

12. Abstract:

Title: Performance of different Agroforestry Systems in Semi- Arid Tropics of Andhra Pradesh

- Sandal progenies of seventeen clones were established in the year 2002 and evaluated for their performance. The progenies that exhibited better growths AP4, KL3, K14, K3, T26, T15, T9 and T7 in that order of suitability.
- Plus tree teak and *D. latifolia* progenies were collected and raised in Agroforestry trials. The Khammam teak progenies and Jannaram rosewood progenies have exhibited the best growths.
- Tree crop combinations like Rosewood + Sandal, Teak + Sandal and Eucalyptus + Sandal were raised and agricultural crops like Green gram, Pigeon pea and Jowar were raised in the beginning and afterwards in fourth and fifth years Castor was raised. It was observed that Green gram, Pigeon pea and Jowar have performed on par with control (no trees) in the first three years of the system per unit cropped area under rosewood + Sandal system. However, the yields were found to be reduced in Teak + Sandal and were found to be lowest in Eucalyptus + Sandal system. Therefore, they are in the descending order of their suitability.
- Castor was not found to be suitable in inter cropping at fourth and fifth years as germination was observed to be poor and are suppressed by weeds. That means growths are very poor increasing the cost of weeding and maintenance and reducing profit margins.
- Allelopathic studies (pot cultures) revealed that germination was affected by rosewood, Teak and Eucalyptus in the ascending order. However, the growths were better in rosewood followed by Teak and Eucalyptus. Sandal was intermediate in response.
- Therefore, germination is affected but growths in rosewood and to some extent Teak are not affected by leachates and litter upon decomposition. That means the reduction in growths observed in individual plants may be due to competition and may not entirely be due to allelochemicals.

13. Utility of research findings:

The results on Sandal show that progenies AP4 clone is performing with greatest promise followed by progenies of clones KL3, K14, K3, T26, T15, T9 and T7. Similarly, Plus tree teak and *D. latifolia* progenies were collected and raised in Agroforestry trials. The Khammam teak progenies and Jannaram rosewood progenies have exhibited the best growths.

Tree crop combinations like Rosewood + Sandal, Teak + Sandal and Eucalyptus + Sandal were raised and agricultural crops like Green gram, Pigeon pea and Jowar were raised in the beginning and afterwards in fourth and fifth years Castor was raised. It was observed that Green gram, Pigeon pea and Jowar have performed on par with control (no trees) in the first three years of the system per unit cropped area under rosewood + Sandal system. However, the yields were found to be reduced in Teak + Sandal and were found to be lowest in Eucalyptus + Sandal system. Therefore, they are in the descending order of their suitability.

Castor was not found to be suitable in inter cropping at fourth and fifth years as germination is observed to be poor and are easily suppressed by weeds. That means growths are very poor increasing the cost of weeding and maintenance and reducing profit.

Allelopathic studies (pot cultures) revealed that germination was affected by rosewood in very higher concentration, Teak and Eucalyptus in the ascending order. However, the growths were better in rosewood followed by Teak and Eucalyptus. Sandal was intermediate in response.

Therefore, germination is affected but growths in rosewood and Teak are not affected by leachates and partly decomposed or decomposing litter. That means the reduction in growths observed in individual plants may be due to competition and may not entirely be due to allelochemicals.

14. End user to whom the research findings need to be circulated:

The end users here are farmers from semi -arid tropics on nine districts forming Telangana and Rayalaseema region of A.P. The farmers esp. be they small land holdings or large holdings of Nalgonda, Mahabubnagar and Ranga Reddy Dist have evinced keen interest who have been introduced to this system as well as farmers from Kurnool, Cuddappah and Vishakhapatnam. They are all interested. They want the plant material and the extension. Even the VSS of APSFD have been interested in these systems who

may need extension support of these systems esp from Adilabad and Khammam dists.; VSS of Cuddappah and Chittoor dists of Rayalaseema region also evinced keen interest who need to be extended of these results.

15. Scope of further research:

These models esp. Rosewood and sandal which was found to be most suitable and promising system can be tested over a longer rotation period with crops like Jowar, pigeon pea and Green gram. Teak and sandal is second best combination. Eucalyptus and Sandal was found to be not at all suitable as Eucalyptus out grows Sandal and suppressed it. The agricultural crops in this combination also suffered with lack of germination and growth and a major drop in yields. Therefore, this system may not be repeated as the results are on expected lines. The Castor crop germination was poor and growth of the germinated plants lack vigour and get easily suppressed by weeds. Different varieties of Castor (non dwarfs or hybrids) can be tested. The pigeon pea crop establishes well and gives higher yield so also Jowar in all combinations. The crop yields were found to be decreased by upto 40 per cent in combination with *Eucalyptus* as compared to sole crops even in the first two years of the system. Therefore, these systems can be extended onto farmers field and further studied for their efficacy on experimental level.

16. Publications:

1. Proceedings of Agroforestry Seminar IFGTB Coimbatore.
2. Reddy, GRS, Honnuri, M.B. and Lokeswara Rao, M. (2008). Evaluation of performance of Sandal (*Santalum album* L.) germplasm under Agroforestry conditions at Hyderabad. Participated in National Seminar on Sandal held at IWST Bangalore from 11th to 14th December, 2007. Full length manuscript submitted for publication.

17. List of equipments procured: Nil

18. Total expenditure of the project : Rs.1.47 lakhs

19. Acknowledgements

The former Director Dr. K.S. Rao, and Mr. K.S. Reddy I.F.S. Group Co-ordinator (R) who were instrumental in starting and initiation of this work at FRC Hyderabad. Mr. Ch. Muralidhar Rao who has encouraged to conduct the work systematically and constantly guiding the program.

The former Director Dr. K. Shashidhar I.F.S. and Mr. S.C. Gairola the present Group Co-ordinator (R) for their competent guidance and Mr. M. Lokeswara Rao IFS for his constant encouragement, Mr. Rajeev K. Srivatava IFS former ADG (M&E) and

Mr. Balbir Singh ADG (M&E) who have guided in implementation and hastening the pace of work. Mr. G.S. Rawat DDG Research for his kind visit and encouragement.

20. Bibliography

Art, H.W. and Marks, P.L. (1971). A summary table of biomass and net annual primary production in forest ecosystems of the world. Forest Biomass Studies (ed. Young, h.E.); 1-32. Life Sciences and Agricultural Experiment station, Univ. Maine, Orono, U.S.A.