

ENVIS CENTRE ON FLORAL DIVERSITY



ENVIS



NEWSLETTER

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From Director's Desk



Biodiversity and climate change are always interconnected, and the relationship between them has long been established. A rapid change in the climate will drastically alter the biotic and abiotic components and function of an ecosystem, and ultimately result in loss of biodiversity. Due to climate

change and global warming there is a significant loss of Arctic and Antarctic sea ice, increase in melting of Himalayan glaciers, constant rise in temperatures, and ocean acidification, resulting from higher concentrations of carbon dioxide in the atmosphere. According to an analysis of surface temperature measurements by NASA's Goddard Institute for Space Studies, the year 2014 was earth's warmest in 134 years of records.

The Decision XII/20 – "Biodiversity and Climate Change and Disaster Risk Reduction" of 12th meeting of Conference of the Parties to the Convention on Biological Diversity (COP12, CBD) held in Pyeongchang, South Korea also emphasises the significant role of the conservation and sustainable use of biodiversity and the restoration of ecosystems in climate change mitigation and adaptation, combating desertification and disaster risk reduction. In fact, in coming years the climate change will gradually become a more significant threat to the existing biodiversity, and will also accelerate exponentially the biodiversity loss across the globe. Knowing the impact of climate change on the biodiversity, the Ministry of Environment and Forests, Government of India, the nodal Ministry for the planning, promotion, co-ordination and overseeing the implementation of India's environmental and forestry policies and programmes, has recently added Climate Change to its name, and it is now known as Ministry of Environment, Forests and Climate Change. Therefore, before the climate change starts taking its toll on the existing biodiversity, especially the plant diversity of our country, we should take necessary efforts to make comprehensive documentation of our flora and also to draw conservation strategies to conserve the biodiversity.

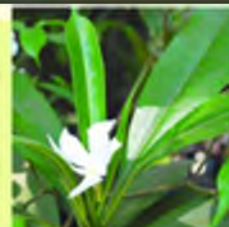
Like earlier ones, this issue of ENVIS Newsletter also has articles on rare, endemic, medicinal and economic plants of our country. I appreciate the efforts of entire team of ENVIS Centre on Floral Diversity in bringing out this informative issue, and I also wish that it will also be appreciated by the readers.

(Paramjit Singh)
Director & Scientist 'G'
Botanical Survey of India

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Occurrence of *Cerbera odollam* (Apocynaceae) in the urban environs of Kolkata

While documenting the tree wealth of Kolkata in 2014 a tall tree of *Cerbera odollam* Gaertn., locally known as 'Dabur', 'Daboor' or 'Ghukur', has been observed in the west of Bidhan Nagar railway station at Ultadanga main road. Though, it prefers to grow in coastal salty swamps, in marshy areas and backwaters of east and west coasts of India, the present collection forms an extended distribution to the urban limits of Kolkata. Consultation of herbarium and literature reveals that, in West Bengal, *C. odollam* is found only in the estuarine vegetation of Sundarbans in 24-Paraganas district. Its fruit is highly toxic to human beings, thus it is known by a common name, 'Suicide Tree'; it contains a toxin called cerberin, a potent compound which can lead to irregular heart beat and death (Gaillard & al., 2004). It is also called 'Sea Mango' due to its mango-shaped fruits. The seed oil is a promising non-edible feedstock for biodiesel production.

Cerbera odollam is an evergreen tree with acrid milky latex, and grows 20–25 m tall. Leaves are alternate, whorled or closely set at the end of the branchlets, oblanceolate or oblong-obovate in outline, 10–25 cm long, glossy and deep green. The fragrant, white flowers with yellow throat are produced in terminal or subterminal panicle cymes. Fruits are subglobose, 10–12 cm in diam., green, pink-tinged when ripen and 1-seeded. The tree flowers during January–March, and fruits from April to August. In India, this species is distributed in Andaman and Nicobar Islands, Karnataka, Kerala, Tamil Nadu and West Bengal, also found in Malay Peninsula, Malesi and Sri Lanka (Huber, 1983).



Cerbera odollam: Flowering twig

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D*albergia melanoxylo* Guill. & Perr. (Leguminosae – Papilionoideae), commonly known as the 'African Blackwood', is a small heavily branched tree, but occasionally may reach up to 15 m in height. It has imparipinnate leaves, small, white-coloured flowers in dense clusters and 3–7 cm long pods with 1 or 2 seeds. It is reported to have been introduced at AJC Bose Indian Botanic Garden, Howrah and grown in different divisions during the pre-Independence period. A considerably mature tree is growing in division number 21, which flowers and fruits profusely every year.

The tree is harvested for its dense lustrous heartwood. The wood is not really black but ranges from dark violet to brownish. It is used for making ornaments and musical instruments. The wood has a natural resistance to saliva. The German knife company Wusthof has also begun to sell a series of knives with black wood handles due to the wood's moisture repellent quality. Gresso, a Russia based cell phone manufacturing company recently begun selling luxury cell phones, whose casing is made of 'African Blackwood'. It is also used to make jewellery. The wood is considered to be the most expensive in the world which commands a price commensurate with its utility and rarity, i.e., \$ 25,000 per cubic metre!

H.S. Mahapatra & A. Pramanik

AJC Bose Indian Botanic Garden, Botanical Survey of India, Howrah – 711 103.



Dalbergia melanoxylo: a. Habit; b. Twig with flowers and pods

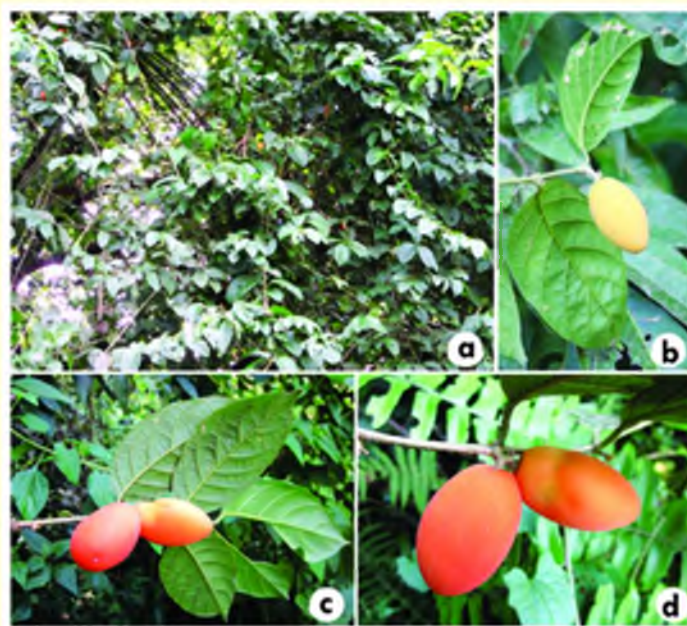
Iodes hookeriana (Icacinaeae), recollected after more than seventy years from India

I*odes* is an Old World tropical genus, represented by 28 species in the world (Mabberley, 2008). It is distributed in tropical and subtropical regions of the world, especially in Southern Hemisphere (Hua & Howard, 2008). In India, this genus with three species, viz. *I. cirrhosa* Turcz., *I. hookeriana* Baill. and *I. ovalis* Blume is confined to Arunachal Pradesh, Assam, Meghalaya and Nicobar Islands (Mathur, 2000).

During the floristic explorations in the Gibbon Wildlife Sanctuary, Jorhat district of Assam, *I. hookeriana* was collected. A thorough scrutiny of literature revealed that this species is known to occur only in Bangladesh (Chittagong), Myanmar, Malesia and India. In India, the species is confined to Arunachal Pradesh, Assam and Meghalaya. It is an extremely rare species, represented only by a very few herbarium collections. The present collection from the Gibbon Wildlife Sanctuary is a recollection of this species after a gap of 78 years. It was last collected from Umteswar forest, Meghalaya in 1936 (S.R. Sarma 13534).

Iodes hookeriana Baill., *Adansonia* 10: 268. 1872.

Large, climbing shrub. Leaves sub-alternate, oblong-ovate, cordate at base, sub-crenulate at margins, acuminate at apex, coriaceous, glabrous above, setose on veins beneath; petioles rugose, brownish hairy. Inflorescence extra-axillary; peduncles rugose and dichotomous; pedicels spreading. Flowers unisexual, whitish. Calyx-limb shortly 5-lobed. Corolla densely



Iodes hookeriana: a. Habit; b. A pre-ripening drupe; c. A mature fruiting-twig; d. Close-up of ripe drupes

hairy outside at base, deeply 5-parted; lobes thick. Stamens 5. Drupes ellipsoid, c. 2 × 3 cm, orange-red.

Fl. & Fr.: February–September.

Specimen examined: Assam, Gibbon WLS, 26.2.2011, 115 m, R. Daimary 122639 (ASSAM).

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Jerdonia (Gesneriaceae): A little-known, endemic Indian genus from southern Western Ghats

This curious little plant commemorating famous ornithologist and plant collector Major General T.C. Jerdon, F.L.S. of Indian Army, was described by Wight (1848). *Jerdonia* is monotypic, represented by *J. indica* Wight, a species endemic to the southern Western Ghats. *Jerdonia indica* occurs naturally in moist shady slopes in medium elevations, but easy to grow in pots in homestead gardens.

Jerdonia is one of the nine basal Asiatic genera recognised by Weber (2004) and has significant biogeographical interest. The genus is unusual in its isocotylous seedlings, flattened and appendaged filaments, unilocular ovary with four separate placentae and seed anatomy. Though Wight (1848) included this genus under Gesneriaceae, he doubted its position in the family because of the unusual structure of the ovary and nature of the stamens. Burt (1977) considered this genus isolated from all other Didymocarpoid Gesneriaceae on the basis of isocotylous seedlings. Möller & al. (2009), based on molecular data, placed it in the basal most position in Didymocarpoid Gesneriaceae.

As part of an ongoing research programme on the Gesneriaceae of India, *J. indica* was collected from different places in southern Western Ghats and successfully introduced at Calicut University Botanical Garden. More than twenty gesneriad species are also maintained by the research team for regular observation. *Jerdonia indica* came up very well in the Garden, and produced flowers and fruits from July to December. With its scapigerous habit, long-petioled, crowded, rusty-villous leaves and milky white to pale lilac, funnel-shaped corolla streaked with red or dark lilac, the plant is of horticultural interest, and can also be grown as a popular indoor plant.

Jerdonia indica Wight, *Icon. Pl. Ind. Orient.* 4(2): 10, t. 1352. 1848.

Perennial, scapigerous herb; rootstock 2–10 cm long. Stem reduced or absent. Leaves simple, elliptic, 5–8 × 3.5–7 cm, cordate to sagittate at base, margins and veins of older leaves covered with purple or reddish hairs, acute to acuminate at apex; petioles 5–12 cm long, hairy. Scapes numerous, erect, longer than leaves. Flowers horizontal. Corolla funnel-shaped, bilabiate, milky white to pale lilac, with red or dark lilac streaks at throat. Stamens 4, all fertile, cohering together over the stigma by their lobes; posterior filament with a descending yellow spur. Capsules ovoid to globose, hairy, reddish brown.

It is endemic to Western Ghats of Karnataka (Kodagu district), Kerala (Idukki, Kannur, Kozhikode, Pathanamthitta and Wayanad districts) and Tamil Nadu (Coimbatore and Nilgiri districts).

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Jerdonia indica: a. Habit; b. Corolla split-open; c. Fruit.

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One of us observed five individuals of *Gloriosa superba* L. (Liliaceae) growing on the peripheral bushes of Tikri Reserve Forest area, which lies between 26°57'12.2" N and 82°10'29.1" E, at an elevation of 81 m during the field trips conducted between 2012 and August 2014 in Parvati-Aranga Wildlife Sanctuary and adjacent Tikri Reserve Forest area in Terai region. In the Terai region of Uttar Pradesh (undivided), *G. superba* was once very frequent and abundant, but now it is scantily represented by a few populations in some localities.

In Ayurvedic system of medicine the tubers of this species are referred to as 'Langali' because the shape of the tubers resembles that of a 'Langalaka', i.e., a plough. All parts of the plant, especially the tubers and seeds, contain the alkaloids colchicine and gloriosine and have long been used in Ayurveda. They are used mainly to cure acute gout, infertility, skin diseases, chronic ulcers, leprosy and inflammation, also used as anthelmintic, laxative, abortifacient, antidote for snake-bite and to remove placenta from the uterus.

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Gloriosa superba

***Calyptocarpus vialis* (Asteraceae – Heliantheae) – A prolific exotic weed in India**

During the revisionary studies on tribe Heliantheae (Asteraceae), the senior author came across an exotic species, *Calyptocarpus vialis* Less. [= *Synedrella vialis* (Less.) A. Gray] growing at various localities in Punjab and Uttar Pradesh. This fast spreading species is native to eastern Mexico and to south and south-central Texas, USA (Nesom, 2011). In India, the occurrence of this species was first reported from Pune, Maharashtra by Ahuja & Pataskar (1969). It is now distributed in northwest Himalaya, northern and western parts of India (Karthikeyan & al., 2009).

It is predominantly found growing in swampy, shady habitats and lawns in association with species of *Eclipta*, *Malvastrum*, *Sida*, *Tridax*, *Cynodon* and *Parthenium*. It grows gregariously, retarding and restricting the growth of native plant species. The plant is mainly dispersed through seeds by sticking to clothes and other objects. It is also observed to get introduced to other places through cow dung manure and soil. This species is fast spreading and already been reported as invasive weed in other countries (Peng & Kao, 1984). Hence, simple and effective eradication method should be adopted to eradicate this weed. Otherwise, it could become a possible potential threat to the native plant species in the near future. A brief description and photograph of this species are provided for its easy identification in field.

***Calyptocarpus vialis* Less., Syn. Gen. Compos.: 221. 1832.**

Annual, scabrid, branching from the base and rooting at nodes. Leaves ovate, cuneate at base, serrate at margins, acute at apex, c. 4 × 3 cm, hairy on both surfaces. Inflorescence capitate, with c. 3 cm long peduncle; involucre bracts 4, membranous; outer bracts ovate or oblong-lanceolate, ciliate



Calyptocarpus vialis

at margins; inner bracts linear-lanceolate. Ray florets ligulate, 2 or 3-lobed, yellow. Disc florets tubular. Achenes dorsally compressed, crowned with 2 or 3 spines.

Fl. & Fr.: Throughout the year.

Distribution: **India:** Andaman and Nicobar Islands, Assam, Himachal Pradesh, Kerala, Maharashtra, Madhya Pradesh, Punjab, Tamil Nadu, Uttar Pradesh, Uttarakhand and West Bengal. **World:** Central and South America, Tropical Asia, China, Polynesia, Australia and Pacific Islands.

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Generally epiphytic orchids do not show host specificity. Their establishment on a tree depends on the nature of bark surface, nature of epidermal tissue of velamenous roots, available humidity and external source of nutrients (if it is propagated through seeds). A trial was made at AJC Bose Indian Botanic Garden (AJCBIBG), Howrah to observe host preference of two epiphytic orchids, viz. *Aerides odoratum* Lour. and *A. multiflorum* Roxb. during 2010 and 2011, respectively on different hosts with coconut husk as the facilitating medium for attachment.

Aerides odoratum Lour. was introduced long time ago at AJCBIBG, and it grows luxuriantly on trees such as *Ficus altissima* Blume and *Mangifera indica* L. In 2010, trials were made to grow it in the garden on some other tree species such as *Brownea coccinea* Jacq., *Chrysophyllum cainito* L., *Spathodea campanulata* P. Beauv. and *Syzygium cumini* (L.) Skeels, but it successfully thrived only on *C. cainito* trees.

Aerides multiflorum Roxb. was collected from Mahabaleswar, Maharashtra and introduced at AJCBIBG by one of the authors (PVS) in 2011. This was planted on the trees of *B. coccinea*, *C. cainito* and *M. indica* in the garden and supplemented with coconut husk as support. The species got established and growing luxuriantly on *B. coccinea* and *C. cainito* trees.

Chrysophyllum cainito with its considerable spongy and fissured bark provides a very congenial condition for epiphytic orchids and can serve as a good host for growing epiphytic orchids in nursery or garden condition.

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a. *Aerides odoratum*; b. *Aerides multiflorum*

Tea plants in AJC Bose Indian Botanic Garden, Howrah

The genesis of introducing Tea cultivation in India and current trials of its reintroduction at AJC Bose Indian Botanic Garden (AJCBIBG), Howrah is presented here briefly. Tea plant, the source for most popular invigorating, aromatic beverage, 'Cha' or 'Chai' is scientifically known as *Camellia sinensis* (L.) Kuntze (Theaceae). The plants are evergreen shrubs, up to 4 m high with strong taproot. Leaves are elliptic-oblong, serrate at margins, acute at apex and puberulous on veins beneath. Flowers solitary or to 3 in a cluster, with orbicular, glabrous sepals and broadly ovate, white petals. Fruit a globose or obtusely trigonous capsule, consists of obtusely angled, pale brown and smooth seeds.

Tea is said to have originated in China. Lord Macartney, a British envoy to China, brought some seeds and saplings of Chinese tea plants, and the first tea plants grew from Chinese seeds in the Botanic Garden, Shibpur from 1793 onwards. However, the saplings brought by him did not grow, and the tea plants grown from seeds also perished after some time. The next attempt by Lord Amherst in 1816 also failed, because the ship with seeds and saplings sunk on the way from China to India.

It was in 1823, Robert Bruce, an army officer while traveling in Assam on a trading mission had seen the tea plant growing in a hilly region near Rangpur (Ukers, 1935). In the year 1826, David Scott, a British official in Assam identified tea plants growing at Gubroo Purbat, a place between Jorhat and the border to Nagaland, and later in 1831, a Lieutenant called Charleton identified tea at Sadiya in East Assam. During 1835–1836, Nathaniel Wallich, McClelland and William Griffith made an expedition to Assam from Calcutta through today's Bangladesh, Cherrapunji, Guwahati and then up towards Dibrugarh and beyond, and they located about four sites with wild Assamese tea plants. G.J. Gordon, Secretary to a Tea Committee appointed by the then Governor General of India, Lord William Bentinck was sent twice to China in 1835 and 1836; first time to collect saplings of tea and seeds, and second time to bring some workers and tea-specialists from China to Assam. Probably from these China tea seeds, tea



Camellia sinensis: a. Plantation; b. Flower

plant nurseries were raised in the Botanic Garden in Calcutta. The introduction and cultivation of tea in the garden is believed to be made in the division number 25 on the bank of the river Hooghly, adjacent to the Roxburgh's Building. However, the cultivation of tea in the garden has gone into oblivion presumably due to adverse climatic factors and rising salinity levels of river Hooghly.

As part of the project "The development of the heritage garden at division number 25" of AJCBIBG, attempts are being made to reintroduce Tea plantation in the garden. In the first phase, during 2009, some 100 tea seedlings collected from Mungpoo, Darjeeling were planted. They thrived well for a few months, but did not acclimatise in spite of proper care. Second attempt was made in 2012. This time 100 seedlings from Mungpoo, Darjeeling and 150 seedlings from Siliguri (comparatively lower altitude) were brought and planted. The seedlings from Mungpoo again perished but about 50% survival rate is observed in the seedlings from Siliguri and the plants are showing healthy growth with fresh sprouting and flowering. Hopefully, our sincere efforts will bring success and one small tea garden can be re-established at AJCBIBG.

Reference

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Pseudobombax ellipticum (Kunth) Dugand (Malvaceae: Bombacoideae) is commonly known as 'Shaving Brush Tree' because of the apparent resemblance of its flowers with that of a shaving brush. It is growing naturally in the tropical regions of southern Mexico, El Salvador, Guatemala and Honduras and are known to be pollinated by some species of bats, hummingbirds, orioles and bees (Eguiarte & al., *Biotropica* 19: 74–82. 1987; Fleming & al., *Ann. Bot.* 104: 1017–1043. 2009). It is cultivated at division number 16 of AJC Bose Indian Botanic Garden (AJCBIBG), Howrah, and it flowers from October to January (Chowdhery & Pandey, *Pl. Ind. Bot. Gard.*: 641. 2007), but fruit setting has not been observed so far. The reason could be due to absence of the aforementioned pollinators at AJCBIBG.



Pseudobombax ellipticum

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a. Mr. Ashok Lavasa, IAS, Secretary, MoEF&CC, New Delhi during his visit to CNH, Howrah; b. Releasing of ENVIS Newsletter by the Secretary, MoEF&CC, New Delhi at CNH, Howrah; c. Heads of Office Meeting held at CNH, Howrah; d. Prof. Martin Krieger, Department of History, Leibnizstrasse, Germany, Dr. Gwynn Jenkins, Heritage Consultant, Penang, Malaysia and Ms. Khoo Salma Nasution, President, Penang Heritage Trust, Penang, Malaysia during their visit to CNH, Howrah

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Activities of the Centre: The Botanical Survey of India having involved in exploration activity has been collecting diverse data pertaining to floral diversity and its ENVIS Centre proposes to disseminate this information by building databases on the distribution of endemic and threatened plants, documentation of traditional/ethnobotanical knowledge, carnivorous plants and mangroves of India. 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 publications 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) * 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. Bibliography and Abstracts of Papers on Flora of West Bengal – I & II
 6. Bibliography and Abstracts of Papers on Flora of North East India – I
 7. Bibliography and Abstracts of Papers on Flora of Andaman and Nicobar Islands
 8. Bibliography and Abstracts of Papers on Flora of Maharashtra
 9. Bibliography and Abstracts of Papers on Flora of Kerala
 10. Bibliography and Abstracts of Papers on Flora of Tamil Nadu
 11. Bibliography and Abstracts of Papers on Flora of Karnataka (in press)
 12. Bibliography and Abstracts of Papers on Flora of Goa (in press)

Newsletters: Up to Vol. 19(2), 2014

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