



ENVIS RESOURCE PARTNER ON BIODIVERSITY

# ENVVIS NEWSLETTER

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## From Director's Desk

Now a days, we are experiencing a transition to clean and green society and skills gaps in green employment are recognised as a major bottleneck in a number of sectors such as renewable energy, energy and resource efficiency, renovation of buildings, manufacturing and construction, ecosystem services, and control of pollution. The adoption and dissemination of clean technologies requires skills in technology application, adaptation and maintenance. The anticipated good practices of skills need a combination of top-down and bottom-up approaches, public-private partnerships for skills and capacity development and coordinated, comprehensible and forward-looking policies.

The Green Skill Development Programme (GSDP) is an initiative of the Ministry of Environment, Forest and Climate Change with a mission to develop green-skilled workers having technical knowledge and commitment to sustainable development, which will help in the attainment of the Intended Nationally Determined Contributions (INDCs), Sustainable Development Goals (SDGs) and National Biodiversity Targets (NBTs) using vast network of ENVIS Hubs/RPs. Being a strong partner of this



programme we believe that biodiversity conservation and

sustainable development cannot be accomplished through research alone; successful conservation must also include educating and training the next generation of conservation advocates. In this context, Botanical Survey of India has implemented Green Skill Development Programme in its 9 Regional Centres and altogether 88 personnel benefited through this programme and gained the essential skills needs for greener employment at two different levels - foundation and advanced during 2017-18.

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 Partners on Biodiversity in bringing out this informative issue.

(Paramjit Singh)

Director

Botanical Survey of India, Kolkata

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## Prickly Tree Okra

**Botanical Name:** *Erinocarpus nimmonii* J. Graham

**Family:** Malvaceae

**Vernacular Names:** Kannada: *Adavibende, Cavara, Chawra, Haladi, Jangalibende, Kadu-bende*; Kongani: *Hiluo*; Marathi: *Chaora, Cher, Chira, Jangli bhendi*.

**General Morphology:** Tree, 5–6 m high, clothed with stellate hairs. Leaves simple, to 25 x 35 cm, cordate, shallowly 3–5-lobed, cordate at base, dentate at margins, cuspidate at apex, almost glabrous above, distinctly pubescent beneath, 5–7-veined; petioles pubescent. Flowers 5–7 cm across, lax, in terminal panicles and leaf-opposed cymes; buds oblong, fulvous-pubescent, 2 or 3 enclosed together by broadly ovate, acute bracts; bracts to 10 x 8 mm, velvety tomentose on both surfaces, caducous. Sepals 5, oblong, to 3 x 0.35 cm, hooded and acute at apex, fulvous-pubescent outside. Petals 5, obovate-spathulate, to 2.7 x 0.8 cm, clawed, pitted-glandular at base, yellow. Receptacle to 3.5 mm long. Stamens many, arising from raised receptacle; filaments undulate above, more or less united at base and pubescent. Ovary hairy, 3–5-loculed; ovules 2 in each locule; style filiform; stigma minute. Capsules triquetrous with winged angles, to 5.5 x 3.5 cm, cordate at base, woody, indehiscent, often 4-loculed, faces covered with straight or curved prickles arising from broad bases. Seed one in each locule, oblong, to 6 mm long, pendulous.

**Flowering:** September–November; peak blooming in October.

**Fruiting:** From end of September to June.

**Ecology:** Occasionally found along the streams and on the banks of the rivers in scattered patches of semi-evergreen and moist deciduous

forests of the Western Ghats at elevations ranging between 300 to 1200 m.



*Erinocarpus nimmonii*: a. Flowering branch; b. Close-up of flower; c. Immature fruits

## Know your Plant

**Distribution:** Goa, Gujarat, Karnataka and Maharashtra. **Endemic.**

It is the only endemic tree genus, distributed in northern Western Ghats. Though it is found all along in the northern Western Ghats, it is absent from Goa southwards along the windward side, but observed in Deccan region of Western Ghats. Its absence may be due to the presence of evergreen forests from Goa southwards along the windward side. The range of distribution is from Chitradurg district of Karnataka to Thane district of Maharashtra along the Western Ghats to Valsad district of Gujarat. The only population which was recorded in the Deccan region far from Western Ghats is from Chickmagalur district of Karnataka. It is mostly found along the streams or on riverbanks showing that they are niche specific.

**Uses:** The bark fibre is used in rope making and the seed, fruits are a source of organic dyes and wood used as fuel and charcoal.

**Note:** It is observed that on an average 18 flowers are produced in a single inflorescence with a range varying from 16 to 20. The attractive flowers and the presence of nectar show that the flowers are pollinated by biotic agents. *Xylocopa* sp. is observed to be the main pollinator for this plant. The success rate of the flowers becoming fruits is 95%. Fruits last long in the branches till June. Fruits are indehiscent, fall at maturity with fruiting branches. No seedlings were observed either around the plants or along downstream. But propagation through suckers was observed.

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## *Artemisia gmelinii* (Asteraceae) – An important ethnomedicinal plant in Western Himalaya

*Artemisia gmelinii* Web. ex Stechm., earlier known by the name *A. acrorum* Ledeb., is commonly known as 'Ganga Tulsi' or 'Kala-purcha' or 'Chamra'. It is an aromatic perennial herb, mainly distributed in temperate and alpine regions of Western Himalayas. The species was reported to occur from West Pakistan to China, Mongolia, Russia and East Europe. In India, it is found in the temperate and subalpine regions of Jammu and Kashmir, Himachal Pradesh and Uttarakhand at elevations ranging from 3000 to 3900 m (Hajra & Balodi, 1995). Pristine natural populations of the species are found in Bhoj Kharak, Pandav Gumfa, Jadh-Ganga, Patanganga, Bhaironghati-Nilang Valley of Gangotri National Park of Uttarakhand (Pusalkar & Singh, 2012); on hilly rocky slopes of Lata-kharak, Peng (3500 m), Geoldong, Malari (Naithani, 1984) and Gechang region of Pin Valley National Park at about 3900 m (Chandra Sekar & Srivastava, 2009).

It is a perennial herb, growing to a height of 40–60 cm. This plant can be recognised by its caespitose habit, woody and densely pubescent rhizomes. The branches are dense and more crowded towards upper parts. Leaves are 2 or 3-pinnatisect, strongly fragrant and gland-dotted. Inflorescence a capitulum, 6–15-flowered, borne on densely congested panicles. Heads oblong, 3.5–5 mm in diameter; female flowers 8–20, marginal; disc florets bisexual. Achenes are obovate or ovate and obscurely ribbed. It flowers and fruits from July to October.

The species has religious and economic values. The plant is rich in essential oil, which contains medicinally important ketones (oxygenated monoterpenes), an alkaloid "artemisin" and a volatile oil psilostachyin which contributes to its strong aroma useful in indigenous perfumery industries. This species is considered sacred and traditionally offered to the Goddess Maa Ganga in holy Ganga Puja at Gangotri temple since ancient times and thus named 'Ganga-tulsi'. In Harshil and Gangotri regions of Uttarkashi district, the plant is used for treating cough, cold and fever, and in Malari and Niti of Chamoli district, it is used in the preparation of aromatic sticks (Shah, 2013). Raw plants are used as "dhoop" and "hawan" by Bhotia and Tharu tribal communities. Leaves are burnt in monasteries by Bhotias and Jaadh in upper Bhagirathi Valley, for fragrance (Naithani, 1995; Awasthi & al., 2003). Leaf extract is applied externally, for the treatment of skin diseases and ulcers (Pusalkar & Singh, 2012).

The plant was collected from Harshil (near Gangotri) in 1966, where it was found to grow in abundance but, later in 1979, the plant was not much seen (Shah, 2013). It is interesting to note that because of the religious faith associated with the plant, it is excessively being exploited during Char Dham Yatra. Young leaves are being picked from the plant before flowering and



fructing by thousands of devotees to offer Maa Ganga and local deities, which is the biggest human threat for the survival of the species in its natural habitat. Even in many areas, the species is usually cultivated due to its unavailability in natural habitats during the festive seasons. Owing to its elaborate rooting system, the species is not only highly beneficial in controlling soil erosion but also have a great potentiality in restoration of ecosystem and soil conservation. Thus special strategies of sustainable utilisation and promotion of its domestic cultivation are of urgent need to minimize the anthropogenic pressure on this species in its natural habitats.

### References

- Awasthi, A., Uniyal, S.K. & Rawat, G.S. 2003. Status and extraction patterns of *Jurinea dolomiaea* Boiss. (dhoop) in an alpine meadow of Kumaon Himalaya (Uttaranchal). *Indian Forester* 129: 589–595.
- Chandra Sekar, K. & Srivastava, S.K. 2009. *Flora of Pin Valley National Park, Himachal Pradesh*. Botanical Survey of India. p. 127.
- Hajra, P.K. & Balodi, B. 1995. *Plant Wealth of Nanda Devi Biosphere Reserve*. Botanical Survey of India. p. 196.
- Naithani, B.D. 1984. *Flora of Chamoli*. Vol. 1. Botanical Survey of India, Calcutta. p. 309.
- Naithani, B.D. 1995. Tribe 1. Anthemideae Cass. In: Hajra, P.K., Rao, R.R., Singh, D.K. & Uniyal, B.P. (eds.), *Flora of India*. Vol. 12. Botanical Survey of India, Calcutta. pp. 23–25.
- Pusalkar, P.K. & Singh, D.K. 2012. *Flora of Gangotri National Park, Western Himalaya, India*. Botanical Survey of India, Calcutta. p. 363.
- Shah, N.C. 2013. The economic and medicinal *Artemisia* sp. in India. *The Scitech Journ.* 1(1): 29–38.

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## Report on Green Skill Development Programme – Foundation Course on Biodiversity Conservationist

The Environmental Information (EI) Division of Ministry of Environment, Forest and Climate Change, Govt. of India, in association with the National Skill Development Agency of the Ministry of Skill Development and Entrepreneurship, Govt. of India has formulated a novel programme called Green Skill Development Programme (GSDP) for skilling X/XII standard pass/drop outs. This was proposed to be taken up as a pilot programme in May 2017 for skilling the selected candidates in the fields of Biodiversity Conservation and Parataxonomy across 10 Centres located in different biogeographical regions of India.

The ENVIS Coordinators of Botanical Survey of India (BSI), Howrah, Zoological Survey of India (ZSI), Kolkata, Salim Ali Centre for Ornithology and Natural History (SACON), Coimbatore and Foundation for Revitalisation of Local Health Traditions (FRLHT), Bangalore were entrusted with the preparation of training modules. The four coordinators by corresponding with each other prepared the modules of 420 hrs each within one month time frame.

In the mid-May 2017, the process of selecting GSDP trainee students in the designated 10 Centres of BSI/ZSI were initiated. On 29th May 2017, the Directors of BSI and ZSI launched the pilot programme of GSDP at Central National Herbarium, BSI, Howrah, West Bengal. Simultaneously, in other Centres located in Calicut, Jodhpur, Dehra Dun, Port Blair and Itanagar the programme was inaugurated and conducted a 3-month training course. The remaining Centres, situated in Allahabad, Coimbatore, Gangtok and Pune started the programme little later as they were having some problems in getting the trainee students.

### Syllabus structure

The Foundation Course syllabus structure comprises a total of 11 different modules namely, Biodiversity (35 hrs), Introduction to Floral Diversity of India (35 hrs), Introduction to Faunal Diversity of India (35 hrs), Economic botany, Medicinal plants and Traditional knowledge (70 hrs), People's Biodiversity Register (PBRs) for Sustainable Development (35 hrs), Wetland Ecosystem (35 hrs), Horticulture and Nursery Techniques (35 hrs), Conservation issues and efforts (Laws, rules and regulations) (35 hrs), Nature guide training (35 hrs), Basic Computer Skills and GIS Theory and Practical (35 hrs), One Field work/visit, hands-on training (35 hrs). In six Centres, where BSI and ZSI are located in the same city,

the floral diversity and its related subject classes were conducted at BSI, while the faunal diversity related syllabi were covered by the ZSI. The other topics such as environmental issues, PBRs, Biodiversity Acts, Wetland Laws, Grid Based Decision Support System (GRIDSS), Nature trail, Nature guide and Ecotourism were taught and practical demonstrations were provided by the resource persons from different institutions. In Coimbatore, SACON conducted the classes for the modules on Wetland ecosystems and Basic Computer Skills and GIS theory and practical. Besides, ZSI team from Chennai visited the Centre and conducted both theory and practical classes for faunal diversity module. Similarly, the ZSI team from Kolkata visited Allahabad and Gangtok Centres and covered the faunal diversity module.

During this three month fundamental course, the scientific officials and research students of BSI and ZSI imparted the training to the GSDP students. Students were taken to nearby forests and wetland areas for field work and also to various organisations/institutions as well as Agri-Horticultural Society and Botanical Garden. As theory and practical classes were conducted the GSDP trainee students gained good knowledge in all the modules simultaneously.

After completion of the 420 hrs of theory and practical classes including field visits, theory and practical exams were conducted. The pass mark for theory exam (multiple choice questionnaire) was 50 out of 100 marks. In practical, 75 marks were allotted for practical exam and 25 marks for viva-voce and 50 marks was considered as pass mark however, in practical exam the trainee should score at least 40 out of 75 marks.

Valedictory function was conducted at each centre and the certificates were distributed to the successfully completed GSDP students while resource persons were felicitated with mementos. The students, who qualified as 'Biodiversity Conservationist' were given the option to opt the Advanced course 'Para-taxonomist' course either in Floral Diversity or in Faunal Diversity. Presently, the Advanced Course on 'Floral Diversity' is being conducted at nine Centres of Botanical Survey of India.

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## A report on the World Ozone Day celebration

The year 2017 marks the 30th Anniversary of the Montreal Protocol on "International Day for the Preservation of the Ozone Layer" with a theme, "Caring for all life under the Sun". The Botanical Survey of India (BSI), Kolkata/Howrah with its ENVIS Resouce Partner celebrated the World Ozone Day on 16th September, 2017. A group of 36 students studying in Class IX and X along with their teachers of Vivekananda Shiksha Niketan School of Basanti block in South 24 Parganas district, West Bengal attended the programme. The programme began with the procession of students, teachers and scientific officials of BSI by holding the placards at AJCB Indian Botanical Garden, BSI, Howrah.

The programme began with an inaugural song by the students of Vivekananda Shiksha Niketan School at Central National Herbarium (CNH), BSI, Howrah. Welcome address and a brief introduction about World Ozone Day were given by Dr. Subir Bandyopadhyay, Scientist 'B' in Bengali. A film on Ozone Layer was shown to the students with brief explanation in Bengali by Dr. Avishek Bhattacharjee, Scientist 'B', which is followed by a lecture on "Fundamentals of Ozone" in Bengali by Dr. Monalisa Dey, Scientist 'B'. After these, students were taken in groups to the displayed theme poster section comprising "Ozone heroes campaign", "Stratospheric Ozone

Layer", "Science of Ozone Layer", "Antarctic Ozone Hole", "International Action for Protection of Ozone Layer", "Major uses of Ozone Depletion substances", "How can you help to protect the Ozone Layer", "Implementation of Montreal Protocol: India's Achievements and Achievements of Montreal Protocol" and each theme was explained to the students in Bengali by the scientific officials of BSI. The programme was concluded with a discussion among the participants.

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## Note on conservation of *Cyathea spinulosa* (Cyatheaceae) through religious practices in Uttarakhand, Western Himalaya

Tree ferns are the relict plant species that found predominantly during Carboniferous Period, about 200 million years ago. Globally, there are 526 species of tree ferns belonging to 15 different genera (<http://www.theplantlist.org/1.1/browse/P/Cyathaceae>). These ferns are mainly distributed in the tropical rain forests of the world (Kramer, 1991), a few species also extend to the subtropical and temperate Himalayan regions in India and China (Kholia, 2012). In India, the genus is represented by 11 species (Fraser-Jenkins & al., 2017).

Tree ferns are well-known for their various socioeconomic values (Singh, 2003; Kholia & Joshi, 2010). Due to overexploitation they are facing serious threats. Besides, habitat destruction and change in land use pattern are other major threats to tree ferns (Chandran, 2008). To save this unique group of plants these are placed in the Appendix II of CITES and the IUCN has also listed them under various threat categories.

*Cyathea spinulosa* Wall. ex Hook. is the only tree fern species found in Western Himalayas with restricted distribution. This fern can easily be identified by its tree-like trunk and a rosette of terminal bipinnate fronds with spiny petioles. The species is found only in five localities, viz., Nagnath Pokhari, along Gopeswar-Tangsa Road; Birahi Ganga Catchment in Badrinath Forest Division in Chamoli district; Pamtori area near Thal; near Antora en route from Didihat to Debbichina and Toli village in Kanalichiina tehsil in Pithoragarh district in small populations with scattered distribution (Singh & al., 1986; Chowdhery & al., 2008; Kholia & al., 2013). The species prefers to grow in moist and damp places along streams.

During the field trip to Nand Prayag area of Garhwal, one of us (BK) found

an individual of *C. spinulosa*, growing near Kali Mandir, Kali Math and locally known as 'Kalyugi Lingura'. On conversation with local inhabitants it was known that only a single plant of the species is growing in this area near a stream, and is worshiped by the pilgrims who visit the famous Kali Maa Temple in the area. According to religious beliefs and faith, the devotees offer a "chunar" (a sacred cloth) to the tree for fulfilling their wishes.

Hence, *C. spinulosa* is conserved and protected by stone fencing around the tree and demarcated it as a sacred by the aborigines. The present report is first report of scared beliefs related with tree ferns and helps us to understand how the religious rituals are contributing towards conservation of plants and forests through their socio-cultural and religious activities.

### References

Chandran, M. 2008. Some plants of taxonomic and high conservation significance in Uttarakhand Himalaya.

In: Rawat, G.S. (ed.), *Special Habitats and Threatened Plants of India*. ENVIS Bull.: Wildlife and Protected Areas. Vol. 11(1). Wildlife Institute of India, Dehra Dun. pp. 45–50.

Chowdhery, H.J., Pande, H.C. & Agrawala, D.K. 2008. The vanishing tree fern of West Himalaya. *ENVIS Newsltt.* 13(2): 2–3.

Fraser-Jenkins, C.R., Gandhi, K.N., Kholia, B.S. & Benniamin, A. 2017. An annotated checklist of Indian Pteridophytes. Part 1 [Lycopodiaceae to Thelypteridaceae]. Bishen Singh Mahendra Pal Singh, Dehra Dun. pp. 120–127.

Kholia, B.S. 2012. Sikkim Himalayan Tree ferns diversity, distribution, uses, economic potentials and conservations. In: *Geology, biodiversity and natural resources of the Himalaya and their intellectual property law*, October 14–15, 2012 (Abstract). Pp. 36.

Kholia, B.S. & Joshi, R. 2010. International year of Biodiversity – Issues on some practices. *NeBIO* 2: 56–61.

Kholia, B.S., Joshi, R. & Punetha, R. 2013. Extended distribution of *Cyathea spinulosa* Wall. ex Hook. in



*Cyathea spinulosa* – A sacred tree fern covered with "Chunar" or Sacred cloth growing near Kali math, Kali Mandir, Nand Prayag.

Uttarakhand Himalaya with a note on distribution and diversification of Himalayan ferns in relation to recent climatic change. *NeBIO* 4(2): 40–45.

Kramer, K.U. 1991. Cyatheaceae. In: Kubitzki, K. (ed.), *The families and genera of vascular plants*. Part I. *Pteridophytes and Gymnosperms*.

Springer, Berlin. [Repr. Ed. 1991]. Pp. 69–74.

Singh, H.B. 2003. Economically viable Pteridophytes of India. In: Chandra, S. & Srivastava, M. (eds.), *Pteridology in the New Millennium*. Kluwer Academic Publishers, Dordrecht. Pp. 421–445.

Singh, S., Chaudhery, U. & Rao, R.R. 1986. Ferns and fern allies of Chamoli district. *Indian J. Forest.* 9(1): 1–15.

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## *Ophioglossum reticulatum* (Ophioglossaceae) from Sundarban Hazi Desarat College Campus, South 24 Parganas, West Bengal

*Ophioglossum reticulatum* L. is found in sporadic patches in fully exposed sandy and lateritic soils as well as shady places and along small streams or nearby shallow ponds in West Bengal.

In West Bengal, the population of this species is dwindling particularly in southern parts of the state. Even

in the recent past the species was commonly seen in different parts of Nadia, Burdwan, Birbhum, South and North 24 Parganas districts, and is now found seldom in these localities due to habitat fragmentation and various urbanization activities.

Few years back a moderately large population of the species was

discovered in the premises of Sundarban Hazi Desarat College, situated at Pathankhali Island of Gosaba Block, a small riverine island of Sundarban Delta in South 24 Parganas, West Bengal. In 2015, only 10–15 individuals were seen. However, in the next year 18 plants were recorded. Presently, the population comprises 30–40 individuals and maintained with proper care. The number of individuals increased promisingly in successive years. This species flourishes well during mid-July to February and gradually disappears in hot summer and again reappears in rainy season.

The plant is characterized by short, erect rhizome; fronds usually one, rarely more; common stipes 3–16 cm long, as long as the fertile spike; trophophylls sessile or with a short haft up to 1 cm, broadly ovate, ovate-orbicular or even subreniform, 10–15 x 1–5 cm, broadly truncate or cordate at base, obtuse or rounded rarely acute at apex, thin; fertile stipes 5–18 cm long; strobilus 1–5.5 cm long; spores 35–38 x 38.5–42  $\mu$ m; exospore finely reticulate.

Necessary steps have been taken by the competent authority to conserve the species in the college campus.

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*Ophioglossum reticulatum*: a. Habitat; b. Habit; c. Spore formation; d. Enlarged spores

## Birbal Sahni

**Birbal Sahni** (1891–1949), a renowned Indian paleobotanist, was born on 14 November 1891 at Bhera, Shahpur district, West Punjab. He obtained his B.Sc. degree from Emmanuel College, Cambridge in 1914. For his researches on fossil plants, Sahni was awarded D.Sc. degree of the University of London in 1919. After returning to India, he worked as a Lecturer at Banaras Hindu University, Varanasi and Punjab University, Punjab for a year each. Sahni joined the Lucknow University as Professor of Botany in 1921, and where he later established the Department of Geology, and served as Head of both the departments. His love and devotion on paleobotany led him to establish a well-recognised International Institute on Paleobotany. He was a teacher of par-excellence and had great passion for palaeobotany, besides he was an enthusiastic geologist with huge interest in archaeology. Sahni made comprehensive studies

## Unusual Development of Inflorescence in *Musa x paradisiaca* (Musaceae)

The common plantain, *Musa x paradisiaca* L., is a monocarpic plant and is cultivated widely throughout India for its edible fruits. The flower buds as well the juvenile flowers are used as vegetables. The plant has underground rhizome and the aerial pseudostem formed by the compact arrangement of sheathing leafbases. The solitary, compound spadix inflorescence appears once in life (monocarpic) having central



*Musa x paradisiaca*: a. Habit; b. Unusual inflorescence

on Indian Conifers. He explored the fossil plants from Rajmahal Hills. His studies revealed the stem **Bucklandia**, leaf **Ptilophyllum** and flower **Williamsonia** belong to the same plant. His reconstruction of **Williamsonia seawardiana** is very significant. He discovered petrified wood of **Homoxylon rajmahalense**, and also described **Glossopteris angustifolia**, **Palmoxylon sundram** a petrified wood, Cocoswood and a water fern **Azolla intertrappea**. He instituted a new plant group, 'Pentoxyleae', which received a worldwide attention. He also studied Gondwana plants of Salt Range and Karewa flora from Kashmir, and his palaeobotanical studies had given support to continental drift theory. In 1929, he became the first Indian scientist to be awarded again the D.Sc. degree by the University of Cambridge, for his outstanding contributions in paleobotany. Sahni was also the first Indian botanist bestowed with the prestigious Fellow of the Royal Society of London. He

elongated rachis ensheathed by petioles (pseudostem), and a small part is exerted above and bends downward with large deciduous bracts covering or protecting the flowers. The rachis is simple and without any branch. The basal part of the spadix starts with female flowers and the apical part with male flowers. Flowers are usually in two rows in each bract.

During a visit to Harowa area, 24 Parganas (South), West Bengal a cultivated plantain plant was seen having unusual appearance of inflorescence. There was a solitary rachis with a larger terminal compound spadix. The basal part of the rachis branched many times even to third order and each branch terminated into a compound spadix. In some cases, the basal female flowers were replaced by an inflorescence. Altogether 29 spadixes were observed in the plant. The

## Know your Botanist

was a General President of the Indian Science Congress in 1940, President of National Academy of Science during 1937–1939 and 1943–1944, and Honorary Member of the American Academy of Arts and Sciences in 1948. Sahni founded the Paleobotanical Society on 10 September 1946. He died on 10 April 1949 due to heart attack.



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photographs were taken as evidence to illustrate such type of curious and unusual growth of the plantain. It is possible that during differentiation instead of female flowers, branches or inflorescences are developed resulting in the aggregation of multiple spadixes in a single plant. There is a need to study this kind of phenomenon in cultivated banana plant to know the actual scientific reason behind it. However, it is disappointing that the local people without knowing the importance of such unusual growth destroyed the plant fearing of omen incidence.

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a. Dr. (Mrs.) Anandi Subramanian, IES, Sr. Economic Advisor, MoEF & CC, Dr. Paramjit Singh, Director, Botanical Survey of India alongwith other officials of ENVIS Secretariat and BSI at 'Green Skill Development Programme' Meeting at New Delhi; b-e. Mr. Yashvir Singh, Economic Advisor, MoEF & CC, New Delhi visiting ENVIS Centre, BSI, Type Herbarium, Central National Herbarium, BSI and Digital Herbarium, BSI during his visit to BSI, Howrah; f. Students of Green Skill Development Programme 'Biodiversity Conservationists Course' visiting J.D. Hooker's Gallery at Industrial Section Indian Museum, Kolkata; g. Inauguration of GSDP Advanced Course 'Parataxonomists' at CNH, BSI, Howrah; h. Releasing of a Book 'Invasive Alien Plant Species of India' during the International Conference on Invasive Alien Species of India held at Kolkata.

## ENVIS CENTRE

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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 Centre 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 and Nicobar Islands, Maharashtra, Kerala, Tamil Nadu, Karnataka, Goa, Andhra Pradesh (including Telangana) and Odisha]

### II. Newsletters: Up to Vol. 22(2), 2017

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