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ENVIRONMENTAL INFORMATION, AWARENESS, CAPACITY BUILDING
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CENTRE-RESOURCE PARTNER ON BIODIVERSITY
(FLORA)



EIACP Newsletter

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From Director's Desk



Environmental Information, Awareness, Capacity Building and Livelihood Programme (EIACP) Programme Centre-Resource Partner on Biodiversity (Flora) of Botanical Survey of India, Ministry of Environment, Forest & Climate Change, New Delhi plays a crucial

role in documenting and sharing information about India's floral diversity. This centre has indeed been actively involved in the collection, collation, and dissemination of information on the floral wealth of India. The EIACP Programme Centre has been playing a crucial role not only in documenting India's floral diversity but also in disseminating this knowledge through their newsletters. By highlighting results from extensive field explorations, documenting curious plants, medicinal and ethnobotanical uses, rare species, and distributional plant records across different phytogeographic regions, they contribute significantly to botanical research and conservation efforts. Their focus on rare and endangered species underscores their commitment to biodiversity conservation. Additionally, their reports on environmental awareness programmes help in fostering public understanding and support for conservation initiatives. It's great to hear that the EIACP PC-RP Newsletter features Dr. Gopinath Panigrahi in the 'Know your Botanist' section. He has made

significant contributions to the field of botany, especially during his tenure as Joint Director of the Botanical Survey of India. Interesting details of popularly known Ant plant or Baboon's head, *Hydnophytum formicarum* Jack, is a myrmecophyte plant that live in a mutualistic association with a colony of ants of the family Rubiaceae is provided under 'Know Your Plant' Section. In this issue an overview of the occurrence of *Tridax procumbens* L. in Buxa Tiger Reserve (BTR) and how it is used to treat leech bites and in traditional phytotherapy. Such documentation not only aids in conservation efforts by understanding plant distributions but also preserves traditional knowledge of medicinal plants that have been used by local communities for generations.

Along with regular publication of Newsletters, BSI EIACP Programme Centre-Resource Partner also publishes Books, Pamphlets and Brochures on different topics related to Floral Wealth of our country. It also maintains Databases on Flora related topics in the EIACP website which are well received and appreciated by the scientific community.

Like earlier issues, I hope this issue will also be well received by readers for its contents. I appreciate the efforts of entire team of BSI EIACP PC-RP on Biodiversity (Flora) in bringing out this informative issue of the Newsletter.

(Dr. Ashiho A. Mao)
Director
Botanical Survey of India

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Know your Botanist

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The Ant Plant – *Hydnophytum formicarum* Jack

Introduction: Popularly known as the Ant plant or Baboon's head, *Hydnophytum formicarum* Jack, is a myrmecophyte plant that live in a mutualistic association with a colony of ants. *H. formicarum* belongs to the family Rubiaceae. The genus *Hydnophytum* Jack comprises of 57 species worldwide, confined to the Indo-China to W. Pacific region (POWO 2024). In India it is represented by single species *Hydnophytum formicarum* Jack from Andaman & Nicobar Islands which is a phytogeographical part of Indochinese-Malesian region as well as the native distributional range of this species. The name is derived from the Ancient Greek 'hydnon' meaning 'tuber', and 'phyton' 'plant', after their appearance with their swollen succulent stems (Jebb & Huxley 2019). The specific epithet 'formicarum' denotes ant's nest. *Hydnophytum formicarum* Jack is also the Type species of the genus *Hydnophytum*.

Taxonomy: *Hydnophytum formicarum* Jack, Trans. Linn. Soc. London 14: 124. 1823. (syn.: *Hydnophytum andamanense* Becc., 1885)

English name: Ant plant or Baboon's head.

Morphological characters: The plant is an epiphytic shrub growing on other trees. It has large basal swollen portion, tuberous, which is fleshy, irregularly subglobose, with diverse tuber morphology, ranging from 10–60 cm in diameter. Tuber surface is smooth to rugose, grey to brown. Roots are confined to substrate side of tuber, occasionally numerous throughout, then becoming more or less spinose. Many stems and branches radiate from the basal tuber. Leaves are opposite, sessile, thick, fleshy, glossy, bright green, elliptic, oblong or obovate in outline, 5–12 cm long and 2.5–6 cm across, larger in low altitude and smaller in high altitude, leaf apex is rounded, entire along margin, narrowed to cuneate at base, lateral veins 3–10, oblique. The flowers are white, 4-merous, small, sessile, found in groups of 3–5 at the axil of leaves. Calyx is short, cupuliform, 4-dentate, persistent. Corolla white, tubular, with ring of hairs below level of mouth, 4-lobed. Fruits are fleshy berries, orange at maturity, ellipsoid, 5–7 mm across.

Flowering & Fruiting: March–May.

Ecology: This species occurs from sea level to montane forests. It is found in the rainforests of Andaman & Nicobar Islands in India, growing on the trees along rivers, streams, mangrove swamps, coastal forests, hill top stunted evergreen forests etc. The tuber is parenchymatous. The epidermal surface tends to be grey, silvery or brown in colour, while the flesh is green towards the periphery and white within. In montane forests the tissue tends to be drier and more leathery in texture, brown or reddish in colour when cut open. Tubers mostly inhabited by ants, and usually by *Philidris cordata* (Jebb & Huxley 2019).

Mutualism: *Hydnophytum formicarum* a myrmecophyte plant has developed different morphological structures through evolution that benefit ants as well as the plant, resulting in a

mutualistic relationship between the two. These structures include the domatium, hollow chambers along the roots and leaves of the plant and the enlarged tuberous structure, the caudex. The domatium and the caudex are hollow inside with numerous chambers which forms a perfect nest for ants. They provide shelter for ants, which is a major benefit to ants and in turn the ants protect the plant from external forces such as environmental factors or predation. Although the formation of these structures requires considerable energy by the plant, the plant benefits as the caudex is the place where ants defecate and deposit debris. Ant defecation is beneficial to the plant as it absorbs nutrients from it as well as the gases the ants release. Ants have high diets in animal tissue which is correlated to a faster release of nutrients and they trim encroaching vegetation (Buckley 1982). The cells lining the nest show layers enriched with endoplasmic reticulum, dictyosomes, mitochondria and higher levels of enzymes associated with absorptive surfaces. The plant receives ammonia, carbon dioxide, calcium and nitrogen from the ants, shown by radioactive tests as these nutrients move throughout the plant. These plants are epiphytic in nature and are heavily reliant on ants for nutrients (Huxley 1978).

In addition, *Hydnophytum formicarum* has extra-floral nectaries, which are nectar-producing and secreting glands. Nectar is produced from the sugars through photosynthesis, then secreted via trichomes. These sugars attract ants towards the plant, and provide them with energetic benefits that they then use to defend the plant against herbivory (Dáttilo & al., 2015).

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J. Jayanthi¹, J.S. Jalal² & K. Karthigeyan³

¹Botanical Survey of India, Headquarters, Kolkata-700064

³Southern Regional Centre, BSI, Coimbatore-641003

*E-mail: jayanthi.bsi@gmail.com



Hydnophytum formicarum – a. Habit; b. Cut open portion of tuber showing ant chambers

Observations on the traditional phytotherapy of *Tridax procumbens* L. in Buxa Tiger Reserve, West Bengal

Tridax procumbens L., frequently referred to as coat buttons or *Tridax* Daisy, is a member of the Asteraceae family. It is called as Tridhara or Bishalya Karani in the state of West Bengal (Ghosh & al., 2019).

Due to its traditional use as a medicinal plant, it holds critical importance in the tribal regions of the Buxa Tiger Reserve (BTR). With a total area of 760.87 sq. km, the BTR is situated in the Alipurduar district of West Bengal, India. Its geo-coordinates range from 26°30' N to 26°55' N and 89°20' E to 89°55' E. The core zone of the BTR encompasses 385.02 sq. km, which includes both the Buxa Wildlife Sanctuary (252 sq. km) and the Buxa National Park (117 sq. km). The remaining 375.85 sq. km make up the buffer area, which is a reserve forest that is divided into two forest divisions and has thirteen forest ranges. According to Chatterjee (2018), the ethnic groups residing in and around the BTR include the Bhutia, Dukpa, Garo, Madesia (Santhal), Mechia, Nepali, Oraon, Rava, and Rajbanshi. This study gives an overview of the occurrence of *Tridax procumbens* L. in BTR and how it is used to treat leech bites and in traditional phytotherapy. This overview is based on the observations that were made during the field survey in BTR.

Botanical Name: *Tridax procumbens* L.

Family: Asteraceae

Common Names: Tridhara, Bishalya Karani

Identifying Characters: Annual or perennial herb; stem is ascending to 30–50 cm in height, branched, sparsely hairy, rooted at nodes; leaves opposite, simple, fleshy, exstipulate, shortly petiolate, lanceolate to ovate, 3–7 cm long, irregularly toothed along margin, base wedge-shaped, hairy on both surfaces; inflorescence a capitulum; flower tubular, yellow; ray florets and disc florets with basal placentation; fruit achene, covered with stiff hairs and having a feathery, plume-like white pappus at one end, which assists in aerial dispersal.

T. procumbens L. is native from Mexico to tropical America, naturalized in tropical Africa, Asia, and Australia, and found almost throughout India up to 2400 m asl.

Flowering & Fruiting: Throughout the year.

Phytochemistry & Pharmacology: *T. procumbens* L. contains a variety of minerals, including iron, copper, manganese, sodium, zinc, magnesium, phosphorus, potassium, selenium, and calcium. The aqueous extract includes phytochemicals such as alkaloids, steroids, carotenoids, flavonoids (catechins and flavones), saponins, and tannins. Flavonoids (centaureidin and centaurein) and bergenin are extracted using ethyl acetate as an organic solvent. The 2° metabolites include flavonoids, sterols, lipid components, luteolin, glucoluteolin, quercetin, isoquercetin, and fumaric acid (Gubbiveeranna & Nagaraju, 2016).

The herb is significant because it has several medicinal applications, including liver protection, immune system stimulation, wound healing (Udupa & al. 1995), combating diabetes, germs,

inflammation, and free radicals, as well as treating bronchial catarrh, diarrhea, dysentery, and hair related problems (Amutha & al. 2019)

Phytoremediation activity: Phytoremediation is the use of plants to absorb and remove hazardous substances from the environment or to limit their bioavailability in soil (Farouq & Adjarho, 2022). Govarathanan & al. (2016) reported that the roots of *T. procumbens* have an endophytic bacterial population of *Paenibacillus* sp., which could successfully remove heavy metals like Cr, Cu, Ni, Pb, and Cd from contaminated soil in our environment.

Bio-adsorbent: According to Suneetha and Ravindhranath (2016), *T. procumbens* leaf ash has the potential to remove nitrite ions from polluted waters in India. They have successfully applied this low-cost biosorbent to real groundwater samples and observed positive results.



Fig: *Tridax procumbens* - (A) Plant in its natural habitat; (B) A single flower; (C) Leech; (D) Bleeding from the site of the leech bite; (E) Leaf paste applied to the site of the leech bite; (F) Completely immerse the leech bite site.

Based on the experiment by Jagaba & al. (2019), the activated carbon derived from *T. procumbens* possesses the ability to absorb a large quantity of fluoride from the drinking water in the Nigerian village. This activated carbon is a simple, cheap, non-toxic and environmentally friendly adsorbent that helps in defluoridation of drinking water in Nigeria.

Traditional phytotherapy:

T. procumbens L. has long been utilized in India as an anticoagulant, antimicrobial, insect repellent, and wound healing agent (Singh, 2022). It is also used for treating boils, blisters, and ulcers (Mnaje & al. 2022). In ethnomedicine, leaf decoctions are used to treat infectious skin ailments. It is a well-known ayurvedic treatment for liver diseases since plant decoctions have hepatoprotective properties (Ghosh & al. 2019). Furthermore, the extracts are utilized to treat gastroenteritis and heartburn. It is commonly used in wound healing to prevent bleeding and speed up the healing process. The plant is also used to treat excessive blood pressure, blood glucose levels, dysentery, and severe diarrhoea. It helps to prevent hair loss and increase hair growth. The herb may also be used to treat respiratory conditions (Shanware & al. 2023). It possesses powerful immunomodulatory and insect repellent properties. In West Africa and the tropical regions of the globe, local medical practitioners and indigenous peoples utilize the plant's leaves to treat conjunctivitis (Nia & al. 2003). This medicinal plant is also often used in ethnomedicine to treat jaundice and liver diseases. Ethanol decoctions of *T. procumbens* L. were used to treat kidney stones (Ghosh & al. 2019).

Leech bite cure: *Leech infestation:* In tropical country's rural areas, leech bite is widespread. People travelling in marshy regions or across slow-moving brooks or streams are the most common casualties. Leeches typically infest the host's bodily surface. They seldom enter by the nose, anus, vagina, or penis. (Pal & al., 2016).

Case report: While doing a field survey in BTR, our team mates were bitten by leeches. Leeches are hermaphroditic parasites; they utilize their anterior oral suckers to ingest food from the host's body. Manual removal of the leeches was unsuccessful because their anterior oral suckers were strongly adhered to the target substratum. When the leech attaches to the host, it emits an anesthetic that prevents the host from detecting the parasite. The saliva of leeches includes hirudin, a powerful anticoagulant. This causes prolonged bleeding from the leech bite, enabling the organism to feed while also resulting in prolonged bleeding once detached.

In BTR, it was observed that local Garo tribal communities utilize *T. procumbens* L. to cease bleeding after a leech bite by plucking 6–8 fresh leaves, smashing them with a mortar pestle, and applying the paste to the surface of the leech bite area. The paste is left to air dry on the infected area for some time, and the bleeding ceases naturally. If required, the paste is reapplied within 1 hour. Leech bites are usually painless; however, in most cases, the leech bite sites will start to itch on the second day after treatment and will then continue to itch for about 2–3 days. This is a good sign, as the itching is due to histamine release and shows that healing is taking place at the site. The leech bites can also cause varying degrees of inflammation (swelling, redness) at and around the bite sites. Along with any itching, the signs of inflammation will usually subside within a few days of the leech treatment. After 7–14 days, the wound marks completely heal, and most of the time they become unrecognizable.

The Garo community informed us that some people feel pleasantly drowsy for a few hours after an excessive leech bite.

Conclusion: The Garo tribes of Buxa Tiger Reserve in West Bengal, India, have long utilized *Tridax procumbens* L. leaf pastes to treat leech bites. It cures leech bites by preventing excess blood loss. However, traditional phytotherapy approaches need more study to evolve into a suitable pharmacological treatment that is readily available to ordinary people in the event of a leech bite.

Acknowledgement: Author is grateful to Dr. Avishek Bhattacharjee, Scientist 'E', Central National Herbarium, Botanical Survey of India, for providing necessary facilities and encouragements. I would also like to acknowledge the local tribes of Buxa Tiger Reserve, West Bengal, India.

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Ranjan Shaw

8, Satashi Pal Para, G.I.P. Colony,
Jagacha, Howrah-711112
E-mail: ranjanshaweditor@gmail.com

Report on Two days' National Level Workshop on 'Collection, Preservation and Identification of Angiosperm'

Two days' National Level Workshop on 'Collection, Preservation and Identification of Angiosperm' was organised by the EIACP Programme Centre-Resource Partner, Botanical Survey of India in collaboration with Binod Bihari Mahto Koyalanchal University (BBMKU), Dhanbad, Jharkhand at University Department of Life Sciences, BBMKU, Dhanbad, Jharkhand during 23rd to 24th February 2024. The program was inaugurated by a lamp lighting ceremony, conducted by Dr. R.K. Tiwari, CC-DC, BBMKU, Dhanbad, Dr. Pushpa Kumari, Dean of Student Welfare, BBMKU, Dr. Ishita Bhattacharya, Faculty, Department of Life Science, BBMKU, and Dr. Ram Chandra Jena, Faculty, Department of Life Science, BBMKU. The inaugural speech was delivered by Dr. Kalpana Prasad, Head of the Department of Life Sciences, BBMKU, Dhanbad. The workshop spearheaded by a team of four distinguished Scientists and Resource Persons i.e. Dr. J. Jayanthi, Scientist 'F', Hqrs., BSI, Dr. Jeewan Singh Jalal, Scientist 'E', Hqrs., BSI & Project Coordinator, BSI EIACP PC RP, Dr. Gopal Krishna, Scientist 'C', Hqrs., BSI and Dr. Shyam Biswa, Botanical Assistant, BSI and EIACP aimed at advancing knowledge in essential aspects of plant science. With a focus on plant collection, identification, classification, orchid exploration, preparation of herbarium specimens, the workshop drew the participation of 130 attendees from various colleges in Jharkhand.

After the inaugural session, the technical session began with an interactive presentation by Dr. J. Jayanthi, Scientist 'F', who delivered a detailed lecture on the 'Morphology of Angiosperms'. Following lunch, Dr. Shyam Biswa delivered a lecture on 'Herbarium Methodology' and, during the

practical session, demonstrated how to prepare herbarium specimens. On the second day, February 24th, 2024, Dr. J.S. Jalal delivered a lecture on exploration and orchid identification in the Jharkhand and Bihar regions. His presentation focused on the key characteristics of this intricate group and addressed the challenges faced during the identification of certain species. Following his lecture, Dr. Krishna provided a briefing on the identification of different families of angiosperms. The special emphasis was given to the families Ranunculaceae, Magnoliaceae, Dilleniaceae, Menispermaceae, Papaveraceae, Brassicaceae, Amaranthaceae, Leguminosae, Rubiaceae, Apocynaceae, Asclepiadaceae, Solanaceae, Acanthaceae, Euphorbiaceae, Moraceae, Asteraceae and Verbenaceae. All the participants learnt very well from these valuable speeches. After lunch break, the practical session of identification of plants was carried out by Dr. Krishna and Dr. Biswa. This practical session was immense helpful to the participants.

Dr. J.S. Jalal handed over more than 45 EIACP PC-RP publications (including Books, Newsletters, Bibliography & Abstracts, Brochures, Pamphlets etc.) to the Head, Department of Life Sciences, BBMKU, Dhanbad which are going to enrich the information resources of the university and will certainly be a great support to the researchers working in the field of biological sciences. Additionally, the publications were also distributed to the faculties of the Department of Botany at S.S. College, Chas, Bokaro, Jharkhand, B.B.M. College, Baliapur, Dhanbad, Bokaro Steel City College, and S.S.L.N.T. Mahila Mahavidyalaya, Dhanbad, by the resource persons. During the valedictory function, Dr. Kalpana Prasad and Dr. Jalal shared their



commitment to advancing botanical research and disseminating knowledge to a wider audience. Dr. J. Jayanthi, Dr. Jalal, Dr. Krishna, Dr. Biswa and faculty members of Dept. of Life Sciences, BBM KU, Dhanbad awarded the certificates to the participants. Dr. Prasad expressed her gratitude to Dr. Jalal and all the resource persons for their valuable time and insightful talks on various topics. She also thanked the entire team members of BSI EIACP PC-RP for successfully

organizing the two-day workshop. The program concluded with a vote of thanks by Dr. Ishita Bhattacharya.

Soumen Gantait^{1*} & Jeewan Singh Jalal²

¹ EIACP PC-RP on Biodiversity (Flora), Botanical Survey of India, Howrah- 711103

² Botanical Survey of India, Head Quarter, Salt Lake, Kolkata- 700016

*E-mail: sgantait@gmail.com



Report of 'National Science Day 2024'

BSI EIACP PC-RP (Environmental Information, Awareness, Capacity Building and Livelihood Programme, Programme Centre– Resource Partner) on Biodiversity (Flora), Botanical Survey of India, Howrah conducted an awareness campaign program to observe 'National Science Day 2024' at **Tarakeswar High School**, Tarakeswar, Hooghly on February 28th, 2024 (Wednesday). The program began with a brief introduction about the importance of this day by Dr. Soumen Gantait, Programme Officer, BSI EIACP PC-RP. Dr. Animesh Maji, Ex-Research Associate at BSI, delivered a lecture on this year's theme "Indigenous Technologies for Viksit Bharat," emphasizing the significance of home grown

innovations in India's scientific progress. He also gave a short lecture on 'Biodiversity and its conservation'. A quiz competition was organized among the students, and a Mission LiFE program was conducted. In total, 97 students from Class IX & X and 4 teachers participated in this programme. The programme concluded after taking a group photograph of all the participants.

Soumen Gantait*

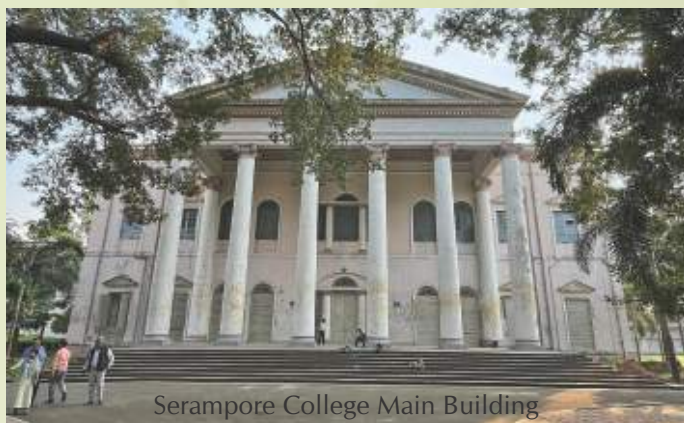
¹ EIACP PC-RP on Biodiversity (Flora), Botanical Survey of India, Howrah- 711 103

*E-mail: sgantait@gmail.com



Report on Two days Workshop on “Hands on Training in Plant Taxonomy – Identification, Nomenclature of Plant Groups and Modern Techniques”

A two day workshop on “Hands on Training in Plant Taxonomy – Identification, Nomenclature of Plant Groups and Modern Techniques” was organized by Environmental Information, Awareness, Capacity Building and Livelihood Programme (EIACP) Programme Centre-Resource partner on Biodiversity (Flora) and Central National Herbarium, Botanical Survey of India, Howrah in collaboration with Department of Botany, **Serampore College**, Hooghly on 1st and 2nd March, 2024. A total of 42 participants attended the programme. Among participants 5 faculty members from different colleges, 1 Research Scholar, 11 UG students and 25 PG students participated in the programme. On the first day, the program commenced with



the lighting of the lamp and an inaugural song. Rev. Dr. Subhro Sekhar Sircar, Acting Principal of Serampore College, delivered the inaugural speech, followed by a keynote address from Dr. R.K. Gupta, Scientist 'E' and Head of Office, CNH, BSI. The technical session began with a presentation on the 'Collection, Documentation, and Identification of Algal Members' by Dr. U. Elaya Perumal, Research Associate at BSI. Dr. Elaya Perumal elaborated on the habitat, collection process, and identification techniques of algal members. He also provided insights into the current research status in algae and showcased slides of collected algal samples, some of which were live specimens. After the lunch Dr. Kanad Das, Scientist 'F', BSI deliver a lecture on 'Collection, documentation and identification of fungal members'. He discussed in detail about the types of fungal members, collection and preservation of the macrofungal members. He also explained about the molecular techniques required for identification of fungal members. After his delighting lecture Dr. Sudeshna Dutta, Botanist, CNH gave a practical exposure to the participants explaining different parts of fungal tissues, their characters utilized for identification purposes. After this practical session a lecture on the 'Collection, documentation and identification of Bryophytic members' by Dr. Sashi Kumar, Research Associate, BSI. His explained beautifully about the vegetative morphological features as well as reproductive features utilized to distinguish the bryophytic members. Sk Nasim Ali, JRF, BSI then gave a glimpse of collection and preservation of bryophytic specimens.

On the second day, March 2nd, 2024, the program began with a field visit to the nearby riverside part of the college by Dr. Shyam Biswa, Bot. Asst., CNH, BSI and Ms. Ruma Bhadra, Sr. Pres. Asst., CNH, BSI who explained in detail about the collection of live specimens, tagging and documentation of characters in the field. Following this visit, a Mission LIFE program was organized in the field, and the Mission LIFE pledge was also taken. Afterward, Dr. Biswa delivered a lecture on the 'Herbarium Technique' in detail with the difficulties in it and the technique to overcome it. After this





lecture Ms. Ruma Bhadra also gave a lecture on the identification of grasses mentioning about their specific feature. Dr. Subir Bandyopadhyay, Retd. Scientist, BSI delivered a lecture on the nomenclature process and nomenclatural types. His lecture was highly appreciated by all the participants. After this lecture Dr. Biswa and Ms. Bhadra explained the participants about the characters of the specimens that can be utilized for the identification of Dicot as well as Monocot members, particularly grasses. After a short lunch break Dr. Ranjith Layola M. R., Botanist, BSI discussed about the process of molecular techniques utilized for the phylogenetic analysis. Along with Dr. Lyola, Ms. Priya Singh Kushwaha, JRF, BSI also explained about the utilization of software to analyze the gene sequence data and the process to conduct the phylogram. During the valedictory session, Dr. J.S. Jalal, Scientist 'E' and In-charge of EIACP PC-RP on Biodiversity (Flora), BSI delivered a brief concluding speech on the program. Following this, certificates were distributed by Dr. Jalal, Dr. Gupta, and Dr. Debranjana Das, Associate Professor & PG Botany Course Coordinator, Serampore College. The program concluded after taking a group photograph of all the participants.



Soumen Gantait¹, J.S. Jalal² & Suman Datta³

¹EIACP PC-RP on Biodiversity (Flora), Botanical Survey of India, Howrah-711103

²Botanical Survey of India, Head Quarter, Salt Lake, Kolkata-700016

³Assistant Professor, Dept. of Botany, Serampore College, Hooghly

*E-mail: sgantait@gmail.com

Dr. Gopinath Panigrahi



Photo Source: (https://ravenshawuniversity.ac.in/?page_id=13373)

Dr. Gopinath Panigrahi (1924–2004), a renowned plant taxonomist and nomenclatural expert was born on 27th February 1924 in Baikunthpur- a remote village in Bhadrak district of Odisha, India. He secured the first position in matriculation examination of the erstwhile Patna University in 1942. Later he did B. Sc. Honours from Ravenshaw College, Cuttack under Utkal University and M. Sc. from Allahabad University. Then he started his career as Lecturer in Botany at Ravenshaw College, Cuttack, Odisha in July 1948 and continued till July 1956 except for two years (May 1952–August 1954) when he was on a study leave for a Ph. D degree at the University of Leeds, United Kingdom under the supervision of late Professor Irene Manton. His research work was on Cytotaxonomy of Ferns and Angiosperms. He was the first botanist to produce hybrids in Ferns.

He joined Botanical Survey of India (BSI) as a Systematic Botanist in August 1956, became Regional Botanist in December 1959 and worked as Indian Liaison Officer at Royal Botanic Garden, Kew, United Kingdom from December 1972 to December 1975. At Kew Botanic Garden, he worked with Dr. W.D. Clayton on floristic relationships of Indian grasses using computer analysis. On return from UK, he joined as Deputy Director, BSI, Howrah in January 1976 and was assigned to reorganise 1.25 million specimens present in Central National Herbarium (CAL), Howrah in geographical sequence following the pattern of Kew herbarium (K). He is the founder of the Computer-data Bank Unit in the Botanical Survey of India, and has initiated work involving the preparation of the Type Specimens Register of Indian plant taxa. He served the department as Deputy Director, Special/Headquarters, BSI, Howrah, from January 1976 to June 1977, of Central National Herbarium (CAL), Howrah from June 1977 to July 1978; Joint Director, Central Botanical Laboratory from July 1978 to February 1982 and

retired from the same post. After retirement, he continued his taxonomic studies at Botanical Survey of India as Emeritus Scientist from March 1982 to February 1987.

He explored various parts of Eastern and Central India and collected more than 20,000 field numbers of plants, those are deposited in ASSAM, CAL, BSA and K. He was an expert on plant nomenclature. He also made outstanding contributions in the field of cytotaxonomy, phytogeography and as well as in plant taxonomy. He has published more than 300 scientific papers in different reputed National and International journals including two new families (Brachycaulaceae and Tectariaceae), two new genera (Brachycaulos and Parahaemionitis), 309 of new species, new combinations and new names. He published books viz., 'The family Rosaceae in India' in 4 volumes (Vol.1 with K.M. Purohit, Vol. 2, 3, and 4 with Chhabi Ghora, Arvind Kumar and B.K. Dikshit respectively, as co-authors), 'Flora of Bilaspur District, M.P.' in 2 volumes (with Dr. S.K. Murti as co-author) and 'Ferns and Fern Allies of Arunachal Pradesh - Tirap District' in 2 volumes (with S. Singh as co-author). He worked on 'Flora of the USSR' (English Translation) as the Botanical Editor and his masterly editing received high appreciation at international level. He also supervised and guided 10 Research Scholars/Fellows for awarding their Ph. D. degrees from different Universities of India.

He was Fellow of the Linnaean Society, London; Bangladesh Academy of Sciences; Indian Fern Society; Indian Botanical Society; Indian Society of Genetics and Plant Breeding and West Bengal Academy of Science and Technology. Besides he was a life member of various international scientific societies like International Association of Plant Taxonomists, Netherlands, International Society of Plant Morphologists, etc. He was also on the Editorial Board of many journals and referee for many reputed journals. In recognition of his outstanding contribution to Plant Taxonomy, he received 'Panchanan Maheshwari Gold Medal' from Indian Botanical Society in 1994. He was conferred with prestigious 'E. K. Janaki Ammal National Award' instituted by the Ministry of Environment and Forests, Government of India for Plant Taxonomy in 2002. Seven plant names viz., *Alchemilla panigrahiana* K.M. Purohit, *Bulbophyllum panigrahianum* S. Mishra, *Habenaria panigrahiana* S. Mishra, *Osmunda regalis* L. var. *panigrahiana* R.D. Dixit, *Potentilla panigrahiana* B.K. Dixit, *Selaginella panigrahii* R.D. Dixit and *Spiraea panigrahiana* K.M. Purohit were published in his commemoration.

Dr. G. Panigrahi was involved in different philanthropic activities and passed away on 15th December 2004 in Kolkata at the age of 80.

Soumen Gantait¹ & J.S. Jalal²

¹ EIACP PC-RP on Biodiversity (Flora), Botanical Survey of India, Howrah- 711 103, West Bengal

² Botanical Survey of India, Head Quarter, Salt Lake, Kolkata- 700016

*E-mail: sgantait@gmail.com



Mega Sit & Draw competition on World Environment Day 2024 at Central National Herbarium



Prize winners of Quiz Competition of International Day for Biological Diversity, 2024



Shri H.V. Girisha, IFS, Head, Wildlife Crime Control Bureau (WCCB) and Shri Abhijit Roychowdhury, WCCB's Assistant Director (Eastern Region) visited BSI EIACP PC-RP centre



Mr. Manoj Chandran, IFS, CCF, Uttarakhand Forest Dept., Govt. of Uttarakhand visited BSI EIACP PC-RP Centre, B. Garden, Howrah

EIACP PC-RP on Biodiversity (Flora)

Established : April, 1994
Contact Person : Dr. Jeewan Singh Jalal
Address : Scientist 'E', Hqrs., BSI & In-Charge
 EIACP PC-RP on Biodiversity (Flora)
 Botanical Survey of India
 Central National Herbarium
 P.O. Botanic Garden, Howrah 711103

Subject Area : Floral Diversity
Phone : (033) 26680667
Fax : (033) 26686226
E-mail : bsi@envis.nic.in
Website : <http://www.bsienvi.nic.in>

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 EIAPC PC-RP on Biodiversity (Flora) 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

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) [value: 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. A Handbook on Bryophytes with special reference to type Specimens of Liverworts and Hornworts in Indian Herbaria
8. The Wild Orchids of Goa
9. The Genus *Calanthe* R.Br. (Orchidaceae) in India
10. Mangroves of the Sundarbans, West Bengal – A Pictorial Handbook
11. Lesser Known Vegetables of West Bengal, India

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, Uttar Pradesh & Uttarakhand, Rajasthan, Gujarat and Punjab & Haryana]

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