Journal of Crop and Weed 3(2) : 30 – 32 (2007)

A comparative study on simple correlation coefficient values in capsularis jute at different population levels

K. S. KARMAKAR; C. BHATTACHARYA AND A. BAKSHI

Department of Plant Breeding,
Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, W.B., India

ABSTRACT

In this experiment, investigations were done to evaluate the extent of similarities and dissimilarities in correlation coefficient values between different yield and yield contributing characters of capsularis jute at three population levels which were alike. Amongst these three, A and B populations were composed of same four commercially cultivated *Corchorus capsularis* L. varieties which were grown under normal and topping treated conditions respectively and the C population was comprised of A and B populations.

This experiment revealed a few facts which come in front that though the three populations were genetically alike, still the correlation coefficient values obtained at different population levels may be misleading to a breeder to judge the proper relationships between the characters under study at the three population levels. The results of the experiment indicate that, it will be safer for a plant breeder to estimate the correlation coefficient values at normal grown population (A) and the topping treated population (B) levels separately. It will provide a breeder, the right informations in two direction of selection for two different types of desired plant types. The correlation coefficient values of A and B populations will provide informations to a breeder for designing or selecting a desirable plant type for higher seed production, suitable for this agroclimatic situation respectively. The informations available from the combined population may be misleading to a breeder to select or design a particular plant type for the two different treatment conditions. But, the cause of differences in correlation coefficient values at the three population levels studied under this experiment remained unanswered, though all these three populations were composed of varieties with similar genetic make up.

Key Words : Simple correlation coefficient, capsularis jute, population level, same genetic background, topping, normal grown condition, seed production.

Yield is the ultimate target for improvement of a crop to a plant breeder. But it is influenced by several yield attributing factors. Jute, being a bast fibre crop, is commercially grown for the fibre. Then fibre is its yield but when it is grown for seed production, seed becomes its yield. Substantial literatures are available correlating fibre yield with other indices as fibre crop. In red and laterite zone of West Bengal, jute cultivation for fibre production is not common. But the agroclimatic situation of this region is very much congenial for seed production in this region. The informations regarding the seed production of jute for this region are very scarce. Correlation coefficient analysis helps the breeder to know the relationships of different characters towards the ultimate yield.

Many investigators have provided informations on correlation coefficient between different yield and yield attributing traits on different crops. In general, those correlation coefficients are deducted from parental (pure) lines where the genes remains in homozygous conditions. In case of jute when topping is done the mean performances of a population on yield and yield related characters changes, though the genetic composition of that population remains unchanged. The present investigation was, therefore undertaken to evaluate the extent of similarities and differences of those correlation coefficients obtained from different population levels like, parental / purelines grown without topping (A); the same parental / purelines where topping was done (B) and the same parental lines / purelines with and without topping combined population (C) in capsularis jute.

MATERIALS AND METHODS

Four commercially cultivated varieties for fibre yield of *Corchorus capsularis* L. (JRC-212, JRC-321, JRC-4444 and JRC-7447) were sown at first fortnight of August, 2001 in randomized block design with six replications per variety per treatment. The two treatments which followed were : (i) the four varieties of capsularis jute were grown normally with the cultural practices followed as usual, (ii) the same four varieties of capsularis jute were grown normally with all the cultural practices followed in the first group, but here topping was done at the 7 weeks after sowing. Data were recorded on plant height (cm), branch number per plant, pods per plant, pods per branch, days to 50% flowering and seed yield per plant (g). Observations were recorded from randomly selected 10 plants from each variety, each replication and each treatment. The analysis of variances and simple correlation coefficients were calculated following the methods suggested by

Nadarajan and Gunasekaran (2005).

RESULTS AND DISCUSSION

In this article, we will discuss about the simple correlation or total correlation or zero order correlation for which unreplicated data is required, still the results of analysis of variances for all the six yield and yield attributing traits studied at the tree population levels are represented in Table 1, to study the variation between the varieties and variation within the varieties i.e. environmental variation. From the results, it is observed that in the population A, there were significant differences between the varieties i.e. treatment effects were significant for all the characters except branch number per plant. In the population B, except the characters days to 50% flowering and seed yield per plant, rest were non-significant in treatment effect. But, the combined population (C) was significant for all traits in treatment effects.

The results of simple correlation coefficients deducted at different population levels are presented in Table 2. The correlation coefficient values between seed yield and plant height at A (0.619) and B (0.063) had positive non-significant effects but C population (–0.374) had negative non-significant effect. The correlation coefficient values between seed yield per plant and branch number per plant had significant and positive effect (0.929) at A population level but B(– 0.252) and C (–0.426) populations had negative non-significant effects. Similarly seed yield and pods per plant had non-significant positive correlation coefficient effect (0.040) in A population but non-significant and negative in B (–0.266) and C (0.155) populations. Again, between pods per branch and seed yield per plant A (–0.283) and B(–0.409) population had non-significant negative correlation coefficient effects but C (0.308) had non-significant and positive effect. The days to 50% flowering and seed yield per plant had negative correlation coefficient values for the population levels but it was significant in case of B (–0.892) population only.

Table 1 : The analysis of variances between different characters of capsularis jute at normal / control (A); topping (B) and normal & topping combined (C) population.

Source		DF	Mean sum of squares					
			Plant height (cm)	Branch number per plant	Pods per plant	Pods per branch	Days to 50% flowering	Seed yield per plant (g)
Replication	A	5	8.469	7.950	13.254	0.0006	2.867	0.0654
	B	5	8.377	1.590	0.653	0.0118	3.175	0.0056
	C	5	14.000	5.938	6.621	0.0074	3.397	0.0529
Treatment	A	3	205.913**	6.549**	129.351**	0.2241**	69.376**	0.2988**
	B	3	100.450	0.963	5.043	0.0019	59.153**	1.2636**
	C	7	706.875**	40.685**	60.896**	0.2301**	55.096**	0.9166**
Error	A	15	14.517	7.156	13.747	0.0032	4.600	0.0586
	B	15	46.137	7.299	14.906	0.0072	4.286	0.0669
	C	35	26.360	6.709	13.421	0.0052	4.186	0.0564

** Significant at 1% level.

The positive and significant correlation coefficient values were obtained between plant height and branch number per plant at B(0.915) and C(0.925) population levels, between pods per plant and plant height at C(0.736) population level, between branch number per plant and pods per plant at B(0.924) population level, between pods per branch and pods per plant at A(0.944) and B(0.671) population levels, between days to 50% flowering and pods per plant at A(0.921) and C(0.706) population level, between days to 50% flowering and pods per branch at A(0.993) population level only. Significant and negative correlation coefficient values were obtained between plant height and pods per branch at A(–0.865) and C(–0.884) population levels.

From this experiment, a few facts which are coming in front that though the varieties involved in the three population levels were genetically alike, whereas in C population was just aggregate of A or B population, still the results obtained at different population levels may be misleading to a breeder to judge the proper genetic relationships between the characters under study at different population levels. The results of this experiment indicate that it will be safer for a breeder to estimate correlation values at normal grown (A) population level (without topping) and topping treated (B) population level separately. It will provide a breeder the right informations in two directions of selections for two different types of desired plant type. The correlation coefficients values of A and B population will provide informations to a breeder for designing or selecting a desirable plant type for higher seed production, suitable for this agroclimatic situation under normal grown and topping treated conditions respectively.

The informations available from the combined (C) population may be misleading to a breeder to select or design a particular plant type for two different treatment conditions. But, the cause of differences in correlation coefficient values at the three population levels studied under this experiment remains unanswered, though all these population were composed of the varieties with similar genetic makeup. Working with three different types of populations in *Pisum* sp. (*P. sativum* L. and *P. arvense* L.) which were parental (pure) lines, their F_{IS},. parent and F_{IS} combined populations, Bhattacharya and Bhattacharya (2002), Bhattacharya and Roy (1991) suggested that utility of correlation coefficient values in selection and breeding objectives should be restricted to those similar kind of populations from which these values are estimated.

Table 2 : Simple correlation coefficients between different characters of capsularis jute at normal / control (A); topping (B) and normal / control & topping combined (C) population levels.

Character		Branch number per plant	Pods per plant	Pods per branch	Days to 50% flowering	Seed yield per plant (g)
Plant height (cm)	A	0.395	– 0.665	– 0.865*	–0.896*	0.619
	B	0.915*	0.736*	– 0.007	0.379	0.068
	C	0.925*	0.031	– 0.884*	–0.182	– 0.374
Branch number per plant	A		0.377	0.050	–0.011	0.929*
	B		0.924*	0.354	0.610	–0.252
	C		0.345	–0.720	0.025	–0.426
Pods per plant	A			0.944*	0.921*	0.040
	B			0.671*	0.508	–0.266
	C			0.40	0.706*	–0.155
Pods per branch	A				0.998**	–0.283
	B				0.280	–0.409
	C				0.496	0.308
Days to 50% flowering	A					–0.337
	B					–0.892*
	C					–0.550

* and ** significant at 5% and 1% levels respectively.

REFERENCES

Bhattacharya, S. and Bhattacharya, N. (2002). A comparative study of correlation and path coefficient values in *Pisum* at different population levels. *Crop Res*. **23**(1) : 79 – 86.

Bhattacharya, C. and Roy, K. (1991). Variation of correlation and path coefficient at different population levels. National Symposium : Plant Sciences in the Uineties, Kalyani University, pp. 313 – 21.

Nadarajan, N. and Gunasekaran, M. (2005). Quantitative genetics and Biometrical techniques in Plant Breeding : Kalyani Publishers, New Delhi, India.