



From Director's Desk

I feel greatly privileged to record my observations in this column of the ENVIS Newsletter no. 16(1) after taking over as In-Charge of this Institution. Since its inception, the Newsletter has been on time and presenting articles on diverse groups with emphasis on plant diversity and conservation, the assigned theme of the ENVIS Centre. The articles pertain to *Phoenix acaulis* exploitation in Meghalaya; plant foods used by the wild animals in Gorumara National Park (West Bengal); horticultural potential of *Tacca integrifolia*; the rarity of *Olax scandens* in Burdwan district, West Bengal and the successful introductions of *Salacia fruticosa*, *Neogyne gardneriana* and *Curcuma aurantiaca* in BSI associated gardens at Howrah and Shillong. Five new additions to the lichen flora of Nilgiri hills and a rare fern, *Dipteris wallichii*, from Mizoram are also included. I congratulate the ENVIS team for its timely publication.



(D.K. Singh)
Director-in-Charge
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United Nations Decade on Biodiversity



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The much exploited *Phoenix acaulis* in Meghalaya

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The Khasi and Jaintia tribes of Meghalaya carve out brushes from the stem of *Phoenix acaulis* Buch.-Ham, ex Roxb. (Arecaceae) and sell them in local markets to supplement their income. They dig out the 4 – 10 years old trees and after removing roots and leaves, stems are sliced lengthwise with their hard persistent petiole bases. The sliced stems are cut into 4"–6" x 1.5"–2" pieces in such a way so that one side of each piece has bristles of the persistent petiole bases. The pieces are left for sun drying and sold in market as brushes. The brushes are chiefly used for cleaning clothes, wooden floors and toilets. Each piece is sold for ₹ 5 – 10/- depending on the quality and size. The brushes have a high demand as they possess stiff bristle fibres which last long. *Phoenix humilis* is also used for making brushes which grows along in the pine forests on the open hill slopes but *P. acaulis* is reported to give out better quality of fibres.

The species is turning rare in the wild as the local people uproot the trees for making brushes. Judicious collection

practices and prudent harvesting looking at natural regeneration might help this species from becoming further threatened in wild. As the plants regenerate only from seeds, it must be ensured that sufficient number of mature individuals should be spared for fruit setting. Large scale plantations of the species for fencing and *ex situ* conservation are to be encouraged.



Brushes of *Phoenix acaulis* in Police Bazar, Shillong

Wild plants as animal foods in Gorumara National Park

Vinay Ranjan* & A. Kumar

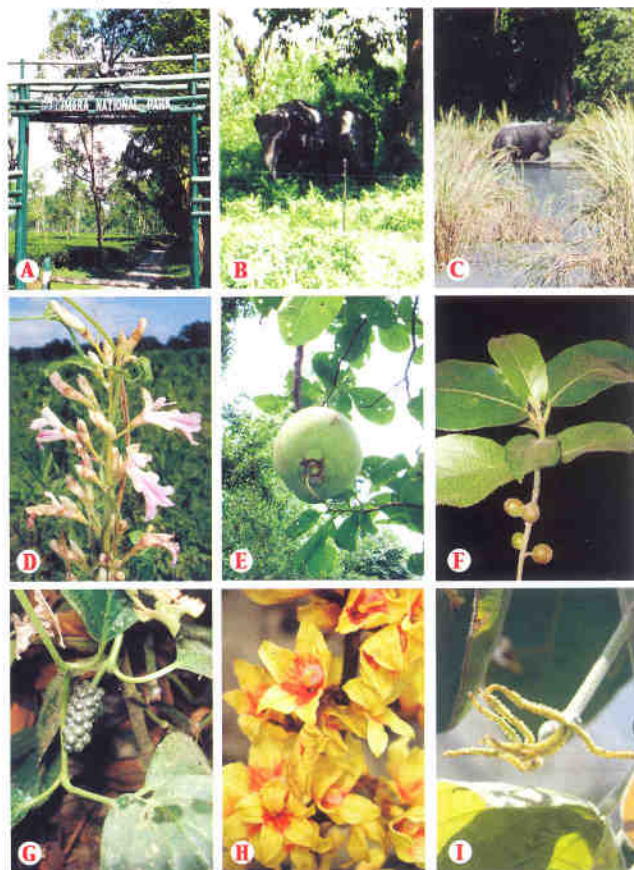
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Gorumara National Park (26°16'–27°N latitudes & 88°4'–89°53' E longitudes), with a spread of about 79 sq km, is situated in the *doars* of Eastern Himalayas in Jalpaiguri District, West Bengal. It harbours one horned rhinoceros, gaurs, elephants and leopards, all included in different appendices of CITES. The National Park has gained global significance owing to rhinoceros; national importance due to presence of elephants, gaurs and leopards; importance in the state due to rich floristic diversity; regionally important as elephant corridor and locally as an important eco-tourism spot. The forests are classified as dry mixed forests, wet mixed forests, sal forests and large terrai-grasslands interspersed with riverine forests. Terrai-grassland is the most favourable niche of rhinoceros and hog deer while chital colonize in forest edges. Sambhar and barking deer prefer forested area. Hornbills, jungle fowl, pea fowl & bush birds nest in diverse trees. Elephants move all over National Park area. About 10% of total area of the Park is under grassland which is not sufficient to meet the needs of herbivores. The problem gets further aggravated when the cattle of nearby villages intrude the park for grazing. Moreover, during flood and dry season in winter, animals move to forested area and eat saplings of planted trees, lower canopy of foliage trees and fleshy fruits. Sri Ram Bahadur Subba, the field guide in the Park provided information on plants used as food by the animals. The elephants eat leaves of *Alpinia nigra* (*Purundi*), *Dillenia indica* (*Tantari*), *Ficus hispida* (*Khoksa*), and *Mallotus philippensis* (*Sinduri*). In winter, elephants prefer to eat the leaves of *Piper sylvaticum* (*Pani-lahari*), *Tinospora cordifolia* (*Gurja*), leaves and barks of *Shorea robusta* (*Sal*). Saplings of *Dalbergia sissoo* (*Sissoo*) and *Bauhinia purpurea* (*Kanchan*) are

source of food for elephants and gaur. *Trewia nudiflora* (*Pitali*) is a staple food of rhinoceros and gaur. The flowers of *Schima wallichii* (*Chilauni*) and *Sterculia villosa* (*Udal*) are the food of hornbills, jungle fowl, pea fowl and bush birds. Fruits of *Bischofia javanica* (*Kinjal*) and *Careya arborea* (*Kumbhi*) are eaten by monkeys while the seeds

of *Gmelina arborea* (*Gamar*) and fruits of *Careya arborea* (*Kumbhi*) are used as food by hog deer, chital, sambhar and barking deer. Habitat manipulation and expansion of fodder area are regularly monitored by National Park authority. For conservation, sustainable supply of staple food and to meet the ever increasing demands of fodder, plantation of herbaceous species such as *Saccharum*, *Alpinia* and saplings of trees like *Bischofia*, *Bauhinia*, *Dalbergia*, *Dillenia* and *Gmelina* are to be propagated in the forest nursery to plant them in the park area.



A, Entrance of Gorumara National Park; B, Wild elephants; C, One-horned rhinoceros; D, *Alpinia nigra*; E, *Careya arborea*; F, *Ficus hispida*; G, *Piper sylvaticum*; H, *Sterculia villosa*; I, *Trewia nudiflora*

Tacca integrifolia with horticultural potential

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Tacca integrifolia; Inset: Flowers

Tacca integrifolia Ker Gawl. (Taccaceae), an acaulescent rhizomatous herb that grows in shady and humid conditions, is known for its ornamental leaves and peculiar floral morphology. The flowers have many whisker-like floral bracteoles which hang down up to 55 cm. The upright whitish involucral bracts that resemble a flying bat's wings spread above the flowers, thus earning the common English name as *White Bat Flower*.

In India, this species is distributed in the North East and grows profusely

on heavily shady mountain slopes as forest undergrowth. The plant has a great ability to thrive in high temperature, high humidity and shady areas.

The species is assumed to have the sapromyophilous syndrome (Drenth, 1972; Saw, 1993), i.e., the unusual floral morphology is believed to function as 'deceit syndrome' in which the flowers and the floral parts mimic rotting organic matter, so as to attract flies to facilitate cross-pollination. Stevenson (2004) had also suggested that the dark coloured flowers and large bracts are likely to be

associated with pollination by flies. However, Zhang *et al.* (2005) based on their studies on *T. chantrieri*, a closely related species of *T. integrifolia*, established that self-pollination is the preset mode of fertilization in *Tacca* and have no great need of pollinators.

Since the species is uncommon, it is not fully utilized for horticultural purpose in India. It is felt that *T. integrifolia* should be brought to the limelight by introducing in the gardens.

In *ex-situ* condition the species can be grown in open, shady places, in good porous drained soil, but care should be taken to keep the soil moist by adequate watering. Flowering starts in 1–1.5 years old plants from May–September and fruiting from August–October. Each inflorescence lasts up to 7–12 days or occasionally more. The plants multiply naturally by rhizomes and seeds. Germination of seeds is also possible *in vitro*.

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Zhang, Ling, Spencer C.H. Barrett, Jiang-Yun Gao, Jin Chen, W.W. Cole, Yong Liu, Zhi-Lin Bai & Qing-Jun Li. 2005. Predicting mating patterns from pollination Syndromes: the case of "sapromyophily" in *Tacca chantrieri* (Taccaceae). *Amer. J. Bot.* 92: 517-524.

Neogyňa gardneriana conserved in Experimental Botanic Garden, Shillong

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Neogyňa gardneriana (Lindl.) Rchb.f. [= *Coelogyne gardneriana* Lindl.; *Pleione gardneriana* (Lindl.) Kuntze] is the only species under genus *Neogyňa*. This epiphytic orchid has cylindrical-conical or flask-shaped, 5–15 cm long, crowded pseudobulbs and two elliptic lanceolate leaves that have long petioles. It flowers during October–December. The drooping

inflorescence originates from the base of pseudobulb with several distichous white flowers which hardly open out. The species is rare and confined to N.E. India (Arunachal Pradesh, Meghalaya, Manipur and Nagaland). Outside India, it is distributed in Nepal, Bhutan, Bangladesh, Myanmar, China and Thailand. This species is of horticultural importance because of its beautiful



Neogyňa gardneriana; Inset: Flowers

flowers. It has been conserved in the Experimental Botanic Garden of Botanical Survey of India at Shillong and is now thriving well.

Curcuma aurantiaca – A new record for N.E. India

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Curcuma aurantiaca Zipp. (Zingiberaceae) is distributed in Sri Lanka, Malaysia, Indonesia, Thailand and India (Amalraj *et al.*, 1992; Siriruga, 1999). In India, this species was known to occur in Kerala. Recently this species was collected from Shella (Meghalaya) extending its range of distribution within the country. It flowers from June–July and can be easily recognized by cordate unequal leaf bases, concealed peduncle and pale orange flowers. It has been introduced in the Botanic Garden of Botanical

Survey of India, Shillong for *ex-situ* conservation and the plants are thriving well here.

References

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Curcuma aurantiaca

Olax scandens turning rare in Burdwan district, West Bengal

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Olax scandens Roxb. (Olacaceae) was once familiar in Bengal as *Kokorari* but at present the name is almost forgotten as it has become rare. The specific epithet '*scandens*' implies its

lignous scandent nature. It is partially parasitic on the roots of large trees. The flowering and fruiting spreads from February–June. The species is referred to as *Malliveppam* and *Kadalranchi* in

Siddha medicine. In Burdwan district a single plant of *O. scandens* could be located at Paschim Gangarampur while working for People's Biodiversity Register (PBR) for the district.

O. scandens is a very useful plant. Its leaves and young shoots are used as pot herbs or as green vegetable. The unripe fruits are eaten and are also used in preparation of soft drinks. The bark is used in the treatment of anaemia. It is frequently used as a supporting drug in diabetes and in fever. It also reduces the risk of heart diseases. The decoction of the stem-bark when administered orally cures fever and cough. The hexane extract of this plant has an antimicrobial property against *Klebsiella pneumoniae*. This species being rich in kaempferol (Haron & Ping, 1997) is likely to possess anti-cancer properties, especially in prevention of lung, pancreas and colon cancers.

Since the species has appreciable medicinal properties and has become rare in the forests of Burdwan district it is high time to think of its conservation.

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Olax scandens; Inset: Flower

Additions to the lichen flora of Nilgiris in Tamil Nadu

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The Nilgiris, a part of the larger mountain chain of the Western Ghats hold rich lichen diversity in its diverse habitats. While working on the lichens of Nilgiris one of us (SJ) collected five interesting macrolichens viz., *Heterodermia microphylla*, *Parmotrema indicum*, *Parmotrema melanothrix*, *Pyxine cocoes* var. *prominula* and *Usnea eumitrioides* which were hitherto not reported from this region (Awasthi & Singh, 1973; Singh & Singh, 1976; Nayaka & Upreti, 2005; Awasthi, 2007). The rich lichen diversity of these hills, has been getting degraded due to many anthropogenic activities such as fire wood collection, converting lands for *Eucalyptus* and tea plantations, illegal logging, construction of buildings and roads, frequent collections and sale of economically important lichens in the local market and unmanaged tourism activities. These activities need to be regulated in order to save the richness and diversity of lichens. Each species is provided with the currently accepted name, distribution in India and specimens examined along with a photograph to facilitate its identification. All the specimens cited are deposited in the Herbarium of Bharathiar University, Coimbatore.

Heterodermia microphylla (Kurok.) Skorepa (Physciaceae)
Distribution: Sikkim, Tamil Nadu and Uttarakhand.



Heterodermia microphylla

Specimen examined: Tamil Nadu: Nilgiri district, Dodabetta, ± 2550 m, *S. Joseph* 09107.

Parmotrema indicum Hale (Parmeliaceae)

Distribution: Kerala and Tamil Nadu. Specimens examined: Tamil Nadu: Nilgiri district, Kotagiri, ± 1800 m, *S. Joseph* 09049; on way to Dodabetta from Kotagiri, ± 2400 m, *S. Joseph* 09068B.



Parmotrema indicum

Parmotrema melanothrix (Mont.) Hale (Parmeliaceae)

Distribution: Andhra Pradesh, Assam, Himachal Pradesh, Tamil Nadu and Uttarakhand. Specimens examined: Tamil Nadu: Nilgiri district, Dodabetta, ± 2550 m, *S. Joseph* 09102A & ± 2600 m, 09119.



Parmotrema melanothrix on a fallen tree trunk; Inset: Thallus showing apothecia

Pyxine cocoes (Sw.) Nyl. var. *prominula* (Stirt.) D.D. Awasthi (Caliciaceae)



Pyxine cocoes var. *prominula*

Distribution: Karnataka, Madhya Pradesh, Maharashtra, Tamil Nadu and West Bengal.

Specimens examined: Tamil Nadu: Nilgiri district, Tippu sate bungalow, Coonoor, ± 1920 m, *S. Joseph* 09014; Kayunni, ± 900 m, *S. Joseph* 09024 & 09025A; Wellington, ± 1800 m, *S. Joseph* 09033.

Usnea eumitrioides Motyka (Parmeliaceae)

Distribution: Himachal Pradesh, Nagaland, Sikkim, Tamil Nadu, Uttarakhand and West Bengal.

Specimen examined: Tamil Nadu: Nilgiri district, Tippu sate bungalow, Coonoor, ± 1920 m, *S. Joseph* 09009.



Usnea eumitrioides

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Dipteris wallichii – A rare fern from Mizoram

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Dipteris is the only living genus of Triassic origin of the family Dipteridaceae. The genus is represented in India by *D. wallichii* (R.Br.) T. Moore and is restricted to the N.E. India (Dixit, 1984; Fraser-Jenkins, 2009). Clarke (1880) reported it from the Jaintia hills and several other places near to the border of Nagaland; Beddome (1883) from the Khasi & Jaintia Hills, the Cachar and Sylhet districts of the present day Bangladesh; Baishya & Rao (1982) from the Khasi & Jaintia Hills; Jamir & Rao (1988) from Nagaland; Choudhury & Bhattacharya (1996) from Cachar and Hailakandi districts of Assam; Borthakur *et al.* (2001) from Sonitpur and Kamrup districts of Assam and Singh & Panigrahi (2005) from the Tirap district of Arunachal Pradesh. Chandra *et al.* (2008) listed this species under 'Critically Endangered' perhaps due to its smaller populations and restricted distribution in India.

While surveying the flora of the Pualreng Wildlife Sanctuary located in the Kolasib district of Mizoram the authors recognized a population of

approximately 150 individuals of *D. wallichii* growing in a shady place (24°11'27" N & 92°44'28" E) at 466 m in association with *Selaginella wallichii*, *Begonia thomsonii*, *Homalomena aromatica*, *Tacca laevis* and *Bamboo* species. This constitutes a new record of this species from Mizoram.

The conservation of *D. wallichii* is significant since this species belongs to *Dipteris*, the single extant genus of the family Dipteridaceae. Therefore this



Dipteris wallichii; Inset: Sori

fern has been introduced in the Experimental Botanical Garden of Botanical Survey of India at Barapani, Shillong and is growing well.

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Salacia fruticosa in Acharya Jagadish Chandra Bose Indian Botanic Garden, Howrah

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Salacia fruticosa B. Heyne ex M.A. Lawson (Celastraceae), a climbing shrub endemic to Western Ghats of India (Karnataka, Tamil Nadu and Kerala), was collected by one of the authors (SSH) on 23.3.2004 from Agasthyamalai region of Southern Western Ghats on the way to Chemunchi and introduced in the Acharya Jagadish Chandra Bose Indian Botanic Garden. After six months of introduction, it was transplanted inside a gabion at division number 19 of

AJCBIBG. The plant thrived well and first flowered in the month of July, 2007. Fruit setting was observed on several occasions in the subsequent years but the percentage of seed germination was low and so ample number of seedlings could not be raised for further multiplication and conservation. Presently this species is included under Red Listed Medicinal Plants (<http://www.smpbkerala.org/ret-species.html>).

In Malayalam *S. fruticosa* is known

as *Kovandi*. Its fruits are edible. The root and root bark shows anti-hyperglycemic activity and are used in Ayurveda, Sidha and Unani systems of medicine for the treatment of diabetes.



Salacia fruticosa; Inset: Fruit



Participants with the Course Director Dr. Thomas V. Jacobs, Professor of Botany (Retd. UNISA), Professor of Philosophy, Latin & Greek, Theological Institute, Pretoria, South Africa in Botanical Latin Workshop organized by Botanical Survey of India from 17.1.2011 to 24.1.2011 at Southern Regional Centre, Coimbatore

E.K. Janaki Ammal National Award for Plant Taxonomy, 2009 was presented to Dr. D.K. Singh, Director-in-Charge, Botanical Survey of India by Shri Jairam Ramesh, Hon'ble Minister of State (Independent Charge), Environment & Forests on World Environment Day, the 5th June, 2011. Mr. Achim Steiner, India Coordinator, UNEP looks on



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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 the ENVIS Centre of BSI 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. Bibliography and abstract of papers on flora of West Bengal
5. Bibliography and abstract of papers on flora of North East India - I
6. Bibliography and abstracts of papers on flora of West Bengal - II
7. Bibliography and abstracts of papers on flora of Andaman and Nicobar Islands

Newsletters: Up to Vol. 16(1)

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