldenke in Torreya 34: 9. 1934.

Straggling or scandent shrubs up to 3 m high, with pale to yellowish-brown bark. Leaves 2 - 8 x 2-5 cm, ovate or ovate-oblong, crenate-serrate. Flowers orange-yellow, pink or multicoloured in umbellate spikes. Drupes 3-4 mm across, globose, 2-seeded, bluish-black when ripe.

Fl. & Fr.: Almost throughout the year.

Common weed in open forests and outskirts of forests.

Specimen examined: Amalda forest area [24 58 49.5 N, 74 51 25.23 E, 428 m], *P. Hari Krishna & R. Kumar* 35642(BSJO).

2. Lantana veronicifolia Hayek in Repert. Spec. Nov. Regni Veg. 2: 163. 1906. *L. wightiana* Wall. ex Gamble, Fl. Madras 2: 761. 1087. 1924; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 681. 1991. *L. indica* Roxb. var. *albiflora* Wight ex C.B. Clarke in Hook.f., Fl. Brit. India 4: 562. 1885. *L. indica sensu* Duthie, Fl. Gangetic Plain 2: 216. 1911, non Roxb. 1832.

Pubescent shrubs, up to 1.5 m high. Leaves 3.5-5 x 2-2.5 cm, ovate-lanceolate, base rounded, subacute at apex, crenulate, scabrid above, glandular-pubescent beneath. Flowers in axillary, elongated spikes, white. Drupes 2-3 mm across, globose, purplish-black, 2-seeded.

Fl. & Fr.: September -December.

Rare, found in the open forests and rocky places..

Specimens examined: Mevasa [24 59 38.27 N, 74 48 37.04 E, 430 m], *P. Hari Krishna & R. Kumar* 35136(BSJO); Semaldhar [24 56 59.11 N, 74 25 55.52 E, 521 m], *P. Hari Krishna & R. Kumar* 37377(BSJO); Near Maheshra [25 03 04.09 N, 74 53 03.31E, 420 m], *P. Hari Krishna & R. Kumar* 38339(BSJO).

2. Phyla Lour.

Phyla nodiflora (L.) E. Greene in Pittonia 4: 46. 1899; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 681. 1991. *Verbena nodiflora* L., Sp. Pl. 1: 20. 1753. *Lippia nodiflora* (L.) A. Rich. in Michaux, Fl. Bor.-Amer. 2: 15.

1803; Clarke in Hook.f., Fl. Brit. India 4: 563. 1885; Duthie, Fl. Gangetic Plain 2: 217. 1911. 'Jal- nim, Jal-butí'

Prostrate herbs, rooting at nodes. Leaves 0.4-2.6 x 0.7-1.8 cm, obovate-spathulate or oblanceolate. Flowers axillary, solitary in purplish-white. Drupes ellipsoid, enclosed within the persistent calyx, separating at maturity in to two, 1-seeded pyrenes .

Fl. & Fr.: Throughout the year

Common near riverbanks and marshy beds.

Specimen examined: Near Paat Khurd [25 00 16.67 N, 74 51 14.77 E, 416 m], *P. Hari Krishna & R. Kumar* 35310(BSJO).

LAMIACEAE Martinov

Key to the genera

- 1a. Plants trees **7. Tectona**
- b. Plants shrubs, undershrubs or herbs **2**
- 2a. Annuals or biennials herbs or under shrubs **4**
- b. Perennial shrubs **3**
- 3a. Leaves simple **2. Clerodendron**
- b. Leaves digitate **8. Vitex**
- 4a. Calyx tubular; stamens ascending **5**
- b. Calyx 2-lipped; stamens declinate **6**
- 5a. Calyx-teeth 5; upper lip of corolla flat, not hooded **1. Anisomeles**
- b. Calyx-teeth more than 5; upper lip of corolla hooded. **3. Leucas**
- 6a. Lower lip of corolla deflexed, concave or boat shaped
..... **4. Mesosphaerum**
- b. Lower lip of corolla decline, flat. **7**
- 7a. Corolla tube exceeding the calyx..... **6. Orthosiphon**
- b. Corolla tube not exceeding the calyx **5. Ocimum**

1. Anisomeles R.Br.

Key to the species

- 1a Branchlets tawny tomentose; leaf margin serrate. **2. A. malabarica**
- b. Branchlets pubescent; leaf margin crenate serrate. **1. A. indica**

1. Anisomeles indica (L.) Kuntze, Rev. Gen. Pl. 2: 512. 1891; Mukerjee in Rec. Bot. Surv. India 14 (1): 152. 1940; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 688. 1991. *Nepeta indica* L., Sp. Pl. 2: 571. 1753. *Anisomeles ovata* R. Br. in Ait., Hort. Kew. ed. 2: 2: 364. 1811; Hook.f., Fl. Brit. India 4: 672. 1885; Duthie, Fl. Gangetic Plain 2: 245. 1911. *Ballota disticha* L., Mant. Pl. 83.1767.

Perennial herbs. Stem and branches 4-angled, villous. Leaves 3.5 -5 x 2.5-4 cm, broadly ovate, crenate-serrate. Flowers sessile, in dense, axillary whorls, bluish-purple. Corolla 1.4 -2 cm long, villous. Nutlets ovoid, smooth, black.

Fl. & Fr.: August - December.

Occasional found in open forests and wastelands.

Specimen examined: Near Nal forest area [25 05 14.86 N, 74 56 55.32 E, 411 m], P. Hari Krishna & R. Kumar 35766(BSJO).

2. Anisomeles malabarica (L.) R. Br. ex Sims in Curtis. Bot. Mag. 46: t. 2071. 1819; Hook.f., Fl. Brit. India 4: 673. 1885; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 689. 1991. *Nepeta malabarica* L., Mant. Pl. Ait. 2: 566. 1771.

Tomentose undershrubs. Stems and branches obtusely in tetragonous. Leaves oblanceolate, 2.5-8 x 1.5 -2.5 cm, acute or acuminate, crenate-serrate. Flowers axillary whorls. Corolla pinkish purple, bilipped. Filaments hairy. Nutlets c. 0.4 cm long, ovoid-ellipsoid, smooth, compressed, blackish-brown.

Fl. & Fr.: August - December.

Occasional, in edges of forests.

Specimen examined: Devalgadh forest area [24 58 21.25 N, 74 50 55.87 E, 544 m], P. Hari Krishna & R. Kumar 37350(BSJO).

2.Clerodendron L.

Clerodendrum phlomidis L.f., Suppl. 292. 1781; C.B. Clarke in Hook.f., Fl. Brit. India 4: 590. 1885; Duthie, Fl. Gangetic Plain 2: 225. 1911; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2 : 677. 1991. 'Arni'

Perennial shrubs, up to 4 m high. Leaves deltoid-ovate, 1-5 x 1-4 cm, chartaceous, acute, subcordate at base, subentire, glabrous above, more or less puberulous and glandular-punctate beneath. Flowers in dichotomous, axillary and terminal cymes. Corolla yellowish-white. Drupes broadly obovoid, dry, wrinkled. Seeds 5-6 mm long, dull white.

Fl. & Fr.: August - March.

Occasional, found near human habitation around the fields and open forests.

Specimen examined: Near Muroli [25 03 03.34 N, 74 55 51.72 E, 433 m], *P. Hari Krishna & R. Kumar* 38463 (BSJO).

3. *Leucas* R.Br.

Key to the species

- 1a. Bracts foliaceous; mouth of calyx hairy within..... **2. *L. cephalotes***
b. Bracts linear, filiform; mouth of calyx glabrous or minutely pubescent within. **1. *L. aspera***

1. *Leucas aspera* (Willd.) Link, Enum. Pl. Hort. Berol. 2: 113. 1822; Hook.f., Fl. Brit. India 4: 690. 1885; Duthie, Fl. Gangetic Plain 2: 250. 1911; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 694. 1991; Singh, Monogr. Ind. Leucas: 43. 2001. *Phlomis aspera* Willd. Enum. Pl. Hort. Berol. 2: 621. 1809. 'Gotta'

Erect herbs, up to 50 cm high. Stem and braches with spreading hairs. Leaves sessile, 2.5 -7 x 0.8-1.5 cm, linear-lanceolate or lanceolate. Flowers white, in terminal, densely many-flowered, globose heads. Bracts linear, ciliate, spinulose at apex. Nutlets oblong, truncate at apex smooth or granulate, brown.

Fl. & Fr.: August - March.

Common in sandy- gravelly soil of open forests.

Specimens examined . Near Sagarani [24 55 30.79 N, 74 52 43.22 E, 489 m], *P. Hari Krishna & R. Kumar* 35274(BSJO); Near Fathepura forest area [25 04 29.74 N, 74 53 39.20 E, 394 m], *P. Hari Krishna & R. Kumar* 37317(BSJO); Kelzar village road [24 58 54.71 N, 74 46 54.5 E, 431 m], *P. Hari Krishna & R. Kumar* 35224(BSJO).

2. *Leucas cephalotes* (Koen. ex Roth) Spreng. Syst. Veg. 2 : 743. 1825; Hook.f., Fl. Brit. India 4 : 689. 1885; Duthie, Fl. Gangetic Plain 2 : 251. 1911; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2 : 695. 1991; Singh, Monogr. Ind. Leucas 15. 2001. *Phlomis cephalotes* Koen. ex Roth, Nov. PL., Sp. 262. 1821. *Leucas capitata* Desf. in Mem. Mus. Hist. Nat. Paris 11 : 8. t. 4. 1824. 'Gotta'

Annual herbs, up to 70 cm high. Leaves sessile, 3-7.5 x 1.3-3.5 cm, elliptic or elliptic-lanceolate, obtuse or subacute. Flowers white, in terminal, globose whorls. Bracts ovate-lanceolate to elliptic-lanceolate, acuminate, ciliate, green. Nuts oblong, smooth, brown.

Fl. & Fr.: August - October.

Common, in sandy-loam soils of flat terrain and narrow valleys.

Specimens examined: Near Mahesara forest area [25 03 05.08 N ,74 52 59.25 E, 422 m], *P. Hari Krishna & R. Kumar* 37379 (BSJO); Near Taleti [24 58 42.65 N, 74 52 50.68 E, 547 m], *P. Hari Krishna & R. Kumar* 35664(BSJO); Badapani [25 03 11.82 N, 74 53 28.82 E, 435 m], *P. Hari Krishna & R. Kumar* 35749(BSJO).

4. *Mesosphaerum* P. Browne

Mesosphaerum suaveolens (L.) Kuntze in Revis. Gen. Pl. 2: 525. 1891. *Hyptis suaveolens* (L.) Poit. in Ann. Mus. Nat. Hist. Paris. 7: 472. t. 29. f. 2. 1806; Hook.f., Fl. Brit. India 4: 630. 1885; Mukerjee in Rec. Bot. Surv. India 14 (1): 46. 1940; Raizada, Suppl. Duthie, Fl. Gangetic Plain 220.1976; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 690. 1991. *Ballota suaveolens* L., Syst. Nat. ed. 10. 1100. 1759.

Annual herbs or undershrubs. Leaves 2.5-8 x 2.5- 7.5 cm, broadly ovate crenate-serrulate. Flowers in in verticils or in short, stalked cymes, 2 to 5-flowered blue or bluish-purple. Nutlets oblong, compressed, pubescent, emarginate at apex.

Fl. & Fr.: Allmost throughout the year.

Common weed of open forests and wastelands.

Specimens examined: Jariya Mahadev water fall area [25 01 59.29 N, 74 53 1.91 E, 469 m], *P. Hari Krishna & R. Kumar* 35388(BSJO); Near Nahargarh [25 03 41.9 N, 74 53 25.12 E, 493 m], *P. Hari Krishna & R. Kumar* 35647(BSJO); Near Jharia Mahadev [25 02 00.40 N, 74 53 07.51 E, 250 m], *P. Hari Krishna & R. Kumar* 35683 (BSJO).

5. *Ocimum* L.

Key to the species

- 1a. Calyx-tube villous or hirsute within 2
- b. Calyx-tube glabrous within **3. *O. gratissimum***
- 2a. Corolla upto 1 cm long **2. *O. filamentosum***
- b. Corolla upto 7 mm long **1. *O. americanum***

1. *Ocimum americanum* L. in Cent. Pl. I: 15. 1755. *O. canum* L., Sims. in Curtis, Bot. Mag. 51:t.2452.1824; Hook.f., Fl. Brit. India 4: 607. 1885; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 701. 1991.

Much-branched herbs, up to 60 cm high; stems with simple, white hairs. Leaves 2.5-3.5x 0.6-1 cm, ovate-lanceolate, obtuse, entire. Verticillasters densely flowered, in up to 20 cm long, spiciform racemes. Corolla white to purplish. Nutlets narrowly ovoid, brownish - black.

Fl. & Fr.: Almost throughout the year.

Common in open forests.

Specimens examined: Near Mahesara forest area [25 03 07.28 N, 74 52 56.40 E, 420 m], *P. Hari Krishna & R. Kumar* 37361(BSJO); Kevdiya forest chowki [24 59 15.85 N, 74 49 47.22 E, 412 m], Near Bobla Kala [24 59 21.77 N, 74 47 1.85 E, 432 m], *P. Hari Krishna & R. Kumar* 38344(BSJO).

Uses: It is used in cold and fever.

2. *Ocimum filamentosum* Forssk. in *Fl. Aegypt.-Arab.* 108. 1775. *O. adscendens* Willd., *Sp. Pl.* 3 (1): 166. 1800; Hooker's, *Fl. Brit. India* 4: 609.1885; Gamble, *Fl. Madras* 2: 1112. 1924. *Becium filamentosum* (Forssk.) Chiov. in *Nuovo Giorn. Bot. Ital. n.s.*, 26: 162. 1919.

Perennial erect herbs, 30-50 cm high. Leaves elliptic- ovate, obovate-lanceolate, 1-4 × 1-3 cm, cuneate or attenuate at base, serrate along margin, obtuse at apex. Racemes lax, whorls few-flowered, distant, bracts sessile, each bract subtending 3 flowers. Corolla pinkish-white. Stamens 4, didynamous, twice as long as corolla, anther 1-celled, oblong. Nutlets orbicular, compressed, smooth, reddish brown.

Fl. & Fr.: July - October.

Occasional found in open forests.

Specimen examined: Near Modiya mahadev [24 59 35.73 N, 74 52 30.62 E, 502 m], *P. Hari Krishna & R. Kumar* 35344 (BSJO).

3. *Ocimum gratissimum* L., *Sp. Pl.* 2: 1197. 1753; Hook.f., *Fl. Brit. India* 4: 608. 1885; Duthie, *Fl. Gangetic Plain* 2: 234. 1911; Parmar in Shetty & Singh (eds.), *Fl. Rajasthan* 2: 702. 1991.

Undershrubs, up to 2 m high. Leaves 4.5-7 x 3-4 cm, ovate, subacuminate at apex, cuneate at base, crenate-serrate, pubescent on both surfaces; petioles as long as the lamina. Flower whorls in long racemes. Calyx up to 2.6 mm long, pubescent outside, glabrous inside. Corolla reddish pink, ca 5 mm long, pubescent outside. Nutlets ellipsoid, warty, with a glandular depression, dark brown.

Fl. & Fr.: August - January.

Rare, in moist-shaded localities of forests and along exposed hilly tracts.

Specimen examined: Devalgadgh forest area [24 58 20.74 N, 74 51 03.67 E, 489 m], *P. Hari Krishna & R. Kumar* 37344(BSJO).

6. *Orthosiphon* Benth.

Orthosiphon pallidus Benth., Lab. Gen. & Sp. 708. 1835 & in Hook. Bot. Misc. 3: 370. 1853; Hook.f., Fl. Brit. India 4: 613. 1885; Duthie, Fl. Gangetic Plain 2: 236.1911; Mukerjee in Rec. Bot. Surv. India 14 (1): 23. 1940; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 703. 1991. '*Ban Tulsī*'

Small herbs or undershrubs, up to 25 cm high. Leaves 1.3-5 x 0.7-2 cm, ovate usually obtuse, crenate-serrate. Flowers 6-flowered whorls white or lilac. Corolla 0.4-0.6 cm long. Nutlets subglobose, smooth, yellowish-brown.

Fl. & Fr.: August - December.

Occasionally found in moist - rocky habitats.

Specimens examined: Near Panduria [24 58 31.31 N, 74 53 20.19 E, 512 m], *P. Hari Krishna & R. Kumar* 35335(BSJO); Near Modiya Mahadev area [24 59 35.73 N, 74 52 30.62 E, 502 m], *P. Hari Krishna & R. Kumar* 35344(BSJO); Near Ram Mandir-Bassi [25 00 01.16 N, 74 47 09.02 E, 435 m], *P. Hari Krishna & R. Kumar* 35301(BSJO).

7. *Tectona* L.

Tectona grandis L.f., Suppl. 151. 1781; C.B. Clarke in Hook.f., Fl. Brit. India 4: 570. 1885; Duthie, Fl. Gangetic Plain 2: 220. 1911; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 682. 1991. '*Sagwan*'

Large trees, trunk and pale brown. Leaves very large, 8-30 x 6-15 cm, broadly elliptic, subentire, glabrescent above, stellate pubescent beneath. Flowers white or cream coloured. Drupes 1.0-1.5 cm across, subglobose. Seeds oblong, enclosed in enlarged calyx, brown.

Fl. & Fr.: August - May.

Rare in forests, usually introduced and cultivated in some areas of sanctuary.

Specimen examined: Near Sagarani [24 55 32.13 N, 74 52 30.64 E, 491 m], *P. Hari Krishna & R. Kumar* 35287(BSJO).

8. *Vitex* L.

Vitex negundo L., Sp. Pl. 2: 638. 1753; C.B. Clarke in Hook.f., Fl. Brit. India 4: 583. 1885; Duthie, Fl. Gangetic Plain 2: 224.1911; Pandey in Shetty & Singh (eds.), Fl. Rajasthan 2: 684. 1991. '*Nirgundi*'

Shrubs, up to 4 m high. Stem white or grey pubescent. Leaves 3-5-foliolate. Leaflets 4-10 x 1.5-2.5 cm, entire or coarsely serrate, pale greyish-pubescent beneath. Flowers simple bluish-purple. Drupes glabrous, black when ripe with persistent calyx.

Fl. & Fr.: Almost throughout the year.

Common along the river banks or on road sides.

Specimens examined: Near Mevasa Gate [24 59 38.27 N, 74 48 37.04 E, 430 m], *P. Hari Krishna & R. Kumar* 35137(BSJO); Near Amarpura [25 04 41.75 N, 74 54 08.38 E, 394 m], *P. Hari Krishna & R. Kumar* 35738(BSJO).

Order: Asterales Link

CAMPANULACEAE Juss.

Wahlenbergia Schrad. ex Roth

Wahlenbergia marginata (Thunb.) A. DC., Monogr. Campan. 143. 1830. *Campanula marginata* Thunb., Fl. Jap. 89. 1784. *Wahlenbergia gracilis* (G. Forst.) DC., Monogr. Campan. 142. 1830; C.B. Clarke in Hook.f., Fl. Brit. India 3: 429. 1881; Duthie, Fl. Gangetic Plain 498. 1905; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 454 - 455. 1987.

Perennial herbs, up to 30 cm high. Leaves sessile, 1.2-3 x 0.3-1.3 cm, linear-oblong, entire glabrous above, pubescent beneath. Flowers blue, in lax cymose panicles. Capules ca 0.5 cm long, turbinate, crowded with the calyx lobes. Seeds smooth, yellowish.

Fl. & Fr.: February - May.

Occasional in open moist places.

Specimens examined: Muroli forest area [25 03 03.34 N, 74 55 51.72 E, 433 m], *P. Hari Krishna & R. Kumar* 35591(BSJO); Near Sarana lake [24 59 51.76 N, 74 48 21.97 E, 487 m], *P. Hari Krishna & R. Kumar* 38372(BSJO).

MENYANTHACEAE Dumort.

Nymphoides Seguiet

Nymphoides indica (L.) Kuntze, Revis. Gen. Pl. 2: 429. 1891; Duthie, Fl. Gangetic Plain 2: 79. 1911; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 2: 499. 1991. *Menyanthes indica* L., Sp. Pl. 1: 145. 1753. *Limnanthemum indicum* (L.) Griseb., Gen. Sp. Gent. 343. 1839; C.B. Clarke in Hook.f., Fl. Brit. India 4: 131. 1883. (Plate-26). *'Kumudani'*

Perennial herb. Stem scale-like leaves. Floating leaves up to 30cm in diam, coarsely serrate-crenate, thick, glabrous. Flowers creamy white with yellow throat. Capsules ca 0.6 x 0.4 cm, obovoid or oblong-ovoid. Seeds many globose, pale-brown.

Fl. & Fr.: October - December.

Occasionally found in marshy habitat.

Specimens examined: Jhaleshwer [24 57 20.79 N, 74 48 10.49 E, 454 m], *P. Hari Krishna & R. Kumar* 38354(BSJO); Sama Talab [24 59 51.76 N, 74 48 21.97 E, 492 m], *P. Hari Krishna & R. Kumar* 38359(BSJO).

ASTERACEAE Bercht. & J.Presl

Key to the genera

- 1a. Involucral bracts spinescent or aristate **2**
- b. Involucral bracts neither spinescent, nor aristate **5**
- 2a. Heads 1-flowered, crowded in dense globose compound heads.
..... **10. Echinops**
- b. Heads many-flowered, distinct, simple **3**
- 3a. Densely woolly herbs; leaves entire. **9. Dicoma**
- b. Glabrous or hispid herbs; leaves, some or all, lobed or pinnatifid..... **4**
- 4a. Involucral bracts of female heads 2-beaked, clothed with hooked spines, enclosing achenes utricle **28. Xanthium**
- b. Involucral bracts not form utricles as above **19. Oligochaeta**
- 5a. Heads homogamous, either male or female or bisexual **6**
- b. Heads heterogamous, outer florets usually female, inner ones bisexual or male. **13**
- 6a. Heads with ligulate florets only. **7**
- b. Heads with tubular florets only. **9**
- 7a. Pappus of extremely short, 2-3 seriate scales. **6. Cichorium**
- b. Pappus of equal or unequal, multiseriate scales. **8**
- 8a. Leaves mostly cauline; achenes with a narrow base and truncate apex.....**24. Sonchus**
- b. Leaves mostly rosulate; achenes truncate at both ends**18. Launaea**
- 9a. Heads compound. **17. Lagascea**

b. Heads simple	10
10a. Leaves opposite, at least in the lower region.	2. Ageratum
b. Leaves alternate and radical.	11
11a. Involucral bracts 1-serrate	12. Emilia
b. Involucral bracts 2 to many seriate.	12
12a. Anther base sagitate, tailed.	22. Pulicaria
b. Anther base obtuse, not tailed.	7. Cyanthillium
13a. Heads globular compound	25. Sphaeranthus
b. Heads simple, distinct	14
14a. Leaves opposite, at least in the lower region	15
b. Leaves alternate or radical.	21
15a. Leaves trifoliolate or pinnate	3. Bidens
b. Leaves simple, entire or serrate-dentate	16
16a. Plea concave, embracing the florets or achenes	17
b. Plea flat, not embracing the florets or achenes	20
17a. Ray florets 2-many seriate.	11. Eclipta
b. Ray florets 1-seriate.	18
18a. Florets white	4. Blainvillea
b. Florets yellow.	19
19a. Achenes armed with 2, terminal spines.	1. Acanthospermum
b. Achenes unarmed.	23. Siegesbeckia
20a. Achenes with pointed spines.	26. Synedrella
b. Achenes without pointed spines.	27. Tridax
21a. Ray florets ligulate.	22
b. Ray florets narrow, tubular not ligulate.	24
22a. Pappus of 2, stiff awns	23
b. Pappus of more than 2 hairs, bristles or scales.	22. Pulicaria
23a. Florets white.	20. Parthenium
b. Florets yellow.	13. Glossocardia
24a. Anther base obtuse or truncate.	25

- b. Anther base tailed. 26
- 25a. Papus present. 16. **Grangea**
- b. Papus absent. 8. **Cyathocline**
- 26a. Involucral bracts dry, scarious 27
- b. Involucral bracts herbaceous. 5. **Blumea**
- 27a. Heads in leafy spikes or leaf clusters. 28
- b. Heads in leafless corymbs..... 21. **Pseudognaphalium**
- 28a. Heads in axillary and terminal clusters..... 15. **Gnomophalium**
- b. Heads in spikes..... 14. **Gnaphalium**

1. **Acanthospermum** Schrank

Acanthospermum hispidum DC., Prodr. 5: 522. 1836; Raizada, supp. Duthie, Fl. Gangetic Plain 99. 1976. *A. austral* sensu Raizada and Sharma in Ind. For. 88(5): 364. 1962, non Kuntze, 1891; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 390. 1987. 'Dokanta'

Annual, hispid herbs, up to 50 cm tall. Leaves opposite, sessile or sub sessile, 0.6-8 x 0.5-4.5 cm, elliptic, obovate or spatulate. Heads pale-yellow, sub sessile, c. 1 cm across, solitary, axillary. Ray florets 5-8, female. Disc florets bisexual, tubular.

Fl. & Fr.: July - October.

Common weed in open forests.

Specimen examined: Near Sagarani [24 55 30.79 N, 74 52 43.22 E, 489 m], *P. Hari Krishna & R. Kumar* 35273(BSJO).

2. **Ageratum** L.

Ageratum conyzoides L., Sp. Pl. 2: 839. 1753; Hook.f., Fl. Brit. India 3: 243. 1881; Duthie, Fl. Gangetic Plain 1: 443. 1905; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 391. 1987. 'Bhakumbar'

Erect, hairy herbs; up to 80 cm high. Leaves opposite, 2.6-9 x 0.7-9 cm, broadly ovate, ovate-lanceolate or ovate-oblong, with ciliate margins. Corolla white or blue. Achenes ca 0.5 cm long, black. Pappus of 5 scales.

Fl. & Fr.: Almost round the year.

Common in moist-shaded places.

Specimen examined. Near Gopalpura [25 02 26.94 N, 74 50 23.62 E, 388 m], *P. Hari Krishna & R. Kumar* 38338(BSJO).

3. *Bidens* L.

Key to the species

- 1a. Leaves 2-3 pinnatifid; Heads yellow or yellowish-brown.....
..... **1. *B. bipinnata***
- b. Leaves pinnate or bipinnate; Heads white or yellowish-white.....
..... **2. *B. biternata***

1. *Bidens bipinnata* L., Sp. Pl. 2: 832. 1753; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 394. 1987; H.J. Chowdhery in Hajra & al., Fl. India 12: 367. 1995. *B. pilosa* L. var. *bipinnata* Hook.f., Fl. Brit. India 3: 309. 1881.

Annual herbs, up to 1.5 m high; stem glabrous. Leaves opposite, 5-15 cm long, 2-3 pinnatifid or pinnate; ovate-lanceolate, serrate, thinly hairy. Heads solitary, terminal, yellow or yellowish-brown. Achenes 0.6-3 cm long, linear, glabrous or sparsely hairy. Pappus setae 2-4, brown.

Fl. & Fr.: August - November.

Common under shades in mixed forests.

Specimens examined: Sarna Lake [24 59 51.17 N, 74 48 22.95 E, 491 m], *P. Hari Krishna & R. Kumar* 35139(BSJO); near Hanuman Chowaraha [24 59 43.59 N, 74 48 39.24 E, 493 m], *P. Hari Krishna & R. Kumar* 35481(BSJO).

2. *Bidens biternata* (Lour.) Merr. & Sherff in Bot. Gaz. 88: 293. 1929; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 394. 1987; H.J. Chowdhery in Hajra & al., Fl. India 12: 367. 1995. *Coreopsis biternata* Lour. Fl. Cochinch. 508. 1790. *Bidens pilosa* sensu Hook.f., Fl. Brit. India 3: 309. 1881.

'Karakokdi'

Erect herbs, up to 55 cm high; stems pubescent. Lower leaves 5-10 cm long, opposite, pinnate or bipinnate. Heads white or yellowish-white. Ray florets usually 3. Achenes linear, tetragonal, glabrous.

Fl. & Fr.: August - December.

Common in waste places, gardens, cultivated fields etc.

Specimen examined: Jhaleswar Mahadev [25 01 20.41 N, 74 48 26.32 E, 414 m], *P. Hari Krishna & R. Kumar* 35189 (BSJO).

4. *Blainvillea* Cass.

Blainvillea acmella (L.) Philipson in Blumea 6: 350. 1950; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 394. 1987. *Verbesina acmella* L., Sp. Pl. 2: 901. 1753. *B. latifolia* L.f., Suppl. 378. 1781. *Blainvillea rhomboidea*

Cass. in Dict. Sci. Nat. 29: 493. 1823; Duthie, Fl. Gangetic Plain 1: 469.1905. *B. latifolia* (L.f.) DC. in Wight, Contr. Bot. Ind. 17. 1834; Hook.f., Fl. Brit. India 3: 305. 1881.

Erect, annual, hispid herbs, up to 65 cm high. Leaves 2.6-8 x 1-4 cm, ovate-lanceolate, ovate or ovate-rhomboid. Heads solitary, 0.6-0.8 cm across, white or yellow, in axillary and terminal cymes. Ray florets with 2-dentate corolla. Pappus unequal, plumose.

Fl. & Fr.: August - October.

Common in open forests.

Specimens examined: Sarna Lake [24 59 51.17 N, 74 48 22.95 E, 491 m], *P. Hari Krishna & R. Kumar* 35147(BSJO); Jhaleswar Mahadev[25 00 56.90 N, 74 4759.43 E, 421 m], *P. Hari Krishna & R. Kumar* 35193(BSJO); Nandwai to Amla route[25 00 37.49 N, 74 56 55.58 E, 432 m], *P. Hari Krishna & R. Kumar* 35262(BSJO); Semaldar [24 59 37.69 N, 74 52 31.35 E, 493 m], *P. Hari Krishna & R. Kumar* 35703(BSJO).

5. *Blumea* DC.

Key to the species

- 1a. Heads solitary, axillary or terminal **2**
- b. Heads many, variously paniculate or clustered. **3**
- 2a. Leaves entire, leaves irregularly- dentate; corolla hairy on the lobes
 **4. B. oxyodonta**
- b. Leaves apiculate, serrate-dentate, uppermost leaves spiral; involucre bracts longer than the florets **3. B. obliqua**
- 3a. Leaves sessile, lacinate; leaves lyrate lobed; heads yellow
 **2. B. lacera**
- b. Leaves distinctly petiolate; leaves not lyrate lobed; heads purplish.
 **1. B. axillaris**

1. *Blumea axillaris* (Lam.) DC. in Prodr. 5: 434. 1836. *B. mollis* (D. Don) Merr. in Philipp. J. Sci. 5: 395. 1910; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 398. 1987; Sarv. Kumar in Hajra & al., Fl. India 13: 135-137. f. 41. 1995.

Slender herbs, up to 50 cm high. Leaves 1.6-7 x 0.5-3 cm, ovate-oblong. Heads c. 0.6 cm across, pale to bright-purple. Corolla of bisexual florets tubular, white at base. Achenes pubescent, brown. Pappus white.

Fl. & Fr.: February - May.

Common in dry deciduous forests.

Specimens examined: near Umar ki Khal [24 58 34.88 N, 74 54 00.86 E, 512 m], *P. Hari Krishna & R. Kumar* 35540(BSJO); near Panduria [24 58 36.47 N, 74 53 08.26 E, 524 m], *P. Hari Krishna & R. Kumar* 35550 (BSJO); near Gopalpura [25 02 26.94 N, 74 50 23.62 E, 388 m], *P. Hari Krishna & R. Kumar* 38377(BSJO); Bassi Dam [24 59 34.32 N, 74 49 26.56 E, 409 m], *P. Hari Krishna & R. Kumar* 38314(BSJO).

2. *Blumea lacera* (Burm. f.) DC. in Wight, Contr. Bot. Ind. 14. 1834; Hook.f., Fl. Brit. India 3: 263. 1881; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 396. 1987. *Conyza lacera* Burm.f., Fl. Ind. 180. t. 59. f. 1. 1768..

Aromatic herbs, up to 1 m high. Leaves 1.6 - 5 x 0.6 - 2.5 cm, elliptic-ovate or obovate, acute or obtuse, entire or coarsely dentate, glandular and densely hairy. Heads yellow, c. 0.6 cm across, in axillary and terminal panicles. Involucral bracts linear- acute, glandular hairy, slightly longer than the florets. Achenes oblong, sparsely hairy, brown. Pappus white.

Fl. & Fr. December - May.

Common weed of wastelands.

Specimens examined: Ambapani [24 58 53.34 N, 74 51 16.42 E, 433 m], *P. Hari Krishna & R. Kumar* 35574(BSJO); near Palka[24 58 27.01 N, 74 48 47.99 E, 442 m], *P. Hari Krishna & R. Kumar* 38335(BSJO); near Shivpura [25 02 16.35 N, 74 51 47.30 E, 447 m], *P. Hari Krishna & R. Kumar* 38398 (BSJO).

3. *Blumea obliqua* (L.) Druce in Bot. Soc. Exch. Club Brit. Isles. Rep. 4: 609. (1916)1917; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 398. 1987; Sarv. Kumar in Hajra & al. (eds.), Fl. India 13: 137. f. 42. 1995. *Erigeron obliquum* L., Mant. Pl. 2: 573. 1771. *Blumea amplexens* DC. in Wight, Contr. Bot. Ind. 13. 1834 & Prod. 5: 483. 1836; Hook.f., Fl. Brit. India 3: 260. 1881.

Glabrous herbs, up to 55 cm high. Leaves 0.6-8 x 0.3-2.5 cm, elliptic-oblong to lanceolate. Heads yellow, 0.5-1 cm across, solitary, axillary or terminal. Corolla of bisexual florets tubular. Achenes pubescent, dark-brown. Pappus yellowish-white.

Fl. & Fr.: October - May.

Common in moist places.

Specimen examined: Near Jharia Mahadev [25 01 51.29 N, 74 53 01.91 E, 469 m], *P. Hari Krishna & R. Kumar* 35506(BSJO).

4. **Blumea oxyodonta** DC. in Wight, Contr. Bot. Ind. 15. 1834; Hook.f., Fl. Brit. India 3: 266. 1881; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 399. 1987; Sarv. Kumar in Hajra & al., Fl. India 13: 139. f. 43. 1995.

Annual herbs, up to 50 cm high; branches with whitish-silky hairs. Leaves 0.5-8 x 0.3-3.5 cm, serrate-dentate, villous. Heads yellow, in terminal and axillary. Achenes oblong, 4-5 angled, pale-brown. Pappus white.

Fl. & Fr.: January - March.

Common weed of cultivated fields.

Specimens examined: Badapani [25 04 45.99 N, 74 55 24.91 E, 417 m], *P. Hari Krishna & R. Kumar* 38405(BSJO); Badapani area [25 4 45.98 N, 74 55 24.82 E, 419 m], *P. Hari Krishna & R. Kumar* 38406(BSJO).

6. **Cichorium** L.

Chichorium intybus L., Sp. Pl. 2: 813. 1753; Hook.f., Fl. Brit. India 3: 391. 1881; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 403. 1987; Mamgain in Hajra & al., Fl. India 12: 248. f. 60. 1995. 'Chikory'

Perennial herbs. Stems angled, glabrous or hairy. Leaves 1.5-7.5 x 1-2.5 cm; lower leaves variable, oblong, oblong-lanceolate, pinnatifid, runcinate-pinnatifid or dentate along the margins. Heads 0.8-1.2 cm across, bright purple, solitary or clustered, axillary or terminal. Achenes obovoid-conical, compressed, angled, many ribbed, glabrous. Pappus pale, very short.

Fl. & Fr.: October - March.

Commonly found in near cultivated fields and waste places.

Specimen examined: Near Muroli [25 02 46.79 N, 74 55 44.49 E, 443 m], *P. Hari Krishna & R. Kumar* 38459 (BSJO).

7. **Cyanthillium** Blume

Cyanthillium cinereum (L.) H. Rob. in Proc. Biol. Soc. Washington 103: 252. 1990. *Vernonia cinerea* (L.) Less in Linnaea 4: 291. 1829; Hook.f., Fl. Brit. India 3: 233. 1881; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 441. 1987.

Annual herbs, up to 1.5 m high; stems glandular-pubescent. Leaves 1.4-7 x 0.7-3 cm, ovate to obovate or elliptic, entire or dentate. Heads violet or pink, 0.6-1.5 cm long. Achenes c. 0.10 cm long, oblong, terete, hairy, brown. Pappus hairs white or fulvous.

Fl. & Fr.: Throughout the year.

Common throughout, in variable habitats.

Specimens examined: Crocodile view point-Bassi dam [25 0 35.97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35116(BSJO); near Sagarani [24 55 32.13 N, 74 52 30.64 E, 491 m], *P. Hari Krishna & R. Kumar* 35282(BSJO); Semaldar [24 59 37.69 N, 74 52 31.35 E, 493 m], *P. Hari Krishna & R. Kumar* 35706(BSJO).

8. *Cyathocline* Cass.

Cyathocline purpurea (Buch.-Ham. ex D. Don) Kuntze, Rev. Gen. Pl. 333. 1891; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 407. 1987; Hajra in Hajra & al., Fl. India 12: 111. f. 32. 1995. *Tanacetum purpureum* D. Don, Prodr. Fl. Nepal. 181. 1825. *Cyathocline lyrata* Cass. in Ann. Sci. Nat. (Paris) 17: 420. 1829; Hook.f., Fl. Brit. India 3: 246. 1881. (Plate-22).

'Bandhariya'

Aromatic herbs, up to 50 cm high. Leaves sessile, 3-9 cm long; cauline leaves pinnatisect. Heads 0.5-0.8 cm across, purple, in terminal. Corolla of ray florets ca 1.6 cm long. Achenes glabrous, pale-brown. Pappus absent.

Fl. & Fr.: September - April.

Common in moist localities.

Specimen examined: Near Jharia Mahadev [25 01 51.29 N, 74 53 01.91 E, 469 m], *P. Hari Krishna & R. Kumar* 35508(BSJO).

9. *Dicoma* Cass.

Dicoma tomentosa Cass. in Bull.Sci. Soc. Philom. Paris 47: 1818; Hook.f., Fl. Brit. India 3: 387. 1881; Duthie, Fl. Gangetic Plain 1: 487.1905; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 408. 1987; R.R. Rao in Hajra & al., Fl. India 13: 171. f. 53. 1995.

Much-branched herbs, up to 45 cm high; stems terete, clothed with white-cottony wool. Leaves sessile or sub-sessile, 2.6-7.5 x 0.6-1.5 cm, linear or linear-obovate. Heads 0.7-1.3 cm across, pale-yellow, solitary, axillary. Achenes tomentose, pale-brown. Pappus feathery.

Fl. & Fr.: August - March.

Common in dry sandy habitats.

Specimens examined: Nal Bada Anikat [25 05 28.85 N, 74 56 40.59 E, 439 m], *P. Hari Krishna & R. Kumar* 35593(BSJO); near Fathepura forest area [25 04 31.19 N, 74 53 39.19 E, 398 m], *P. Hari Krishna & R. Kumar* 37315(BSJO); Muroli forest area [25 03 33.56 N, 74 56 02.39 E, 432 m], *P. Hari Krishna & R. Kumar* 38410(BSJO).

10. *Echinops* L.

Echinops echinatus Roxb., Fl. Ind. (Ed. Carey) 3: 447. 1832; Hook.f., Fl. Brit. India 3: 358. 1881; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 408. 1987; Hajra in Hajra & al., Fl. India 12: 178. 1995. (Plate-23).
'Oont-Kanta'

Much-branched, herbs, up to 50 cm high; branches with cottony pubescence. Leaves sessile, 1.6-10 x 1.5 - 4 cm, pinnatifid, glabrous. Heads 2.6-4 cm across, white or pale-blue, solitary, terminal. Achenes 0.5-0.8 cm long, villous. Pappus yellowish.

Fl. & Fr.: October - June.

Common in open forest in dry habitats.

Specimen examined: near Maheshra forest [25 03 01.61 N, 74 52 23.74 E, 443 m], *P. Hari Krishna & R. Kumar* 35521 (BSJO).

11. *Eclipta* L.

Eclipta prostrata (L.) L., Mant. Pl. 2: 286. 1771; H.J. Chowdhery in Hajra & al., Fl. India 12: 381. f. 103. 1995. *Verbesina prostrata* L., Sp. Pl. 2: 902. 1753. *E. erecta* L., Mant. Pl. 2: 286. 1771. *Eclipta alba* (L.) Hassk., Pl. Jav. Rar. 528. 1848; Hook.f., Fl. Brit. India 3: 304. 1881; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 409. 1987. (Plate-23).
'Bhringraj'

Annual, hirsute herbs; stems and branches terete. Leaves 1-6 x 0.4-5 cm, ovate, elliptic, oblong or lanceolate. Heads 0.6-1.5 cm across, white, axillary or terminal peduncles. Ray florets female or sterile. Achenes cuneate. Pappus absent or of minute hairs.

Fl. & Fr.: Almost throughout the year.

Common in moist places.

Specimens examined: near Amalda [24 59 18.26 N, 74 56 45.14 E, 456 m], *P. Hari Krishna & R. Kumar* 35265(BSJO); Near Modiya Mahadev area [24 59 06.22 N, 74 52 28.42 E, 528 m], *P. Hari Krishna & R. Kumar* 35551(BSJO); Badapani [25 4 45.90 N, 74 55 24.68 E, 418 m], *P. Hari Krishna & R. Kumar* 38407(BSJO); near Paat Khurd [25 00 16.67 N, 74 51 14.77 E, 416 m], *P. Hari Krishna & R. Kumar* 35312(BSJO).

12. *Emilia* Cass.

Emilia sonchifolia (L.) DC. in Wight, Contr. Bot. Ind. 24. 1834; Hook.f., Fl. Brit. India 3: 336. 1881; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 410. 1987; R. Mathur in Hajra & al., Fl. India 13: 212. 1995. *Cacalia sonchifolia* L., Sp. Pl. 2: 835. 1753. (Plate-23).

Annual herbs, up to 50 cm high; stems pale-brown. Leaves 5-10 x 0.6-3 cm; lower leaves petioled, ovate or obovate to lyrate. Heads bright purple, solitary or in terminal. Achenes 0.3-0.5 cm long, hairy on the ribs. Pappus of white soft hairs.

Fl. & Fr.: Most part of the year.

Common in open forests.

Specimens examined: Jamunia [25 00 45.47 N, 74 48 00.9 E, 466 m], *P. Hari Krishna & R. Kumar* 35206(BSJO); Bichhor forest area [25 04 12.2 N, 74 54 37.36 E, 447 m], *P. Hari Krishna & R. Kumar* 35404(BSJO).

13. *Glossocardia* Cass.

Glossocardia bosvallia (L.f.) DC. in Wight, Contrib. Bot. Ind. 19. 1834; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 413. 1987; H.J. Chowdhery in Hajra & al., Fl. India 12: 391. f. 107. 1995. *Verbesina bosvallea* L.f., Suppl. Pl. 379. 1781. 'Chidia - Chugga'

Prostrate herbs. Leaves 1.3-2.6 cm long, bi-pinnatisect; linear, apiculate. Heads 0.5-1.2 cm long, yellowish-brown, solitary, terminal. Ray florets with 2 or 3 lobed corolla. Achenes 0.4-0.6 cm long, oblong. Pappus of 2 stiff, smooth awns.

Fl. & Fr.: July - September.

Common in rocky habitat .

Specimen examined: Mahuria-Jhaleshwar Nala [25 1 15.75 N, 74 48 14.93 E, 418 m], *P. Hari Krishna & R. Kumar* 35176(BSJO).

14. *Gnaphalium* L.

Gnaphalium polycaulon Pers., Syn. Pl. 2: 421. 1807; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 416. 1987; P.C. Pant in Hajra & al., Fl. India 13: 91. 1995. *G. indicum auct. non* L., 1753; Hook.f., Fl. Brit. India 3: 289. 1881.

Annual, woolly herbs, up to 20 cm high. Leaves sessile, 3-4 x 0.3-0.5 cm, linear-obovate or oblanceolate-spathulate. Heads sessile, yellowish-white. Achenes minute oblong, papillose. Pappus hairs uniseriate.

Fl. & Fr.: December - March.

Common in moist places along the riverbeds .

Specimen examined: Near Bassi Dam [24 59 34.21 N, 74 49 26.66 E, 399 m], *P. Hari Krishna & R. Kumar* 38309 (BSJO).

15. *Gnomophalium* Greuter

Gnomophalium pulvinatum (Delile) Greuter in Willdenowia 33: 242. 2003. *Gnaphalium pulvinatum* Delile, Descr. Egypte, Hist. Nat. 266. t.44. 1813; Hook.f., Fl. Brit. India 3: 289. 1881; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 416. 1987.

Diffusely branched, woolly herbs, up to 12 cm long. Leaves sessile, 0.6-1.6 x 0.2-1.5 cm, spatulate or obovate, mucronate. Heads yellow, emerged in white wool. Ray florets female, filiform; disc florets bisexual. Achenes oblong, minutely papillose. Pappus hairs white.

Fl. & Fr.: December - April.

Common in moist places .

Specimen examined: Badapani [25 4 46.01 N, 74 55 24.89 E, 417 m], *P. Hari Krishna & R. Kumar* 38409(BSJO).

16. *Grangea* Adans.

Grangea maderaspatana (L.) Poir. in Lam. Encycl. Suppl. 2: 825. 1812; Hook.f., Fl. Brit. India 3: 247. 1881; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 417.1987; Hajra, in Hajra & al. (eds.), Fl. India 12: 127. f. 37. 1995. *Artemisia maderaspatana* L., Sp. Pl. 2: 849. 1753. (Plate-23).

Hairy herbs. Leaves sessile, up to 8 cm long, sinuate-pinnatifid, serrate-dentate lobes, pubescent. Heads yellow, 0.6-1.5 cm across, solitary. Corolla tube of ray florets filiform, 2 to 4-fid at the apex. Achenes compressed with fimbriate mouth.

Fl. & Fr.: Throughout the year.

Common throughout, in drying up ponds .

Specimens examined: near Bassi dam area [25 00 35 .97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35516(BSJO); Bassi dam [24 59 34.21 N, 74 49 30.27 E, 410 m], *P. Hari Krishna & R. Kumar* 38305(BSJO).

17. *Lagascea* Cav.

Lagascea mollis Cav. in Anales. Ci. Nat. 6: 333. t. 44. 1803; Hook.f., Fl. Brit. India 3: 302. 1881; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 420.1987; H.J. Chowdhery in Hajra & al.(eds.), Fl. India 12: 397. f. 110. 1995.

Villous herbs, up to 1.2 m high. Leaves 2-6 x 1.4-6 cm, ovate, ovate-lanceolate. Heads pale-blue or white, axillary, solitary. Florets bisexual, corolla tubular. Achenes cuneate. Pappus of a fimbriate cup.

Fl. & Fr.: August - December.

Occasional in open forests.

Specimen examined: Nandwai to Amla route [25 00 37.49 N, 74 56 55.58 E, 432 m], *P. Hari Krishna & R. Kumar* 35258(BSJO).

18. *Launaea* Cass.

Launaea procumbens (Roxb.) Ramayya & Rajagopal in Kew Bull. 23: 465. t. 1. 1969; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 423.1987; Mangain & R.R. Rao in Hajra & al. (eds.), Fl. India 12: 309. 1995. *Prenanthus procumbens* Roxb., Fl. Ind. 3: 404. 1832. *Launaea nudicaulis* Hook.f., Fl. Brit. India 3: 416. 1881 non Less., 1832; Duthie, Fl. Gangetic Plain 1: 494.1905. (Plate-23).

Glabrous herbs, with creeping stolones. Leaves up to 18 x 4.5 cm, oblong, sinuate-lobed to lyrate-pinnatifid. Heads sessile, yellow. Achenes 0.3-0.5 cm long, rugose. Pappus soft, white.

Fl. & Fr.: September - April.

Common in moist habitats.

Specimens examined: Meghpura Chowki [25 01 38.94 N, 74 48 43.55 E, 410 m], *P. Hari Krishna & R. Kumar* 35308(BSJO); Near Paat village [25 02 14.93 N, 74 51 03.63 E, 424 m], *P. Hari Krishna & R. Kumar* 35432(BSJO); Near Nal forest area [25 03 01.61 N, 74 52 23.74 E, 443 m], *P. Hari Krishna & R. Kumar* 35523(BSJO); Bassi Dam [25 59 34.9 N, 74 49 26.66 E, 390 m], *P. Hari Krishna & R. Kumar* 38310(BSJO).

19. *Oligochaeta* (DC.) K. Koch

Oligochaeta divaricata (DC.) K.Koch in Linnaea 17: 43. 1843. *O. ramosa* (Roxb.) Wagenitz in Verroffent. Geobot. Inst. 37: 323. 1962; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 425.1987. *Amberboa ramosa* (Roxb.) Jafri in Scientist 3: 29. 1958.

Straggling, dichotomously branched, annual herbs. Leaves obovate to spatulate, the upper lanceolate, 2.5-7 x 0.3 - 5cm, pinnatifid, base subamplexicaul, apex mucronate. Heads solitary, terminal, spinescent, pink, homogamous. Achenes oblong, ribbed. Pappus hairs numerous, up to 1 cm long, silvery-brown, inner ones longer than the outer.

Fl. & Fr.: September - April.

Common in sandy soils.

Specimen examined: Near Bassi Dam [25 00 35 .97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35514 (BSJO).

20. *Parthenium* L.

Parthenium hysterophorus L., Sp. Pl. 2: 988. 1753; Duthie, Fl. Gangetic Plain 1: 127.1976; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 425.1987; R.S. Rao in J. Bombay Nat. Hist. Soc. 54: 218. 1956; H.J. Chowdhery in Hajra & al., Fl. India 12: 403. f. 113. 1995. '*Gajjar ghas*'

Branched herbs, up to 1.5 m high; stems hair. Leaves alternate, 3-6 x 4-6 cm, pinnately or bi-pinnately lobed. Heads white, c. 0.6 cm across, in axillary and terminal. Ray florets 5, white. Pappus of 2-broad, puberulous along the side.

Fl. & Fr.: July - November.

Common in open forests.

Specimens examined: Near Ambapani area [24 58 59.4 N, 74 51 7.40 E, 421 m], *P. Hari Krishna & R. Kumar* 35640 (BSJO); Sarna Lake [24 59 51.17 N, 74 48 22.95 E, 491 m], *P. Hari Krishna & R. Kumar* 35146(BSJO).

21. **Pseudognaphalium** Kirp.

Pseudognaphalium luteoalbum (L.) Hilliard & B.L.Burt in Bot. J. Linn. Soc. 82: 206.1981. *Gnaphalium leuto-album* L., Sp. Pl. 2: 851. 1753; Hook.f., Fl. Brit. India 3: 288. 1881; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 415. 1987; P.C. Pant in Hajra & al., Fl. India 13: 87. 1995. *G. luteo-album* L. var. *pallidum* Hook.f., l.c. 3: 288. 1881.

Annual, woolly herbs, up to 50 cm high. Leaves sessile, 1.6-7 x 0.5-1.6 cm, entire; lower leaves oblong-spathulate, linear-lanceolate. Heads white to yellowish, 0.2-0.6 cm long, in terminal. Ray florets female, filiform; disc florets bisexual. Achenes papillose, brown.

Fl. & Fr.: December - April.

Common in the moist places.

Specimens examined: Near Umar ki Khal [24 58 34.88 N, 74 54 00.86 E, 512 m], *P. Hari Krishna & R. Kumar* 35541(BSJO); Ambapani [24 58 53 N, 74 51 17 E, 430 m], *P. Hari Krishna & R. Kumar* 35559(BSJO); Bujrabandh-Bichhor [25 04 54.41 N, 74 55 18.94 E, 434 m], *P. Hari Krishna & R. Kumar* 35586 (BSJO); Mahudia Nala - bandh[25 02 35.21 N, 74 52 16.76 E, 430 m], *P. Hari Krishna & R. Kumar* 35614 (BSJO); Bassi Dam [24 59 34.32 N, 74 49 26.56 E, 399 m], *P. Hari Krishna & R. Kumar* 38313(BSJO).

22. **Pulicaria** Gaertn.

Pulicaria angustifolia DC., Prod. 5: 479. 1836; Hook.f., Fl. Brit. India 3: 299. 1881; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 429.1987; Kumar, in Hajra & al. (eds.), Fl. India 13: 33. 1995.

Erect, annual herbs, up to 35 cm high. Leaves sessile, 1.5-4 x 0.5-1 cm, linear to linear-oblong or obovate, entire or serrulate. Heads yellow, up to 1.5 cm across, solitary, terminal; peduncles puberulous, not thickened below the heads.. Pappus with white barbellate hairs.

Fl. & Fr.: November - February.

Occasional, along riverbeds.

Specimens examined: Near Panduria [24 58 36.47 N, 74 53 08.26 E, 524 m], *P. Hari Krishna & R. Kumar* 35544 (BSJO); Bujrabandh-Bichhor [25 04 54.41 N, 74 55 18.94 E, 434 m], *P. Hari Krishna & R. Kumar* 35584(BSJO).

23. *Sigebeckia* L.

Sigesbeckia orientalis L., Sp. Pl. 2: 900. 1753; Hook.f., Fl. Brit. India 3: 379. 1881; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 434.1987; Chowdhery in Hajra & al., Fl. India 12: 407. f. 115. 1995.

Erect, herbs. Stem pubescent. Leaves opposite; lower petioled, ovate-triangular or rhomboid, acute or obtuse, cuneate; upper ones subsessile. Heads yellow, up to 0.5 cm across, terminal, in the centre of forks, combined into leafy panicles. Achenes up to 0.4 cm long, glabrous. Pappus wanting.

Fl. & Fr.: March - November .

Rare in open forests and wastelands.

Specimen examined: Watch tower road [25 00 46.44 N, 74 48 39.57 E, 484 m], *P. Hari Krishna & R. Kumar* 35153(BSJO) .

24. *Sonchus* L.

Sonchus oleraceus L., Sp. Pl. 2: 794. 1753; Hook.f., Fl. Brit. India 3: 414. 1881; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 436.1987; Mamgain & R.R. Rao in Hajra & al. (eds.), Fl. India 12: 321. f. 83. 1995.

Annual, erect, up to 60 cm tall herbs, with milky latex. Leaves 5-20 x 4-6 cm, ovate-oblong, irregularly-dentate. Heads yellow, 1.3 -2 cm long, crowded in irregular umbellate cymes. Achenes oblanceolate, obovoid, 3-5 ribbed. Pappus white, longer than the achenes.

Fl. & Fr.: August - March.

Common weed of open forests.

Specimens examined: Mahudia-Maheshra [25 02 36.95 N, 74 52 09.32 E, 430 m], *P. Hari Krishna & R. Kumar* 35603(BSJO); On way to Kevdiya [24 58 27.01 N, 74 48 47.99 E, 442 m], *P. Hari Krishna & R. Kumar*

38330(BSJO); Modia Mhadev [24 59 06.22 N, 74 52 28.42 E, 528 m], *P. Hari Krishna & R. Kumar* 35543(BSJO); Near Savrna Talab [24 59 53.09 N, 74 48 23.70 E, 487 m], *P. Hari Krishna & R. Kumar* 35630(BSJO).

25. *Sphaeranthus* L.

Sphaeranthus indicus L., Sp. Pl. 2: 927. 1753; Hook.f., Fl. Brit. India 3: 275. 1881; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 436. 1987; Kumar in Hajra & al., Fl. India 13: 160. f. 49. 1995. *S. hirtus* Willd., Sp. Pl. 2395. 1802.

Much-branched herbs, with winged stems. Leaves alternate, 1.3-5 x 0.6-1.4 cm, obovate-oblong, spathulate, obtuse. Heads pink or purple, compound, ovoid, oblong or globose. Achenes c. 0.2 cm long, oblong, angled or ribbed.

Fl. & Fr.: September - April.

Common in drying - moist grounds.

Specimen examined: Near Nandwas [24 57 15.85 N, 74 53 8.17 E, 513 m], *P. Hari Krishna & R. Kumar* 38429(BSJO).

26. *Synedrella* Gaertn.

Synedrella nodiflora (L.) Gaertn., Fruct. Sem.Pl. 2: 456. t. 171, 7. 1791; Hook.f., Fl. Brit. India 3: 308. 1881; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 438. 1987; H.J. Chowdhery in Hajra & al. (eds.), Fl. India 12: 413. f. 117. 1995. *Verbesina nodiflora* L., Cent. Pl. 1: 28. 1755.

Annual herbs, up to 50 cm high; stems terete, with white hairs. Leaves 2-10 x 1.3-5 cm, ovate-lanceolate, acute. Heads yellow, 1-4 together, axillary. Achenes dimorphic; of the ray florets oblanceolate, with pale-yellow lacerate wings.

Fl. & Fr.: July - December.

Common weed in dry deciduous forests.

Specimens examined: Kelzar village road [24 58 54.71 N, 74 46 54.5 E, 431m.], *P. Hari Krishna & R. Kumar* 35222(BSJO); Devalgad forest area [24 58 27.49 N, 74 50 55.79 E, 433 m], *P. Hari Krishna & R. Kumar* 37334(BSJO).

27. *Tridax* L.

Tridax procumbens L., Sp. Pl. 2: 900. 1753; Hook.f., Fl. Brit. India 3: 311. 1881; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 439. 1987; Chowdhery in Hajra & al. (eds.), Fl. India 12: 418. f. 118. 1995.

Straggling herbs, up to 50 cm high. Leaves in distant pairs, 3-6 x 0.8-5 cm, ovate or ovate-lanceolate. Heads yellow, 0.7-1.3 cm across, solitary, on terminal. Achenes c. 0.3 cm long, silky hairy, black. Pappus bristle plumose, aristate.

Fl. & Fr.: Almost round the year.

Common in open forest.

Specimens examined: Crocodile view point [25 00 35.97 N, 74 49 14.59 E, 409 m], *P. Hari Krishna & R. Kumar* 35115(BSJO); Near Palka [24 58 27.01 N, 74 48 47.99 E, 442 m], *P. Hari Krishna & R. Kumar* 38331(BSJO).

28.Xanthium L.

Xanthium strumarium L., Sp. Pl. 2: 987. 1753; Hook.f., Fl. Brit. India 3: 303. 1881; Singh in Shetty & Singh (eds.), Fl. Rajasthan 1: 443.1987. *Xanthium indicum* Koenig ex Roxb., Fl. Ind. 3: 601. 1832; H.J. Chowdhery in Hajra & al. (eds.), Fl. India 12: 427. f. 123. 1995. 'Adhasisi'

Aromatic herbs, up to 1 m high. Leaves 6-12 x 6-10 cm, ovate to suborbicular, 3-5 lobed, acute or acuminate, serrate, hispid. Heads in terminal and axillary racemes, greenish-yellow. Outer involucral bracts few, short; inner many, uniseriate, narrow, connate into a 3-locular body covered with hooked bristles and terminating into 2, strong, hooked, divergent beaks. Male heads globose. Female heads ovoid. Florets 2; corolla absent. Achenes greyish-black, tapering to a fine point at the apex.

Fl. & Fr.: October - May.

Common in open moist places.

Specimen examined: Near Sagarani [24 56 23.98 N, 74 52 57.98 E, 504 m], *P. Hari Krishna & R. Kumar* 35800(BSJO).

Order: Apiales Nakai

APIACEAE Lindl.

Psammogeton Edgew.

Psammogeton diffusus (Roxb. ex Sm.) Rech.f. ex Pimenov, Pl. Syst. Evol. 305(1): 57. 2018. *Seseli diffusum* (Roxb. ex Sm.) Santapau & Wagh in Bull. Bot. Surv. India 5: 108. 1963; Parmar in Shetty & Singh (eds.), Fl. Rajasthan 1: 364. 1987. (Plate-22).

Diffuse, much-branched, pubescent, annual herbs. Leaves 2 to 3-pinnate or partite; secondary segments ovate, lobed, apiculate, pubescent.

Flowers pinkish-white, white or white-purple. Fruits hispid, subglobose; ridges thick, obtuse, pale-yellow.

Fl. & Fr.: April - May.

Occasional, found in semi-moist places.

Specimens examined: Ambapani [24 58 53.34 N, 74 51 16.42 E, 433 m], *P. Hari Krishna & R. Kumar* 35576(BSJO); Near Sarana [24 59 50.96 N, 74 48 21.46 E, 493 m], *P. Hari Krishna & R. Kumar* 38373(BSJO).

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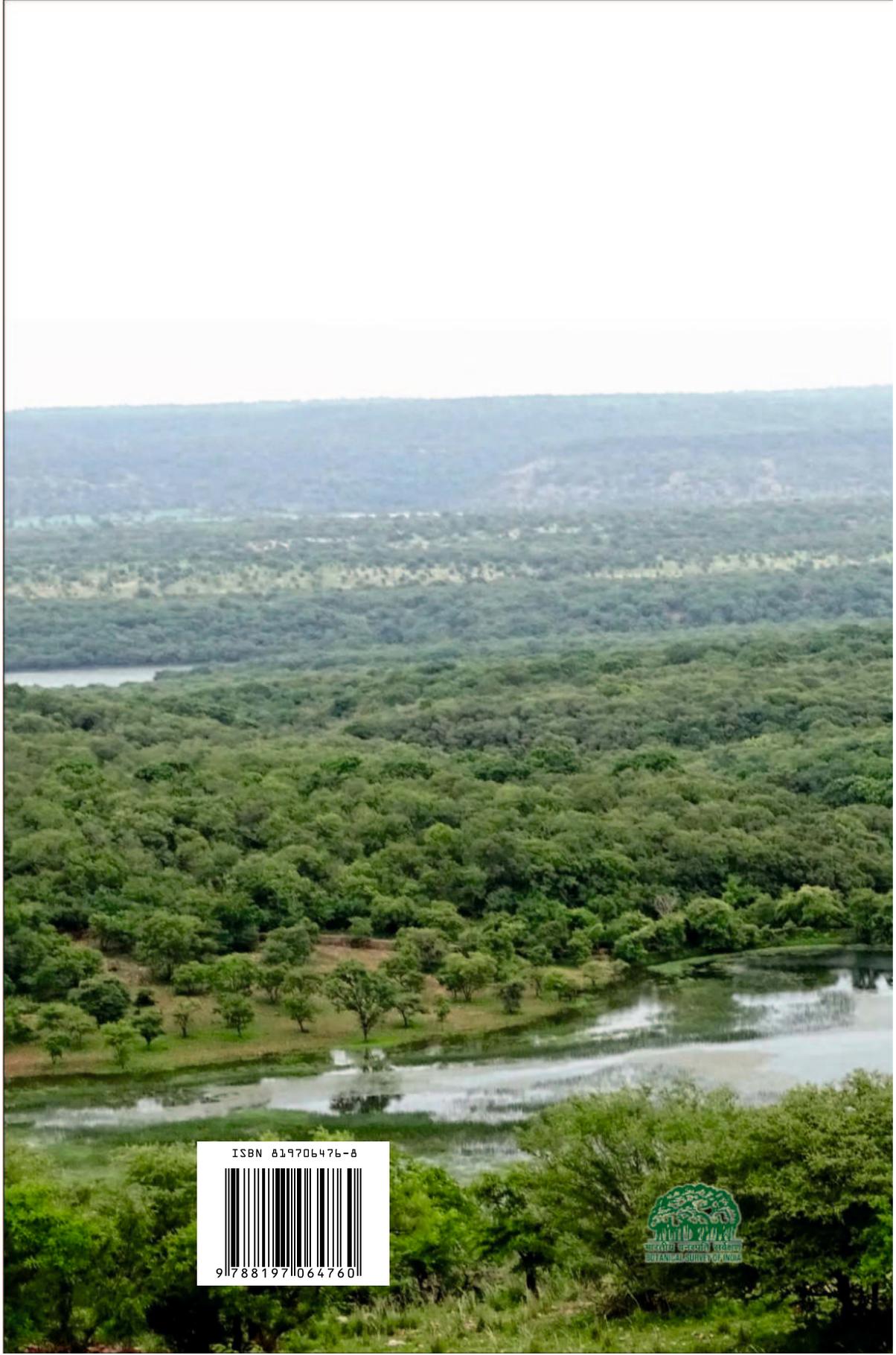
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