



ARBUSCULAR MYCORRHIZATION AND GROWTH PERFORMANCE OF *PTEROCARPUS MARSUPIUM* SEEDLINGS RAISED FROM DIFFERENT SEED SOURCES OF CHHATTISGARH, INDIA

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Abstract: The aim of present study is to determine natural development of arbuscular mycorrhiza (AM) in *Pterocarpus marsupium* (bija sal) saplings. Development of AM was correlated with growth performance of saplings after two years. The seeds were collected from six different localities of Chhattisgarh, India for raising seedlings at Jabalpur. After two years height, diameter of seedling at collar height and root colonization was determined. AM fungi spores were also isolated from rhizosphere soil of each seed source and were identified. Total eighteen AM fungi were identified which include: *Acaulospora lacunosa*, *A. scrobiculata*, *Ambispora appendicula*, *Archaeospora trappei*, *Diversispora aurantium*, *D. spurca*, *Glomus caledonium*, *G. clarum*, *G. constrictum*, *G. coronatum*, *G. deserticola*, *G. etunicatum*, *G. flavisporum*, *Glomus glomerulatum*, *G. insculptum*, *G. intraradices*, *G. macrocarpum* and *G. mosseae*. Root colonization in this important tree ranges from 41.3 to 57.5%. Correlation study confirms that mycorrhization of seedlings by AM fungi supported growth of seedlings. Seedlings raised from seeds collected from Balod and Hati had higher root colonization and performed better in relation with growth parameters measured (plant height and seedling diameter).

Keywords: *Bija sal*, collar diameter, root colonization, seed sources, symbiosis

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Pterocarpus marsupium Roxb. (Bija-sal), belongs to family Fabaceae, also known as Vijaysar in India

and Indian Kino in foreign countries. It is native to India, Nepal, and Sri Lanka. In India it occurs in parts of the Western Ghats in the Karnataka-Kerala region and also in the forests of Central India, Gujarat, Odisha and Tamil Nadu. It is used in preparation of many Ayurvedic medicines apart from wooden tumblers for drinking water stored overnight by diabetic patients (Reddy et al. 2008). Wood, bark and combined extract of wood and bark have been reported as antidiabetic effect in alloxan induced diabetic rats (Maruthupandian and Mohan 2011). The timber is also highly valued for its quality (Kirtikar and Basu 1999). Bija sal forests are declining in central India due to various reasons. The native natural stands of this tree are fast disappearing. The winged fruit is the only propagating material and natural regeneration in this tree is through seeds, however, seed germination rate has reported very poor, only 30% (Das and Chatterjee 1993, Kalimuthu and Lakshmanan 1995). Hard fruit coat, less germinability coupled with poor seed viability is responsible for its diminishing population size. Due to its significant multipurpose properties, the tree has been overexploited, which in turn has led to its inclusion in the

list of endangered plant species (Anis et al. 2005). Overexploitation from natural habitat and inadequate efforts for its propagation resulted in marked decline from its existing forests. Due to this problem the species is at the verge of extinction along with other 121 tree species and categorized either as endangered or threatened (Tiwari et al. 1998). To overcome problem of natural regeneration, *in vitro* propagation of this species was also tried through seeds (Mishra et al. 2013, Tiwari et al. 2004) and through somatic embryogenesis (Hussain et al. 2010) have been tried.

Arbuscular mycorrhizal (AM) fungi are integrated components of most of terrestrial plants. The nutrient exchange and other benefits due to AM symbiosis, especially *phosphorus* are well documented (Abbott and Robson 1984, Gerdemann 1968, Koide 1991, Cooper and Tinker, 1978, Lambert et al. 1979). Mycorrhizal roots effectively enlarge root soil interface by extension of hyphae in the soil for nutrient uptake (Li et al. 1991, Jakobsen et al. 1992). Seedlings with better root colonization also help to withstand the water stress conditions (Verma and Jamaluddin 1994). In the present study seeds of bija sal from different sources have been collected keeping selecting superior seed sources in view for raising seedlings for plantation. Since, AM symbiosis plays an important role on growth