International Journal of Farm Sciences **6(2)** : 159-162, 2016

Variation in physical characteristics of different provenances of teak, *Tectona grandis* L

RK MEENA , AU NIMKAR* and SEEMA BHATT

Department of Forest Products
Dr YS Parmar University of Horticulture and Forestry Nauni, Solan 173230 HP, India
*** Department of Forest Products and Utilization**
Dr Panyabrao Deshmukh Krishi Vidyapeeth, Akola 444104 Maharashtra, India
Email for correspondence: meenarajeshkumar147@gmail.com

ABSTRACT

Variation in physical traits viz height, diameter and grain angle of 30 provenances of teak in National Teak Germplasm Bank, Lohara, Chandrapur District (MS) was studied. Among different provenances of teak significant differences were noticed for all characters. The maximum height (28.60 m) and diameter (36.26 cm) were recorded in ORANR-2 and ORANR-6 respectively whereas the minimum height of 17.53 m was observed in MHSC-A2 and minimum diameter in APT-17 (20.50 cm). The maximum deviation of grain angle ie 5.34 (84.66 against 90°) with vertical axis was TNT-13. The minimum deviation of 0.90° (89.10 against 90°) was recorded in APNPL-10.

Keyword: *Tectona grandis*; provenances; variability; physical character

INTRODUCTION

One of the major divergent and economically important groups of species ie Indian teak is widely distributed naturally in the peninsular region below 24°N latitude. The teak is indigenous in peninsular of India in northeast of Indian archipelago. It is widely distributed in central India and western and southern region of the country as well in Myanmar, Thailand, Laos and Indonesia. It occupies about 12 and 14 per cent area in the country and Andhra Pradesh respectively out of total forest area. The majority of natural teak forest area is found in Madhya Pradesh, Kerala, Tamil Nadu, Gujarat, Orissa, Andhra Pradesh and Karnataka. Outside its natural occurrence teak has been raised in different states eg Uttar Pradesh, West Bengal, Assam, Bihar, Orissa, Andaman, Andhra Pradesh etc. It is the most widely planted hardwood timber species in the world covering 2.25 million ha area. Teak can withstand an absolute mean annual temperature of 13-40°C and mean annual rainfall ranging from 1250 to 3750 mm per year. However for the production of good quality timber the

species requires a dry season of at least four months with less than 60 mm precipitation. Teak can be grown in a variety of soils. Its growth qualities depend on edaphic factors like depth, structure, porosity, drainage and moisture holding capacity of the soil. It develops best on deep, well-drained and fertile soils especially on volcanic substrata such as igneous and metamorphic soil or alluvial soil of various origins with optimal soil pH between 6.5 and 7.5. The calcium content of the soil is also important factor; calcium deficiency in the soil results in stunted growth of teak.

Teak wood has high degree natural durability and is moderately hard and heavy, strong, tough, straight grained and coarse textured. Wood has low stiffness and shock resistance and is termite and insect attack resistance for very long periods. It is the best timber in dimensional stability and has very low fibre saturation point and shrinkage. *T grandis* is the most important general purpose timber in India suitable for almost all end uses. Teak is extensively used in construction, railway sleepers, wagons and coaches and is one of the most preferred timber for door, window frames and shutters.

MATERIAL and METHODS

The present investigation was carried out at National Teak Germplasm Bank, Lohara, Chandrapur district of Maharashtra. The data recorded for the physical traits were statistically analyzed by using randomized block design in three replications for each treatment as described by Panse and Sukhatme (1978) and Chandel (1984). The observations were recorded on height, diameter and grain angle. The height of each tree was measured with the help of Ravi multimeter. The readings were taken from two different locations from where the top and base of the trees were visible. The average of these readings was recorded as the height of the tree in meters. Diameter of trees was measured at breast height (1.37 m from the ground level) with the help of tree calliper. It was measured at two points which were at right angle to each other and mean value of these two observations was recorded as diameter at breast height in cm. Grain angle of the trees was measured by drawing straight line perpendicular to the base of the tree trunk and the deviation of the grain was measured with the help of protractor after shaving the bark.

RESULTS and DISCUSSION

The data pertaining to variations in height, diameter and grain angle of teak are presented in Table 1. There was significant variation in height and diameter among the different provenances. The maximum height of 28.60 m was found in ORANR-2 whereas minimum of 17.53 m was observed in MHSC-A2. The diameter ranged from 20.50 to 36.26 cm. The significantly maximum value of diameter

Table1. Physical parameters of provenances of *Tectona grandis* located at National Teak Germplasm Bank, Lohara, district Chandrapur, Maharashtra

Source	Provenance number	Height (m)	Diameter (cm)	Grain angle (deviation) in degree
Maharashtra	MHSC-A2	17.53	21.16	88.66 (1.34)
Maharashtra	MHSC-A1	26.83	28.04	88.73 (1.27)
Tamil Nadu	TNT-8	23.10	33.45	88.06 (1.94)
Maharashtra	MHSC-J1	23.16	23.06	86.66 (3.34)
Andhra Pradesh	APT-22	27.23	32.26	85.66 (4.34)
Andhra Pradesh	APT-11	26.76	33.23	86.66 (3.34)
Tamil Nadu	TNT-14	25.50	28.47	88.50 (1.50)
Tamil Nadu	TNT-13	25.46	22.06	84.66 (5.34)
Kerala	KLN-2	23.43	23.11	87.83 (2.17)
Tamil Nadu	TNT-10	25.13	28.86	88.16 (1.84)
Andhra Pradesh	APT-20	21.08	30.74	88.50 (1.50)
Andhra Pradesh	APT-3	26.30	35.76	88.16 (1.84)
Andhra Pradesh	APT-16	25.66	28.87	88.16 (1.16)
Tamil Nadu	TNT-12	26.33	26.73	87.60 (2.40)
Andhra Pradesh	APT-17	24.70	20.50	86.16 (3.84)
Tamil Nadu	TNT-11	25.47	26.12	87.33 (2.67)
Orissa	ORANP-3	26.03	25.20	86.66 (3.34)
Kerala	KLS-3	26.13	28.80	86.60 (3.40)
Andhra Pradesh	APNPL-11	24.50	26.53	86.33 (3.67)
Andhra Pradesh	APKEA-24	21.30	22.14	87.33 (2.67)
Orissa	ORANR-3	24.10	25.81	86.53 (3.47)
Orissa	ORPB-18	25.96	29.80	88.10 (1.90)
Andhra Pradesh	APKEC-2	25.54	27.00	88.13 (1.87)
Orissa	ORNAP-7	25.33	34.10	86.33 (3.67)
Andhra Pradesh	APNPL-10	26.30	29.43	89.10 (0.90)
Kerala	KLS-4	26.26	31.69	87.23 (2.77)
Orissa	ORANR-2	28.60	31.80	88.50 (1.50)
Orissa	ORPLM-1	24.74	30.21	86.33 (3.67)
Orissa	ORANR-6	25.80	36.26	87.00 (3.00)
Orissa	ORANP-6	22.77	24.60	87.50 (2.50)
Mean		24.90	28.19	87.37 (2.63)
SEm		0.6319	0.9650	0.7981
$CD_{0.05}$		2.3801	3.6345	3.0062

36.26 cm was observed in ORANR-06 and minimum of 20.50 cm in APT-17. In the present study irrespective of height and diameter the different provenances of teak were almost similar barring few trees. The sensitivity of height growth to the micro-site in *Populous deltoids* has been explained by Ying and Bagley (1976) and the heredity control for height growth has been emphasized by Kozlowsky and Ward (1957). The different provenances of *Tectona grandis* recorded significant variation in grain angle as presented in Table 1. The minimum deviation of 0.90° (89.10 against 90°) with vertical axis was observed in APNPL-10 and the maximum deviation of 5.34 (84.66 against 90°) was recorded in TNT-13. Schajer and Orhan (2006) have also reported the significant variation in *Acacia mangium* and Shirsat (2011) in *A nilotica.*

REFERENCES

Chandel SRS 1984. A handbook of agricultural statistics. Achal Prakashan Mandi, Kanpur, UP, India 565p.

Kozlowsky TT and Ward RC 1957. Seasonal height growth of deciduous trees. Forest Sciences **3:** 168-174.

Panse VG and Sukhatme PV 1978. Statistical methods for agricultural workers. ICAR, New Delhi, India 610p.

Panshin AJ and PV DeZeeuw 1970. Text book of wood technology. Vol I, McGraw-Hill Book Co, Inc, New York 538p.

Schajer G and Orhan B 2006. Measurement of wood grain angle, moisture content and density using microwaves. European Journal of Wood Products **64(6):** 483-490.

Shirsat S 2011. Evaluation of candidate plus tree of *Acacia nilotica* (L) willd for physico-chemical characteristics of wood. MSc thesis, Dr Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India.

Ying, Ch-Ch and Bagley WT 1976. Genetic variations of eastern cottonwood in eastern Nebraska provenance study. Silvae Genetica **25:** 67-73.

Received: 6.4.2015 ***Accepted: 22.8.2015***