

RESEARCH NOTE

Varietal screening of isabgol (*Plantago ovata* Forsk.) against downy mildew

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ABSTRACT

Isabgol (*Plantago ovata* Forsk.) is important medicinal plant. Isabgol crop suffers a lot due to fungal diseases. Among all diseases, downy mildew caused by *Peronospora plantaginis* Underwood is the most important and wide spread disease, which appears in severe form every year and causes extensive damage to the crop. Therefore screenings of 15 germplasm against downy mildew disease was carried out.

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India, with its varied agro-climatic conditions and topography, is considered as the botanical garden of the world. Its herbal wealth constitutes about 5000 species of known medicinal and aromatic plants, which have been used in various systems of medicine such as Ayurveda, Siddha and Unani to treat human since time immemorial. Besides, the idea of using medicinal plants to treat livestock is not new to India, making thus the importance of medicinal plants much more interesting in agriculture oriented country including India (Anonymous, 2001a). Isabgol (*Plantago ovata* Forsk.) is one of the important medicinal plants. It is also known as blond psyllium and belongs to the family Plantaginaceae of the order Plantaginales. It is a native of Mediterranean region, especially south of France (Rastogi and Mehrotra, 1993). It was introduced in India during Muslim attack in middle ages. The name "Isabgol" is derived from two Parsian words "Isap" and "Ghol" meaning horse's ear means shape of seeds, which resembles the ear of horse. In India, it is traditionally cultivated in North Gujarat, Kutch and South-western Rajasthan. Likewise, Haryana, Madhya Pradesh and Punjab produce small quantity of isabgol. Rajasthan is the second largest growing state after Gujarat. Mehsana, Banaskantha, Jamnagar, Rajkot

and Kutch districts are main tracks of isabgol cultivation in Gujarat (Rathore and Pathak, 2002d). Isabgol crop suffers a lot due to fungal and bacterial diseases, but fungal diseases are predominant. Damping-off seedlings, wilt, downy mildew and powdery mildew are major fungal diseases. Among these, downy mildew is the most important and wide spread disease which appears in sever form every year and causes extensive quantitative as well as qualitative damage to the crop and makes the cultivation of isabgol crop unprofitable (Rathore and Pathak, 2002b). Downy mildew causes considerable reduction in seed yield and yield attributes of isabgol. It is reported to be caused by *Peronospora alta* Fuckel (Kapoor and Chowdhary, 1976), *Pseudoperonospora plantaginis* Underwood (Sharma and Pushpendra, 1998) and *Peronospora plantaginis* Underwood (Desai and Desai, 1969). *Peronospora plantaginis* is a commonly prevailing pathogen of isabgol downy mildew in Gujarat

The varietal resistance is an ecofriendly method for management of plant diseases. Hence a search was made to locate resistant germplasm/culture. Fifteen germplasm/cultures, collected from the Medicinal and Aromatic Plants, ICAR scheme, Anand Agricultural University, Anand (Table

1) were screened under field conditions against downy mildew disease of isabgol. Three lines of each germplasm/culture were grown. To induce a disease pressure, all the entries were given foliar sprays of the inoculum (sporangial suspension) after 40 days of sowing. The spraying was carried out during early morning and at late evening.

When the crop was at flowering stage (*i.e.* after 90 days of sowing), 15 plants of each of the germplasm/cultures were graded for disease intensity as per below mentioned scale.

Observations recorded :

After 10 days of final spray, following observations were recorded and compared with the untreated check *i.e.* control.

Disease index :

Disease index of downy mildew of isabgol was recorded 10 days after the final spray. Hundred leaves were collected randomly from net plot area in each plot for scoring the disease. These selected leaves were graded into six classes using 0-5 rating scale on the basis of per cent area of plant leaf showing downy mildew infection through visual observations.

Disease rating scale (Rathore and Pathak, 2001)

Class	Per cent necrotic leaf area of plant
0	Healthy plants (no infection)
1	1 to 20 per cent plant leaf area covered
2	> 20 to 40 per cent plant leaf area covered
3	> 40 to 60 per cent plant leaf area covered
4	> 60 to 80 per cent plant leaf area covered
5	> 80 per cent plant leaf area covered.

The PDI was calculated by adopting the following equation (McKinney, 1923).

$$\text{Per cent disease intensity (PDI)} = \frac{\sum (\text{Class value} \times \text{Frequency})}{\text{Total number of plants observed} \times \text{Maximum rating}} \times 100$$

Results of 15 germplasms/cultures screened under field conditions for their reactions against downy mildew disease revealed that none of the germplasms/cultures remained completely free from the downy mildew infection. The per cent disease intensity (PDI) ranged from 10.66 to 65.2 per cent. The germplasms/cultures UR-188, MBN-29, JI-83, Niharika, and MB-322 were found resistant showing 10.66, 11.60, 13.46, 14.66 and 16.00 PDI, respectively. JI-77 (23.46

Table 1 : Germplasm/cultures screened under field conditions against downy mildew disease of isabgol

HI-5	JI-56	MB-322
HI-2	JI-77	Niharika
HI-96	JI-83	IP-II
JI-80	MBN-2	UR-188
JI-53	MBN-29	GI-1

Table 2 : Screening of different germplasms/cultures against downy mildew of isabgol under field conditions

Germplasms/cultures	Per cent disease intensity	Grade*
HI-5	65.20	HS
HI-2	61.06	HS
HI-96	41.20	S
JI-80	44.93	S
JI-53	24.13	MR
JI-56	41.73	S
JI-77	23.46	MR
JI-83	13.46	R
MBN-2	45.06	S
MBN-29	11.60	R
MB-322	16.00	R
Niharika	45.06	R
IP-II	32.80	MR
UR-188	10.66	R
GI-1	34.40	MR

* Immune : 0 (No symptoms)
 Resistant (R) : > 0 to 20 per cent infection
 Moderately resistant (MR) : > 20 to 40 per cent infection
 Susceptible (S) : > 40 to 60 per cent infection
 Highly susceptible (HS) : > 60 per cent infection

PDI), JI-53 (24.13 PDI), IP-II (32.80 PDI) and GI-1 (34.40 PDI) were found moderately resistant, whereas HI-96 (41.20 PDI), JI-56 (41.73 PDI), JI-80 (44.93 PDI) and MBN-2 (45.06 PDI) were found susceptible. Only two germplasms/cultures viz., HI-2 and HI-5 were highly susceptible against downy mildew of isabgol with 61.06 and 65.20 PDI, respectively

Conclusion :

None among 15 germplasms/cultures screened was found completely free from infection by downy mildew. HI-5 and HI-2 were found highly susceptible, whereas UR-188, MBN-29, JI-83, Niharika and MB-322 were found resistant with minimum per cent disease intensity.

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