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NEWSLETTER

Vol. 26(1), 2021

From Director's Desk

The ENVIS Resource Partner on Biodiversity (Flora) established 27 years ago in Botanical Survey of India with subject area Floral Diversity, has rendered service in collection collation and dissemination of information on floral wealth of the country. The centre has been publishing Newsletter biannually, highlighting the valued result of extensive explorations conducted by the survey and principally in reference to the well being of rare species, their rediscoveries in old locations after long gaps and their added recording in new areas. It has also been publishing threat analysis of recognised rare and endangered species in various phytogeographic regions. Such are the reports published in this issue too, the articles like Know your Plant and Know your Botanist are regularly published which gives interesting information towards students and general researchers, in this issue of ENVIS RP Newsletter people may get some interesting information on Kush/Darba [*Desmostachya bipinnata* (L.) Stapf] under 'Know Your Plant' and about Eminent Botanist Dr. N.L. Bor under 'Know Your Botanist' title, A note on *Setaria bipinnata* and Ethnobotanical uses and distribution of 'Som'/'Kaulo' - *Machilus gamblei*

(Lauraceae), a primary food plant of Muga silk worm in Darjeeling foothills of West Bengal are also provide detailed information, Article like Vertical farming of Orchids - an effective tool for value addition and conservation are also provide some usefull conservation strategies towards biodiversity.

Alongwith this regular publication of Newsletter, BSI-ENVIS Resource Partner regularly published Bibliography and Abstract of Papers on Flora of different states and Union Territories, Pamphlet and Brochure on different topics related to Floral wealth of our country, maintained Databases on Flora related topics in the ENVIS Website which are also well appreciated by the reader's community as well.

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)
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Botanical Survey of India, Kolkata

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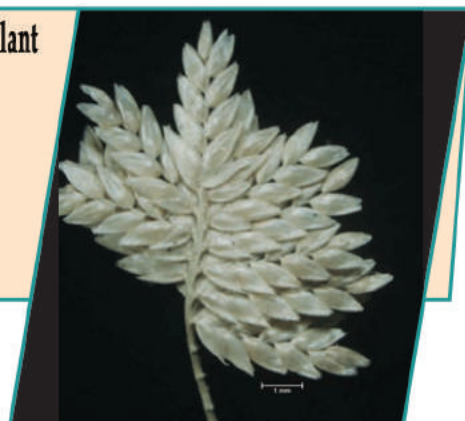
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Kusha/Darba

Botanical Name: *Desmostachya bipinnata* (L.) Stapf

Family: Poaceae/Gramineae

Common Names: Bengali: *Kush*, English: Sacrificial grass, Hindi: *Dabh*, *Dabholi*, *Durva*; Kannada: *Kusha*, *Dharbe*, Malayalam: *Darbhappullu*, Marathi: *Darbha*, Sanskrit: *Darba*, Tamil: *Darbhaipul*, Telugu: *Asvalayana*.

General Morphology: The plant is characterized by its rhizomatous,



Desmostachya bipinnata (L.) Stapf

tussock forming habit. Leaf blades up to 60 cm long, flat to inrolled, margin scabrous with sharp cutting edge, attenuate, filiform at apex. Panicle pyramidal, rachis puberulous. Spikes more or less spreading, spirally arranged on rachis. Spikelets on the lower side of, and often at right angles



Captured 1X inflorescence *desmostachya*

to, the rachis, closely packed, up to 20 flowered, light straw coloured or tinged with brown or purple. Glumes with serrulate keels, Lemma with a prominent midnerve and two faint lateral nerves close to margin, awnless. The plant is easily recognizable by the linear spikelets which are closely imbricate, alternately arranged and strongly laterally compressed.

Distribution & Ecology: The species is distributed from North Africa, Arabian Peninsula to South Asia. In India it occurs in habitat ranging from sandy areas, riverbeds, marginal lands to fallow agricultural fields almost throughout the country. It usually flowers during August to November and fruit sets during September and lasts up to June.

Uses: The plant is popularly known

Know your Plant

as 'Darba'. It plays an important role in Hindu Vedic rituals and is considered as a holy plant. In India it is predominantly used during religious ceremonies, eclipses and is believed to have purification power. The mat or asana made up of this plant is used and a ring made of it is worn in fingers during sacred rituals and ceremonies. Roots of this plant are used as astringent, diuretic and galactagogue in the Indian traditional system of medicine. It is also used in the treatment of dysentery, diarrhoea, dysuria and other bladder diseases. *Desmostachya bipinnata* is an excellent sand binder because of its thick, scaly rootstock which proliferates its rhizome in all directions.

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Uses of Kush in Sradha ceremony

Ethnobotanical uses and distribution of 'Som'/'Kaulo'- *Machilus gamblei* (Lauraceae), a primary food plant of Muga silkworm in Darjeeling foothills of West Bengal

Machilus gamblei King ex Hook.f., locally known as 'Som'/'Kaulo' is a primary food plant of Muga silkworm, scientifically known as *Antheraea assamensis* Helfer (Fig. 4). It is an evergreen tree with spreading branches, bark & foliage usually aromatic. According to PoWO (2021) this species is found in Assam, Bangladesh, China South-Central, China Southeast, East Himalaya, Hainan, Laos, Myanmar, Nepal, Thailand, Tibet, Vietnam. In India it is distributed across Brahmaputra valley in Assam up to elevation of 500 meters and extends to Khasi and Jaintia hills, Meghalaya and along the lower foothills of Himalaya including Darjeeling and Terai-Dooars region of West Bengal (Kanjilal & al., 1992; Rahman & al., 2012). Choudhury (2015) mentioned that *Machilus gamblei* is found in Mahananda Wildlife Sanctuary of Darjeeling foothills.

The commercial use of *M. gamblei* is restricted to NE India only for Muga culture. The traditional knowledge of local people on the use of these plants in their social, cultural and economic milieu has not been studied and documented enough from other parts of India. The nutritive value of

'Som' leaf has a considerable influence on the growth and development of Muga silkworm. Khanikar & Unni (2006) reported that better the quality of the leaves of food plant, greater the possibility of obtaining good quality of cocoons.

In course of knowing and exploring the traditional medicinal property of another primary Muga food plant 'Soalu', *Litsea monopetala* (Roxb.) Pers., locally known as 'Bonkathali' or 'Kutmiro' (a very common plant in Darjeeling foothills) from rural Nepali folks of Farabari Nepali Basti, Siliguri subdivision of West Bengal, the first author came across two 'Som' plants locally known as 'Kaulo' or 'Guyokaulo' from Farabari Nepali Basti, Siliguri, under cultivation in November 2019. Further, we came to know from the rural people of Farabari Nepali Basti and local forest offices that there is a huge plantation of 'Som' or 'Kaulo' plants in forest areas of Darjeeling foothills and Terai-Dooars region i.e. Cooch Behar, Jalpaiguri and Alipurduar districts and famous for its bark property.

According to the available source, the bark of this plant is stolen from Terai-Dooars region and smuggled for incense making and for its

medicinal uses. It was also known that the bark of this plant has a huge demand in market (Rs. 600/kg). Due to property of the bark, the plant is also known as 'Bokhrakaulo' (Bark Kaulo).

Various surveys were carried out in Farabari Nepali Basti of Siliguri subdivision West Bengal to know the ethnobotany of 'Som' in Darjeeling foothills. The collected ethnobotanical information along with some other relevant data is given as follows:

Local names: 'Kaulo', 'Kaula' or 'Guyo Kaulo', 'Som'

The plants are evergreen, middle sized with spreading branches (Fig. 1); bark light or dark grey, rough (Fig. 6). Leaves (Fig. 1 & 3) are variable in shape and size, simple, alternate, spirally arranged, 5–14 × 1.4–5.3 cm, obovate-oblong, oblanceolate or lanceolate to elliptic, narrowed to cuneate or acute at base, acuminate at apex, entire, thinly coriaceous, glaucous and pale beneath with sericeous lamina, exstipulate, petiolate. Flowers greenish white, borne in numerous panicles arising from lower part of young shoots, 3–12 cm long; peduncle 2.2–8.3 cm, densely greyish sericeous; perianth lobes

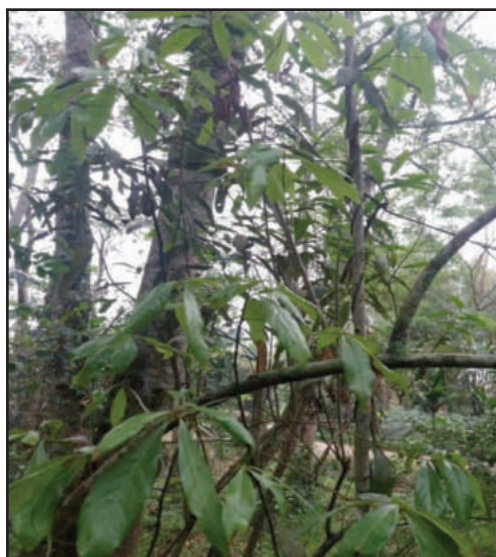


Fig. 1. Som/Kaulo Plant



Fig. 2. Som/Kaulo Inflorescence



Fig. 3. Som/Kauloleaves



Fig. 4. Muga silkworm rearing on Som plant



Fig. 5. Cocooning of worms in 'jali' made of dry som leaves



Fig. 6. Som/Kaulo bark

subequal, oblong, densely minutely grey-white sericeous.

Ethnobotany & Ethnomedicinal properties

- ◆ Fresh leaf extract is made into a paste and used to massage for lowering the body temperature. The bruised fresh leaf is also applied in joint pains. Extract of leaves is given in mouth ulcers. Bark extract is effective in asthma. Fresh leaves are used as a remedy to cure pimples.
- ◆ Bark powder (Fig. 7) is used as sticking agent in incense (Agarbati) for continuous burning. The bark powder is called 'Jigat' powder. It has strong viscosity and adhesive properties. Therefore, it is used as a binding agent in incense sticks.

- ◆ The leaves are collected by rural Nepali folks as fodder for domesticated animals. (Fig. 9)
- ◆ The fresh twigs are used by spiritual healers to expel devil spirits from ill person.
- ◆ West Bengal is famous for its delicious sweet Rasagolla. As per available information from sweet shop owners from neighbouring Cooch Behar district, 'Som'/'Kaulo' is a good firewood plant species. It is a popular phenomenon that the quality of Rasagolla is further increased if cooked in fire by using 'Som'/'Kaulo' plant's wood. There is no need to dry the wood like those of other firewood plant species.

- ◆ Due to break resistant quality of Som/Kaulo fire wood, in Assam the infantry of Ahom kingdom used arrow made up of Som twig to attack enemies by firing their camp.
- ◆ Apart from muga silkworm rearing in Som or Kaulo plant the muga rearers utilized the dry leaves of Som for preparation of jail (mounting device for cocooning of muga silkworms). (Fig. 5)
- ◆ Muga rearers tie and hang pair moths in 'khorika' (egg laying device of muga moth) for coupling and egg laying of muga moth which is made from the branch of 'Som' plant or thatch grass. (Fig. 8)



Fig. 7. Som/Kaulo bark powder



Fig. 8. Som/Kaulokhorika(egg laying device of mugasilkmoth)



Fig. 9. Som/Kaulo as cattle feed

Based on the available literature and interaction made with local people, it can be said that 'Kaulo' or *Machilus gamblei* is found in the forest areas of Darjeeling foothills but not reported as Muga food plant from here. Local people were ignorant of the Sericultural use of the plant which is considered as the primary food plant of Muga silkworm or *Antheraea assamensis*, a rarest and most valuable silkworm in the world. The piece of work has been conducted under limited facility and there is an ample scope to make an intensive survey work throughout the forest areas of Darjeeling foothills of West Bengal to explore and document more plants of *M. gamblei*.

Quality of feed plays a remarkable role in the growth and development of larvae and cocoon production in Muga culture. Hence, considering the

existence of *M. gamblei* in Darjeeling foothills, which have a wide range of ethnobotanical uses, rearing should be conducted to observe the cocoon characteristics and quality of Muga silk. Thus, it may open a new dimension in muga silk industry.

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Vertical farming of Orchids– an effective tool for value addition and conservation

Orchids belong to one of the dominant and highly evolved families of flowering plants, well known for their complex floral morphology, diverse genetic make-up and specialized mechanism for effective pollination and seed germination. They inhabit almost every type of ecosystem (barring the polar region) with suitable and specialized adaptive phenetic features. One of the most important reasons for the dominance and successful spread of orchids is their capacity for vegetative propagation. The epiphytic, terrestrial and myco-heterotrophic species all have specialized structures to reserve food material by which they remain alive for a longer period of stress. The epiphytic species generally attach to the substratum by their roots and do not derive any nutrient from the host. Generally, the epiphytic orchids are not host specific and can grow on wide range of substratum which provides the required roughness, moisture and humidity. They are often found growing on rock cliffs and other rocky surfaces and sometimes established on soil after falling from a tree. They can even grow on pots with various potting media like brick bats, charcoal, coconut fiber and wood pieces.

Orchids occupy a dominant position in floriculture industry for their beautiful flowers, evergreen foliage, as cut flowers with long self-life or as potted plants. Their compatibility to hybridization and adaptability to alternate habitat condition has made them one of the most sought-after plants in the ornamental market. Mostly, orchids are cultivated and marketed for the beautiful flowers, but of late, they are also found grown for their evergreen foliage which requires very less maintenance cost. Presently, live

Table 1: List of species considered for the trial

Sl. No.	Name of the species
1.	<i>Coelogyne corymbosa</i> Lindl.
2.	<i>Coelogyne cristata</i> Lindl.
3.	<i>Coelogyne flaccida</i> Lindl.
4.	<i>Coelogyne fuscescens</i> Lindl.
5.	<i>Coelogyne prolifera</i> Lindl.
6.	<i>Coelogyne stricta</i> (D. Don) Schltr.
7.	<i>Dendrobium amoenum</i> Wall. ex Lindl.
8.	<i>Dendrobium chrysanthum</i> Wall. ex Lindl.
9.	<i>Dendrobium densiflorum</i> Lindl.
10.	<i>Dendrobium fimbriatum</i> var. <i>oculatum</i> Hook.
11.	<i>Dendrobium hookerianum</i> Lindl.
12.	<i>Dendrobium nobile</i> Lindl.
13.	<i>Dendrobium stuposum</i> Lindl.
14.	<i>Epigeneium amplum</i> (Lindl.) Summerh.
15.	<i>Epigeneium rotundatum</i> (Lindl.) Summerh.
16.	<i>Epigeneium treutleri</i> (Hook.f.) Ormerod



Fig. 1: Images showing the orchid specimens hanged on the protection wall: 1. View of the wall during first year of experiment, 2. Flowering observed on the protection wall, 3. View of the wall during third year of the experiment.

orchid plants are of common sight in airports, business centers, parks and other public places. Hobbyist and amateurs also grow orchid plants in various ways to increase the aesthetic beauty. In recent times, orchids are also seen as planted in pots that are arranged vertically on walls of important places.

Orchids are one of the important bio-resource that needs no specific introduction. But in order to harness its value to its optimum potential and at the same time meeting the conservation benefit, one has to identify and exploit the good qualities.

The facts that epiphytic orchids are not host specific, can grow on wide range of substratum, tolerate prolonged period of stress, propagate vegetatively and can absorb water and nutrients from atmosphere, provokes inventorization on its value addition and explore conservation method. A vertical farming trial was conducted at Botanical Survey of India, Sikkim Himalayan Regional Centre by selecting some epiphytic species made to establish themselves on walls made of stones. The idea was to check whether these species can survive in such situation which would

demonstrate a cost-effective value addition and conservation model.

16 species of epiphytic orchids (Table-1) were selected and hanged along the protection wall at Botanical Survey of India, Sikkim Himalayan Regional Centre campus with the support of metallic wires. These walls are made of stones and joined with cement with certain degree of roughness on the surface. Such walls in the hilly terrain are normally loaded with growth of lichens, algae, mosses and liverworts which keep the surface moist and humid. The prolonged rainy season in such locality help the cause. During June 2018, at least 20-30 samples of each species were placed in close proximity of these walls (Fig. 1) and observed with regular monitoring of water supply. At the end of the first growing season these specimens have produced fresh roots and new shoots with some degree of adhesion towards the wall. In the next growing season, they successfully anchored to the substratum and produced flowers as well (Fig. 2). Presently all 16 species are well established on the protection walls.

The successful demonstration of Orchid cultivation on vertical walls with very low-cost involvement endorses the idea of orchid conservation in alternate habitat. By using this technique, large number of epiphytic orchids can be rescued from tree felling (due to developmental work or other natural reason) happening everywhere. By this method, Orchid cultivation can be promoted even at places with less space. The exposed situation (vs. closed greenhouse condition) will facilitate the free movement of pollinator and chances of fruit setting are more. It can be a low investment strategy for turning out an unused, space crunched region to a piece of land with high aesthetics. Thus, vertical farming is an effective tool for value addition and contributes immensely in the conservation of epiphytic orchids.

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Fig. 2: Flowers of the selected species: 1. *Coelogyne corymbosa*; 2. *Coelogyne cristata*; 3. *Coelogyne flaccida*; 4. *Coelogyne fuscescens*; 5. *Coelogyne prolifera*; 6. *Coelogyne stricta*; 7. *Dendrobium amoenum*; 8. *Dendrobium chrysanthum*; 9. *Dendrobium densiflorum*; 10. *Dendrobium fimbriatum* var. *oculatum*; 11. *Dendrobium hookerianum*; 12. *Dendrobium nobile*; 13. *Dendrobium stuposum*; 14. *Epigeneium amplum*; 15. *Epigeneium rotundatum*; 16. *Epigeneium treutleri*

Setaria barbata (Lam.) Kunth, a common grass in Acharya Jagadish Chandra Bose Indian Botanic Garden, Howrah

Setaria barbata (Lam.) Kunth of the family Poaceae is native of tropical Africa and tropical Asia. It grows very common and found in abundant in Acharya Jagadish Chandra Bose Indian Botanic Garden, Howrah, during September to February. It prefers shady moist or swampy areas, along the banks of river and also along

hedges or fences. It is generally found in association with species such as *Cynodon dactylon* (L.) Pers, *Oplismenus compositus* (L.) P.Beauv, *Cyanthillium cinereum* (L.) H.Rob. etc.

Common names: East Indian Bristle grass, East Indies Bristle grass

General Morphology: Loosely tufted, annual. Culms creeping or

decumbent, c. 1 m high; nodes pubescent, lower ones rooting; internode 5-8 cm long, reddish when young, green at maturity. Leaf sheath c. 7 cm long, split-margins overlapping, keeled towards apex, margins ciliate; ligule a fringe of hairs, c. 1 mm long; leaf-blade elliptic-lanceolate to lanceolate, 5-15 x 1-2 cm, acuminate, base narrowly truncate, sparsely tuberculate hairy. Panicles linear, open, 5-15 cm long, green, panicle branches pubescent, or pilose. Racemes 12-16, 1-2 cm long, alternate to sub-whorled, consisting upto 25 spikelets. Spikelets solitary, pedicelled, oblong to elliptic, c. 2.8 mm long, greenish; bristles 1 in principal whorl, 3-5 mm long. pedicels 0.2-0.7 mm long, terete. Lower glume ovate, c. 1 x 0.5 mm, subacute, chartaceous, greenish, prominently 3-nerved. Upper glume oblong elliptic, c. 1.5 x 1 mm, subacute, chartaceous, greenish, prominently 7-nerved. Florets 2; lower barren, upper bisexual. Lower lemma broadly ovate to elliptic, boat shaped, c. 2 x 1 mm, acute, chartaceous, greenish, prominently 7-nerved. Lower palea broadly oblong-elliptic, c. 1.8 x 1 mm, acute to subacute, chartaceous, greenish, 2-nerved, margins infolded. Upper lemma ovate, c. 2 x 1 mm, dorsally compressed, finely transversely rugose, margins incurved, tightly enclosing palea. Upper palea elliptic, c. 1.8 x 1 mm, crustaceous, rugulose, margins incurved. Lodicules 2, membranous, c. 0.2 mm long. Stamens 3; anthers c. 1.2 x 0.5 mm, yellowish, filament c. 0.4 mm long. Ovary oblong, c. 0.5 x 0.2 mm, glabrous; style 0.5-1 mm long; stigmas 0.5-1 mm long, plumose, purple. Caryopsis c. 1 x 0.5 mm, tightly enclosed between lemma and palea, brown, smooth.

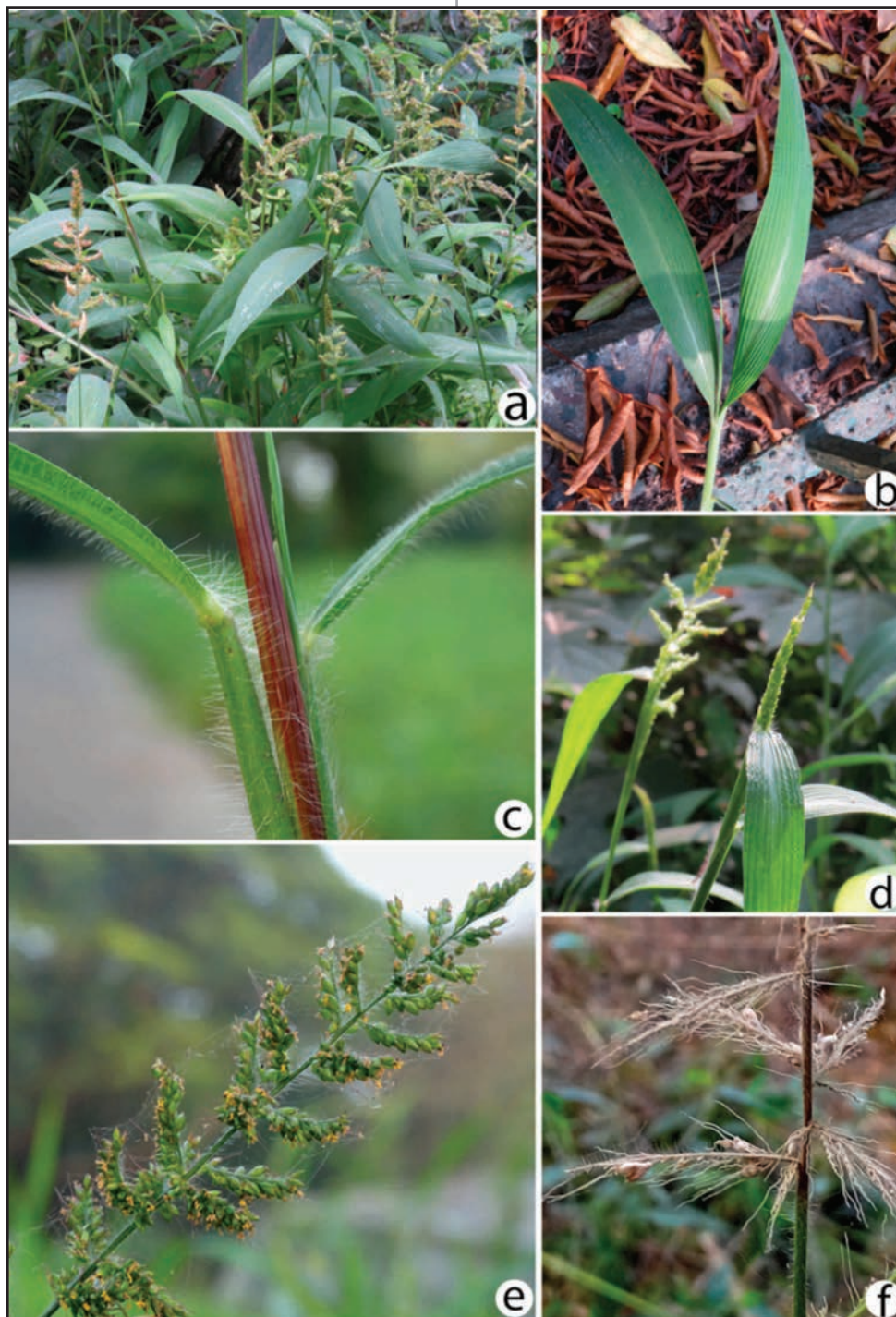


Plate. 1: *Setaria barbata*: a. Habit; b. Leaf blade; c. Culm enclosed by leaf sheath; d. Young inflorescence; e. Mature flowering inflorescence; f. A part of dry inflorescence showing persistent bristles after spikelet have fallen

Distribution: This species is native to tropical Asia and Africa (Bor, 1960). In India this species is found in Andaman & Nicobar Islands, Bihar, Karnataka, Kerala, Himachal Pradesh, Madhya Pradesh, NE India, Tamil Nadu, West Bengal (Kabeer & Nair, 2009). It grows commonly on slopes and roadsides between elevation range of 600–2500 m (Kaur & al. 2011).

Cytology: Kaur & Gupta (2018) worked out single population in *Setaria barbata* (Lam.) Kunth and found, hexaploid with 27 bivalents ($2n=54$) at meiotic metaphase-I (M-I) and normal 27:27 distribution of chromosomes at Anaphase-I (A-I). Kaur & al. (2011) reported tetraploid cytotypes *i.e.* $2n=36$ from Kangra, Himachal Pradesh whereas,

Christopher & Abraham (1976) reported hexaploid ($2n=54$) from South India. Sarkar & al. (1976) observed aneuploid cytotype with $2n=56$ from India.

Notes: Generally it is a shade-loving grass, grows in diffuse clumps in disturbed land. Bristles remain on the plant after the spikelets have fallen.

Uses: It is a good pasture grass. The species is also used as medicines for paralysis, epilepsy, convulsions, spasm (http://plants.jstor.org/stable/pdf/10.5555/al.ap.upwta.2_727).

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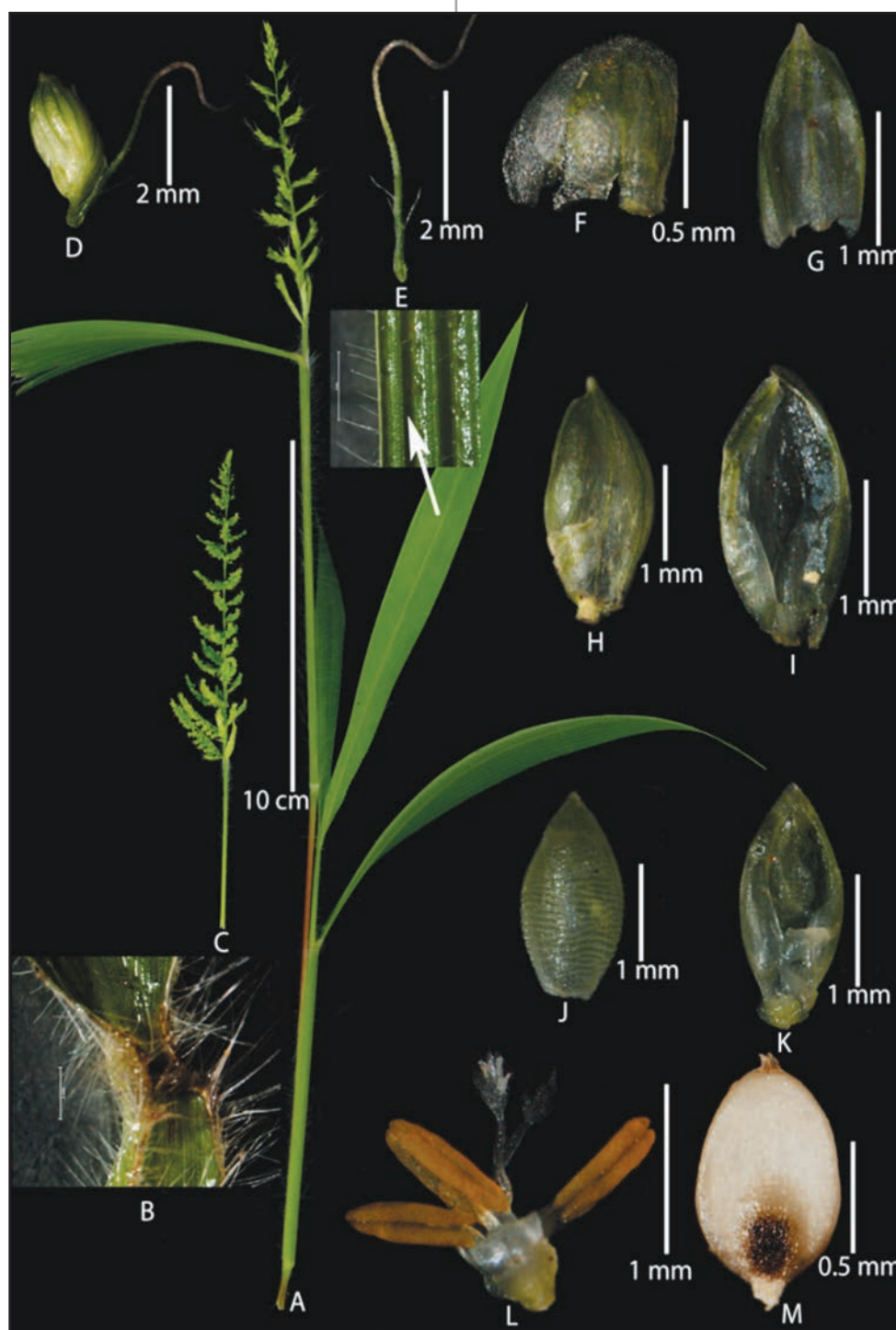


Plate. 2: Dissected parts of *Setaria barbata*: A. Flowering twig; B. Part of a leaf showing ligule; C. Inflorescence; D. Single spikelet; E. Bristle; F. Dorsal view of a longer glume; G. Dorsal view of upper glume; H. Dorsal view of lower lemma; I. Ventral view of lower palea; J. Dorsal view of upper lemma; K. Ventral view of upper palea; L. Upper floret; M. Caryopsis

Norman Loftus Bor (1893–1972)

Norman Loftus Bor is profoundly revered by the entire Grass taxonomists in India for his intensive research and boundless knowledge on the grasses of Indian subcontinent. Without consultation of Bor's literature, it's quite impossible to study Indian Grasses. He was born on 2nd May, 1893 at Tramore, Co. Waterford, Ireland. He completed his schooling at Mountjoy School, Dublin. In 1911, he joined Trinity College for medical degree though discontinued in 1914 as he joined the Army. He serviced actively up to October, 1919 in the Army. In 1921 he was awarded B.A. degree in Arts from Dublin. In the same year, he had also received B.Sc. Degree from Department of Forestry, University of Edinburgh. In 1927, he was awarded M.A. degree from Dublin and D.Sc. degree in December, 1930 from University of Edinburgh. He was conferred with Sc.D. degree in 1948 for his enormous contribution on the grasses and vegetation of Assam. The connection with India started up when he joined the Indian Forest Service in December, 1921 and appointed as conservator of immense areas of forests of Assam. He had keen interests about vegetation, several native tribal, their languages and led him to prepare vocabularies and grammars of them and latterly published. He was a very energetic and adventurous person. For a short time, he kept a baby rhinoceros and which he fed with a bottle. He also hunted and purchased elephants for forest use. He also appointed as Political Officer in Balipara Frontier Tract from 1931 to 1934. In 1935, he became Deputy Commissioner of Forests in the Naga Hills. Then he served as Forest Botanist and Silviculturist at Shillong from 1936–1937. There he revised the herbarium collections and also collected many grasses from different areas of Assam. He brought all specimens to Kew for detailed studies and prepared a list of the grasses of Assam. It was then published in 1940 as volume 5 of the flora of Assam. Next he was transferred to Forest Research Institute, Dehra Dun and joined as Forest Botanist and served till 1942. This was the golden period for Indian grasses as he could able to study in details of different groups of grasses. He also taught forest botany to the College students. For some times, he was the editor of 'Indian Forester' journal and

also President of the Institute and Inspector-General of Forests.

For war emergency duties, Bor was posted to Naga Hills and had taken administrative task. In a short time he was appointed as Chief Administrator of the Burma Refugee Organization to prohibit refugees' entry into Assam from Burma. In 1944 to 1946 he became director of the Assam Relief Measures. He retired in 1946 as Conservator of Forests and left India. In May, 1948, he was appointed as Assistant Director of the Royal Botanic Garden, Kew and continued up to September, 1949. Bor was so much intrigued and curious about grass structures, identity classification and thus he continued his studies whenever he got free time from official duties. He was very humble, kind person, always encouraged his students and tries to help them. In 1953 he wrote 'Manual of Indian Botany' to help his forestry students also prepared a book on 'Some Beautiful Indian Climbers and Shrubs' (1954) in collaboration with Dr. M. B. Raizada. He critically examined so many Indian grasses from herbarium, identified them, mentioned types, made taxonomic account and monographed various taxonomically difficult genera including **Arundinella**, **Cymbopogon**, **Digitaria**, **Dimeria**, **Microstegium** and **Poa**. He discovered numerous new genera and species from different parts of Asia and also corrected numerous errors of Identification. After Flora of British India, his Grasses of Burma, Ceylon, India and Pakistan which was published in 1960 is the milestone of Indian Grasses provides a compact taxonomic account of Indian Grasses. He had described several novelties and also made new combination for above 271 taxa. He also revised Poaceae part for Flora of Iraq and Iran that were published in 1968 and 1970 respectively. He also published over 180 small articles in various journals like 'Journal of Bombay Natural History Society', 'Kew Bulletin', 'Indian Forester', 'The Bulletin of the Botanical Survey of India', 'Notes from the Royal Botanic Garden Edinburgh', 'Webbia' etc. He deposited his extensive collection mainly at K and further materials at ASSAM, B, BP, DD, G, GOET, L, LE, W, etc. which is very helpful for many generations of taxonomists in Indian Grass.

He was the member of Indian National Science Academy, Linnean Society, Royal society of Edinburgh and also president of

Know your Botanist



the Indian Botanical Society. For his effortless services in India, he received the C.I.E. award in 1945. Royal Asiatic Society of Bengal felicitated him with Paul Johannes Bruhl Medal in 1945, O. B. E. in 1957. He was also awarded the Gold Medal by Linnean Society of London in 1962.

Many taxonomists including taxonomists of Botanical Survey of India paid tribute to him by naming more than 25 new species namely *Acrachne borii* J. Swamy, L. Rasingam, S. Nagaraju, *Anthoxanthum borii* Jain & Pal, *Bhidea borii* Deshp., V. Prakash & N.P. Singh, *Calamagrostis borii* Tzvelev, *Carex borii* Nemes, *Carex borii* f. *lutea* R.R. Stewart, *Ceropegia borii* Raizada, *Deyeuxia borii* S. Bhattacharya & S.K. Jain, *Dimeria borii* Sreek., V.J. Nair & N.C. Nair, *Dimeria mooneyi* subsp. *borii* (Sreek., V.J. Nair & N.C. Nair) Kiran Raj & Sivad., *Eragrostis norman-borii* S. Yadav & M.R. Almeida, *Isachne borii* Hemadri, *Ischaemum borii* M.R. Almeida, *Ophiorrhiza borii* Deb & Mondal, *Scleria borii* D.M. Verma, *Senecio borii* Raizada, *Smilax griffithii* var. *borii* Panigrahi & Naik, *Synotis borii* (Raizada) R. Mathur, et in R.R. Rao et al., *Synotis borii* (Raizada) R. Mathur, *Tripogon borii* Kabeer, V.J. Nair & G.V.S. Murthy etc.

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World Environment Day 2021: Drawing Competition - a. Group A (1st Prize: drawn by Anavi Ash); b. Group B (1st Prize: drawn by Surjali Mukherjee); c. Group C (1st Prize: drawn by Anurag Ramola)

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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 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. A Handbook on Bryophytes with special reference to Type Specimens of Liverworts and Hornworts in Indian Herbaria
8. Bibliography and Abstracts of Papers on Flora of different States and Union Territories [West Bengal I & II, North East India – I, Andaman & Nicobar Islands, Maharashtra, Kerala, Tamil Nadu, Karnataka, Goa, Andhra Pradesh (including Telangana), Odisha, Bihar & Jharkhand, Madhya Pradesh & Chhattisgarh, Himachal Pradesh, Uttar Pradesh & Uttarakhand.]

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