

CORRELATION AND PATH ANALYSIS IN BACKCROSSES IN SESAME

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ABSTRACT

Simple correlation analysis was done in two backcrosses B1 (TSS 4/Si 1125 // TSS 4) and B2 (TSS 4/Si 1125 // Si 1125). The analysis revealed branches, capsules on main stem and capsules on branches had significant association with seed yield. The path analysis revealed that capsules on branches had high direct effect on seed yield. The association analysis of B1 and B2 showed slight difference in the association of characters. However, the selection on capsules on branches will give simultaneous selection on seed yield in both the backcrosses.

KEY WORDS : Correlation, path analysis, backcross, sesame

Sesame is one of the important oil seed crops in India. The crop improvement practices in this crop are usually through pure line breeding. The approach of backcross to both the parents is an important study for the selection programme. In this study, an attempt is made to study the association of characters in backcrosses.

MATERIALS AND METHODS

The study was conducted at the Annamalai University, Annamalainagar, Tamilnadu during Summer 1992. One basic cross TSS 4 / Si 1125 was backcrossed to both parents *viz.*, TSS 4 and Si 1125. The crosses are : B1 = TSS 4 / Si 1125 // TSS 4 and B2 = TSS 4 / Si 1125 // Si 1125. The progenies of BC₁F₂ generation of these two backcrosses were utilized for the study. Three hundred progenies in each cross were studied. Observations were recorded for branches, capsules on mainstem, capsules on branches, seeds/capsules, 1000-seed weight and seed yield. The simple correlation was worked out and partitioned into direct and indirect effects by path analysis.

RESULTS AND DISCUSSION

A knowledge of association between yield and its components is useful to make simultaneous selection of more than one character. The correlation analysis helps in determining the direction and number of characters to be considered in improving the yield. The correlation coefficients between seed yield and yield components in B1 and B2 are presented in Table 1. Seed yield was highly correlated with branches, capsules on mainstem and capsules on branches in both the crosses. Zhan (1983), Babu and Sivasubramanian (1993), Chandrasekara and Ramianareddy (1993) and Rai *et al.* (1997) also reported the same finding. Gupta and Labana (1983) and Ramakrishnan and Soundrapandian (1990) reported that capsules per plant correlated with seed yield. The character capsules on mainstem had significantly positive correlation with branches in B2 only. Capsules on branches had significantly positive correlation with branches and capsules on mainstem in both B1 and B2. The characters *viz.*, seeds/capsule and 1000-seed weight had no

Table 1. Simple correlation coefficients between seed yield and yield contributing characters in sesame.

Character		Branches	Capsules on mainstem	Capsules on branches	Seeds/capsule	1000-seed weight	Seed yield
Branches	B1	1.00	0.36	0.90**	-0.59	-0.23	0.85**
	B2	1.00	0.72*	0.83**	0.06	0.35	0.83**
Capsules on mainstem	B1		1.00	0.68*	-0.30	0.54	0.75*
	B2		1.00	0.90**	0.55	0.59	0.95**
Capsules on branches	B1			1.00	-0.57	0.12	0.98**
	B2			1.00	0.46	0.56	0.98**
Seeds/capsule	B1				1.00	0.22	-0.48
	B2				1.00	0.60	0.52
1000-seed weight	B1					1.00	0.20
	B2					1.00	0.65

*, ** denotes significant at 5% and 1% respectively ; B1 = TSS 4/ Si 1125 //TSS 4 ; B2 = TSS 4/ Si 1125 // Si 1125

Table 2. Direct (diagonal) and indirect effects of yield components on seed yield in sesame

Character		Branches	Capsules on mainstem	Capsules on branches	Seeds/capsule	1000-seed weight	Correlation coefficients with seed yield
Branches	B1	0.06	0.06	0.80	-0.07	0.003	0.85**
	B2	0.19	0.20	0.39	0.004	0.041	0.83**
Capsules on mainstem	B1	0.02	0.17	0.60	-0.03	-0.007	0.75*
	B2	0.14	0.28	0.43	0.04	0.07	0.95**
Capsules on branches	B1	0.06	0.11	0.88	-0.06	-0.002	0.98**
	B2	0.16	0.25	0.47	0.03	0.06	0.98**
Seeds/capsule	B1	-0.04	-0.05	-0.50	0.11	-0.003	-0.48
	B2	0.01	0.15	0.22	0.06	0.07	.52
1000-seed weight	B1	-0.01	0.09	0.11	-0.03	-0.01	0.20
	B2	0.07	0.17	0.26	0.04	0.12	0.65
Residual effect	B1 = 0.013						
	B2 = 0.005						

*, ** denotes significant at 5% and 1% respectively ; B1 = TSS 4/ Si 1125 // TSS 4 ; B2 = TSS 4/ Si 1125 // Si 1125

association with other characters in both the crosses. Krishnadoss (1984) and Ramakrishnan and Soundrapandian (1990) also reported that 1000-seed weight had no association with seed yield. However, Zhan (1983), Babu and Sivasubramanian (1993), Chandrasekara and Ramanareddy (1993), Rai *et al.*, (1997) reported that seeds/capsule had positive association with seed yield and Ramakrishnan and Soundrapandian (1990) reported that seeds/capsule had positive association with branches.

The residual effect of path analysis in both B1 and B2 are 0.013 and 0.005 respectively indicates the appropriateness of the characters chosen for the study. The path analysis revealed that in both B1 and B2, the character capsules on branches had high positive direct effect on seed yield. The character capsules on mainstem had moderate effect on seed yield in B1 and low in the cross B2. The characters, branches and capsules on mainstem had high indirect effect on seed yield through capsules on branches. Seeds/capsule had high negative indirect effect on seed yield through capsules on branches on B1 and moderate positive indirect effect in B2. Thousand seeds had negligible and low indirect effect through capsules on mainstem on seed yield in B1 and B2 respectively. Chandrasekara and Ramanareddy (1993) and Rai *et al.*, (1997) reported that positive direct effect of branches and negative direct effect of 1000-seed weight, seeds/capsule and capsules on the main stem on seed yield.

To conclude, branches, capsules on mainstem and capsules on branches had association with seed yield in correlation analysis. The path analysis revealed that capsules on branches had high direct effect on seed yield. The association analysis of B1 and B2 showed little difference in the association of characters. However, the selection on capsules on branches will give simultaneous selection on seed yield in both the backcrosses.

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