percentage had brought about significant reduction in seed weight and seed number per boll, resulting in reduced seed yield per plant as compared with 50 ppm. In T_1, T_3 and T_4 treatments seed index values over stratified harvests showed significant reduction over control in some of the pickings while in T_2 treatment they were almost at par with control.

Germination percentages were at par in all the treatments excepting T_2 where the values were significantly superior to control in the later pickings.

GA_3 treatments for a limited crossing period proved to be superior to the ones extended over the entire period in terms of seed yield and quality attributes. Apparently, limiting the boll load on the plant seems to have an additive effect in improving the setting percentage. Beneficial effects of partial defruiting in increasing the retention of younger fruits due to the lowering of ethylene and abscisic acid levels in the plant system were reported[7,8] in cotton.

Gibberillic acid thus seems to bring about normalization of receptor base (gynoecium with stylar and stigmatic portions) in terms of growth, conditioning and hormonal balance between emasculation and pollination as also during the earlier stages of fruit development thus enabling much higher setting percentage inspite of emasculation injury and the resultant traumatic changes in terms of deranged hormonal balance (higher levels of ethylene) and subsequent metabolic manifestations. Thus GA_3 appears to be a potential tool to improve setting percentages and to realise much higher seed yield within approximately half the normal crossing period and with minimum impact on seed quality traits.

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EFFICIENCY OF S_1 METHOD FOR POPULATION IMPROVEMENT IN PEARL MILLET

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In order to isolate superior inbred lines, superior base population is a prerequisite. Various methods of population improvement have been proposed from time to time. Pearl millet is a cross-pollinated crop with high heterozygosity prevailing in the natural population. Therefore, a method which exposes greater variability and genetic advance would be more effective in providing material for selection of good genotypes. The present study is aimed at comparing the three methods i.e., S_1, half sib and full sib selections for their effectiveness in increasing the grain yield and its related traits.

The material consisted of 84 randomly selected plants from an isolation plot of composit JOB-GT-1. Each plant was selfed, allowed to be open-pollinated and crossed with a plant taken at random from the 84 plants. Thus from each plant three types of progenies were developed. They are: selfed (also known as S_1 progenies), half sib and full sib corresponding to the selfing, open pollination and crossing to the known selected plant respectively. All these three types of progenies were evaluated in three parallel experiments laid out side by side in R.B.D. with two replications. Each progeny was sown in a plot of 3 m × 0.8 m size consisting of two rows of 3 m length and spaced 40 cm apart. The plant-to-plant distance was adjusted to 15 cm by thinning at 3 to 4 leaf stage. At maturity, data were recorded on various morphological traits and analysed using standard statistical procedures to estimate genotypic and phenotypic coefficients of variation in each type of progeny.

Comparison on the basis of coefficient of variation (both genotypic and phenotypic) indicated that the coefficient of variation did not differ between different types of progenies for days to 50% flowering, plant height and ear length, thus all the three methods were uniform in expressing the variability with regard to these traits (table 1). The coefficient of variation was higher for tillers per plot, ears per plot and dry fodder weight per plot in S_1 than either in half sibs or full sibs. Thus it can be inferred that S_1 progeny method is more effective in

Table 1 *Mean, coefficients of variation, heritability (broad sense) and genetic advance for different morphological traits in pearl millet*

Character	Progeny	Mean	Coefficient of variation Genotypic	Phenotypic	Herita-bility(%)	Genetic advance
Days to 50% flowering	S_1	61.01	2.89	7.37	15.41	3.84
	H.S.	59.04	2.97	7.51	15.67	4.10
	F.S.	57.88	3.32	7.55	17.65	11.99
Plant height	S_1	123.19	7.96	15.04	28.03	7.04
	H.S.	124.04	6.49	12.75	25.96	5.49
	F.S.	125.11	7.98	15.57	26.29	6.74
Number of tillers/plot	S_1	39.44	17.60	28.68	37.67	56.42
	H.S.	43.75	7.77	20.40	14.51	14.94
	F.S.	40.36	–	–	–	–
Ear length	S_1	22.10	6.86	16.66	16.96	26.33
	H.S.	21.81	5.99	13.37	20.13	25.42
	F.S.	21.87	6.13	13.56	20.47	26.14
Number of ears/plot	S_1	32.14	17.63	39.23	20.21	50.81
	H.S.	37.32	8.58	27.67	9.62	14.68
	F.S.	34.02	–	–	–	–
Dry fodder weight	S_1	515.23	15.25	30.51	24.97	3.05
	H.S.	535.83	10.99	28.37	15.02	1.64
	F.S.*	523.69	–	–	–	–
Ear weight	S_1*	197.04	–	–	–	–
	H.S.	225.80	6.30	28.83	4.77	1.25
	F.S.	210.78	7.49	36.73	4.16	1.49

*The variation within progeny was found non-significant; therefore coefficients of variation, heritability and genetic advance were not estimated.

unravelling the hidden variability than either open pollination (half sib) or close mating (full sib). Ear weight per plot, the main character, has shown low variability in all the three types of progenies. During maturity adverse conditions such as high temperature and winds were observed which might have affected the grain filling. Alternatively, low variability may also be due to lack of variability in the basic material. However, high coefficients of variation observed for main yield traits namely tillers per plot and plant, ear length etc rule out the possibility of lack of variability. The heritability (broad sense) estimates were generally higher in S_1 progenies than the other two types of progenies for plant height, tillers per plot, ears per plot and dry fodder weight. Similarly the expected genetic advance was also higher in S_1 progenies for these traits. Thus S_1 progeny method appears to be superior to either half sib or full sib methods in exposing the hidden variability. Available evidence also supports this conclusion[1,2].

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SYNTHESIS OF *BRASSICA CARINATA* A. BR.

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Two major factors limiting the productivity of Indian mustard (*Brassica juncea*) are its susceptibility to biotic and abiotic stress conditions and the limited variability for these traits available within this species. On the other hand, the amphidiploid species *Brassica carinata* (Ethiopian mustard) has