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**Forest Genetic Resources &
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VAN VIGYAN

INSTITUTE OF FOREST GENETICS AND TREE BREEDING
(Indian Council of Forestry Research and Education)



From the
Director's Desk

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Dr C. Kunhikannan
Director, IFGTB

Know Your Trees - *Dipterocarpus retusus* Blume

Taxonomic classification

Kingdom	: Plantae
Phylum	: Tracheophyta
Class	: Magnoliopsida
Order	: Malvales
Family	: Dipterocarpaceae
Genus	: <i>Dipterocarpus</i>
Species	: <i>retusus</i>

Common names

English	: Hollong, gurjan tree
Hindi	: Dhuliyagurjan, Dholigurjan, Hollong
Assamese	: Hollong
Mizo	: Thingsen

Introduction

Dipterocarpus retusus, commonly known as hollong, is a large evergreen tree in the genus *Dipterocarpus*. According to The IUCN Red List of Threatened Species it is considered 'Endangered' (Ly *et al.*, 2017), mainly due to habitat loss and degradation. Its earlier status of 'Vulnerable' in 2011 has downgraded in 2017 due to continued threat. It is declared as the state tree of Assam and Arunachal Pradesh and is considered a sacred tree by the Moran tribe of Assam. The word *Dipterocarpus* is derived from the Greek words di=two, pteron=wings and karpos=fruit, referring to the two-winged fruit.

Distribution

Dipterocarpus retusus is found in Bangladesh, China, India, Indonesia, Laos,



Malaysia, Myanmar, Thailand and Vietnam. In India, it occurs in Arunachal Pradesh, Assam, Manipur, Meghalaya, Nagaland, Tripura and West Bengal. It can be found at elevations from 100-1300 m. It grows best in areas where annual temperature ranges between 22-30°C, though it can tolerate 5-38°C and with an average annual rainfall of 2500-3500 mm, tolerating 1550-4550 mm. Generally it is found in tropical wet evergreen or tropical semi-evergreen forests and sometimes in tropical moist deciduous forests.

Botanical description

Evergreen tree, about 30-50 m tall, trunk about 3-5 m in girth. Bark smooth, pale bluish grey, pale reddish brown inside, pale red raised tubercles at trunk base and with aromatic white resin. Bole straight, cylindrical, free of branches for 15-20 m, and a small spherical crown when mature, and base of the trunk buttressed. Branchlets with tubercular dots, densely buff puberulent or glabrous. Leaves simple, alternate, elliptic to obovate-elliptic, about 14-25 x 9-15 cm across, base obtuse to cuneate,

margins slightly undulate, apex abruptly short acuminate or cuspidate, plicately folded in bud, membranous, coriaceous, midrib impressed above and prominent beneath, lateral veins straight, 12-25, curved near margins, tertiary veins transverse, petiole buff pubescent or sparsely pilose, about 4-5 cm long, stipules encircling twigs near terminal buds, glabrous or punctuate inside, densely buff pilose outside with fascicled hairs, caducous, about 7.5-12.5 cm long, scars annular. Inflorescence axillary, somewhat irregular spikes or cymes, simple or branched, about 2-6 flowered, peduncles about 5-8 cm long, densely buff pubescent. Flowers bisexual, large, fragrant, pedicel slender, calyx 5-lobed, tubular with short valvate lobes, silky pubescent inside, velvety buff puberulous outside, 2 longer, linear oblong, strap shaped, about 2-2.5 x 0.3-0.5 cm across, 3 lobes shorter, deltoid-triangular, forming a crown round apex, about 2 mm long, petals 5, narrow oblong-ob lanceolate, membranous, faintly veined. Stamens 30, adnate persistent, during anthesis longer than the style, filaments unequal, base connate, yellow anthers, linear lanceolate, about 6-8 mm long, pollen sacs 4, connective appendage, filiform, about 4 mm long. Ovary enclosed inside calyx tube, narrow ovoid-



conical, about 6 x 4 mm across, 3 locular, 2 ovules per locule, densely tomentose, style filiform, base pilose, apex glabrous, about 1.5 cm long, stigma dilated. Fruit nut-like, globose, about 1.5-2.5 cm long, base 5 winged, enclosed in calyx tube with 2 accrescent lobes like wings, linear ovate, stellate tomentose, about 15-28 x 3.8-5 cm across, trinerved. Seeds adnate at the base.

Phenology and Reproductive Biology

Flowering occurs from June - July and seed maturation and fruiting takes place from January - March. Flowers are complete and bisexual. Pollination is entomophilous i.e., by insects and there is also selfing by cleistogamy. Seeds are dispersed by autochory (self-dispersal), anemochory (wind dispersal), zoochory (dispersal by birds or animals) and anthropochory (dispersal by humans).

Silviculture of the species

The tree is 20-45 m tall and trunk can extend up to 3.5-6 m in diameter at breast height. It is a



lofty semi-evergreen tree with oval spreading crown which is a shade bearer in the early stages of its growth (Rajkhawa, 1961), but requiring increasing levels of light as they grow. It cannot tolerate water logging and prefers a deep, fertile, well-drained sandy loam soil, with a pH range of 5-5.5, but tolerating 4.5-6. Therefore, its best growth is found in high table lands or in foothill regions on well drained slopes. The species is not resistant to forest fires, and is easily damaged.

Natural regeneration

In forests it regenerates naturally under shade. Seedlings and saplings can persist in dense shade for years. In the first two years, the young plants cannot tolerate major openings in the canopy, but after they are established and grown to a height of 120 cm, the canopy can be opened up to accelerate growth.

Direct sowing

The seeds are sown directly by dibbling of about ten healthy seeds in the troughs of 1 x 4 m size made 5 m apart. Hollong is generally done up to 20 cm depth. Hollong seedlings are highly susceptible to intense sunlight at initial stages till they attain a height of 15 cm after which shade can be thinned out. Sometimes along with hollong seeds other crops such as *Crotalaria* or *Tephrosia* are broadcast to provide shade for the seedlings.

Artificial regeneration

For better success compared to direct dibbling, seedlings are raised in containers and planted in the field. This involves the following steps:

a. Collection of seeds: Collection of seeds is done during the month of February till the first week of March. The seeds are mostly collected from healthy trees having good shape and form to take advantage of superior genetic qualities of these plants. Ripen fruits are collected from the ground, as it is difficult to collect them from standing trees which are extremely tall. Mostly freshly fallen seeds are collected as those seeds lying on forest floor for some time, are mostly damaged by insects and pathogen or must have lost the viability which is very low. The use of net or canvas has been found effective for collecting falling seeds by spreading them around the tree, above ground level, but daily collection has to be done from the net. It has been found that the germination success and early seedling growth is governed by the seed size and weight, and the latter mattered more than the former (Shankar, 2006).

b. Processing and handling: Hollong seeds remain viable for about 15 days. Hollong seeds do not require any pretreatment. If the seeds need to be transported then the seeds should be packed in small batches with their wings intact, preferably in loose woven cloth bags or gunny bags, without exposing to direct sunlight. If plastic bags are used for packing either the top should be left open or small hole made on their sides to aid air movement.

c. Sowing medium and germination: Sowing is done in shaded nursery beds immediately after collection of seeds. The germination beds are prepared as raised beds with pure river sand. To ensure good contact with the germinating medium, it is necessary to remove wings of

seeds prior to sowing. Seeds are then covered by sand or jute and moistened by regular sprinkling of water until radicle emerges. Germination is around 70 percent and depends on the quality of seeds collected. Germination is hypogeal and starts after 8 to 10 days of sowing and continues to about 45 days.

d. Transplantation: The humus rich top soil from hollong-bearing forest is collected and urea is added in the ratio of 1:500, and used for filling the polybags. Polybags of 500 cc volume (10 x 15 x 6.3 cm size) are generally used. Ectomycorrhiza in the forest soil may play an important role in seedling establishment and growth. The bags are kept under shade and as soon as the seeds start sprouting in the nursery beds they are transferred to polythene bags for further maintenance.

e. Planting and maintenance: Seedlings are planted in the field with the onset of monsoon, when they are about 9 months old and about 25-30 cm tall. After planting the seedlings grow best when provided with 25% overhead shade and complete shade on the sides (Beniwal, 1990). The plantation sites should be weed free as many climbers suppress the young seedlings by forming a dense overhead canopy. Cleaning to eliminate competition from other vegetation and woody climbers should be done when the sapling is 1.5 m tall. Hollong plants are also prone to many diseases, and spraying of chemical control agents at regular intervals may be required. The plantation of saplings from the diseased nursery should be avoided. The infected leaves or twigs of the plant should be

burnt or removed so that it does not cause further infection.

Crop maturity and harvesting

Dipterocarp forests have been managed under Shelterwood as well as Selection systems. In a shelter wood system uniform crop of trees is produced through concentrated regeneration under the overstorey of mother trees. In Selection system an all-aged stand is produced through cutting at shorter intervals, and regeneration in small gaps produced. Now for the reasons of conservation, the tendency is to favour Selection system over the Shelter wood system. Trees are removed at 30 year cutting cycle, on a rotation of 150 years with safeguards such as lower girth limit of 225 cm, 20 m minimum distance between trees marked for felling, climber cutting on a 15 year cycle, protection buffers along streams and rivers, and harvest of only the dead and dying trees in steep slopes. However, the population is endangered due to not following the safeguards and illegal felling in the past.

Utilization

Hollong is recognized as the best timber for house building and furniture, especially for planking, boats and railway sleepers. Tree yields oleoresin on blazing or cutting a hole in the trunk near the base, about 90-150 cm from the base. To increase the flow, a fire is made in the hole at intervals to burn off the dry resin and to allow fresh resin to flow. The resin is used for caulking boats, to make torches for lighting, as a coat for waterproofing paper, as a varnish for boats, walls and furniture. It is also medicinal and applied to wounds to help the healing process.

Wood is heavy, soft and not very durable when in contact with the ground, and is susceptible to termite and insect attack. Wood is used for making plywood, internal construction work and furniture. Because of the resinous nature, it is less suitable for flooring and woodwork exposed to sun. Wood can also be used for making charcoal. Poles after treatment have been found suitable for use in electric and telecommunication lines. The indigenous community in Northeast India uses the wood for fuelwood and insect repellent, and the oleoresins as a lubricant and in soap work.

Till 1996, almost half of the production of plywood in India used to be from Assam, the major raw material used was from *Dipterocarpus retusus*. After imposition of restrictions on felling and functioning of industries by the Hon'ble Supreme Court of India, the production of plywood has come down in the region.

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A role of Butterflies on native tree *Mitragyna parvifolia* (Roxb.) Korth

Mitragyna parvifolia (Roxb.) Korth., is commonly called as Kadam it is one of the fast-growing deciduous tree species. It belongs to the family Rubiaceae. The genus *Mitragyna* consist of 11 species, mostly distributed in tropical and arid/semi-arid parts of India, Africa, China, Bangladesh, Myanmar, Sri Lanka, Pakistan, South-East Asia, and Andaman and Nicobar Island (Govaerts *et al.*, 2015). Out of 11 species of *M. parvifolia* seven species are distributed in India. *M. parvifolia* grow up to 1300 m, msl elevation, and widely grows in 20-35°C of temperature with mean rainfall between 1500 and 2500 mm and wide range of fertile soil optimum soil pH is 5.5-6.5. The species exhibits many therapeutic properties and multipurpose indigenous value therefore used in the local/traditional medicine for many ailments (Pandey *et al.*, 2006). The major constraints of the wild stocks of *M. parvifolia* is exploitation and habitat destruction which resulted as endangered tree species in Rajasthan (Panwar and Tarafdar 2006; Rai and Lalramnghinglova 2011). Conservation of germplasm *in situ* and *ex situ* is an important pre-requisite to prevent loss of genetic diversity.

M. parvifolia wood quality is equal to that of teak, so it is commercially important as timber value for making furniture, cooperages in paper industry, agricultural appliances, and construction materials. The species is well recognized for its pharmaceutical medicinal properties of the alkaloids in it (indole and oxindole) (Brown *et al.*, 2017). In the Chenchus,

Yerukalas, Yanadis and Sugalis of Gundur District, Andhra Pradesh, tribals used fresh leaves sap of *M. parvifolia* to treat jaundice (Rao and Pullaiah, 2001). Valaiyans tribe, population of Sirumalai hills, Madurai district, Western Ghats, Tamil Nadu utilized stem bark of *M. parvifolia* for rheumatic pain. The fruit juice augments the quantities of breast milk in lactating mothers and also work as lactodepurant agent. Moreover the pollination ecology study has been improving quantity and quality *M. parvifolia* species. The present study was carried out to explore the role of butterflies in a selected native tree species *Mitragyna parvifolia*.

Butterflies are one of the largest taxonomically grouped insects (Lepidoptera: Rhopalocera) with 19,238 species in world wide and 1,501 species in India (Evans, 1932). Butterflies are important components of biodiversity and play a vital role in the ecosystem between flora and fauna. Most of butterflies are diurnal with attracting scaly wings called jewels. Butterflies are good indicators of environmental changes in the ambient features of any ecosystem. These insects are natural resources as they help in pollination, natural propagation and they feed on specific host plant foliage, nectar and pollen as their food.

The study was conducted in the selected (4 CPTs) *M. Parvifolia* trees at forest campus, Coimbatore, (Latitude 11°1'3.2" longitude 76°56'57" altitude 442 m) Tamil Nadu. The

pollinator activity was recorded over the period of 24 hours and subsequently the observations were confined between 06.00 am to 06.00 pm for a period of 15 days. The floral visitors were collected using standard entomological procedure (Daffni, 1992) and butterflies were identified using field guides (Kehimkar, 2008; and Wynter-Blyth, 1957). Photographs were taken using (Nikon D3400) for species identification.

Butterflies are the most frequent pollinators of *M. parvifolia*. The study was mainly focused on butterfly's visitation period as pollinating insect. The number of flowers visited per unit of time and the amount of time spent at each bloom are indicators of insect movement, which, in turn, is an indicator of the insects' mobility. This demonstrates the efficiency with which the floral resource can be utilized. The length of time spent by each species of butterfly varies, as does the time spent on different plants by the same species. When a lot of nectar accumulates, the butterfly needs a number of

visit to extract the nectar in fewer flowers. The preliminary observation butterflies were started to visit *M. parvifolia* flowers during 07.00 am to 06.00 pm. A total of 16 species of butterflies were observed in to four families like Papilionidae (1), Pieridae (4), Nymphalidae (9) and Lycaenidae (2). Other insect groups such as bees, wasps and moths were also observed the flower visiting in the *M. parvifolia* tree.

Among the sixteen butterflies, species of *Acraea terpsicore*, *Junonia lemonias*, *Ypthima ceylonica*, *Azanus ubaldus*, *Tirumala limniace*, *Hypolimnas bolina*, *Danaus chrysippus*, and *Catopsilia pomona* are observed as a frequent visitors of *M. parvifolia* flowers. The highest peak time of butterfly visitation is observed between 07.30 am to 09.00 am. The butterfly flower handling time varied between 0.2 to 6.23 minutes. For a proper appraisal of butterflies as users of floral nectar and pollen vectors, detailed studies in this intriguing and complex field of inquiry across several geographical regions are required.

S. No	Common Name	Species	Time of Visit	Peak time of visit	No. of visit	Flower handling time (minutes)
Family : Papilionidae						
1	Common Rose	<i>Pachliopta aristolochiae</i> Fabricius, 1775	7.35 am	07.40 am	12	0.5 - 0.10
Family : Pieridae						
2	Pioneer	<i>Belenois aurota</i> (Fabricius, 1793)	07.12 am	8.45 am	59	0.4 – 1.0

S. No	Common Name	Species	Time of Visit	Peak time of visit	No. of visit	Flower handling time (minutes)
3	Crimson-tip	<i>Colotis danae</i> (Fabricius, 1775)	07.00 am	07.30 am	21	0.2 – 0.38
4	Common Emigrant	<i>Catopsilia Pomona</i> (Fabricius, 1775)	8.00 am	09.00 am	142	0.5 – 0.30
5	Common Gull	<i>Cepora nerissa</i> (Fabricius, 1775)	8.08 am	8.40 am	76	0.8 – 1.0
Family : Nymphalidae						
6	Tawny Coaster	<i>Acraea terpsicore</i> Linnaeus, 1758	7.15 am	08.00 am	205	0.10 - 3.30
7	Yellow Pansy	<i>Junonia hierta</i> Fabricius, 1798	8.17 am	8.34 am	54	0.25 - 2.12
8	Lemon Pansy	<i>Junonia lemonias</i> Linnaeus, 1758	7.08 am	7.37 am	167	0.15 - 6.23
9	White Four-ring	<i>Ypthima ceylonica</i> Hewitson, [1865]	7.08 am	7.50 am	155	0.30 – 6.0
10	Blue Tiger	<i>Tirumala limniace</i> (Cramer, [1775])	07.35 am	08 am	125	0.6 – 0.54
11	Danaid Eggfly	<i>Hypolimnias bolina</i> (Linnaeus, 1758)	08.12 am	8.45 am	102	0.5 – 0.36
12	Double branded Crow	<i>Euploea Sylvester</i> (Fabricius, 1793)	7.40 am	8.06 am	45	0.14 – 1.15
13	Plain Tiger	<i>Danaus chrysippus</i> (Linnaeus, 1758)	7.55 am	8.14 am	120	0.10 - 0.53
14	Stripped Tiger	<i>Danaus genutia</i> (Cramer, [1779])	07.13 am	07.56 am	116	0.5 – 0.13
Family : Lycaenidae						
15	Bright Babul-Blue	<i>Azanus ubaldus</i> (Stoll, [1782])	8.40 am	8.45 am	117	0.20 – 1.26
16	Common Shot Silverline	<i>Spindasis ictis</i> Hewitson, 1865	08.00 am	08.25 am	36	0.20 - 0.45



*Common Shot Silverline -
Spindasis ictis*



*Common Rose –
Pachliopta aristolochiae*



*Tawny Coaster -
Acraea terpsicore*



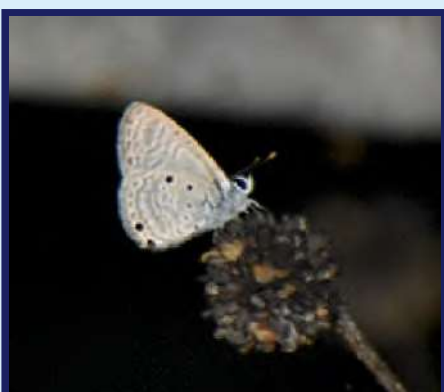
*Yellow Pansy -
Junonia hierta*



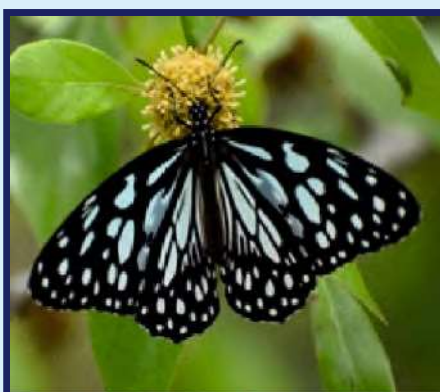
*Lemon Pansy –
Junonia lemonias*



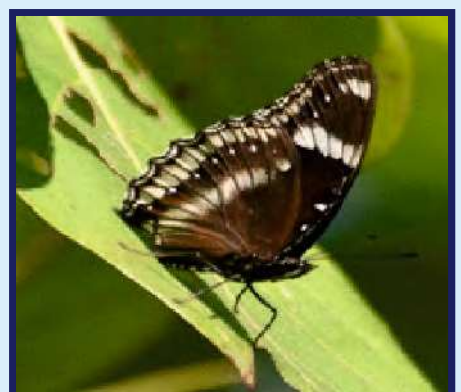
*White Four-ring -
Ypthima ceylonica*



*Bright Babul-Blue –
Azanus ubaldus*



*Blue Tiger -
Tirumala limniace*



*Danaid Eggfly -
Hypolimnas bolina*



*Double branded Crow –
Euploea sylvestris*



*Plain Tiger -
Danaus chrysippus*



*Stripped Tiger -
Danaus genutia*



*Common Emigrant –
Catopsilia pomona*



*Common Gull -
Cepora nerissa*



*Crimson - tip -
Colotis danae*

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ENVIS ACTIVITIES

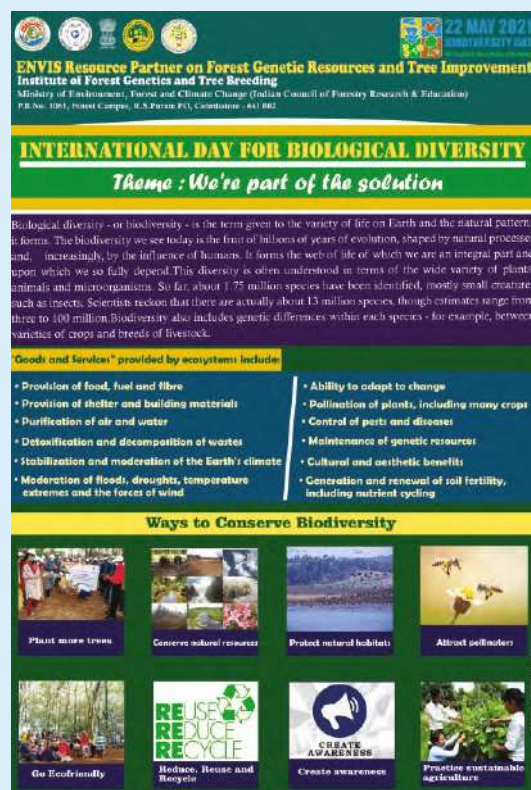
Digital Observance of Earth Day, 2021

ENVIS Resource Partner on Forest Genetic Resources and Tree Improvement at the Institute of Forest Genetics and Tree Breeding marked the Earth Day 2021 digitally through Facebook live on 22nd April 2021. The digital observance also found a place in the worldwide events organized by earthday.org. Dr C Kunhikannan, Director IFGTB inaugurated the digital event and released an awareness poster on the theme Restore Our Earth. An Awareness Quiz was also organized for students and general public. Participants numbering 899 from all walks of life have participated and E - certificate was awarded to all. The digital copy of the awareness poster was shared with students and all the stakeholders. The online event can be accessed at <https://bit.ly/3n8d1rs>.



Digital Observance of International Day For Biological Diversity 2021

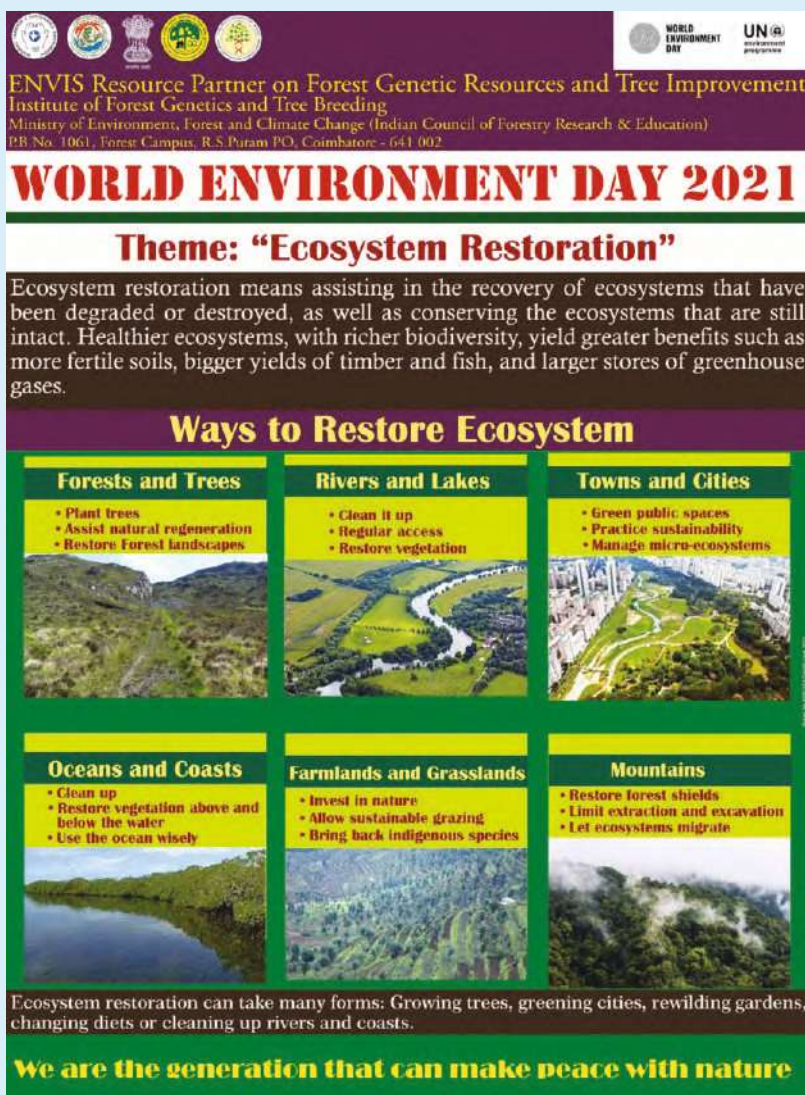
The ENVIS Resource Partner on Forest Genetic Resources and Tree Improvement at the Institute of Forest Genetics and Tree Breeding, Coimbatore marked the International Day for Biological Diversity digitally through Facebook Live on 22nd May 2021. Dr C Kunhikannan, Director IFGTB inaugurated the programme. A mobile photography competition on the theme biodiversity was organized for people from different walks of life and individuals from different parts of the world participated in the competition and Director announced the results of the same. Among the 121 participants who took part in the contest from different countries, Ms Divya. N, PSGR Krishnammal College for Women, Coimbatore, Shri Anto Thomas, Research Scholar, Department of Environmental Biotechnology, Bharathidasan University,



Tiruchirappalli, Ms Athira KR from Kerala bagged the first, second and third prizes respectively. Four consolation prizes were also awarded to Shri Akarsh Sivaprasad, United States of America, Dr Pankaj Kumar, Nagpur Veterinary College, Ms Astha Srivastava, University of Lucknow, Ms Madagoni Venkatesham, Telangana. Prizes were awarded to the winners and E Certificates to all the participants. An awareness poster highlighting the current year's theme was also released during the occasion and was digitally transmitted to students and all other stakeholders. The digital event can be

Digital Observance of World Environment Day

The ENVIS Resource Partner on Forest Genetic Resources and Tree Improvement at the Institute of Forest Genetics and Tree Breeding, Coimbatore marked the World Environment Day digitally through Facebook Live on 05 June 2021. Dr C Kunhikannan, Director IFGTB inaugurated the programme. A painting competition on the theme environment was organized for people from different walks of life and individuals from different parts of the world participated in the competition. 156 unique painting photographs were received and they were scrutinized by the Chief Jury, Dr John Prasanth Jacob, Scientist G and Head, Forest Protection Division. Director Dr C Kunhikannan announced the results of the same. Among the participants Shri Tanuj Samaddar, S. E. R. S. Public School, Assam, Shri Muneeswaran V, Erode, Ms Deepshikha De, Noida bagged the first, second and third prizes respectively. Four consolation prizes were also awarded to Ms Anshika Jain, Uttar Pradesh, Ms Nisa Tandon, University of Calcutta, Shree Pradesh Vell M.U, Sona college of arts and sciences and Shri Kumar Arijit Mishra, Odisha. Prizes were awarded to the winners and E Certificates to all the participants. An awareness poster highlighting the current year's theme was also released during the occasion and was digitally transmitted to students and all other stakeholders. The digital event can be accessed at <https://bit.ly/2Rn1skl>.



IFGTB PRODUCTS



INSTITUTE OF FOREST GENETICS AND TREE BREEDING

(Indian Council of Forestry Research and Education)

(An autonomous body of Ministry of Environment Forest & Climate Change, Govt. of India)
P.B. No. 1061, R.S. Puram, Coimbatore - 641 002, Tamil Nadu, India



The following Services are provided at IFGTB for various stakeholders. Please contact us for details as below.

	Services	Cost per unit		Contact Number with Email ID
Clonal Seedling: For Sale & Booking				
1.	Clones of Casuarina Hybrids (CH-1, CH-2 & CH-5)	Rs. 4.50 per plant		Smt. K. Shanthi, ACTO, Division of Plant Biotechnology, Phone : 0422 2484122 E-mail : shanthik@icfre.org
	Eucalyptus clones (EC-4, EC-6, EC-9 & EC-11)	Rs. 4.00 per plant		
	Tissue Culture Teak Plants	Rs. 25.00 per plant		
2.	Windbreak Clones (WBC-1, WBC-2, WBC-3 & WBC-4)	Rs. 4 per plant		Dr. C. Buvaneswaran, Scientist- F, Silviculture & Forest Management Division, Phone : 0422 2484198, 94422 45047 E-mail : buvanesc@icfre.org
3.	ArborEasy® DNA Isolation Kit	Price Rs.	Packaging & Transportation Rs.	Dr. Modhumita Dasgupta, Scientist-F, Division of Plant Biotechnology, Phone : 0422 2484123 E-mail : ghoshm@icfre.org gmodhumita@gmail.com
	Pack Size			
	10 Reactions	950.00	150.00	
	20 Reactions	1900.00	200.00	
	50 Reactions	4750.00	300.00	
4.	Soil Testing (pH, EC, OC, Micro and Macro Nutrients)	Rs. 2850.00		Dr. A.C. Surya Prabha, Scientist-C, Silviculture & Forest Management Division, Phone : 0422 2484150 E-mail : acsuryaprabha@icfre.org
5.	Phytosanitary Certificate	Rs.100.00 + Tax per application		Dr.John Prasanth Jacob, Scientist- G, Forest Protection Division, Phone : 0422 2484159 E-mail : jacob@icfre.org
Products of IFGTB: For Sale & Booking				
6.	Hy-ACT (Natural and Seed Oil Based Biopesticide)	Rs. 80.00 per bottle		Dr. N. Senthilkumar, Scientist-E & Head, Division of Chemistry & Bioprospecting, Phone : 0422 2484193 Mobile : 9629160703 E-mail : senthilnk@icfre.org
	Tree PALH (Natural and Seed Oil Based Biopesticide)	Rs. 80.00 per bottle		
	Crawl clean (Plant Based Green Insecticide)	Rs. 25.00 per packet		
	Tree Rich Biobooster (Instant Organic potting mixture for home garden, terrace and kitchen garden)	Rs. 50.00 per packet		(or)
	Tara Red Jam (with natural fruit colorant)	Rs. 60.00 per bottle		Smt. R. Sumathi, ACTO Division of Chemistry & Bioprospecting, Phone : 0422 2484144 Mobile : 9942245542 E-mail : sumathir@icfre.org

ABOUT IFGTB

Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore is a National Research Institute under the Indian Council of Forestry Research and Education. IFGTB envisions a wood secure society. The Institute primarily aims to carry out research to improve productivity of forest tree species through conventional breeding programmes and biotechnological interventions. The major areas of research include tree improvement, breeding, planting stock improvement, marker assisted selection, genomics, clonal propagation, agroforestry systems, climate change research, integrated disease and pest management, seed handling and testing, eco restoration and conservation.

ABOUT ENVIS

ENVIS established by the Government of India, in 1982 has been on providing environmental information to decision makers, policy planners, scientists and engineers, research workers, etc. all over the country. It is a comprehensive decentralized information system on environment involving effective participation of institutions / organisations in the country actively engaged in work relating to different subject areas of environment. A large number of nodes, known as ENVIS Centres, have been established in the network to cover the broad subject areas of environment with a Focal Point in the Ministry of Environment, Forest and Climate Change.

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Views expressed in this newsletter are not necessarily those of the Editors or of the Institute of Forest Genetics and Tree Breeding

INSTRUCTIONS TO CONTRIBUTORS

Dear Author/Subscriber/Contributor,

We invite contributions to the ENVIS Newsletter issues! The ENVIS Resource Partner at IFGTB focuses on Forest Genetic Resources and Tree Improvement. It aims to act as a window for quality scientific publications and a forum for presenting your thinking on the challenges in the fields of FGRs and tree improvement. The ENVIS Newsletter, Van Vigyan, a quarterly publication, publishes original research articles, reviews, reports, research highlights, news-scan etc., related to the thematic area of the ENVIS Resource Partner. Original research and review articles, notes, research and meeting reports are invited for the newsletter. Details of forthcoming conferences / seminars / symposia / trainings / workshops also will be considered for publication in the newsletter. Articles may be sent in Times New Roman (with font size 12) in double spacing with a maximum of 5-6 typed pages. Photographs/line drawings and graphs need to be of good quality with clarity for reproduction in the newsletter. Only electronic submission will be accepted.

Details may be sent to: ifgtb@envis.nic.in.