



Growth Performance of *Melia dubia* Cav. Germplasm Grown under Semi-arid Conditions

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Abstract: Among the various abiotic stress, water deficit is the most devastating factor. The present investigation was carried out to identify desirable genotypes under low rainfall conditions. Forty-two genotypes of *Melia dubia* were evaluated for different growth parameters like girth, mean annual girth increment, plant height, total standing biomass per tree, leaf area, fibre qualities like fibre length and fibre diameter at the Hoskote Research Station of Hoskote Range Forest Division, Bengaluru Rural District, Karnataka. Significant differences were observed for all the growth parameters among the germplasm lines. In experiment I, germplasm line MD013 showed highest girth (35.81 cm), plant height (3.83 m), biomass (17.26 kg/tree), leaf area (3.21 cm²), fibre length (886.67 µm) and fibre diameter (33.30 µm) while in experiment II, germplasm line MD058 accounted for the maximum girth (37.40 cm), plant height (3.83 m), biomass (16.76 kg/tree), leaf area (3.05 cm²), fibre length (903.33 µm) and fibre diameter (39.37 µm). MD058 in experiment I and MD013 in experiment II exhibited significant growth performance to other germplasm lines. These lines were found suitable for cultivation in the low rainfall regions.

Keywords: Genotypes, Rainfall, Growth, Performance, Cultivation

One of the approaches to reducing CO₂ concentration in the atmosphere is carbon (C) sequestration, the process of removing C from the atmosphere and depositing it in a reservoir. The Land Use, Land Use Change and Forestry (LULUCF), an approach that became popular in the context of the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC)-the first and so far the largest international agreement to stabilize GHG concentrations-allows the use of C sequestration through afforestation and reforestation as a form of GHG-offset activities. Forests are both a source and a sink of carbon. Thus, managing forests for carbon storage will help to absorb atmospheric carbon dioxide. Forests sequester carbon from the atmosphere as a result of photosynthesis. As trees have a much longer lifespan, they act as long-term reservoirs the carbon for decades, even centuries, in their biomass. In order to sustain livelihood under the above situations agroforestry is considered to be a potential option. It can help boost food and fodder production and also serve as an alternative source of income especially during the lean periods (Parthiban and Govinda Rao 2008). Agroforestry is a potential option which can provide economic, environmental and social benefits in a sustainable manner to the farmers.

Melia dubia plantation as an agro forestry option, on wastelands has become popular because of a variety of benefits like timber, fuelwood and fodder for goats, sheep and cattle. *Melia dubia* belongs to the family meliaceae and is

a fast growing, indigenous and economically important multipurpose tree species that grows naturally in certain parts of the Western Ghats of South India. The species is identified as one of the potential alternate pulpwood species. The *Melia dubia* grows at the rate of 41.54 cubic metre / ha / yr (Saravanan et al 2013), which is higher than eucalyptus and poplar. Hence, the plantations of fast growing, short rotation woody crops like *Melia dubia* gained more importance also in carbon. Wood of *M. dubia* is an excellent and highly suitable raw material for wood based industries like paper and plywood industries owing to its natural anti-termite property, high pulp recovery and exceptional fibre strength as compared to traditional raw material (Saravannan et al 2013). It is a promising tree highly suitable for farm forestry and agro forestry for generating higher income in the semi-arid regions. The wood from this tree is used in plywood industry and is also suitable for pulp industry (Parthiban et al 2009). Thus the major emphasis of the study is to evaluate forty-two genotypes based on the growth performance of *Melia dubia* in the field conditions to identify lines that can perform best under low rainfall regions.

MATERIAL AND METHODS

The investigations were carried out with forty-two germplasm lines genotypes of *Melia dubia* plantation established by Karnataka State Forest Department in December, 2013 at Hoskote Research Station of Hoskote