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From Director's Desk

The United Nations has declared 2017 as "International Year of Sustainable Tourism for Development", with the official launch by the World Tourism Organisation (UNWTO) on January 18, 2017 in Madrid. It could be observed that tourism has become a mainstay of economy, a passport to prosperity, and a transformative force for improving millions of lives. According to UNWTO more than 1.2 billion people travelled around the world for tourism purposes and another 6 billion people travelled domestically, in 2016. It is imperative to harness the power of tourism as we strive to achieve the 2030 global agenda for Sustainable Development with 17 goals. In parallel with the growth of the sector, there is also increased concern to advance towards greater sustainability, uniformity, generality and peace in our societies.

A respectful approach towards nature, "Sustainable Tourism" only could preserve resources and natural wealth thereby stimulate the economy, creating jobs and income and, thus, the development of countries and their populations.

The geographical spread and ecosystem diversity of India makes it a multiple-interest and all-season destination. Sustainable visitor strategies centred with consideration on natural heritage and environment, art, craft, local culture, indigenous cuisine can target larger tourism earnings, which could contribute meaningfully to conservation of flora, fauna, and their habitats in general and to the rural prosperity in particular. Tourism has every possibility of a potential of being a non-polluting, sustainable, income source. The global



emphasis on sustainability and combating with climate change creates a major opportunity to position the tourism

experience of India as a unique visitor takeaway with setting of low- impacts. The main target should be low-volume but high-yield visitors, attuned with the carrying capacity of the local environment, alternate energy options, local community acceptance and visitor satisfaction.

A training programme, 'Biodiversity Conservationists' launched by Ministry of Environment, Forest and Climate Change under Green Skill Development Programme (GSDP) by ENVIS Centres of BSI and ZSI with the 10th and 12th pass/dropout trainees in some of their designated Centres is a new and futuristic initiative, which may create some employment opportunities to those trained youth.

Like earlier issues, hope this will also be well received by its regular readers for its contents. I appreciate the efforts of entire team of ENVIS Centre on Floral Diversity in bringing out this informative issue.

(Paramjit Singh)

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Wight's Twisted-Flower

Botanical Name: *Strophanthus wightianus* Wall. ex Wight

Family: Apocynaceae

Common Names: Wight's Twisted-Flower; Malayalam: *Kambetti*; Tamil: *Nerivalli*.

General Morphology: Climbing shrub. Stems, petioles and peduncles violetish. Leaves elliptic to elliptic-obovate, 8–10 x 2.5–3 cm, base attenuate, apex acute; lateral veins 8–12 pairs, looped to form intramarginal vein. Flowers in terminal branched cymes. Bracts triangular, 3–4 mm, apex acuminate; peduncles stout; pedicels 5–6 mm long. Calyx lobes 5, acuminate, 2–3 mm long. Corolla tube 7–8 mm long, widened at throat, brown. Coronal lobes 5, linear-lanceolate, 8–10 mm long. Stamens 5, included; anthers sagittate. Carpels 2, free, connate at base; ovules many; style filiform; stigma conical. Follicles stout, 8–10 cm, tapering to tip. Seeds many, ovoid, 6–8 mm long, compressed, with silky apical coma.



Strophanthus wightianus. Inflorescence

Distribution: It is endemic to southern Western Ghats and scrub jungles found along the west coast. The species is reported from Alappuzha, Kollam and Thiruvananthapuram districts of Kerala and Tirunelveli and Coimbatore districts of Tamil Nadu.

Uses: The species of *Strophanthus* are best known for the arrow poisons, extracted from the crushed seeds. The seeds of this genus contain a glucoside called strophanthin, which is a cardioactive agent. In some species, the ground seeds are used for cardiac insufficiency, while the roots or leaves of other species such as *S. hispidus* DC., *S. kombe* Oliv., *S. gratus* (Wall. & Hook.) Baill., *S. welwitschii* (Baill.) K. Schum. and *S. preussii* Engl. & Pax ex Pax are utilised in preparations for venereal diseases, intestinal parasites

and skin diseases like scabies. Recent study evidenced that leaf extract of this plant has antimicrobial properties on clinically important bacteria. Kani tribes of southern India use the extract of this plant mixed with milk to cure rheumatic pain. The plant can be introduced as an ornamental in gardens.



Propagation of *Strophanthus wightianus*

Propagation: The plant can easily be propagated by seeds, and also vegetatively by mature stem cuttings. It is observed that the seeds of this species possess a fairly long viability period of three years and germination success of 86%.

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Strophanthus wightianus. a. Habit; b. Follicles

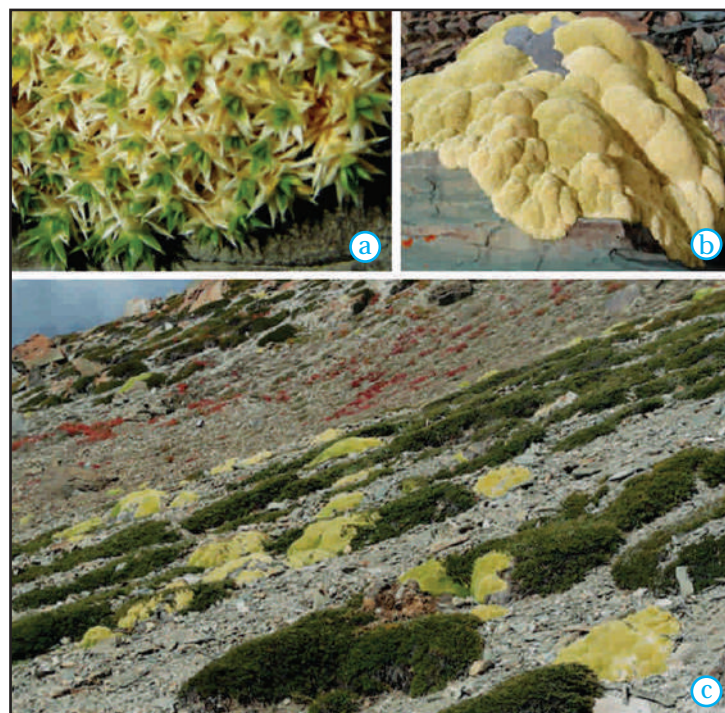
Golden Alpine Sandwort: A spectacular cushion species in the Trans-Himalaya

Thylacospermum caespitosum (Camboss.) Schischk. belongs to the family Caryophyllaceae. The generic name *Thylacospermum* Fenzl is derived from the Greek words 'thylakos', which means 'a bag, sack or pouch' and 'sperma' means 'seed'. The specific epithet *caespitosum* is attributed to the caespitose habit (growing in tufts/clumps or forming a dense turf) of the plant. It is locally known as 'Spang', 'Tagaracan' and 'Tegarcan'.

It is a densely tufted, perennial, glabrous herb, forming large, hard spherical or hemispherical cushions of 25–100 cm across. Stems branched, spreading. Leaves densely crowded, ovate, with margins thickened and ciliate, apex mucronate. Flowers solitary, sessile at the tips of the branches. Calyx lobes lanceolate, apex obtuse or acuminate, green. Petals obovate-spathulate, margins entire, greenish white. Stamens shorter than sepals. Seeds light brownish. Flowers and fruits are seen from July to September and found on open dry, exposed or gently sloping stony areas, often in rock crevices above 4400 m. In India, it is found in Jammu and Kashmir (Ladakh); Himachal Pradesh (Lahaul and Spiti); Uttarakhand (Thaga La; Nilang–Sanker Glacier; Niti–Geldung Lake; Topidunga) and Sikkim (Khangchendzonga). The plant has antifungal and antiseptic properties and is an important source of fuel for the migratory shepherds.

It is an endangered species (Srivastava, 2010) found in alpine and subalpine regions of India, Nepal, Pakistan, China, Kazakhstan and Kyrgyzstan. The habitats are predominately of cushioned vegetation, and characterised by compact, low growing, and mat-forming plant species. The semiglobose to nearly mat-forming dwarf herb, *T. caespitosum*, is one of the most prominent alpine cushion plants found in the Trans-Himalayan regions. It occupies the highest vegetation belts at the upper vegetation limits in the region. The mosaics of *Thylacospermum* give a peculiar appearance to the landscape. It is one of the characteristic species that represent one of the special habitats of the Trans-Himalayan regions.

This species is found in alpine screes and boundary fields with dominant hemicryptophytes such as *Pleurospermum stellatum* (D. Don) Benth. ex C.B. Clarke and *Rhodiola tibetica* (Hook.f. & Thomson) S.H. Fu (Dvorsky, 2014). It also grows in open dry and stable slopes forming pure patches and also a major association with *Caragana versicolor* Benth. (Kumar & al., 2016). *Thylacospermum caespitosum* is a strong competitor in highly stressful conditions, while in mesic conditions it is more prone to invasion (Dvorsky, 2014). In general, cushion plants are considered as keystone species that ameliorate the harsh conditions they inhabit in alpine ecosystems, thus



Thylacospermum caespitosum: a. Habit; b. Cushioned plants; c. *T. caespitosum* amidst *Caragana versicolor* in Niti Valley, Nanda Devi Biosphere Reserve, Western Himalaya

facilitating growth of other species and increasing alpine phytodiversity. However, according to de Bello & al. (2011), no nursing effects of *T. caespitosum* on other alpine plants are detected. It is phylogenetically related to another cushion species, *Arenaria polytrichoides* Edgew. with a significant nursing effect in the Himalaya (Yang & al., 2010).

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An indigenous grain storage method in Odisha

The indigenous methods of storing grains of various crops for future use have been traditionally followed by different societies in Odisha. Some storage methods have been developed by various indigenous communities through centuries which not only include making of safe storage structures but also use of plant materials to repel various pests, especially insects.

During the ethnobotanical field survey in Nuapada district, Odisha, the authors observed unique oval-shaped paddy straw storage called 'Puda', used by the local people and different tribal communities for storing paddy grains in Rajana area. It is also known as 'Pura', 'Puduga' or 'Olia'. On request, with initial hesitation, the local farmers demonstrated the process of making these containers. Initially, two lengthy strings were made using straws, that were spun into a single thick rope of around one inch diameter, and coiled to form a bin (storage)-like structure and a layer of dried straws is placed inside to give shape and also to fill the gaps between straw rope coils.

The filling of paddy and the making of storage bin are done simultaneously to prevent the paddy overflow. The paddy is filled firmly by giving heavy pressure through wooden rod. After making up to a required height, mouth of container is tied with the end of same rope, tightened by pulling the ropes and beaten by big wooden rod to smoothen external surface. The bin is finally tied perpendicularly by a strong rope (*Chhatta*) of *Eulaliopsis binata* (Retz.) C.E. Hubb. or *Crotalaria juncea* L. or straw ropes for support. The size of container varies depending upon the requirement.

The container is mostly made by farmers themselves in minimum cost



Steps involved in making 'Puda', the straw storage container

by using easily available raw materials well-aerated with good thermal insulation. These storage bins can easily be transported from one place to another by rolling due to round shape. Unfortunately, making of this kind of indigenous containers for storing paddy are limited due to non-availability of skilled persons or less interest of younger generation towards traditional practices. Hence, farmers prefer gunny bags over traditional storage bins for storing

paddy grains. It is, therefore, suggested that the indigenous storage 'Puda' should be encouraged in the rural and tribal areas for preserving their traditional practices for posterity.

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A Report on the Training Course on Basics of Plant Nomenclature

A two-day training course on Basics of Plant Nomenclature was organised by the ENVIS Centre on Floral Diversity, Botanical Survey of India (BSI) in collaboration with Central National Herbarium (CNH), BSI Howrah on 14th and 15th of January, 2017 at CNH, Howrah. The primary objective of this course was to impart training on basic aspects of plant nomenclature to the teachers, research scholars and post graduate students from various colleges/universities. The inaugural session was commenced with a welcome address by Dr. P.V. Prasanna, Scientist 'F' & HoO, CNH, BSI, followed by the introductory remark on the course by Dr. Paramjit Singh, Director, BSI, and keynote address by Dr. A. Pramanik, Scientist 'E' & HoO, Acharya Jagadish Chandra Bose Indian Botanic Garden (AJCBIBG), Howrah. Dr. Harish Singh, Scientist 'D' & HoO, Central Botanical Laboratory (CBL), BSI, Howrah and Dr. Manas Bhaumik, Scientist 'D' & HoO, Industrial Section Indian Museum (ISIM), BSI, Kolkata also expressed their views on the training course. This session was attended by scientists and other scientific officials from various units of BSI in Howrah and Kolkata, and the Assistant Professors from various colleges in West Bengal, Jharkhand and Uttar Pradesh; research scholars

and students from Calcutta University, Burdwan University, Kalyani University, Vidyasagar University, Visva-Bharati University, Govt. College, Darjeeling and Scottish Church College, Kolkata and North Orissa University, Odisha.

The first session of the training course began with a lecture on "History of the Code of Botanical Nomenclature" by Dr. V. Sampath Kumar, Scientist 'D' & In-Charge, ENVIS Centre, BSI, followed by Dr. Sangita Das Chowdhury, AJCB-PDF, CNH, on "ICBN/ICN, Preamble and Principles of Nomenclature" and Dr. S. Bandyopadhyay, Scientist 'B', CNH, BSI on "Typification of Plant Names". In the post lunch session, Dr. Avishek Bhattacharjee, Scientist 'B', CNH, BSI explained different kinds of names, Dr. V. Sampath Kumar delivered a lecture on "Author Citation" and the last lecture of the day was delivered by Dr. S. Bandyopadhyay about symbols and abbreviations used in revisionary works.

On the second day, 15th January, Dr. P.K. Hajra, former Director, BSI briefly outlined about the activities of ENVIS Centre to the participants, which was followed by a lecture on "Principle of Priority and its limitation" by Dr. Sangita Das Chowdhury, and "Effective and Valid Publication" by

Dr. Avishek Bhattacharjee and about acronyms of herbaria, botanical databases such as IPNI, The Plant List, Tropicos, BPH-2, abbreviations of authors' of plant names, how to search taxonomic literature by Dr. Gopal Krishna, Botanical Assistant, CNH, and the categories and hierarchy in plant classification and how to describe a new taxon by Dr. V. Sampath Kumar. After this session participants were given a short exercise to solve some plant nomenclature problems.

After the lunch, the last lecture of the training course was delivered by Dr. Avishek Bhattacharjee on "Flora, Revision and Monograph".

During the valedictory session, Dr. Paramjit Singh, Director, BSI, Dr. P.V. Prasanna, Scientist 'F' & HoO, CNH, BSI, Dr. A. Pramanik, Scientist 'E' & HoO, AJCBIBG, BSI, Howrah, Dr. Harish Singh, Scientist 'D' & HoO, CBL, BSI and Sri Pradeep Kumar, Asst. Acct. Officer, PAO, BSI/ZSI, Kolkata shared their views on the training course and commended the ENVIS Centre on Floral Diversity, BSI and its staff for organising the training programme. The participants shared their views about the training course and congratulated the organisers for conducting such a training course and also given their written feedbacks on



the training course. Furthermore, the participants expressed that all the sessions were informative and this training would definitely help them to carryout research in plant taxonomy. The Director, BSI also interacted with

participants and conveyed his best wishes to the participants. The participation certificates were issued to the trainees and the programme ended with vote of thanks by Dr. K.A. Sujana, Scientist 'D', CBL, BSI.

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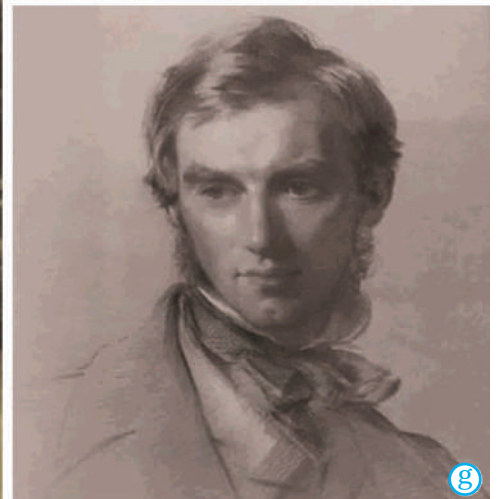
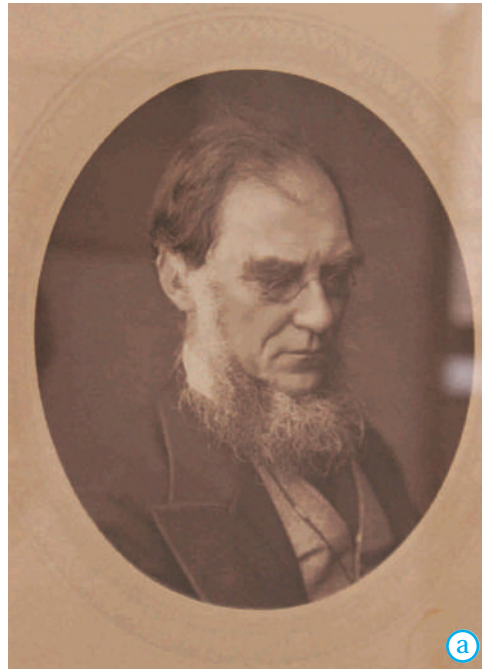
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The awe-inspiring exhibits of Sir Joseph Dalton Hooker offstage

The ongoing botanical exhibition of Hooker's Gallery at the Industrial Section of Indian Museum, Kolkata with elite, awe-inspiring exhibits of Sir Joseph Dalton Hooker offstage, comprises of materials brought over from Kew Gardens, London and corresponding artifacts from the Botanical Survey of India, Kolkata. The life-size plant paintings made out of natural colours during the 19th century, constitute the core exhibits, elucidating the existence and importance of 'history and heritage' of the natural world. The specimen and literature display, depicts most vital stages of botanical history of India and the modern natural world and these core excerpts, not only restage backstage life of Hooker (Fig. a, b) virtually, but also his path blazing botanical distinctions. The life-sized reproductions of plant images, timelines, text, model paintings of Kew Gardens and organisational stages of Kew Botanic Garden development, glimpses of pictures and paintings of his field trips (Fig. c), personal study and published volumes, brew the botanical history since Hooker's era, depicting his endeavours which pave way to aesthetic investigations on contemporary art style in respect of the past.

Many photographs also lead to realisation of the evolutionary taxonomic milestones of 19th century with revelations of life facts of the great founder of Geographical Botany, who, at a tender age of seven years, started attending his father's lectures at Glasgow University and taking interest in plant distribution and explorations of Captain James Cook (Endersby, 2004). A doctor by training, Hooker joined the Antarctic expedition to the South Magnetic Pole



a. Sir J.D. Hooker; b. An exhibit of Sir J.D. Hooker; c. Hooker and his team in field; d. Seeds public litigations during Kew Garden development; e. Public agitation at Kew Gardens; f. Sir J.D. Hooker and his wife Hyacinth; g. Sir J.D. Hooker in 1855; h. Hooker and his wife sitting in his study; i. The Hooker's Gallery at ISIM, Kolkata

from 30 September 1839 to 4 September 1843, to assist the 'Erebus' ship's Surgeon, Robert McCormick (Desmond, 1999). During this voyage, he collected several plant specimens from various locations along the route to Antarctica and made their drawings with live colour extracts, many of which are displayed in the exhibition.

The timeline extracts of Kew Garden restructuring are evidence of the public agitation faced by Hooker during restructuring the Royal Botanic Gardens, Kew, London. The exhibits depict that there was lot of public agitation including litigation (Figs. d, e), in his venture to reserve morning visiting hour of the garden for teachers, researchers and botanists to enable them work in peaceful atmosphere. Adding to these, a flash of the only photograph of Sir J.D. Hooker on his 90th birthday with his

wife Hyacinth in 'Hallow walk' of Rhododendrons of Sikkim, Nepal and Tibet (Fig. f), collected by him in 1773, is a bliss of solitude.

His best portrait of 1855, drawn by George Richmond flaunts him as a lackadaisical young man (Fig.g) while in another one of 1850, he is seen sitting in foreground, surrounded by Lepchas while his Gorkha Guard is seen inspecting the plant collections. In yet another painting of 1904, the 87-year old icon can be seen in his study with his wife and many of his published volumes and photographs of people who had been important in his life, revealing his active research life, post-retirement (Fig. h). Having been carried successfully for about eight months, since 1st October 2016, with many distinguished visitors (Fig. i) the Hooker's Gallery at ISIM, Kolkata is to continue.

Not to be missed, a glance at the rare, archival holdings of this gallery is certainly a lifetime opportunity, mainly for Botanists and aestheticians.

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Mahua – A tree with multiple uses

Mahua [*Madhuca longifolia* var. *latifolia* (Roxb.) A. Chev.], a large deciduous tree of the family Sapotaceae, grows in dry tropical and subtropical climatic conditions, and found almost throughout India. The tree grows to height of 20–25 feet. It is commonly known as 'Butter tree'. It is known as *Mahua* or *Mauwa* in Hindi, Odiya and Bengali; *Hippe* in Kannada and *Vippa* or *Ippa* in Telugu; *Madhukah* or *Madhukam* in Sanskrit and *Illupe* or *Illuppai* in Tamil. *Mahua* is one of the few trees that may not need deliberate conservation efforts due to its integration in cultural identity.

In the tribal belts of northern and central India, almost every village is usually festooned with a large *Mahua* tree, under which all the village meetings are held. The tree is rarely cut due to its economic importance

and religious taboos threatening wrath of spirits upon cutting the tree.



Madhuca longifolia var. *latifolia*: Habit

It is greatly valued for its flowers and seeds. The tribal people prepare country liquor from the flowers by their own brewing techniques and drink in their social and traditional assemblies. Flowering of *Mahua* occurs from February to April. The fruits ripen in June and July and fall off soon after ripening. An average-sized tree yields 50–100 kg flowers in a season that last around a month. Tribal economy (30–40%) in Bihar, Madhya Pradesh and Odisha are dependent on the *Mahua* seeds and flowers (Puhan & al., 2005).

Kulkarni & al. (2013) reported that drying and decortication yield 70% kernel on the weight of seed. The kernel of seed contains about 50% oil. The seed oil is commonly known as 'Mahua Butter'. For the tribals of India, *Mahua* oil is by far the most important tree seed oil. Fresh *Mahua* oil from properly stored seeds is yellow, and is used as cooking oil by most of the tribes

in Odisha, Chhattisgarh, and Maharashtra. In Odisha, seed oil is expelled with *Kirchi* (*Casearia graveolens* Dalzell) for appealing colour and taste. The oil is one of the ingredients of hydrogenated vanaspati. It is also used mainly in the manufacture of soaps, particularly laundry chips, and as illuminant and hair oil, especially in rural parts in the neighbourhood of production centres. The oil is rich in Polyunsaturated Fatty Acids (PUFA) and has desirable level of oleic and stearic acids, and used as cocoa substitute in confectionary products and production of margarines, cosmetic and pharmaceutical industries (Patel & al., 2012). Oil cake is used as fish feed and organic manure.

The *Mahua* oil also has potential for alternative fuel option for diesel, and can be used as a substitute for diesel, for sustainable development of rural areas and as a renewable fuel (Kulkarni & al., 2013). *Mahua* fruits are used as vegetable. *Mahua* flowers and seeds are also edible. Due to their high sugar content (65–70%), the flowers provide adequate energy. In some parts of India, tribal women eat *Mahua* flowers during breastfeeding as a nutritive food (Rathore & Ramchandani, 2016). Flowers are also used in preparation of jams, jellies, biscuits and many other food items because of their nutritive values.

Mahua tree possesses many medicinal uses too. *Mahua* flowers are used in treatment of cold, cough, tuberculosis, bronchitis and other respiratory disorders. In Ayurveda, *Mahua* flowers are used as fermenting agent in preparation of alcoholic fermented drugs (Asava and Arishta). Seed oil is used to stimulate production of breast milk and also to cure pneumonia, skin diseases and piles. The bark is used for the treatment of tonsillitis, gum troubles, diabetes and



ulcers. The leaves are traditionally used in curing bronchitis, rheumatism, headache and haemorrhoids (Patel & al., 2015).

This species can be planted on roadsides and canal banks on commercial scale and in social forestry programmes, particularly in tribal areas. With its wide spreading branches and circular crown, the tree presents a visually appealing structure. Being hardy and pest resistant, the tree requires little attention once it has taken root. Though the tree starts bearing seeds from the seventh year of planting, commercial harvesting of seeds can be done only from the tenth year. Seed yield ranges from 20 to 200 kg per tree every year, depending on its growth and development.

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Madhuca longifolia var. *latifolia*: a. Seeds; b. Decorticated kernels; c. Seeds of *Casearia graveolens*; d. Seed oil expelled with *Kirchi* seeds for appealing colour; e. Indigenous method for preparation of country liquor

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Rev. Fr. Hermenegild Santapau, S.J.

Rev. Fr. Hermenegild Santapau, S.J. (1903–1970), a Spanish Indian, born at La Galera, Tarragona, Spain, on December 5, 1903. He joined the Society of Jesus at Gandia, Valencia, at the age of 16, and left for India in 1928 to serve out the period of his regency and to complete his theological studies. He obtained his B.Sc. (Hons.) and Ph.D. degrees in Botany from the London University. After acquiring two years of experience at the Herbarium of the Royal Botanic Gardens, Kew, he joined as a teaching staff of St. Xavier's College, Bombay (now Mumbai) in 1940. He was recognised as a postgraduate teacher in Botany at the universities of Bombay, Poona, Agra and Calcutta.

Among 216 scientific publications of Fr. Santapau, "The Flora of Khandala on the Western Ghats of India" (1953), "The Flora of Purandhar" (1958), "The Flora of Saurashtra", Part I (1962), "The Acanthaceae of Bombay" (1952), "The Asclepiada-

ceae and Periplocaceae of Bombay" (1962) and "The Orchids of Bombay" (1966) are well-known. In 1972, an important work of Fr. Santapau along with A.N. Henry, "A Dictionary of Flowering Plants in India", which provides generic names of Indian flowering plants in alphabetical order with total number of species in the world and in India, was published posthumously by CSIR, New Delhi. Fr. Santapau was associated with many national and international academic and research societies and associations.

In 1954, the Government of India nominated Fr. Santapau as Chief Botanist for one year for the revival of the Botanical Survey of India, and later he also served as its Director from 1961 to 1967. Fr. Santapau was associated with numerous learned societies and scientific bodies. He served as the President of Indian Botanical Society (1955), Botanical Society of Bengal (1965–1966), and Vice-President and botanical editor of Bombay Natural History Society from 1950 to 1968. In recognising his invaluable services to the country in education and research Fr. Santapau

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was honoured with Padma Shri Award from the Govt. of India and the Order of Alphonsus X, the Wise Award from the Spanish Government. The First Birbal Sahani Medal was also bestowed on him by the Indian Botanical Society in 1964. Fr. Santapau died on January 13, 1970.

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Therapeutical uses of *Crinum asiaticum* (Amaryllidaceae) in Rohtas district, Bihar

Many species of *Crinum* L. (Amaryllidaceae) have been widely used in folk medicines in tropical and subtropical regions around the world (Jenny & al., 2011). *Crinum asiaticum* L., a perennial bulbous herb, is apparently naturalised but scarcely



Medicine men showing the whole plant of *Crinum asiaticum*

found in the marshy areas near river banks and rocky plains of Rohtas hill in Rohtas district, Bihar. In this district, the bulbs of this species are commonly sold as wild onions. The bulbs are naturally endowed with combination of starch amyllum, crinasiatine, crinasiadine (8, 9-methylenedioxy-6-p henanthridone) and lycoryne, which are highly therapeutic (Gupta & al., 2008). The local people of Rohtas have been using the bulbs as salad with rock salt. One teaspoon macerated bulb with half teaspoon of honey, once in a day until cure, was advised by the local informer to cure ovarian cyst, uterine fibroids and breast tumours and to enhance the immune system.

The leaves roasted in mustard oil are used in the treatment of sternum swelling and also relieving the associated body ache and spasm. Tender leaves are brewed into a strong

tea, which is believed to have analgesic, antibacterial, antiviral, antifungal, antitumour properties and retaining hormonal wellness in both women and men.

References

Gupta, A.K., Tandon, N. & Sharma, M. 2008. *Quality standards of Indian medicinal plants*. Vol. 7. Indian Council of Medical Research, New Delhi. pp. 56–66.

Jenny, M., Wondrak, A., Zvetkova, E., Tram, N.T.N., Phi, P.T.P., Schennach, H., Culig, Z., Ueberall, F. & Fuchs, D. 2011. *Crinum latifolium* leaf extracts suppress immune activation cascades in peripheral blood mononuclear cells and proliferation of prostate tumor cells. *Sci. Pharm.* 79: 323–335.

S. Sachan*, V. Mastakar & S. Biswa
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a. Dr. (Mrs.) Anandi Subramanian, IES, Sr. Economic Advisor, MoEF & CC at Botanical Gallery in Industrial Section Indian Museum (ISIM), BSI, Kolkata; b. Dr. (Mrs.) Anandi Subramanian with BSI officials at ISIM, BSI, Kolkata in a discussion regarding initiation of Green Skill Development Programme (GSDP); c & d. Releasing of a CD of publications of ENVIS and pamphlets during the celebration of 127th Foundation Day of Botanical Survey of India held at Central National Herbarium (CNH), BSI, Howrah; e. Visitors and students visiting the exhibit of publication of BSI, ENVIS when Science Express Climate Action Special Train 2017 stationed at Barrackpore Railway Station; f. Inauguration of GSDP Foundation Course at CNH, BSI, Howrah; g. Sit and Draw Competition organised during the celebration of World Environment Day 2017 at AJC Bose Indian Botanic Garden (AJCBIBG), BSI, Howrah; h. Visitors and students during *Van Mahotsav* Day 2017 celebration at AJCBIBG, Howrah; i. Trainees of GSDP Foundation Course, 'Biodiversity Conservationists' planting saplings on *Van Mahotsav* Day 2017 at AJCBIBG, Howrah.

ENVIS CENTRE

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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 various scientific themes such as status of plant diversity in Indian States and Union Territories, Biodiversity Hotspots, distribution of endemic and threatened plants, CITES, interesting plants, carnivorous plants, invasive alien species, wetlands, mangroves and traditional/ethnobotanical knowledge. It is also engaged in publication of state-wise bibliography including abstracts of papers pertaining to plants of India and also selected publications that have relevance both in documentation and conservation.

LIST OF PUBLICATION BROUGHT OUT SO FAR

I. Books

1. Mangroves, Associates and Salt Marshes of the Godavari and Krishna Delta, Andhra Pradesh – India
2. Diversity of Coastal Plant Communities in India (Priced publication) Rs. 804.00*
3. Red List of Threatened Vascular Plant Species in India
4. A Pictorial Guide to some of the Indian Plants included in CITES and Negative List of Exports
5. Phytodiversity of Chilika Lake
6. Bibliography and Abstracts of Papers on Flora of different States and Union Territories [West Bengal I & II, North East India – I, Andaman and Nicobar Islands, Maharashtra, Kerala, Tamil Nadu, Karnataka, Goa, Andhra Pradesh (including Telangana) and Odisha]

II. Newsletters: Up to Vol. 22(1), 2017

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