

Monthly report for the Month of April 2019
Institute of Wood Science & Technology, Bengaluru

1. IMPORTANT RESEARCH FINDINGS:

ICFRE funded Projects:

- **Project Title:** “Enhancing seed productivity of *Pongamia pinnata* L. plantations using silvicultural practices” (2015-2019) PI: Dr.B.N.Divakara, Scientist-E; Funding Agency: Karnataka Forest Department

Findings: First time fertilizer/ manural treatment taken in July 2016 didn't give any result as it was lean period. Whereas the fertilizer application during July 2016 (2nd time) expressed significant results and found treatment number 6 with 1:1:1 npk yielding maximum pod and seed yield. Pruning trails conducted during February 2016 didn't set any fruits, flowers and seed, except increase in more terminal shoots.

- **Project Title:** Nanocellulose Networked Natural Fiber Composites. PI: Dr. S.S. Chauhan; Duration: 2 years; (2017-2019)

Findings: The protocol to synthesize nanocellulose from pulp fibers was standardized and the unique property of nanocellulose to form a complex network was effectively used to develop completely biodegradable natural fiber based composite material. The nanocellulose film exhibited very high stiffness (storage modulus – 120 GPa) and negligible damping coefficient. Composites with density ranging from 0.100 g/cc to 0.800 g/cc were prepared by mixing nanocellulose suspension with fibers. Tensile strength, flexural strength, dynamic modulus of elasticity and electrical resistance of the composites increased with increasing density. The material can be tailored for the desired properties by varying the nanocellulose proportion and processing conditions. The developed material can be used as biodegradable packaging material.

- **Project Title:** Efficacy of Nano metal oxides as wood preservative. PI: Mrs. D. Venmalar Duration: 3 years (2016-2019)

Findings: *Hevea brasiliensis* (rubberwood) wood specimens treated with nano metal zinc oxide by pressure and non-pressure methods showed that nano zinc oxide is well absorbed by the wood specimens and gets fixed (92% fixation in leaching experiments). The efficacy of nano zinc oxide against termites in the field, and brown rot and white rot fungi in the laboratory was evaluated and compared with normal zinc oxide. Nano zinc oxide show more antifungal property than normal zinc oxide. The pressure treated wood

specimens were found to be in sound condition against termites after 24 months of field exposure. The study reveals that nano zinc oxide could potentially be used as an effective wood preservative.

Externally funded projects:

- Project Title:** Assessment of natural variability in selected wood traits using nondestructive tools and identification of superior genotypes of *Melia dubia*.
Findings: Wood quality variability was assessed. *Melia dubia* (Hebbevu) plantations of varying age groups in Kolar, Hunsur, Kollegal, Hosur and Bangalore areas. The management practices had a significant influence on growth parameters. Wood quality was found to vary significantly within the plantation and between plantations. Based on the variability assessment, criterion for selection of superior genotypes of *M. dubia* has been worked out and few superior trees have been identified for wood stiffness and density. These trees can potentially form the pool for seed collection. A multiple linear regression equation has been developed for the species to estimate the pilodyn penetration under bark from bark thickness and measurement of pilodyn penetration over bark to get a quick estimation of wood density. Marker assisted selection of genotypes based on wood properties has also been explored and initial results are showing potential of identifying genotypes with superior wood density and stiffness.
- Project Title:** Evaluation of germplasm of *Dendrocalamus stocksii* for growth, biomass production and quality parameters for selection of superior genotypes.
Findings: Germplasm banks of *Dendrocalamus stocksii* (Marihal bamboo) established by IWST, Bengaluru at three locations namely Gottipura (Bengaluru), Honnavara and Dapoli (Maharashtra) were evaluated for bamboo culm quality. Among the three locations, germplasm bank at Dapoli exhibited the best growth and survival. The clumps were assessed for internodal length, ultrasonic velocity, material density and dynamic modulus of elasticity. A significant variation was observed between clumps. The clump with the highest stiffness is nearly 82% higher than the clump with lowest stiffness. Clump no. 22, 23, 25, 38, 43, 56 and 83 were found to be potentially superior genotypes with high diameter, large internodal length and high stiffness. Also, any culm showing ultrasonic velocity of less than 1 km/s across the diameter was found to be hollow. Non-destructive method can effectively be used for clump selections based on material quality.

2. NEW PROJECTS SANCTIONED DURING THE MONTH:

Name of the project	Amount Sanctioned	Sponsoring Authority
Development of transparent wood	Budget - 11.75	Funded by ICFRE

composite and evaluation of its properties. PI - Dr. K K Pandey, 2 years, 2019-21		
Properties of cross laminated timber from plantation grown hardwoods. PI - Dr. A.K. Sethy/ Dr SS Chauhan; 2 years, 2019-21	Budget - 11.30	Funded by ICFRE
Evaluation of palm wood (<i>Borassus flabellifer</i> and <i>Areca catechu</i>) and their suitability for various applications. PI Dr AK Sethy/ Dr SK Sharma, 2 years, 2019-21	Budget - 9.35	Funded by ICFRE
Wood Plastic Composites- Performance, Sustainability and Life Cycle Assessment PI Dr Pankaj Kumar Aggarwal	Budget - 18.92	Funded by ICFRE

3. PROJECTS CONCLUDED DURING THE MONTH:

ICFRE Funded Projects:

Externally Aided Projects:

4. PARTICIPATION IN SEMINARS/WORKSHOPS (BOTH NATIONAL & INTERNATIONAL)

- **Dr. K.S. Shiny** presented poster titled , “Nanoparticles for wood protection: Biological synthesis of Copper oxide and Zinc oxide nanoparticles using *Lantana camera* leaf extract and evaluation of its wood preservative properties authoring K.S. Shiny, R.Sundararaj, G. Vijayalakshmi, N. Mamatha, B. Lingappa. at The Biennial National Conference held by DST, Mahatma Gandhi University , Kottayam, Kerala from 26 -04-2019 to 27-04-2019.

5. MEETINGS CONDUCTED:

Sl. No	Topic	Duration	No. of participants	Beneficiaries
1.	Wood Preservation Meet	25.4.2019 1 day	24 (External participants) 24 (Scientists, ACTOs, STOs)	Wood Industries, Saw Millers, Wood Preservation Industries, Researchers etc

6. WORKSHOP:

Sl. No	Topic	Duration	No. of participants	Beneficiaries
1	Inception Workshop on Detailed Project Report (DPR) Preparation for Rejuvenation of Major Indian Rivers through Forestry Interventions- Organized in Dehra Dun	24 – 25 April 2019	5	Director, GCR and scientists of IWST associated with the project

7. TRAININGS ORGANIZED:

Sl. No	Topic	Duration	No. of participants	Beneficiaries
1	Short term training on "Filed identification of selected important timbers" (Customised)	22 – 24 April 2019 3 days	32	RFO Trainees Kundal Forest Academy Sangli, Maharashtra.

8. TRAININGS ATTENDED:

Sl. No	Topic	Duration	No. of participants	Beneficiaries

9. DEMONSTRATIONS:

Sl. No	Topic	Duration	No. of participants	Beneficiaries
Nil				

10. PARTICIPATION IN KISAN MELA/EXHIBITION/TRADE FAIR ETC.:

Institute	Participated	Duration	Place
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11. OTHER EXTENSION ACTIVITY:

12. RESEARCH PAPERS:

- **Durai, M.V.,**(2019). The investigation on effect of seed size on germination of Eucalyptus species. **International Journal of Recent Scientific Research**, Vol.10, Issue, 04(A): 30693-30696.

Book chapter:

Krishnamurthy, K.V., Bahadur, B., **Manohara. T.N. 2019.** Handedness Events in Vascular Cambium and their Relation to the So-Called Spiral Grains in woods. In: Asymmetry in Plants: Biology of Handedness. Bir Bahadur, K.V. Krishnamurthy, Monoranjan Ghose and S. John Adams. CRC Press: Taylor & Francis Group, USA. Pp. 43-58. (DOI:<https://doi.org/10.1201/9780429492372>. E-book published on 25 March 2019, ISBN 9780429960710. Author copy not yet received).

13. VISIT OF DIGNITARIES:

14. CONSULTANCIES:

15. OTHER IMPORTANT ACTIVITIES:

- As part of education tour Artisan trainees of Madras Engineering Group, Bangalore visited the institute on 16th April 2019
- As part of education tour 32 RFO Trainees from Kundal Forest Academy visited the institute from 22 -24 April 2019 and were also imparted training on Timber Identification of Selected Imported Timbers.

- **The institute observed Earth Day of Forest on 22 April 2019 and on this occasion a guest lecture by Dr. Ravi chellam, Chief Executive Officer, Meta String Foundation, Bangalore was arranged on the topic “Protect our Species: Conservation of Asiatic Lion, *Panthera leo persica*”**
- As part of education tour Artisan trainees of Madras Engineering Group, Bangalore visited the institute on 23th April 2019
- As part of education tour 46 RFO Trainees from Dharwad Training Centre of Karnataka Forest Department visited the institute on 12th March 2019
- Wood testing enquiries (4 samples for identification, 2 samples for moisture content and 2 samples for specific gravity tests were received and test reports of 2 samples for identification, 1 sample for moisture content and 1 sample for density tests were sent to the concerned department/parties)