



## GENETIC EVALUATION OF IDENTIFIED SUPERIOR CLONES OF *Jatropha Curcas* FOR SURVIVAL AND GROWTH IN EASTERN INDIA

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**ABSTRACT:** Genetic and correlation studies among the growth traits were carried out aiming at early selection among 28 clones of *J. curcas* selected from a wide geographical range in Eastern India. Field experiment was laid down with Randomized Block Design from cuttings of the selected candidate plus trees. Various variability parameters (phenotypic coefficient of variability, genotypic coefficient of variability, heritability, expected genetic advance and genetic gain) were estimated along with correlation among different traits, and path analysis. Dry shoot weight showed the maximum PCV (39.73) and GCV (38.44) along with maximum gain (76.65). High heritability has been observed in all the growth traits except number of branches, which indicate that a considerable portion of variance is additive, which shows the importance of clonal propagation in this species. Highest heritability was recorded for collar diameter and dry root weight (0.999). Significant positive correlation (phenotypic and genotypic) of dry shoot weight with all the growth parameters was recorded. Relative proportion of phenotypic, genotypic and environmental correlations indicates that genotypic correlations were strongest and significant while environmental correlations were feeble and insignificant. Overall genotypic- /phenotypic variations scored over environmental variation. Plant height, collar diameter and dry root weight showed positive direct effect on dry shoot weight. Maximum direct effect on dry shoot was by plant height (0.5710). The present study indicates that parameters like plant height, collar diameter and dry root weight can serve as criteria for early selection in the nursery stage for good vigour plants in the plantations.

**Key words:** Candidate plus trees, correlation, genetic gain, growth, heritability.

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Bio-diesel is a fast-developing alternative fuel in many developed and developing countries of the world. Tropical physic nut *Jatropha curcas* Linn. (Family Euphorbiaceae) is a highly promising species for bio diesel production worldwide. The non-edible oil from *J. curcas* is favored for bio-diesel production due to due to its drought hardiness, rapid growth, easy propagation, small gestation period, wide adaptability, production on good and degraded soils and optimum plant size that makes seed collection more convenient (Jones and Miller, 1991; Francis et al., 2005). However, worldwide introduction of the species has met with limited success due to unreliable and low seed set as well as low oil yields resulting in low economic returns (Singh et al., 2010).

The promise of this valuable crop can only be realized completely through development and release of high yielding variety/clones which needs sufficient

information regarding the extent and pattern of genetic variation in *J. curcas* populations, which is restricted to few recent studies (Kaushik et al., 2007; Rao et al., 2008; Gairola et al., 2011; Tripathi et al., 2013; Brasileiro et al., 2013; Kumar and Singh, 2014).

Improvement has also been hindered by want of appropriate criteria for early selection for plantation programmes. Therefore, genetic and correlation studies among the growth traits were carried out aiming at early selection among clones of *J. curcas* selected from a wide geographical range in Eastern India.

### MATERIALS AND METHODS

28 candidate plus trees (CPTs) of *Jatropha curcas* have been selected from naturalized area of eastern India (Bihar, West Bengal and Jharkhand) on the basis of seed bearing quality, crown size and disease free (Table 1). Field experiment was laid down with Randomized Block Design from cuttings of the selected candidate plus trees.