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Short Communication

A High Yielding Isabgol (*Plantago ovata* Forsk) Genotype for Arid Western Plain of Rajasthan

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Blond psyllium, popularly known as isabgol (*Plantago ovata* Forsk), has great commercial and medicinal importance due to its thin rosy husk (white membranous coating) on the seed. The husk, as well as seed of isabgol is used as bulk laxative in habitual constipation, diarrhea and chronic dysentery diseases. The mucilage may be used as a substitute for agar, stabilizing agent in ice cream, an ingredient in chocolate, formation of pharmaceutical tablets, in cosmetics, etc. (Gupta, 2000). India holds monopoly in the world trade and production of psyllium (Farooqi and Sreeramu, 2001) and earns foreign exchange from exports of psyllium husk and seed. In India, Rajasthan is the largest isabgol growing state occupying an area of around 158 thousand hectares producing of 42.9 thousand tones with productivity of 272 kg ha^{-1} (Anonymous, 2006-07). Other important isabgol growing states are Gujarat, Punjab, Haryana and to a small extent Maharashtra and UP.

A very few varieties of this medicinally important crop are available to the farmers. To increase the production, it is necessary to develop suitable varieties with high yield and consistent performance in different environments, particularly in arid western plain of Rajasthan. A high yielding variety Rajasthan Isabgol-1 (RI 1), identified by the State Varietal Evaluation Committee in September 2006, has resulted from a series of varietal development program at Agricultural Research Station, Mandor, Jodhpur.

RI 1 was developed through mutation breeding in RI 89 (Radiated with γ-rays) and the genotypes

Table 1. Seed yield (kg ha^{-1}) of comparative yield trials of isabgol over years and locations

Entry	2001-02 (2)	2002-03 (2)	2003-04 (4)	2004-05 (4)	2005-06 (3)	2006-07 (3)	Pooled mean (14)	Per cent increase
RI 1	1281	1154	1262	995	1045	767	1074	–
RI 89 (C)	1082	984	1071	976	965	734	968	10.9
GI 2 (C)	–	–	1197	858	1143	664	974	10.3
HI 2 (C)	–	–	1215	824	978	661	934	15.0

Figure in parentheses are number of locations.

Table 2. Important characteristics of isabgol variety RI 1 compared to checks (2000-01 to 06-07)

Character	RI 1	Check varieties			Per cent increase over		
		RI 89	GI 2	HI 2	RI 89	GI 2	HI 2
Seed yield kg ha^{-1}	1074.0	968.0	974.0	934.0	10.9	10.3	15.0
Days to 50% flowering	73.0	73.0	73.0	74.0	0.0	0.0	1.04
Days to maturity	115.0	116.0	116.0	115.0	-0.9	-0.9	0.0
Plant height (cm)	33.6	32.8	34.1	31.8	2.4	-1.5	5.7
Tillers/plant (No.)	5.9	5.1	5.1	5.0	15.7	15.7	18.0
Spikes/plant (No.)	40.0	33.8	33.2	33.3	18.3	20.5	20.1
Spikes length (cm)	4.5	4.2	3.9	4.0	7.1	15.4	12.5
Dry fodder yield kg ha^{-1}	3542.0	3031.0	2664.0	2214.0	16.9	33.0	60.0
Downy mildew reaction (PDI)	6.0	16.2	28.8	20.4	–	–	–
Swelling factor (%)	9.7	9.7	–	–	–	–	–

Table 3. Seed yield performance of isabgol variety RI 1 in the adaptive trials during rabi, 2004-05 at Adaptive Trial Centre, Rampura and at farmer's field in Jodhpur District

Variety	ATC Rampura	Per cent increase over checks	Farmer's field	Per cent increase over checks
RI 1	988	–	1255	–
RI 89 (C)	702	40.7	1175	6.8
GI 2 (C)	845	16.9	–	–
CD 5%	138	–	–	–

recorded more than 10% higher seed yield (1074 kg ha^{-1}) over various checks in multilocation trials conducted at Jodhpur, Jalore, Jaisalmer, Udaipur and Sumerpur during 2000-01 to 2006-07 (Table 1). Other yield attributing characters, i.e., swelling coefficient, downy mildew disease **resistance/reaction**, etc. are also depicted (Table 2). It is earlier in maturity (115 days) to two checks viz., RI 89 and GI 2. Average plant height of the variety is 33.6 cm. It has produced more number of tillers per plant (5.9) and spikes per plant (40) with longer spikes (4.5 cm) over the checks. The genotype has brown seed color and has 9.65% swelling factor. It showed moderate level of resistance to downy mildew disease.

In adaptive trials (Table 3), RI 1 recorded 40.7 and 16.9% seed yield increase over check, RI 89 (702 kg ha^{-1}) and GI 2 (845 kg ha^{-1}) and at farmer's field it produced 1255 kg ha^{-1} with 6.8% superiority over RI 89 (1175 kg ha^{-1}).

Thus, the variety has inbuilt mechanism for higher seed yield, more number of longer spikes and moderate downy mildew resistance, which offered a promise to increase the production and productivity of isabgol in Rajasthan.

References

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