

## Wood properties and utilization of pollard shoots of Indian tulip tree (*Thespesia populnea* (L.) Sol. ex Corrêa)

Navneet M. Kantariya and Satish Kumar Sinha\*

College of Forestry, Navsari Agricultural University, Navsari-396450 India

\*Email: skinsha@nau.in

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### 1. Introduction

Forests are declining in India under severe socio-economic pressure (Saravanan et al 2014). Consequently, short-rotation plantation wood species are emerging as a major raw material resource because of ban on tree felling in the forests (Sujatha et al 2023). Due to shortage of raw materials, industries have to establish the short-rotation fast-grown plantations of suitable wood species. Furthermore, there is also a need to explore the wood properties of lesser-known tree species for various end use applications. Indian tulip tree (*Thespesia populnea* (L.) Sol. ex Corrêa) is one of the fast growing lesser-known tree species which is heavily pollarded and its shoots are used as fuelwood in coastal regions of South Gujarat. Since, *T. populnea* has potential for timber, pulpwood and other industrial applications; therefore, a study was carried out to evaluate the physical and mechanical properties of pollard shoots of this species to check the wood quality for effective utilization.

### 2. Material and methods

Total 20 wood samples of pollard shoots (5-10 cm diameter) from 5 trees of *T. populnea* in the girth class of 110-160 cm were collected from the different blocks of Matwad road side plantation in Navsari, Gujarat for the present study. The physical properties *i.e.*, moisture content, basic density, volumetric shrinkage and mechanical properties *i.e.*, static bending, compression parallel and perpendicular to the grain, hardness and nail & screw holding test of the species were evaluated in air-dry condition at 15.9% moisture content and compared them with published values for teak (*Tectona grandis* L.f.) and 3, 4 & 5 years old Malabar neem (*Melia dubia* Cav.). The moisture content and volumetric shrinkage were determined by oven-dry method, while basic density was determined by water displacement method. The mechanical properties of wood were tested using the Universal Testing Machine (UTM).

### 3. Results and discussion

The mean basic density and volumetric shrinkage based on oven-dry weight of wood samples from pollard shoots of *T. populnea* were 0.249 g/cm<sup>3</sup> and 47.0 %, respectively. In comparison with teak and *M. dubia*, wood density of *T. populnea* recorded 37 per cent value of teak wood density and 50 per cent value of *M. dubia* wood density, while volumetric shrinkage of this species was seven times more than teak and three times more than Malabar neem. Very low wood density and high volumetric shrinkage in *T. populnea* may be due to the thin diameter of juvenile wood of pollard shoots. The mean value of MOR (modulus of rupture) and MOE (modulus of elasticity) in static bending were 786.8 kg/cm<sup>2</sup> and 72.6 x10<sup>3</sup> kg/cm<sup>2</sup>, respectively. In compressive strength parallel to grain, the mean value of maximum crushing stress was 358.3 kg/cm<sup>2</sup> and in compressive strength perpendicular to grain, the mean value of compressive stress at elastic limit was 33.3 kg/cm<sup>2</sup>. The mean value of side and end hardness were 444.2 kg and 490.6 kg, respectively. The mean value of nail holding power on side and end surfaces were 42.3 kg and 32.3 kg while, screw holding power on side and end surfaces were 60.4 kg and 50.5 kg, respectively. It is concluded that the physical properties and mechanical strength of wood from pollard shoots of *T. populnea* is lower than teak wood. Among mechanical properties, static bending, compressive strength and hardness of wood from pollard shoots of *T. populnea* are found to be better than 3 years old *M. dubia*. This indicates that wood from pollard shoots of thin to moderately thick diameter of this tree species can be utilized for tool handles, construction, light packing cases and furniture.

**References**

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