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INBREEDING EFFECTS ON SEED YIELD IN ISABGOL (*PLANTAGO OVATA* FORSK)

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ABSTRACT

Inbreeding effect on seed yield was studied in 125 S_1 lines derived from 25 genetic stock of isabgol. Open pollinated genotypes manifested higher seed yield than their most of the S_1 lines studies. Maximum (45.78%) and minimum (1.00%) inbreeding depression was recorded by the S_1 lines of the genotypes FR 161 and DRP 64, respectively. The S_1 lines of the genotypes FR 169, DRP 63 and DRP 52 exhibited higher seed yield and least inbreeding depression suggested the preponderance of additive gene action and as such these cultivars could be improved by selection.

Key words: Inbreeding, heterozygous balance, isabgol.

Psyllium popularly known as isabgol (*Plantago ovata* Forsk) has great commercial and medicinal importance due to its thin rosy white membranous coating (husk) on the seed. As is common with other cross pollinated crops, inbreeding in isabgol is expected to cause inbreeding depression. But the data on the nature and magnitude of inbreeding depression in this species is scanty. Knowledge on the effect of inbreeding would be of immense help for formulating breeding programme. Keeping this in view an investigation was under taken to evaluate 125 S_1 lines derived from 25 genetic stocks of isabgol.

Twenty five genotypes of isabgol were planted during rabi season 1991-92 at Mandor (Jodhpur). Five spikes in each genotypes in different plants were selfed to raise the S_1 lines. In rabi 1992–93, 125 S_1 lines were planted along with their open pollinated materials in R.B.D. with three replications. Each plot consisted of one 5 m long row with a space of 30 cm and plant to plant distance 5 cm. Seed yield per plot was recorded at maturity and inbreeding depression was estimated as per usual procedure.

Most of the open pollinated genotypes revealed significant differences with regard to seed yield. The seed yield of open pollinated genotypes and range of inbreeding depression

(%) of 5 S_1 lines in each genotype are presented in Table 1. The seed yield was observed to be invariably higher in open pollinated genotypes than their most of the S_1 lines. The S_1 line of genotypes EC-159429 (37.53–40.60%), EC-159600 (37.23–40.07%), FR-161 (42.10–45.78%) and DRP-79 (37.39–42.60) exhibited high inbreeding depression suggested that nonadditive gene action are operative in the inheritance of this complex trait. The S_1 lines of genotypes EC-159429, FR-161 and EC-159600 also possessed higher seed yield. Hence, these cultivars could be used in hybridization programme. But the lack of stable male sterile line and minute floral structure are the important bottleneck for the practical purposes. Very low inbreeding depression or no inbreeding depression was observed in the S_1 lines of genotypes DRP-63 (1.03–1.09%), DRP-64 (1.00–2.05), FR-156 (1.05–1.55%), DRP-66 (1.02–6.01%), FR-169 (3.06–5.02%) and DRP-71 (2.01–5.12%) indicated that the material had narrow genetic base and deleterious effects inflicted on the balanced heterozygous genetic system which is a cause of restricted cultivation of this spices. This finding is in conformity with that in alfalfa. The S_1 lines of genotypes FR-169, DRP-63 and DRP-52 manifested high seed yield and least inbreeding depression suggested the preponderance of additive gene action and as such these genotypes could be improved safely by selection.

Table 1. Seed yield of open pollinated genotypes and inbreeding depression in isabgol

Genotype	Seed yield per plot (g)	Inbreeding depression (%)
EC-159429	226	37.53–40.26
EC-159600	188	37.23–40.07
PG-4488	188	17.73–17.33
FR-161	190	42.10–45.78
FR-185	160	11.25–21.87
DRP-63	191	1.03–1.09
DRP-46	120	5.00–9.02
DRP-71	165	2.01–5.12
DRP-64	181	1.00–2.05
Sel-10	176	23.67–27.84
DRP-67	183	3.03–7.10
DC-619	168	4.00–8.00
FR-169	191	3.06–5.02
DRP-56	155	2.00–12.90
DRP-52	208	6.00–9.00
FR-159	164	4.26–15.85
DRP-56	209	13.39–24.40
GR-2	120	11.11–15.00
FR-200	141	9.92–39.71
DRP-70	163	22.00–22.69
DRP-66	183	1.02–6.01
FR-164	166	3.84–7.58
DRP-79	164	37.39–42.60
FR-156	185	1.05–1.55
KLI-25	183	4.30–8.23
Mean	174	
SEm ±	4.84	
Range	120–226	