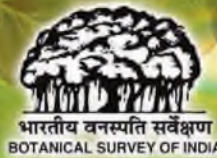


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From Director's Desk

The eighteenth meeting of the Conference of the Parties of the Convention on International Trade in Endangered Species of Wild Fauna and Flora or CITES CoP 18 was held in Geneva (Switzerland), from 17–28 August 2019. Nearly 1700 participants from all over the world took part in the conference. India was represented by 15 participants including one participant from Botanical Survey of India and had 6 Proposals for amendment of Appendices I and II. These include transfer of *Aonyx cinereus* (Small-clawed otter), *Lutrogale perspicillata* (Smooth-coated otter) and *Geochelone elegans* (Star tortoise) from Appendix II to Appendix I, inclusion of *Gekko gecko* (Tokay gecko) and *Rhinidae* spp. (Wedgefishes) in Appendix II and deletion of *Dalbergia sissoo* (North Indian rosewood) from Appendix II.

In the same year, India hosted the fourteenth meeting of the Conference of the Parties of the United Nations Convention to Combat Desertification or UNCCD CoP 14 in New Delhi from 2–13 September 2019. Reversing land degradation and its outcomes while accelerating positive achievements for people and for ecosystems with a view to deliver on Sustainable Development Goals was the core agenda of the Conference. The Parties to the Convention agreed on the actions each will take over the next two years and beyond to get us on a sustainable development



path. The 'Delhi Declaration' was adopted by the Conference in which parties expressed commitment for a range of issues, including gender and health, ecosystem restoration, taking action on climate change, private sector engagement, Peace Forest Initiative and recovery of 26 million hectares of degraded land in India.

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

(Dr. A.A. Mao)
Director

Botanical Survey of India, Kolkata

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Little seed canary grass

Botanical Name: *Phalaris minor* Retz.

Family: Poaceae

Common Names: Little seed canary grass, Small-seeded canary grass, Small canary grass, Lesser-canary grass; Hindi: *Guli danda*; Urdu: *Sittee booti*.



Phalaris minor: a. Stem enclosed by leaf sheath; b. Ligule; c. Young inflorescence enclosed by leaf sheath; d. Matured inflorescence

General Morphology: Annual grass, c. 100 cm tall, loosely tufted; culms erect, herbaceous, branched, hollow, round, green; internodes up to 12 cm long; nodes glabrous, lower nodes rooting. Leaf-blades linear, acuminate, cordate, margin smooth, midrib prominent, c. 31 x 1.5 cm;

auricle rudimentary; collar divided; ligule membranous, acute, lacerate, c. 6 mm long. Inflorescence a compact panicle, cylindrical, dense head like, greenish-white, c. 7 cm long. Racemes with 4–12 spikelets, c. 1.2 cm long. Spikelets broadly lanceolate, shortly pedicellate, 2-flowered, shining, green, c. 5 mm long. Glumes similar and exceeding apex of florets, ovate-lanceolate, chartaceous, winged, 3-nerved, margin serrulate, c. 5 mm long. Lower floret reduced to minute sterile lemma, c. 1 mm long. Fertile lemma lanceolate, acute, laterally compressed, 5-nerved, pubescent, shiny, c. 3 mm long. Palea elliptic-lanceolate, prominently 2-nerved, keeled, greenish, c. 5 mm long; keel ciliate. Lodicules 2, fleshy, whitish, c. 0.2 mm long. Stamens 3; anthers yellowish, c. 1.5 x 1.6 mm; filaments hyaline, c. 0.2 mm. Ovary oblong, pubescent, greenish, c. 0.2 mm long; style c. 2 mm long; stigma 2 mm long. Caryopsis tightly enclosed between lemma and palea, broadly elliptic, dorsally flat, brown, c. 2.5 x 1.2 mm.

Distribution: This species is distributed in all the continents of the world except Antarctica and North Pole. Kabeer & Nair (2009) have given its distribution from Andhra Pradesh, Bihar, Himachal Pradesh, Jammu-Kashmir, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu and Uttar Pradesh.

Ecology: *Phalaris minor* Retz. is a grass species of Mediterranean origin (Baldini, 1995). It invaded India much before the Green Revolution of the country (Inderjit & Kaushik, 2009). Probably it reached with Mexican wheat grains (Singh & al., 1999). This species is usually associated with wheat crop due to their similar growth requirements (Singh & al., 1999) and causes a major wheat crop loss in Punjab, Haryana and northern

Uttar Pradesh of India (Om & al., 2002; Franke & al., 2003). Duthie (1888) mentioned the presence of *P. minor* in the cultivated fields of the plains of Northern India and its occurrence up to an elevation of about 4,000 ft. in the Himalaya.

Notes: In West Bengal, this species grows on wet soil along the earthen drains at rural areas from January to mid-April and interestingly it is not associated with the wheat crop like the incidences in North-west states of India. Kaushik & Inderjit (2007) reported that rice straw has an allelopathic effect to prevent the growth of several weeds including *P. minor*. West Bengal is a major rice producing state of India. According to the report of West Bengal State Marketing Board, the total cultivated area for rice is 5783.6 hectares in compare to only 400.1 hectares for wheat. Wheat is cultivated here in rotation with rice during winter months. Probably due to the allelopathic effect of rice straw, *P. minor* is not able to establish in wheat cultivation land in West Bengal.

To control *P. minor* in wheat cultivation, farmers have been using isoproturon (herbicide) for last four decades in Punjab and Haryana which result establishment of resistant biotypes of this species (Singh & al., 1999; Franke & al., 2003; Singh & al., 2014). In West Bengal, it is hard to predict that which biotype (resistant or non-resistant to isoproturon) of *P. minor* are growing because this species is not tested yet against isoproturon.

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Report of *Cheniella quinnanensis* subsp. *quinnanensis* and *C. quinnanensis* subsp. *gandhiana* from two more localities in NE India (Leguminosae: Cercidoideae)

Clark & Mackinder in Clark & al. (2017) established a new genus *Cheniella* R. Clark & Mackinder and correctly treated *Phanera glauca* Benth. subsp. *tenuiflora* (Watt ex C.B. Clarke) K. Larsen & S.S. Larsen var. *murlenensis* Ram Kumar & al. as a synonym of *C. quinnanensis* (T.C. Chen) R. Clark & Mackinder subsp. *quinnanensis*. They stated that in India it is distributed in Assam but actually it should have been Mizoram from where *P. glauca* subsp. *tenuiflora* var. *murlenensis* was described. Furthermore, Clark & Mackinder in Clark & al. (2017) had not mentioned

anything about the collection of *Bor* 2676 (K000980014) made from Ridima, Naga hills, in 18.5.1935 which was determined as *Bauhinia quinnanensis* T.C. Chen by Ruth Clark herself in 5/2014. We have not seen the specimen at K but seen its duplicate at DD. The collection of *Cheniella quinnanensis* subsp. *quinnanensis* from Ridima, near Barail range is either from Manipur or Assam.

Clark & Mackinder in Clark & al. (2017) treated *Phanera glauca* Benth. subsp. *tenuiflora* (Watt ex C.B. Clarke) K. Larsen & S.S. Larsen var. *gandhiana*

Gogoi & Bandyop. as a subspecies under *Cheniella* as *C. quinnanensis* (T.C. Chen) R. Clark & Mackinder subsp. *gandhiana* (Gogoi & Bandyop.) R. Clark & Mackinder.

Clark & Mackinder in Clark & al. (2017) stated “A notable and unusual feature of this taxon is the leaf form, which is dimorphic. Leaves are ovate and emarginate, with the base rounded to subcordate, or ovate with the apex attenuate to several millimetres, and the base sub-hastate. Both leaf forms can occur on the same branch of an individual. The latter leaf form is very unusual (possibly



a. *Cheniella quinnanensis* (T.C. Chen) R. Clark & Mackinder subsp. *quinnanensis* from Mizoram;
 b. *Cheniella quinnanensis* (T.C. Chen) R. Clark & Mackinder subsp. *gandhiana* (Gogoi & Bandyop.)
 R. Clark & Mackinder from Nagaland

unique) within *Bauhinia s. lat.*, raising the possibility that this plant is an anomalous form of *C. quinnanensis* comb. nov.; however, in the absence of opportunity to study the material directly, or further evidence to support this hypothesis, we here maintain the distinct status of the taxon, reclassifying it as a subspecies of *C. quinnanensis* comb. nov.”

One of us (SD) photographed subsp. *gandhiana* from Wonsoi village forest area near road side, Tuensang district, Nagaland on 13.5.2013. In the photograph it can be seen that the leaves are not attenuate at apex and the base is also not sub-hastate. So the apprehension of Clark & Mackinder in Clark & al. (2017) seems to be correct but considering overall pattern of distribution of *C. quinnanensis* subsp. *quinnanensis* (China: Guangxi, Yunnan, Guizhou; India: Manipur or Assam, Mizoram; Myanmar) and *C. quinnanensis* subsp. *gandhiana* (India: Arunachal Pradesh; Nagaland) in the world the placement of *gandhiana* at rank of subspecies needs reconsideration. The subsp. *gandhiana* is occurring in between the zone of distribution of subsp. *quinnanensis*. More field explorations are certainly necessary in the entire region of NE India to assess its correct taxonomic status.

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Report on the Activities on World Ozone Day-2019 by Botanical Survey of India

“World Ozone Day” was observed in Botanical Survey of India, Howrah on 16th September, 2019 jointly by Acharya Jagadish Chandra Bose Indian Botanic Garden (AJCBIBG), Central National Herbarium (CNH) and ENVIS Resource Partner on Biodiversity to create awareness

among public about the Ozone layer depletion and its impact on the global climate. This year, the theme was “32 years and healing”. The observance of “World Ozone Day” included a short rally (with school children, teachers, scientists and staff) from Curator building of

AJCBIBG, Howrah to Central National Herbarium building, Howrah and a series of events like elocution and drawing competitions among school children from six state government aided schools of Howrah. Dr. B.K. Sinha, Scientist ‘F’, BSI Hqrs., Dr. V.P. Prasad, Scientist



'E' & HoO, CNH, Dr. Pratibha Gupta, Scientist 'E' & HoO, CBL and Dr. Kanad Das, Scientist 'E' & HoO, AJCBIBG were among the dignitaries present during the inaugural programme. The significance of the origin of Ozone day, Montreal Protocol and COP towards the betterment of a healthy and hygienic environment was emphasized in the inaugural session. Few short videos depicting negative

impact on environment and mankind due to ozone layer depletion were also screened to the students. At the end, Dr. A.A. Mao, Director, Botanical Survey of India addressed the scientists, staff, research scholars & participants and emphasized the role, duty and participation of every citizen of the country in minimizing the depletion of ozone layer by limiting our greediness and providing a safe and

healthy environment for the future generations. This one day programme concluded with the prize distribution to the winners of elocution and drawing competitions and by giving vote of thanks.

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Conservation need for *Eria meghasaniensis* (S. Misra) S. Misra, an endemic orchid of Odisha, India

Eria meghasaniensis (S. Misra) S. Misra is a curious sympodial orchid species naturally occurring in Similipal Biosphere Reserve of Odisha. Its distribution is restricted to Meghasani and Khairiburu hills and is endemic in this protected area. This species is unique in having a globose spike having flowers with bilobulate labellum and can be placed in *Eria* section *Pinalia* Lindl. Although the species has been described in 1988 and has been located by many subsequent workers in last three decades, it has never been reported outside its type locality.

An effort was made to analyze the threat perspective of this endemic species in its natural habitat. It has



Fig. 1: *Eria meghasaniensis*: Habit



Fig. 2: Affected plant by insect and natural calamity; a & b. Plant infected by insect; c & d: Plant detached from phorophyte

been observed that 138 number of individuals were found restricted within four sq. km area in the evergreen forest patches of core zone. Most of these plants were found growing on *Syzygium nervosum* A.Cunn. ex DC.. The flowers were somewhat cleistogamous and thus fruit setting is a natural phenomenon. But despite successful fruit setting (Fig. 1), very few seedlings could be observed in the type locality. This may be due to unavailability of suitable mycorrhiza for seed germination or any other climatic factor associated. Maturity of seeds and their viability could also be an issue for reduced seedling development.

Although, this species occurs in the core zone of a protected area and there is no record of anthropogenic exploitation for this species, still its population has been found declining. Its habitat experiences in high summer temperature and heat wave. Being a sympodial orchid, this species has effective vegetative mode of propagation through new shoot developing from the matured pseudobulbs annually. But during the present study it has been observed

that, these vegetative new growths have been infected with some pest (Fig. 2) and many small aggregate of pseudobulbs were found detached from the phorophytes due to unknown reason.

Due to the narrow distribution range, small population size and all other associated threats observed in the present study, this species can be assessed as 'Critically Endangered' and needs immediate conservation attention. For this purpose, a long-term population monitoring programme along with identification of ecological drivers threatening this species must be initiated. *In-vitro* propagation and reintroduction can also act as an important tool for conservation of this endemic species.

Eria meghasaniensis (S. Misra) S. Misra in J. Orchid Soc. India 3(1, 2): 69. 1989; S. Misra, Orchid. Orissa: 398. 2004. *Eria bilobulata* Seidenf. ssp. *meghasaniensis* S. Misra in J. Orchid Soc. India 2(1, 2): 49, t. 1, 2. 1988.

Flowering: September–October

Fruiting: October–March

Habitat: In semi-evergreen moist montane forest, at about 1100 m, on folds of hill slope, epiphytic on moss-covered tree trunks at low heights, in somewhat exposed situations.

Distribution: INDIA (Odisha; Similipal, Meghasani hill, nearing the peak; Khairiburu hill, nearing the peak). Critically Endangered; Endemic.

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Introduction and Proliferation of *Gymnanthemum amygdalinum* (Delile) Sch.-Bip. in South India

Gymnanthemum amygdalinum (Delile) Sch.-Bip. is a common shrub or small tree which belongs to the second largest plant family Asteraceae. It grows in tropical Africa, also well distributed in Asia and is commonly found along drainage lines and in natural forest or plantation. Its native range is E. Bolivia to Brazil, Tropical Africa, W. Yemen. It is commonly called as Bitter leaf, River vernonia or Tree vernonia. The range of distribution of this tree is from Guinea to Mali, Angola, Botswana, Zimbabwe and Mozambique.

Materials and methods

In 2016, the stem cuttings of this tree was brought from Botanical Survey of India, Northern Regional Centre, Dehradun by one of the author (RM)

and it was then planted in the campus of Botanical Survey of India, Southern Regional Centre, Coimbatore. Now this tree is well adapted to this soil and climatic conditions and also is flowering profusely during the month of November–February.

Etymology

In Greek *gymnos* = naked and *anthos* = flower, alluding to the lack of paleae on the receptacle.

Description

Tree. Branchlets arachnoid. Leaves alternate, elliptic, cuneate at base, entire to serrulate at margins, acuminate at apex, 4–8 x 1.5–3 cm, arachnoid below, pubescent above, veins prominent below. Petioles 1–2 cm long, arachnoid. Bracts linear, c. 0.1 mm long. Inflorescence terminal

panicle, dichotomously branched. Capitulum campanulate, c. 20 flowered. Heads c. 1 cm long, white. Pappus c. 7 mm long. Calyx arranged in three rows; sepals elliptic, c. 1 cm long, ciliate and hyaline at margins, green. Petals 5, ovate, c. 3 mm long, acute at apex, white. Corolla tube c. 3 mm long. Stamens synandrous, c. 5 mm long. Ovary c. 2.5 mm long, pubescent. Ovules 2, oblong, c. 1 mm long, transparent white. Achenes c. 1.5 mm long.

Distribution

Widespread throughout tropical Africa extending into Botswana, where it has been recorded from Okavango to Kgwebe Hills, and South Africa, from Soutpansberg in Limpopo southwards to the Ingwavuma River in KwaZulu-Natal.

Medicinal uses

African Traditional Healers across the African continent use the plant for the treatment of fever, malaria, stomach ache, skin infections like ringworm, acne, diabetes, cancer, insomnia, hepatitis, toothache, jaundice, diarrhoea, schistosomiasis or snail fever, pneumonia, tuberculosis, stroke, arthritis, wounds, fatigue and cough. It is also used as an anti-parasitic, anti-bacterial, anti-



Gymnanthemum amygdalinum: a & b. Habit; c. Flowering twig; d. Fruiting twig

inflammatory and anti-helminthes, as a laxative, an appetizer, an aphrodisiac and for body weight loss. The leaves are effective against fevers and are common substitute for quinine in many African countries including Nigeria. The vernoniosides content of this tree is more effective against drug resistant malarial parasites, the sick chimpanzees eat the leaves or stem piths if they are attacked by malarial parasites. In India the tree is widely used to treat against jaundice and diabetes.

Extracts of the plant have been used in various folk medicines as remedies against helminthic, protozoan and bacterial infections. Phytochemicals such as alkaloids, terpenes, steroids, coumarins, flavonoids, phenolic acids, lignans, xanthenes, anthraquinones and sesquiterpenes have been extracted and isolated from *Gymnanthemum amygdalinum*. These compounds stimulate various biological effects including cancer chemoprevention, which recognized to their abilities to scavenge free radicals, induce detoxification, inhibit stress response proteins and interfere with DNA binding activities of some transcription factors. It also has been widely used for the traditional treatment. This plant has been

cultivated by some communities because the herbal clinics are using this plant as an ingredient in the herbal formulations. Stems are used as chew-sticks for oral hygiene and dental problems.

Edible purposes

The leaves are used for human consumption and washed before eating to get rid of the bitter taste. The bitter taste is due to anti-nutritional factors such as alkaloids, saponins, tannins and glycosides. They are used as vegetable and stimulate the digestive system. *Vernonia* is often grown as culinary herb in soup and as food. In beer brewing, the leaf extract has been shown to serve as alternative to hops. Nutritionally, bitter leaf is good leafy vegetables that have been used to improve the problems of micronutrients, malnutrition as it is extremely rich in proteins, vitamins and mineral elements such as iron, phosphorus, calcium, potassium, zinc, copper, folic acids and ascorbic acid.

Propagation

This tree is usually found at the altitude of 500-3000 asl. Although the humid environment is more suitable for its growth and it is drought tolerant species. It can thrive on all

types of soil but grows better on humus-rich soils, these probably underscores its ability to thrive on a range of ecological zones. These plants can be propagated by seeds and stem cuttings, however, mostly stem cuttings are widely used, since they can grow faster.

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Plate 1: SEM Image Achene of *Gymnanthemum amygdalinum*

Prof. S. S. Bir

Prof. Sarmukh Singh Bir (S. S. Bir) was a renowned Pteridologist, taxonomists and cytogenist of world fame who worked in almost all the aspects of classical botany like Morphology, Phylogeny, Anatomy, Ecology, Biosystematics, Floristics, Phytogeography, Conservation biology etc. He is also known as father of Indian Pteridology. He was born on 28th August 1829 at Sahapur, Ambala, Haryana. He did his B. Sc. (Hons.) and M. Sc. (Hons.) from Punjab University, Chandigarh and secured first class and first position in 1951 and 1953 respectively, hence awarded Amritsar Academic Roll Honour of Khalsa College and Panjab University Medals. He pursued his Ph. D. in 1953 from the Punjab University, Chandigarh under the able guidance of Prof. P.N. Mehra on the Cytotaxonomy of Darjeeling and Sikkim Himalayan Pteridophytes and collected plants from Darjeeling and Sikkim between 1953-1957. After completion of Ph.D., he joined Teaching at Punjab University, Chandigarh. Subsequently he shifted to Punjabi University, Patiala as a faculty and become the founder Head of the Department of Botany in 1967. Beside his teaching and research activities, he served in various capacities as Head, Department of Botany (1967- 1982), Dean, faculty of Sciences (1972-1974), Dean, Academic Affairs (1975-1976, 1978-1980), Dean, faculty of Life Sciences (1978-1980) and Senior Professor of Botany (1974-1991). Under his leadership in Punjabi University, Patiala, the research and academic ambience in other discipline was also established and flourished. Prof. Bir was the instrumental in establishing a Botanical Garden, Museum, Conservatory and Herbarium in the University. He visited various herbaria and laboratories in Great Britain, Switzerland, Sweden, USA, Canada, Pakistan and China. After superannuation he was appointed as Professor emeritus in 1991 and served the department for another two decades up to 2012. Prof. Bir passed away at his residence in Patiala, Punjab on 26 Aug 2015, barely two days before his 86th birthday.

During his research and teaching career Prof. Bir published about 350 high quality research papers on cytogenetics, taxonomy, floristics, ecology, anatomy etc. of pteridophyte and angiosperms. He revised many fern genera like *Athyrium*, *Diplazium*, *Polypodium*, *Phymatodes*,

Vittaria, *Pyrrosia*, *Pteris*, *Botrychium*, *Asplenium* etc. Beside high quality research papers about a dozen books on Pteridophytes (Pteridophytes of Darjeeling and Sikkim Himalaya, Pteridophytes of Garhwal Himalaya, Pteridophytes of Pachmari, Pteridophytes of Palni Hills, Pteridophytes of North Eastern Himalaya, Polypodiaceae of India, Chromosome Atlas of Indian Pteridophytes, Glimpses of Cytogenetics in India etc.) and Angiosperms (Flora of Patalia) are authored by Prof. Bir. More than forty species have been described by him as new to sciences and more than 100 taxa were reported by Prof. Bir as new to India. He was also commemorated by many taxa of ferns like *Lepisorus biri*, *Pyrrosia biri*, *Asplenium biri*, *Asplenium sikkimbirii*, *Asplenium unilateral var. birii*, *Pronephrium birii*, *Cornopteris birii*, *Polystichum birii*, *Deparia x birii*, *Diplazium x neobirii* are some of them.

Based on his vast knowledge, experience and quality research, Prof. Bir was also elected and honoured by many reputed scientific and botanical societies. He was elected as Fellow of Linnean Society (London), Indian National Science Academy, National Academy of Sciences (India), Indian Fern Society etc. He was also selected as President, Section of Bryophytes and Pteridophytes during international symposium at McGill University, Montreal (1983); President, Section of Botany in Platinum Jubilee Session of Indian Science Congress (1988); President, Indian Botanical Society (1993), President, Society for Advancement of Botany (1981) etc. He was also elected as Vice- President of Palynological society of India (1997-98), Pleobotanical Society of India, Society of Cytologists and Genetics, India (1978-82), Punjab Academy of Science, Indian Society of Tree Scientists (1982-1986), Society for Promotion of Plant Science Research (1987-1988) etc. He also served as member of Executive Council of various organisations like International Association of Pteridologists (1988-1993), Member INSA Council (1993-1995), Member Govt. of India (DST), Member for Review Committee for Botanical Survey of India and Zoological Survey of India (1985-1986) to name a few. He was also awarded by P. Maheshwari Medal Award (1990), ISCA Platinum Jubilee Lecture Award (1994), Chavan Memorial Lecture Award (1991-1992), Dr. H. Santapau Medal (2002). In addition to this Prof. Bir was conferred by CSIR,

Know your Botanist



Emeritus Scientist (1991-1995), INSA Senior Scientist (1995-2000), INSA Honorary Scientist (2001-2004, 2006-2009), Visiting Fellow, GNDU (2000-2002); Distinguished Fellow, Indian Fern Society (2002-2008); Life Time Achievement Award (Indian Fern Society, 2008) along with many National and international scientific bodies. etc. He was visiting Professor for many universities too.

Indian Fern Society was established by Prof. Bir in 1983 and he served the society as Secretary-Treasurer and President for many years. The Journal of Indian Fern Society, Indian Fern Journal was also started by him in 1984. He was always encouraging students and teachers and promoting the Pteridological research in India alike along with nurturing Indian Fern society and Indian Fern Journal. He actively served as editor of Indian Fern Journal for more than 25 years. Beside this he was also served as editor of Cytology and Genetics during 1983-1990. To honour Prof. Bir three commemoration volumes viz., Plant Science Research in India (Part-I & II, 1989), Perspective in Pteridology (Part-I 1991, Part -II 1992) and Perspectives in Pteridophytes (2009) have been published. To commemorate Prof. Bir, Indian Fern Society and Association of Plant Taxonomy instituted S.S. Bir Gold Medal and S.S. Bir Medal respectively for those who have done outstanding research on Indian Pteridophytes.

B.S. Kholia

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a. Dr. Kanad Das, Head of Office, Acharya Jagadish Chandra Bose Indian Botanic Garden (AJCBIBG), Botanical Survey of India (BSI) presented a memento to Sri Jagdeep Dhankhar, Hon'ble Governor, West Bengal on his visit to AJCBIBG; b. Dr. A.A. Mao, Director, BSI unveiled the bust of Acharya Jagadish Chandra Bose near the main gate, AJCBIBG; c. Dr. A.A. Mao addressing during the inauguration of new Rosarium near Roxburgh Monument, AJCBIBG; d. Delegates attended in World Regional Rose Convention at AJCBIBG; e. Dr. Kanad Das enlightening about the Great Banyan Tree to Sri Ramesh Bais, Hon'ble Governor, Tripura.

ENVIS RESOURCE PARTNER

Established : April, 1994

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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. Macrofungi of Acharya Jagadish Chandra Bose Indian Botanic Garden: A Pictorial Guide
7. 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, Madhya Pradesh & Chhattisgarh, Himachal Pradesh.]

II. Newsletters: Up to Vol. 24(2), 2019

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