

Correlations studies in jatropha (*Jatropha curcas* L.)

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SUMMARY

The present investigation entitled, correlation studies in jatropha (*Jatropha curcas* L.) was undertaken to study the extent of correlation in 30 genotypes of Jatropha. Seed yield per plant was significantly and positively correlated with plant height, collar diameter, number of secondary branches per plant and number of fruits per plant indicating dependence of seed yield per plant on these characters. Number of primary branches per plant exhibited significant negative correlation with seed yield per plant.

Key Words : Jatropha, Genotypic and phenotypic correlation

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Jatropha has been found highly promising species which can yield oil seed as a source of energy in the form of bio-diesel owing to its short gestation period, hardy nature, high quality oil content etc. In field condition this may produce the seed yield as high as 3-5 tonnes per ha per year after five years of plantation (Jones and Miller, 1992), while 0.8 to 1.0 kg of seed per meter of live fence can be obtained if it is planted for hedge (Henning, 1996). The oil content of seeds represents reasonable opportunities for renewable fuel (Schultz and Morgan, 1985; Princen, 1983 and Harrington, 1986). Its seed contains about 30-40 per cent non edible oil. A yield of 0.7-2 tonnes of bio-diesel could be expected per ha per year from the fifth year onwards (Fiodl and Eder, 1997). For any crop improvement programme needs the information regarding the relationship of the various economically

important characters related to yield. The present investigation, therefore, undertaken to study the character association between yield and yield components.

Thirty genotypes of *Jatropha curcas* were evaluated in a Randomized Block Design (RBD) with three replications. The experiment was conducted at All India Co-ordinated Research Project on Agroforestry, Mahatma Phule Krishi Vidyapeeth, Rahuri. (M.S.), during *Kharif*, 2010. The trees were planted at the distance of 3m × 3m. The plot size was 12 m × 9m for gross and 6m × 3m for net. In each replication, for each entry, five plants were selected at random for recording observations for ten characters *i.e.* plant height (cm), collar diameter of the plant (cm), number of primary branches, number of secondary branches, number of clusters per plant, number of fruits per plant, 100 seed weight(g), shelling percentage, oil content (%) and seed yield per plant(g). Statistical analysis was done as per Panse and Sukhatme (1967). Mean, range, components of variance, co-efficients of variation and genetic advance were worked out using standard statistical procedures. Path analysis was carried out according to the method suggested by Dewey and Lu (1959).

In the present investigation, the characters *viz.*, collar diameter, plant height and number of secondary branches per plant and number of fruits per plant showed highly significant positive correlation with seed yield per plant indicating dependency of these characters on each other (Table 1).

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Table 1 : Genotypic (above diagonal) and phenotypic (below diagonal) correlation of 10 characters in *Jatropha*

Sr. No	Characters	Plant height (cm)	Collar diameter (cm)	No. of primary branches per plant	Number of secondary branches per plant	No. of clusters per plant	No. of fruits per plant	100 seed weight (g)	Shelling percentage (%)	Oil content (%)	Seed yield per plant (g)
1.	Plant height (cm)	1.000	0.904**	-0.158	0.885**	0.615**	0.840**	-0.117	-0.007	0.049	0.999**
2.	Collar diameter (cm)	0.601**	1.000	-0.279	0.707**	0.396*	0.632**	0.084	-0.337	0.083	1.037**
3.	No. of primary branches per plant	-0.103	0.046	1.000	-0.105	0.448*	0.335	-0.183	-1.007	0.017	-0.559**
4.	No. of secondary branches per plant	0.572**	0.435	0.129	1.000	0.845**	0.903**	-0.115	0.052	0.118	0.612**
5.	No. of clusters per plant	0.383	0.233	0.224	0.629**	1.000	0.902**	-0.356	-0.019	0.126	0.284
6.	No. of fruits per plant	0.543**	0.384	0.075	0.671**	0.687**	1.000	0.177	0.055	0.123	0.518**
7.	100-seed weight (g)	0.111	0.122	0.089	-0.003	-0.062	0.010	1.000	0.553**	0.275	-0.172
8.	Shelling percentage (%)	-0.007	-0.115	-0.111	0.076	0.149	0.045	0.203	1.000	-0.095	0.129
9.	Oil content (%)	0.046	0.088	0.030	0.095	0.039	0.074	0.121	-0.040	1.000	-0.204
10.	Seed yield per plant (g)	0.554**	0.576**	0.098	0.631**	0.344	0.300	0.071	0.027	-0.175	1.000

* and ** indicate significance of values at P=0.05 and 0.01, respectively

Similar finding were reported by Ginwal *et al.* (2005), More (2008) and Das *et al.* (2008) for collar diameter, number of secondary branches per plant and Gururaja Rao *et al.* (2009) for plant height and number of fruits per plant. Oil content exhibited negative correlation with seed yield per plant. Contradictory results were reported by Kaushik *et al.* (2007) and More (2008). The characters number of clusters per plant and shelling percentage exhibited positive but non-significant correlation co-efficient suggesting the absence of any relation of these traits on seed yield per plant. Contradictory results were reported by More (2008) for number of secondary branches per plant. Plant height exhibited positive significant correlation with number of secondary branches per plant, number of clusters per plant, number of fruits per plant and seed yield per plant at both genotypic and phenotypic level suggesting that selection for increased plant height will be rewarded with number of secondary branches per plant, number of clusters per plant and number of fruits per plant. Similar results were reported More (2008) for number of secondary branches per plant, number of fruits per plant and seed yield per plant. The trait collar diameter exhibited significant positive correlation with number of secondary branches per plant, number of fruits per plant and seed yield per plant. Contradictory results were reported by More (2008). Number of clusters per plant was positively and significantly correlated with number of fruits per plant while it was positively and non-significantly correlated with seed yield per plant. The trait number of fruits per plant was positively and significantly correlated with seed yield per plant. In addition to above, positive significant correlations were observed for number of primary branches per plant with number of clusters per plant and number of fruits per plant.

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