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BOTANICAL SURVEY OF INDIA

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From Director's Desk

In the beginning of this year, Covid-19 made its presence known in India with the first confirmed case from the state of Kerala on 30th January 2020. Then it began to spread its existence in India. As a preventive measure to control its spread within our country, nationwide lockdown for 21 days was imposed by the Government of India from 25th March 2020 to 14th April 2020 as the only way to control the spread of coronavirus was to break the cycle of transmission through physical distancing. The lockdown was then extended in phases, Phase 2 up to 3rd May, Phase 3 up to 17th May and Phase 4 up to 31st May 2020. From the month of June, the "unlock" process started and services started to resume in a phased manner.

During these lockdowns, the officials of Botanical Survey of India, like people belonging to every profession, faced the challenge of fulfilling their official duties while staying at home. Although they were not able to attend office regularly, or go on field tours, they worked from home sincerely for several volumes of Flora of India and other Action Plan projects. Problems were somehow managed through online meetings and discussions.

The Ministry of AYUSH has published several guidelines for the registered practitioners of AYUSH Systems to combat with the existing COVID-19 pandemic. The ENVIS Resource Partner on Biodiversity, Botanical Survey of India has published a poster of nineteen immunity boosting medicinal plants for preventive health measures in context of COVID-19 pandemic in accordance with Ministry of AYUSH's guidelines. The poster is available on the website of BSI ENVIS (http://bsienvis.nic.in/Publication Details.aspx?SubLinkId=589&LinkId=19435&Year= 2020).

This pandemic is at present the biggest challenge in front of the entire world. The virus is still spreading at an alarming rate. In these difficult times, we have to keep ourselves safe as well as fulfil our duties in a balanced manner.

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

DISCLAIMER

All efforts have been made to make the information as accurate as possible. The views expressed by the authors in the articles published in the ENVIS Newsletter are their own. They do not necessarily reflect the views of Government or the organisations they work for. The ENVIS Resource Partner, Botanical Survey of India does not warrant that the information contained is complete and correct and is in no way responsible for any liability arising out of the contents/texts of these articles. Any discrepancy found may be brought to the notice of ENVIS Resource Partner, BSI, Howrah.

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Texas Sage

Botanical Name: **Leucophyllum frutescens** (Berland.) I.M. Johnsb.

Family: Scrophulariaceae

Common Names: Texas sage, Texas ranger, Silver leaf, Purple sage, Cenizo

General Morphology: Shrub normally reach height of 1–2.5 m with a canopy of 0.9–1.8 m. Stem terete, much-branched; bark silvery to gray. Leaves simple, tightly clustered alternate, ovate, 2–4 × 1–2.5 cm, acute at base, obtuse at apex, emarginate, silvery pubescent; lateral nerves 2 or 3 pairs. Inflorescence axillary, solitary. Flowers 3–4 cm across, zygomorphic, bisexual; pedicel 2–4 mm long. Calyx campanulate, 5 lobed, 4–5 × 1.5–2.5 mm, acute-obtuse at apex, silvery pubescent. Corolla purple with yellowish-orange spots on white patches at throat, campanulate, 5 lobed (3+2); lobes unequal, obovate-orbicular, 1–1.5 × 1.2–1.6 cm, rounded at apex, ciliate at margin and throat; tube 1.5–2 cm long. Stamens 4, didynamous; filaments 1.3–1.7 cm long, white; anthers oblong, 1 mm long, yellow. Ovary ovoid, pale green; style *c.* 2 cm long, white; stigma capitate. Fruit is composed of two valved capsule having small wrinkled seeds.

Leucophyllum frutescens: **a.** Habit; **b.** Leafy floweing twig; **c.** A flower

Distribution and Ecology: The plant is native to Texas and Mexico but now widely cultivated in South East Asia. It also grown in some Indian gardens. The plant is a drought tolerant and it grows easily with minimum water availability and demands full sun for better growth and flowering. It stands poor soils and only reported few diseases and pest problems.

Cultivation Practices and Uses: Soft wood cuttings is recommended for the better growth and development. Cuttings planted on late winter performed the best sprouting. It prefers well drained soil and usually will rot out if over watered. Plants become leggy as a result of excess fertilizer, water and shade. Occasional pruning is required to maintain strong structure and branching. The plant plays an important role in beautifying natural or desert gardens and also has high values in planting as a foundation plant, wind breaker, hedges and shrubbery borders. It is a popular plant in xeriscape design. Due to its colourful flowers and low maintenance, Texas sage is fit for any kind of landscape design. It is also regarded as a good nesting plant for hummingbirds.

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A note on the uses of *Nymphaea pubescens* Willd. (Nymphaeaceae) in Katihar district, Bihar

Nymphaea pubescens Willd., locally known as 'Vet' and 'Saru', was collected from Baghar Beel wetland (25.360148 N, 87.665895 E) in Katihar district of Bihar during a floristic survey in November, 2019.

The plant is characterized by its short, ovoid, nodular, rhizomatous stems. Leaves floating, ovate-elliptic, or reniform to orbicular, 10-30 × 5-20 cm, upper surface dark-green, glabrous and often postulate, green or dull purplish-green and velutinous pubescent beneath, margin sharply dentate; petiole 10–60 cm long, spongy, green. Flowers solitary, 4–15 cm across, actinomorphic, bisexual, fragrant; peduncle *c.* 30–90 cm long, spongy. Sepals 4, ovate-lanceolate, with prominent white veins outside. Petals 10-25, white, linear-oblanceolate, inner petals gradually transformed into stamens. Stamens many; anthers adnate, yellow; filaments flat at base. Ovary superior, many chambered; ovules many, superficial. Fruit a berry, 3–5 cm across, globose, spongy. Seeds numerous with spongy aril, *c.* 2 mm long, black.

Flowering and Fruiting: Throughout the year; profusely during August-January.

Distribution: India: Throughout the plain regions; tropical and subtropical Asia to North east Australia.

While interacting with the local people during field trip, two local people namely, Chamaklal Mandal and Muichand Singh shared the following information about different uses of this species and also informed that this plant is highly medicinal.

Rhizome: Locally known as **Saru**. Decoction of it is given for blood dysentery. Rhizomes are also edible

Nymphaea pubescens: **a.** Plant with floating leaves and flower; **b.** Rhizome; **c. & d.** Peeled rhizome; **e.** Flower in upper view; **f.** Cutting pieces of petals and peduncles before cooking; **g.** Cooked vegetables made from peduncles; **h.** Pakori made from petals; **i.** Fruit; **j.** Fruit after removing bark; **k.** Seeds are being dried in sunlight; **l.** Laddo made from seeds; **m.** Local people namely, Chamaklal Mandal and Muichand Singh shared the information about different uses of this species

by local people either raw or boiled after peeling the outer surface.

Leaves: Used as plate for serving food.

Peduncels: Used as vegetable.

Flower: Flowers are used to make delicious food **Pakori**, to worship God and for decoration purpose.

Fruit: After removing the barks, young fruit bodies with seeds are eaten raw.

Seeds: Locally known as **Vet**. Mature seeds are dried and used to make local sweet called **Laddo**.

In Ayurveda and Siddha systems of medicines, this plant is also used for diabetes, liver disorders, urinary problems and menorrhagia. The plant is also reported to possess high anti-diabetic properties (Sreenathkumar & Arcot, 2010). Roy *et al*. (2013) have reported the uses of this plant species from Northeast India.

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Leafless Goglet Plant

Ceropegia juncea Roxb.
(Apocynaceae)

Common Names: Leafless Goglet Flower, Moon Plant, Somalata; Kannada: *Jaathili, Jatili, Jutley*; Malayalam: *Valakody*; Marathi: *Wel Khantudi*; Tamil: *Pulichan*; Telugu: *Bella Gada, Bella Manda*.

General Morphology: Twining herb, with reduced tubers. Stems *c.* 4 m long, terete, succulent, branched, glabrous, green. Leaves simple, opposite, ovate-lanceolate, 0.8–1.5 × 0.15–0.3 cm, sessile, caducous. Flowers extra-axillary, solitary or in cymes, pedicellate; bract subulate, 1.6–2 × 0.25–0.32 mm, glabrous; pedicels 5–9 mm long, terete, glabrous. Calyx 5-partite; lobes 5–5.2 mm long, acute, glabrous. Corolla 4–5.5 cm long, yellowish-green; tube 2–3 cm long, inflated at base, funnel-shaped at throat, with purple blotches outside, hairy inside near throat. Corona 2-seriate; outer corona 5, bidentate-deltoid, ciliate lobes; inner linear, connate at apices forming conical cage. Gynostegium 1–1.5 mm long. Pollinarium *c.* 0.3 mm long; pollinia yellow with pellucid margin, attached to brown corpusculum by short caudicle. Follicles in pairs, usually unequal, 6–9 cm long, acute at apex, slightly curved and swollen at the apices, glabrous; seeds comose; coma *c.* 2 cm long, silky-white.

Flowering & Fruiting: July-January.

Distribution and Ecology: The native range of this plant is India, Myanmar and Sri Lanka. In India, it is distributed in Andhra Pradesh, Karnataka, Kerala, Maharashtra and Tamil Nadu. Mostly this species is found in dry deciduous forests and scrub jungles in association with *Atalantia monophylla* DC., *Capparis sepiaria* L., *Prosopis juliflora* (Sw.) DC., and other elements of drier habitats.

Uses: *Ceropegia juncea* is an important medicinal herb, which is used as a source of 'soma, a plant drug of the Ayurvedic medicine with a wide variety of uses. The fleshy stem and root tubers used as a raw material in traditional and folk medicines for the treatment of stomach and gastric disorders (Usman Ali & Narayanswami, 1970). Stem is crushed with milk and taken orally for three days to cure stomach ulcer by Paliyan tribe in Sirumalai hills of Southern India (Karuppuswamy, 2007). *Ceropegia juncea* has possessed various potent secondary metabolites such as tannins, flavonoids and many polyphenolic compounds. Tuberous roots of *C. juncea* are sources of rare alkaloid 'Ceropegin' and a novel 'Coumarin' is also isolated from whole plant (without flowers), which possess anti-inflammatory, analgesic, anti-ulcer, mast-cell stabilizing, hepatoprotective, anti-pyretic, local anaesthetic, anti-oxidant, anti-thrombotic, anti-allergic and anti-carcinogenic properties (Karayil *et al*. 2014). Sudha and Vivek (2014) reported high concentration of Zn and Cu in *Ceropegia juncea* and the other heavy metals like arsenic, cadmium, lead were found in low levels.

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Fig. 1: **a.** Habit; **b.** Flowering-twig; **c.** Flower close-up; **d.** L.S. of a flower

Report on workshop on Flowering & Non-Flowering Plant Identification and Herbarium Methodology

A Two-days' workshop on 'Flowering & Non-Flowering Plant Identification and Herbarium Methodology' was organised by ENVIS Resource Partner on Biodiversity, Botanical Survey of India (BSI) [Ministry of Environment, Forest & Climate Change, Government of India, New Delhi] in collaboration with Department of Botany, Gurudas College, Kolkata – 700 054 on 26th & 27th February, 2020. The resource persons for the workshop were Dr. Kanad Das, Scientist 'E' & HoO, AJC Bose Indian Botanic Garden (AJCBIBG) & In-charge, BSI ENVIS RP, Dr. R.K. Gupta, Scientist 'E', Hqrs, BSI, Dr. Subir Bandyopadhyay, Former Senior Scientist of BSI, Dr. Avishek Bhattacharjee, Scientist 'C', CNH, BSI, Dr. Monalisa Dey, Scientist 'C', CNH, BSI, Dr. M.E. Hembrom, Botanist, AJCBIBG, BSI, Dr. Gopal Krishna, Bot. Asst., CNH, BSI, Dr. Anant Kumar,














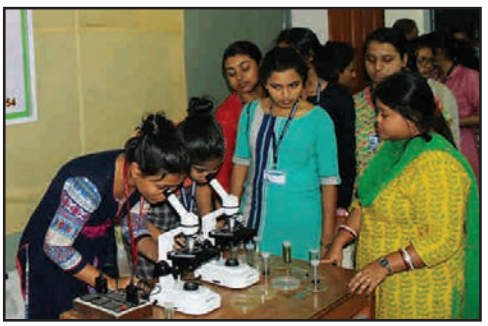


Bot. Asst., Hqrs., BSI, Dr. Shyam Biswa, Bot. Asst., CNH, BSI, Dr. Basant Kumar Singh, Bot. Asst., AJCBIBG, BSI, Sri Alok Mukherjee, Former Senior Preservationist, BSI and Ms. Pritha Basu, SRF, BSI.

A total of 75 participants attended the workshop. Forty-nine students of B. Sc. programme from Bangabasi Morning College, Bangabasi College, Bangabasi Evening College, City College, Rammohan College, Lady Brabourne College, Vidyasagar College for Women, Gurudas College, 5 students from Botanical Survey of India and 5 M.Sc. students of Scottish Church College attended the workshop. The rest of them were Lecturers and Assistant Professors of above mentioned Colleges.

On 26th February, 2020, the workshop started with the welcome address from Dr. Mitu De, Head, Dept. of Botany, Gurudas College followed by a brief introduction about the workshop by Er. A.K. Pathak, Director In-charge, Botanical Survey of India. Dr. Kanad Das and Dr. Mousumi Das, Senior Professor, Gurudas College also put their valuable comments during this inaugural session.

After the inauguration the technical session started with a beautiful lecture on 'Different types of names and the nomenclatural types' by Dr. Avishek Bhattacharjee. Students thoroughly enjoyed this lecture. After that lecture, two lectures were delivered by Dr. M.E. Hembrom and Dr. Monalisa Dey on 'Identification and herbarium methodology on Macrofungi', and 'Identification and herbarium methodology on Bryophytes' respectively. After lunch break, the practical session was carried out in two batches (33 students in each batch) on 'Identification and herbarium methodology on Macrofungi', and 'Identification and herbarium methodology on Bryophytes' by Dr. Hembrom and Dr. Dey. The day ended with a small tea break.

On 27th February, 2020, the session started with a short film on collection and processing of plant specimens and the technique of making herbarium sheets, shown to the students for better understanding of the techniques by Dr. Subir Bandyopadhyay. After this short film, Dr. Bandyopadhyay delivered a lecture on herbarium methodology of angiosperms, which was followed by a lecture on method of plant identification (angiosperm) by Dr. Gopal Krishna. After that, the practical session was carried out in 2 batches (i.e. 33 students of each batch). The practical training on plant taxonomy was given by Dr. Gopal Krishna, Dr. Basant Kumar Singh, Dr. Anant Kumar and Dr. Shyma Biswa, giving special emphasis on families Malvaceae, Lamiaceae, Brassicaceae,

Leguminosae, Solanaceae, Acanthaceae, Rubiaceae, Scrophulariaceae, Asclepiadaceae, Poaceae and Cyperaceae. The processing of plant specimens and preparation of herbarium sheets were demonstrated by Sri Alok Mukherjee. After a small lunch break, a talk and practical session on 'Identification and herbarium methodology on Algae' was given by Dr. R.K. Gupta and Ms. Pritha Basu.

The students actively interacted with the resource persons during their presentations. The filled-up feedback forms were received from the participants. The participants expressed that they were immensely benefitted by attending the workshop. During the valedictory function, Dr. Kanad Das, Dr. R.K. Gupta, Dr. Subir Bandyopadhyay, Dr. Mitu De and other faculty members of Gurudas College awarded the certificates to the participants.

On behalf of the Department, Dr. Mitu De, Head, Dept. of Botany, Dr. Goutam Pahari, Convenor and Dr. Mousumi Das, Dept. of Botany, Gurudas College extended hands of collaboration to all to utilise the available facilities for this workshop. On behalf of organiser, Dr. Pahari expressed his sense of gratitude to Dr. Kanad Das as well as all resource persons and the entire team members of BSI ENVIS Resource Partners for successfully organising the two days workshop. The workshop ended with a formal vote of thanks given by Dr. Mitu De.

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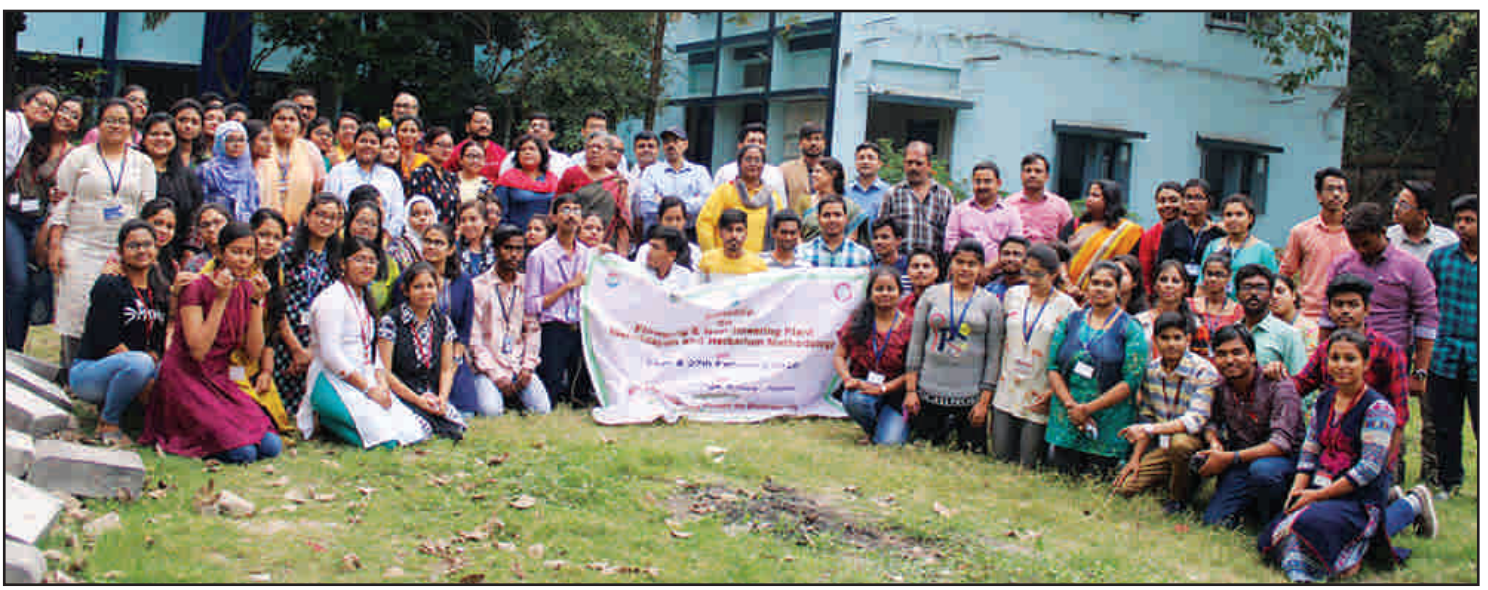

Zantedeschia aethiopica (Araceae): an alien species naturalized in Sikkim & Darjeeling Himalaya, India

Zantedeschia aethiopica (L.) Spreng., was first described by Linnaeus as *Calla aethiopica* L. in 1753 and it has been commonly known as the Calla Lily ever since. Sprengel (1826) transferred it to a new genus which he called *Zantedeschia* Spreng. (Letty, 1973). This Southern African native was largely naturalized in Macaronesia (Portugal, Azores, Madeira Islands); Spain (Canary Islands); Western Indian Ocean Reunion; Australia & New Zealand; Europe (United Kingdom, Italy, Sardinia, Sicily); North-Central Pacific region to Hawaii, parts of South America, Philippines and elsewhere. (Parsons & Cuthbertson 1992; Weber 2003; BSBI 2012). The present work reports the naturalization of this alien aroid species *Z. aethiopica*, a native of South Africa, in Gangtok of Sikkim, Darjeeling and surrounding areas of West Bengal, India.

Zantedeschia aethiopica (L.) Spreng. are glabrous plants, up to 60 cm tall or sometimes up to 2–5 m under trees; leaves evergreen, up to 60 cm long; petiole green; blade immaculate, characteristically more or less spreading and leathery, varied in shape but usually broadly ovate-cordate or hastate, 15–20 cm × 10–15 cm, acute at apex, length above the basal lobes less than twice the width; inflorescence spadix; peduncle 30–60 cm long, green, glabrous, triangular in cross-section, 2–5 × 2 cm at base; spathe *c.* 15 × 12 cm broad, ivory-white inside, bright green at base outside merging into white upwards, longitudinally veined, folded from slightly below the insertion of the spadix into a wide-mouthed funnel, limb obliquely spreading, ending in a green recurving 2 cm long apiculus; spadix sessile; male zone *c.* 7 cm long; anthers bright yellow, 1.5–2 × 1–1.5

mm with 2 pores, pollen white; female zone *c.* 1.8 cm long; ovaries interspersed with numerous mushroom-shaped staminodes, *c.* 4 mm long, globose, grooved, pale yellow-green grading to whitish at the tip, tapering to a short style 1.5 mm long, 3 locular, each locule with 1–4 ovules; fruits numerous *c.* 1.2 cm long, 1–1.2 cm in diameter across the top, tapering to a triangular base with a short persistent style at the apex, green at first, soft and orange coloured at base and greenish at apex when ripe; seeds 1–12.

Plants of *Z. aethiopica* were observed during a field tour, at Gangtok, East Sikkim, where it grows spontaneously in the underwood of a planted forest. Again, some plants were found on the way towards Pangthang on hill slopes. It was probably introduced as an ornamental plant during British era in and around Darjeeling where it became naturalized. Later, may be slowly it became escape spreading in parts of Sikkim too. The dispersal is quite slow and is mostly by the vegetative means, with the rhizomes exploring and occupying the nearby patches and ultimately giving birth to new shoots. Seed dropped by nearby parent plant or spread by birds and water are secondary means of dispersal.

Zantedeschia aethiopica have some traditional ethnobotanical uses in its native place. It is known that, traditionally this plant is boiled and eaten, especially the rhizomes or tuberous roots; leaves are also traditionally used as a poultice and a treatment for headaches. The raw plant is regarded as being highly toxic due different chemicals. Usually it causes discomfort, mostly swelling of the throat (Aubrey, 2001).

Although the plant was mainly introduced to different parts of the world for ornamental purpose, but over a period of time it has spread over in large areas and naturalised itself in wide range of environmental conditions. The dispersion of *Zantedeschia aethiopica* into natural areas and their ever increasing spatial extent in the Himalayan state of Sikkim is a serious threat to the native species and habitats. Therefore, this report of its occurrence will be helpful as an initial step towards the management programme of alien species such as Global Invasive Species Programme (www.gisp.org), European network of invasive species (www.nobanis.org), Invasive Species Information Network (www.gisinetwork.org), and regional Eurasian networks (www.reabic.net).

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Zantedeschia aethiopica: Habit

Prof. N. Anand

Professor Narayanaswamy Anand was born on 28th December 1947 in Muvattupuzha, Kerala. After completing his school education in Chennai, he graduated in botany from Loyola College, Chennai in 1967 followed by his Master's degree in botany from Annamalai University in 1969, where he was awarded with a gold medal for attaining first position. His inclination towards the world of algae was initiated during his post-M.Sc. Diploma in Phycology during 1970. Under the supervision of legendary phycologist Prof. T.V. Desikachary, he achieved his Doctorate degree on Blue-Green Algae in 1976. He also achieved *Sahitya Shiromani* in Sanskrit in 1996 and his D.Sc. degree in 2003 from University of Madras. He was indulged in academic duties as Lecturer in Botany from 1972–1983, Reader from 1984–1989, Professor from 1990–2003 and superannuated as the Director of Centre for Advanced Studies in Botany of University of Madras in 2007. During his tenure he also served as the Dean of the Research in the University (2004–2006).

Prof. Anand had several collaborations for research and invited talks with globally famous phycologists and institutions which not only influenced his own knowledge but also led many findings guiding the future generations. In 1983, he was awarded with the Royal Society of London Commonwealth Bursary and worked with Prof. W.D.P. Stewart, Scotland, UK. He was also invited as Visiting Scientist to the Pasteur Institute (Paris, France) and University of Amsterdam (The Netherlands) in 1992. In the same year, he was honoured with Fulton Fellowship by Association of Commonwealth Universities, UK and worked with Prof. J.R. Gallon, University of Wales (UK). He also represented the country in several conferences and symposiums across the globe.

Due to his significant academic and research contribution in Phycology, he was awarded with Excellency award in 1995, by Madras Educational Trust. He was also honoured as a Fellow of Madras Science Foundation from 2006. Prof. Anand has received the Lifetime Achievement Award by Academy of Biological Sciences. After his superannuation, he also rendered his service as Emeritus Professor in CAS in Botany and was later chosen as the first Vice Chancellor of VELS University, Chennai. During his 36 years of academic tenure, he guided 25 Ph.D. degree and 26 M.Phil. students, who are now maintaining his legacy in various Institutions/Organisations.

Ministry of Environment, Forests & Climate Change, Govt. of India had initiated All India Co-ordinated Project on Taxonomy (AICOPTAX) programme on 3rd June 1999. Understanding the rich diversity and high economic values, freshwater algae was also included in this Programme by Prof. T.V. Desikachary and Prof. N. Anand was designated as All-India Coordinator for freshwater algae. Prof. Anand and his research group have studied the freshwater algae from Tamil Nadu and Kerala, mostly emphasizing the temple tanks. He also explored the algal diversity in the rice fields and on stone monuments in this region. Apart from his academic duties, he had rendered his advisory and administrative services to many state and national level organizations.

His involvement in the AICOPTAX project had also initiated capacity building through organizing training programmes by gathering eminent algal experts from various parts of the country and their fruitful interactions with several budding researchers and academicians through lectures and hand-on practices on algal taxonomy. The revival of the famous algology journal 'Phykos' was one of his significant contributions. The journal was hailed as one of the pioneers in the field of phycological research in the world, started in 1960. Later due to several issues, the journal was closed for a long duration. Prof. Anand, being the Editor-in-Chief had restarted the publication in 2012.

Publications of Prof. Anand were from different facets of algology, ranging from taxonomy to biochemistry and diversity to biotechnology of algae. He has authored six books, mostly enumerating the cyanobacterial and microalgal diversity from the freshwaters, rice fields and monuments of southern India. Several of these books, like, Handbook of Blue Green Algae of rice fields of South India (1989), Indian Phycological Review – Cyanophyta (1993), Indian Freshwater Microalgae (1998), Algological Research in India (2002), Biology & Biodiversity of Microalgae (2009), Manual of Freshwater algae from Temple tanks of Kerala (2016), etc. are considered as must-reads for amateur algologists to conceptualize the subject. His scientific contributions were published in eight books and many book chapters along with more than 200 research articles of national and international repute.

Prof. Anand had always encouraged his fellow colleagues, young students and researchers for their research on different aspects of algology. His extensive collections of algal literature, drawings and photographs are now well preserved in University of Madras, which can be a source of inspiration and knowledge for upcoming generations. He had his last breath on 22nd December 2018 at his residence in Chennai. His research endeavours and popularity will always be hailed among the younger generations.

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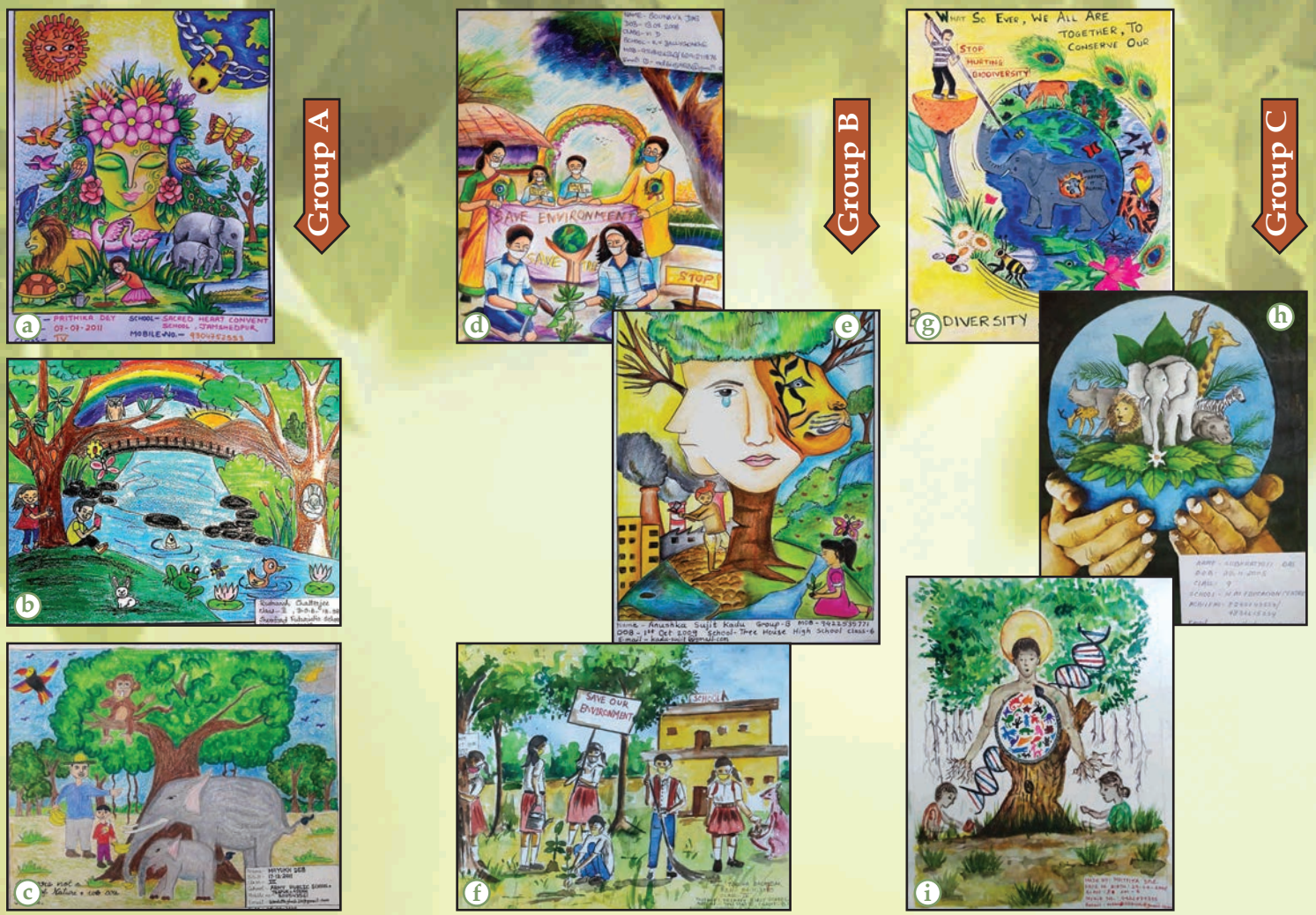

World Environment Day–2020: Online Drawing Competition– Group A: a. First Prize; **b.** Second Prize; **c.** Third Prize. **Group B: d.** First Prize; **e.** Second Prize; **f.** Third Prize. **Group C: g.** First Prize; **h.** Second Prize; **i.** Third Prize.

ENVIS RESOURCE PARTNER

Established : April, 1994
Contact Person : **Dr. Kanad Das**
Address : Scientist 'E' & In-Charge
ENVIS Resource Partner, Botanical Survey of India
Central National Herbarium
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Subject Area : Floral Diversity
Phone : (033) 26680667
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E-mail : bsi@envis.nic.in
Website : http://www.bsienvis.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 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

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 and Himachal Pradesh.]

Newsletters: Up to Vol. 25(1), 2020

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