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From Director's Desk

India has varied climatological and physiographic conditions that make our country very much susceptible to weather disasters. The pressures due to population explosion and urbanization have forced people to live on marginal lands or in cities where they are at greater risk to disasters and damages. In India, it is regarded that 68% of the land is drought prone, 60% is disposed to earthquakes, 12% to floods and 8% to cyclones. Thus almost 85% of the land area in India is vulnerable to natural disasters while 22 states have been marked as hazards prone states. The major natural disasters in India include cyclones, floods, earthquakes, and droughts, while the minor weather hazards are landslides, avalanches, hailstorms, and forest fires.

The fast pace of growth and expansion in the name of development without comprehensive understanding, preparedness or alertness has brought out a range of disputes that seeks vital concern at all levels. Creation of specific setup is imperative to avoid a catastrophe in the future. However, rapid and effective response needs intensive research, collaboration and laboratory support. Appropriate measures for prevention and mitigation of the effects of disasters, the government at various levels have responded, contemporaneous to these occurrences. It has now been noticed that the community as an institution in itself is emerging as an effective

performer in the entire mechanism of disaster management. In the event of actual disasters, the community, if well aware of the preventive actions, may considerably lessen the destruction caused by the disaster. Sensitization of community is particularly useful in areas that are prone to frequent disasters.

Hope, trained candidates of Green Skill Development Programme, which is being organised in different Regional Centres of Botanical Survey of India, could play good role in creation and enhancement of awareness among communities on weather disaster management. The need of the hour is to chalk out a multi-pronged strategy for total risk management, comprising prevention, preparedness, response and recovery and to initiate development efforts aimed towards risk reduction and mitigation. Then only we can look forward to 'sustainable development'.

Like earlier issues, hope this issue will also be well received by its regular readers for its contents. I appreciate the efforts of entire team of ENVIS Resource Partner on Biodiversity in bringing out this informative issue.

(Er. A.K. Pathak)
Director In-Charge
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Beggar's Bowl

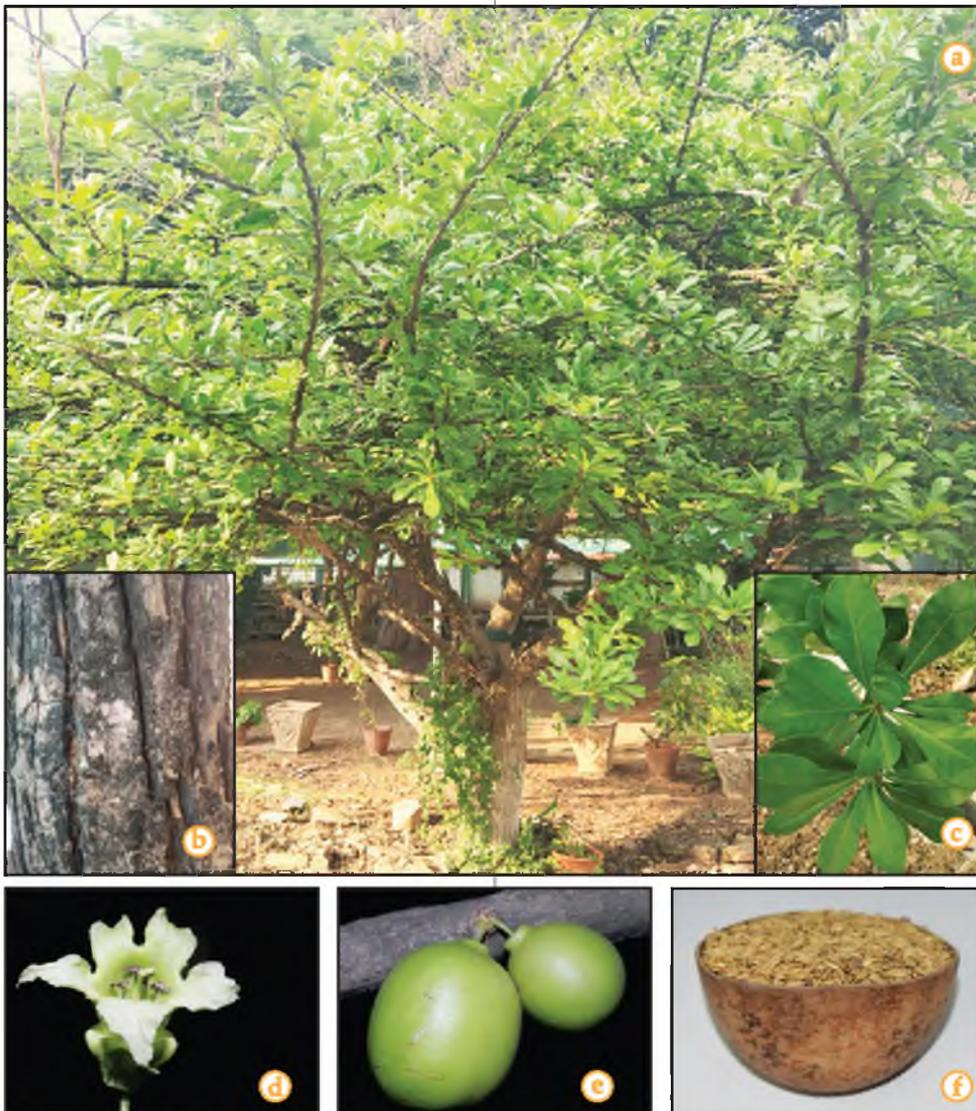
Botanical Name: *Crescentia cujete* L.

Family: Bignoniaceae

Common Names: Beggar's Bowl, Calabash Tree; Kannada: *Sokeburude*; Malayalam: *Thiruvattakkaya*; Tamil: *Thiruvottukai*

General Morphology: Tree, 5–10 m high. Stems terete, much-branched; bark dark brown, longitudinally deeply grooved. Leaves simple, sessile, clustered in alternate fascicles, obspathulate, 7–16 x 2–5 cm, attenuate at base, reflexed at margins, acute or obtuse at apex, chartaceous, glabrous; lateral veins 6–20 pairs. Inflorescence solitary or in pairs, cauliflorous. Flowers 4–7 cm across,

zygomorphic, bisexual; pedicels 0.7–1.7 cm long. Calyx deeply bilobed to base, 1.5–2 x c. 1 cm, obtuse-rounded at apex. Corolla yellow, white or pale green with purplish or brown markings, campanulate, 5-lobed; lobes unequal, triangular, 4–8 x 1–1.5 cm, extended as a narrow point at apex, crenately sinuate or crispate at margins. Stamens 4, didynamous, subexserted; filaments 3–4 cm long; anthers oblong, c. 1 cm long, dorsifixed; style 2.5–3.5 cm long; stigma bilamellate. Ovary superior, globose, 6–7 mm. Berries broadly ellipsoid to globular, 10–30 x 8–25 cm, smooth, greenish yellow or black, with a hard woody shell; seeds many, embedded in pulp.



Crescentia cujete: a. Habit; b. Portion of stem bark; c. Leaves; d. Flower; e. Fruits; f. Bowl made of fruit cover

Know your Plant

Distribution, Ecology and Management: The plant is native to Tropical America and widely distributed in other tropical regions. In India, it is found in Andhra Pradesh, Assam, Delhi, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal; usually planted as an ornamental in gardens, and as a shade tree. It is also an excellent host for epiphytes. It grows easily with minimum care and demands full sun to light shade for best growth and flowering; usually prefers moist, well-drained and sandy loam soils and medium water. Occasional pruning is required to maintain strong structure and branching. The plant is resistant to pest and diseases.

Uses: The subglobose hard-shelled fruits are used as rattles, bowls, cups, containers and for decoration purposes. The hard and smooth shells are polished well and finely carved for making attractive items. The wood of this plant is light brown or yellowish brown and is easy to carve when green, and can be in use for years after thorough seasoning. Wood is used in making yokes and handles of tools. Blocks of the wood are sold commercially used for mounting epiphytic plants. Young fruits are occasionally pickled and seeds are used in making beverages; pulp of the fruit is used in folkmedicines, for respiratory problems like asthma, and also the fruit pulp has laxative, expectorant, anthelmintic, analgesic and anti-inflammatory properties. Bark of the stems and leaves possess antimicrobial properties.

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Notes on medicinal status of *Dregea volubilis* (Apocynaceae)

The Udaipur Wildlife Sanctuary was notified in 1978. The Sanctuary is situated 14.5 km west of Bettiah town in the West Champaran district of Bihar and lies between 26°48'05.0" N and 84°30'10.0" E, covering an area of approximately 8.86 km². The terrain is almost plain with a gentle slope towards the west. Three-fourths of the area is situated around the horseshoe-shaped, natural lake 'Sareyaman' which forms the main catchment area. During the course of documentation of floral diversity of this Sanctuary, a liana, locally known as *Lakhan latti*, was collected and later identified as *Dregea volubilis* (L.f.)

medicinal value as its leaves extract has antioxidant and antibacterial properties. Safer antioxidants suitable for long term use, are needed to prevent or stop the progression of free radical mediated disorders such as arthritis, hemorrhagic shock, diabetes, hepatic injury, aging neuro degenerative diseases and carcinogenesis (Purushoth Prabhu & al., 2012). It is also considered as a source plant of the Ayurvedic drug *Moorva* (blood purifier), and traditionally used in different conditions such as pain, cold, boils and abscess (Karthika & al., 2012).



Dregea volubilis: a. Habit; b. Portion of stem; c. Chips of stem bark

Benth. ex Hook.f. The plant is characterised by warted lenticellate branches, broadly ovate leaves with cordate base, drooping long-peduncled umbellate cymes, green flowers, 5-lobed calyx and corolla, 5 stamens with connate filaments, erect pollinia, waxy pollen masses, 2-locular ovary, narrowly ovoid follicles in pairs or solitary with fugaciously brown-tomentose hairs, many flattened ovate seeds with silky white coma. While interacting with local people during field trips, two medicine men namely, Naseeb and Narayan informed us that the plant is of highly medicinal value.

Decoction of 3 g powdered bark and 21 black peppers in one cup of lukewarm water is taken for 21 days to treat gout and rheumatism, however, number of peppers are descending everyday, i.e., 21 in the first day, 20 in the second day and so on. Local people also use paste of leaves as ointment for treatment of boils, tumours and rashes. The plant is also reported in Ayurvedic literature as a medicinal plant for eye ailments including cataract (Chopra & al., 1956). Further, the plant has high

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Dendrobium regium (Orchidaceae), an endemic epiphytic orchid in need of conservation

Dendrobium regium Prain is a beautiful epiphytic orchid species belonging to the large-flowered group (Sect. *Dendrobium*) within *Dendrobium* and possesses fragrant, pink flowers with longer self-life. The floral structure and colour combination of this species are unique in *Dendrobium* and thus, has high horticultural potential. This can also be used as one of the parents in hybridization experiments.

D. regium is endemic to India, distributed in Odisha, Andhra Pradesh, Jharkhand, Chhattisgarh, Madhya Pradesh and Nagaland. Despite being reported from at least 19 different subpopulations from its range of distribution, a very little information is available on the population size of this species. This species is known from 14 subpopulations from Odisha alone, of which nine (Badamakabadi, Bhanjabasa, Chahala, Jenabil, Kabataghai, Meghasani, Tarinidiha, Tinadiha, Barahakamuda) are from Similipal Biosphere Reserve (SBR) (Misra, 2004). Similipal Biosphere Reserve is considered to be the richest orchid habitat in Odisha as 93 orchid species have been reported from the region so far.

During a botanical tour to Similipal Biosphere Reserve in May 2007, one

of the authors (DB) had observed a large number of *D. regium* plants, growing epiphytically on a tree of *Shorea robusta* C.F. Gaertn. at Jenabil area. The species was found restricted to only five phorophytic plants (the host plants that support the vascular epiphytes), namely *Shorea robusta*, *Terminalia alata* B. Heyne ex Roth, *Syzygium cumini* (L.) Skeels, *Pterocarpus marsupium* Roxb. and *Mangifera indica* L. However, more than 60% of its occurrence observed only on an individual *S. robusta* tree. In the quest of gathering more information on this beautiful species, its identity, range of distribution and habitat requirements were collected.

The report on the occurrence of this species in other localities of Odisha by Misra (2004) could not be confirmed. In SBR also, this species could be located only in five different localities (Jenabil, Tarinidiha, Barahakamuda, Kabataghai, Bhanjabasa) with good population size at Jenabil area. During 2016, Jenabil was revisited by the authors and could observe drastic reduction in population size. The *S. robusta* tree which earlier had a large population of this epiphytic orchid was observed to have lost half of its earlier population. The cause of this

reduction could not be anthropogenic as there is no report of its trade happening for horticultural or medicinal value. The Biosphere Reserve being a protected area and as regulated under Wildlife Protection Act 1972, no one could have collected it from there. Occurrence of natural fruit-setting also indicates no problem with availability of pollinators. Furthermore, all *Dendrobiums* and other sympodial orchids have very effective vegetative mode of propagation, producing new propagules from the sympodium (sometimes many from one point) every year. Therefore, the drastic reduction in population is a worrying fact, especially when the cause of reduction is not known and understood. Non-availability of suitable mycorrhiza for seed germination might be one of the causes as the authors could not observe any new seedlings in the vicinity. On the other hand, the population reduction might be owed to the interference of animals like giant squirrel that often eat the young developing shoots of the orchids.

As there is a very little or no data available on the population status of this species in other localities, the present observation suggests the necessity for a detailed study on this species. Effective conservation strategies have to be developed by the policy makers to save this beautiful endemic species from further loss.

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Dendrobium regium: a. Habit; b. Capsules

Report on Green Skill Development Programme being conducted at Botanical Survey of India: 2018–19

The following four courses are being conducted under Green Skill Development Programme (GSDP) at different Regional Centres/Unit of Botanical Survey of India during the financial year 2018–19.

1. Certificate Course on 'Parataxonomy (including People's Biodiversity Register)' is being conducted in seven Regional Centres and one Unit of Botanical Survey of India: Andaman and Nicobar Regional Centre (ANRC), Port Blair; Arid Zone Regional Centre (AZRC), Jodhpur; Arunachal Pradesh Regional Centre (APRC), Itanagar; Central Regional Centre (CRC), Allahabad; Southern Regional Centre (SRC), Coimbatore, Western Regional Centre (WRC),

Pune and Central National Herbarium (CNH), Howrah.

2. Certificate Course on 'Plant Tissue Culture Techniques and its Application' was conducted in three Regional Centres of Botanical Survey of India: at Northern Regional Centre (NRC), Dehra Dun, the course was commenced on 13th August 2018 and completed on 12th October 2018; at Eastern Regional Centre (ERC), Shillong, the course began on 24th August 2018 and completed on 25th October 2018 and at National Orchidarium and Experimental Garden (NO&EG), BSI, Yercaud, the course was started on 31st August 2018 and completed on 1st November 2018.

3. Certificate Course on 'Community-based Conservation of Mangroves' was started in Western Regional Centre, Pune on 6th August 2018 and completed on 19th September 2018.

4. Certificate Course on 'Management of Small Botanic Garden' in Botanic Garden at Indian Republic (BGIR), Noida was commenced on 15th November 2018 and will be completed on 14th January 2019.

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Report on the World Ozone Day Celebration – 2018 at Botanical Survey of India, Howrah

The Central National Herbarium (CNH), Botanical Survey of India (BSI), Howrah and BSI-ENVIS Resource Partner on Biodiversity, Howrah jointly celebrated the World Ozone Day 2018 on 15th September 2018 with the theme 'Keep cool and Carry on'. Students from three different schools, Shibpur Srimat Swami Projnanananda Saraswati Vidyalaya, Thanamakua Model High School and B.E. College Model School located in Howrah were invited for this programme. Altogether 23 students and five teachers attended the programme.

Students, teachers and the scientific officials of BSI took part in the procession, with banners and placards displaying various slogans on the importance of Ozone layer, from the Curator office of AJC Bose Indian Botanic Garden, BSI, Howrah and reached the CNH building. After the inaugural ceremony in the CNH auditorium, three events were conducted for the school students.

First, the extempore speech competition was conducted followed by drawing competition on the theme, 'Save Ozone and Save Earth'. After these two competitions, three videos,

two on 'Ozone' and one on 'Sundarbans' were shown for the benefit of the students and teachers.

The programme was concluded by distributing participation certificates and also prizes to the students, who won in the extempore and drawing competitions. Dr. Paramjit Singh, Director, BSI was the Chief Guest for the valedictory function.

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Successful *ex situ* conservation of *Pavonia arabica* var. *massuriensis* (Malvaceae), an endemic and endangered taxon in the Experimental Botanical Garden of Botanical Survey of India, Jodhpur

Bhandari (1978) described *Pavonia arabica* var. *massuriensis* based on collections from rocky plateau of Massuria hill, Jodhpur, Rajasthan and on the basis of which it was later included in subsequent publications (Pandey & al., 1983; Shetty & Singh, 1987; Paul, 1993; Sharma, 2014). Recently, Purohit & al. (2017) rediscovered the taxon

during the survey and exploration in Machiya Biological Park (26°16.836' N, 72°58.812' E) at an elevation of 338 m, after a lapse of almost six decades. It is an erect, well-branched, perennial

undershrub of about 1.5 m high, with 2–3 cm long, densely pubescent ovate or oblong leaves and solitary pink flowers from leaf axils.

During the course of field exploration, we were able to locate it in only one locality in Jodhpur. Its seeds were collected in August 2017. After the seeds were shade dried, 30 of them were sown in polythene bags with soil and Farm Yard Manure (FYM) mixture. Germination was observed daily. Seedlings were watered daily, without water-logging and also protected by wire mesh cages or dry spinous tree branches for 20–30 days for better growth. Saplings of 25–30 days old were transplanted in pots having FYM mixture treated with fungicide (Bavistin) and termiticide (Eldrin). Pots were

watered at regular intervals. The observed details on the nature of fruits, seeds, germination of seeds and growth of seedlings during its *ex situ* conservation as well as in natural habitat have been provided here.

Fruits and Seeds Characteristics: Fruits have average width of 4.6 mm (4–5 mm). There were 35–40 fruits per plant and each fruit contained 5 mericarps; average mericarp length is 4.3 mm (4–5 mm), and width is 2.4 mm (2–3 mm), and average seed length is 1.8 mm (1.5–2 mm).

Germination: About 50 seeds were kept for germination, of which about 20% seeds were germinated within 7–8 days.

Seedling Growth: Seedling growth was very slow in first four weeks in polythene bags with average height attained of 2.8 cm. However, seedling mortality was about 50% in polythene bags.

Transplantation and Survival: Saplings after attaining about 10 cm height were transferred in pots filled with soil and FYM mixture. Pots were watered daily for 10–15 days and thereafter twice in a week. Among the six transplanted saplings three are surviving. Since seedling mortality in polythene bags was more compared to pots, seed sowing in pots is more successful for large scale



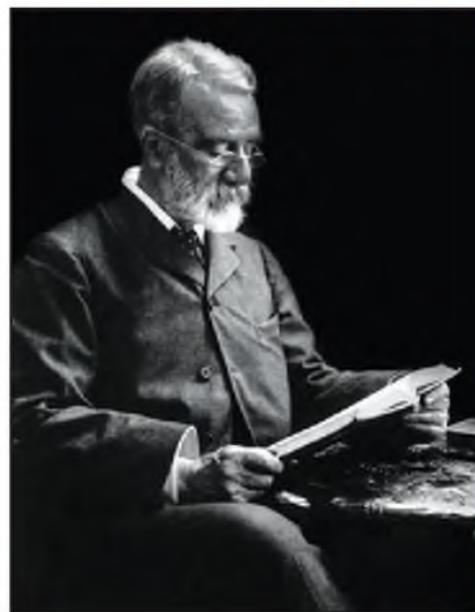
Sir George King

Sir George King (1840–1909), a British botanist was born at Peterhead, Aberdeenshire, Scotland. After obtaining his degree in Medicine from the University of Aberdeen in 1865, he joined the Indian Medical Service and detailed for military medical duty in Central India and Rajputana. He was transferred as Superintendent of the Saharanpur Botanic Garden in 1868. He joined the Indian Forest Service, and worked for Kumaon forests for a short period and then succeeded as the Superintendent of the Royal Botanic Garden, Calcutta in 1871. He served as a Superintendent of the Garden for 26 years (1871–1898) and collected plants in India (Andaman Islands), Burma (Myanmar) and Philippines. He was instrumental in expanding the Garden area to just over 270 acres, with the restoration of the land formerly occupied by the Agri-Horticultural Society of India in 1872. He also designed the unique landscape of the Garden with undulated land surfaces, artificial lakes and moats

interconnected with underground pipes receiving water from the river Hooghly.

He founded the Annals of the Royal Botanic Garden, Calcutta, and devoted his time to the elaboration of fully illustrated monographs of difficult and important genera and families, such as *Ficus*, *Quercus* and *Myristica*, Magnoliaceae, Anonaceae and Orchidaceae. He built a new two-storey building for herbarium in 1882, adjacent to Roxburgh's house in the Garden. It was his initiative that led to the establishment of the Botanical Survey of India as an Imperial Department in 1890 for which he became the founder Ex-officio Director. He also published fascicles for Flora of the Malayan Peninsula. Genera, such as *Indokingia* Hemsl., *Kingella* Tiegh., *Kingiella* Rolfe, *Kinginda* Kuntze and *Kingiodendron* Harms were named in his honour. King was awarded the Linnaean Medal in 1901. He died on 12th February, 1909 at San Remo, Italy. He is remembered, apart from his scientific contributions, for being instrumental in the

Know your Botanist



foundation of the Botanical Survey in British India.

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multiplication of such species. This might be due to availability of more soil depth and area in pots.

Threats: (i) seeds damaged by birds, squirrels and ants; (ii) availability of rain water and soil strata, for germination and vigorous growth of saplings; (iii) drastic fluctuations in temperature and rainfall during its growing season.

Conservation status: The threat status of this variety is provisionally assessed here as Critically Endangered, as its area of occupancy is about one sq. km and only about 200 mature individuals were observed in the area, following IUCN Red List Categories and Criteria (IUCN, 2012).

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a. Dr. Anandi Subramanian, IES, Principal Advisor and Sri Kumar Rajnish, ENVIS National Programme Coordinator, Ministry of Environment, Forest and Climate Change (MoEF & CC), New Delhi visiting Botanical Gallery at Industrial Section Indian Museum (ISIM), Botanical Survey of India (BSI), Kolkata; b. Sri Anil Kumar Jain, IAS, Addl. Secretary and Ms. Manju Pandey, Joint Secretary, MoEF & CC, New Delhi visiting Botanical Gallery at ISIM, BSI, Kolkata; c. Sri Praveen Garg, IAS, Additional Secretary & Financial Advisor to MoEF & CC, New Delhi visiting Type Section at Central National Herbarium (CNH), BSI, Howrah; d. Release of Pamphlet on 'Glimpses of Algae in India' during Eastern Regional Workshop on Conservation and Management of Wetlands at CNH, BSI, Howrah; e. Dr. Paramjit Singh, Director, BSI planting a sapling during Van Mahotsav celebration at AJC Bose Indian Botanical Garden, Howrah.

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Activities of the Centre: The Botanical Survey of India having involved in exploration activity has been collecting diverse data pertaining to floral diversity and its ENVIS Resource Partner on Biodiversity proposes to disseminate this information by building databases on various scientific themes such as status of plant diversity in Indian States and Union Territories, Biodiversity Hotspots, distribution of endemic and threatened plants, CITES, interesting plants, carnivorous plants, invasive alien species, wetlands, mangroves and traditional/ethnobotanical knowledge. It is also engaged in publication of state-wise bibliography including abstracts of papers pertaining to plants of India and also selected publications that have relevance both in documentation and conservation.

LIST OF PUBLICATION BROUGHT OUT SO FAR

I. Books

1. Mangroves, Associates and Salt Marshes of the Godavari and Krishna Delta, Andhra Pradesh – India
2. Diversity of Coastal Plant Communities in India (Priced publication) Rs. 804.00*
3. Red List of Threatened Vascular Plant Species in India
4. A Pictorial Guide to some of the Indian Plants included in CITES and Negative List of Exports
5. Phytodiversity of Chilika Lake
6. Bibliography and Abstracts of Papers on Flora of different States and Union Territories [West Bengal I & II, North East India – I, Andaman & Nicobar Islands, Maharashtra, Kerala, Tamil Nadu, Karnataka, Goa, Andhra Pradesh (including Telangana), Odisha, Bihar & Jharkhand.]

II. Newsletters: Up to Vol. 23(2), 2018

*Demand Draft (DD) is to be drawn in favour of ACCOUNTS OFFICER, PAO (BSI/ZSI) payable at Kolkata and to be sent to the address of the ENVIS Resource Partner given above