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Estimates of Genetic Variation in Wood Mechanical Properties among *Eucalyptus* Clones

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1. Introduction

Eucalyptus is a major forest tree species suitable for production of pulp, paper and poles. Moreover, there is always a great demand for high productive genotypes that provide good strength as pole. Testing of wood mechanical properties is essential to know the suitability of timber for various end uses. Hence, the present investigation was undertaken to identify superior clones for pole.

2. Materials and methods

The present investigation was carried out at Navsari (20.95^0 N latitude, 75.90^0 E longitude, 12 m. MSL and annual rainfall 1355 mm) during 2014-15 to 2016-2017 with 18 *Eucalyptus* clones for four years following Randomized Block Design. A total 6 trees/clone were used for assessment of genetic variation for wood mechanical properties. Wooden samples were collected and tested as per Indian Standard Specification IS 1708 (Part 1-18):1986 using Universal Testing Machine (UTM) of 50 kN capacity.

3. Results and discussion

Analysis of variance studied for mechanical properties such as static bending strength, tensile strength parallel to grain showed significant variation among 18 clones, except compression strength parallel to grain (Table 1). Static bending for MOE ranged from $667.08x10^2$ to $1320.81x10^2$ kg cm^{-2}.

Table 1. Clonal variation for wood mechanical properties among 18 *Eucalypts* clones at 4 years age

Clone	Compression strength parallel to grain [MCS (kg cm^{-2})]	Tensile strength parallel to grain [TS at ML (kg cm^{-2})]	Static bending	
			MOE (10^2 kg cm^{-2})	MOR (kg cm^{-2})
EC-1	445.60	960.36	1023.30	857.73
EC-2	546.05	869.38	1086.45	1046.28
EC-3	539.53	871.00	991.51	900.87
EC-4	529.14	1250.20	1025.25	962.51
EC-5	535.81	1001.46	976.95	1107.61
EC-6	546.21	751.46	1135.79	1106.49
EC-7	509.72	1024.08	905.25	963.35
EC-8	582.68	985.83	972.06	1039.92
EC-9	529.01	967.95	935.62	1178.06
EC-10	581.92	1004.46	915.56	951.59
EC-11	549.01	1149.51	911.12	965.24
EC-12	592.77	1184.8	1320.81	1527.32
EC-13	454.56	940.49	908.95	874.88
EC-14	461.66	775.34	786.41	1020.03
EC-15	473.82	911.57	851.52	1016.77
EC-16	495.37	999.47	848.90	782.70
EC-17	532.59	849.57	841.92	973.59
EC-18	472.58	904.33	667.08	814.69
Mean	521.00	966.74	950.25	1004.98
SEm (±)	33.79	61.41	4736.29	50.08
CD (P≤0.05)	NS	176.84	13639.76	144.23

For MOR, it was ranged from 782 to 1527 kg cm^{-2}. Tensile strength varied from 751.46 to 1250.20 kg cm^{-2} with overall mean 966.74 kg cm^{-2}. Maximum crushing stress varied from 445.60 to 592.77 kg cm^{-2} was at par with results reported by Pima (2015), Olufemi and Malami (2011), Bal and Bektas (2013). Our result showed that among 18 clones, EC-4, EC-5, EC-8, EC-11 and EC-12 clones showed superior wood quality for strength properties and hence these clones can be utilized in pole for various structural applications. Moreover, these clones may be used for commercial plantations and also for further breeding programme to obtain higher productive potential.

References

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