



## Relative Susceptibility of Isabgol Varieties/ Genotypes to the Incidence of Aphids

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### Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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### ABSTRACT

Among the varieties/ genotypes of isabgol evaluated for their relative susceptibility to aphid, *A. gossypii*, three genotypes Anand early- 10, Kutch local and Niharika showed less infestation as compared to the released cultivars. These genotypes may be used as a source of resistance in breeding programme for development of insect resistant varieties.

*Keywords:* Isabgol; Aphid; genotypes; varieties; susceptibility.

### 1. INTRODUCTION

India is rich in medicinal plant wealth, about 2,500 plants are known for their medicinal values. Out of these, 500 plants are utilized for commercial value in formulation of medicines by different firms and pharmaceuticals [1]. Out of

this, Isabgol (*Plantago ovata* Forskel) is most important medicinal plant in India and also a rich source for earning foreign exchange.

Isabgol is the common name used for several members of the plant genus *Plantago* whose seeds are used commercially for the production

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of mucilage. The genus *Plantago* contains over 200 species [2,3,4,5,6].

In the successful production of isabgol crop, insect pests and diseases are of major limiting factors. Among insect pests attacking isabgol, the aphid, *A. gossypii* (Aphididae: Hemiptera) has been reported as major pest of isabgol [7,8]. The aphids are active sap suckers at bloom and later causing considerable loss to the crop and synthetic insecticides used may cause reduction in profit and export potential both. It is not advisable to use costly and persistent insecticides. Therefore, use of non chemical practices to manage aphid becomes necessary. Cultural measures such as use of resistant cultivars [9] have been evaluated by few earlier workers in relation to aphid incidence on isabgol. In spite of regular occurrence of this pest on isabgol crop and causing economic losses, no much work has been done on ecofriendly approaches for its management. To evaluate relative susceptibility of various varieties/ genotypes against aphid infesting isabgol crop, the present investigation was carried out.

## 2. MATERIALS AND METHODS

An attempt was made to study the relative susceptibility of isabgol varieties/ genotypes to the incidence of aphids, a most common and destructive pest of the crop. For the purpose, the varieties/ genotypes grown at the farm of Medicinal and Aromatic Plants, AAU, Anand were utilized. There were three varieties and three genotypes viz; Gujarat Isabgol-1, Gujarat Isabgol-2, Gujarat Isabgol-3, Niharika, Anand early- 10 and Kutch local. Each of the variety/ genotypes was grown in about 150 sq. metre area. The seeds of each variety/ genotype were sown during 4<sup>th</sup> week of November and 2<sup>nd</sup> week of December during 2013 and 2014, respectively. The crop was raised by keeping 30 cm distance between two rows. Necessary routine agronomical practices like weeding, irrigation, interculturing and application of fertilizers were carried out as and when required. All the experimental plots were kept free from any application of chemical pesticides, except single blanket spray application of fungicide (Metalaxyl-MZ) which was given to protect the crop from powdery mildew disease. Proper care was taken to raise the crop.

In order to record the observations on aphid population in various varieties/ genotypes of

isabgol and to analyze the data, the whole plot under each variety/ genotype was divided into four sub-plots of equal size. Each sub plot was further divided into four segments. One quadrat each of 1 m x 1 m was marked in each segment. Each quadrat was considered as one replication. Five plants were randomly selected from each quadrat and tagged for recording the observations of aphid incidence.

Three spikes from each selected plant were critically observed for the presence of aphids and counted its number. Such observations were recorded at weekly interval starting from the appearance of aphid and continued till the maturity of the crop. Total 10 observations were made during both the years of study. Finally, the population of aphids/ spike was worked out. The data thus obtained were statistically analysed by using Randomized Block Design.

## 3. RESULTS

In order to assess the relative susceptibility of three varieties and three genotypes of isabgol to aphid incidence, the observations were recorded at weekly interval. The data thus obtained are presented in Table 1.

Data (Table 1) indicated that the aphid population differed significantly in all the tested varieties/genotypes. Maximum incidence of the pest was found in Gujarat isabgol-3 followed by Gujarat isabgol-1 and Gujarat isabgol-2. Minimum numbers of aphids were registered in genotype Kutch local followed by Anand early-10 and Niharika. Pooled data computed for both the years indicated that among the evaluated isabgol varieties/ genotypes, Gujarat isabgol-3 variety found most susceptible to aphid and registered more number of aphids (7.45 aphids/spike) followed by Gujarat isabgol-1 (6.95 aphids/spike) and Gujarat isabgol-2 (4.93 aphids/spike). With respect to aphid counts, former both the cultivars of isabgol found at par and registered significantly higher population of the pest than rest of the cultivars/ genotypes. Kutch local and Anand early- 10 showed least number of aphids (0.67 to 0.99 aphid/ spike). Both these genotypes exhibited significantly low incidence of aphid over other varieties/genotypes. The varieties/ genotypes evaluated under the study was in the order of susceptibility to aphid incidence as: Gujarat isabgol-3 > Gujarat isabgol-1 > Gujarat isabgol-2 > Niharika > Anand early- 10 > Kutch local.

**Table 1. Incidence of aphid, *A. gossypii* on different varieties/ genotypes of isabgol (Pooled over periods and years)**

Varieties/ genotypes	Mean no. of aphids/spike		
	2013	2014	Pooled
Gujarat Isabgol-1	2.68e* (6.68)	2.78e (7.23)	2.73d (6.95)
Gujarat Isabgol-2	2.37d (5.12)	2.29d (4.74)	2.33c (4.93)
Gujarat Isabgol-3	2.71e (6.84)	2.94f (8.14)	2.82d (7.45)
Niharika	1.44c (1.57)	1.50c (1.75)	1.47b (1.66)
Anand early- 10-10	1.17b (0.87)	1.27b (1.11)	1.22a (0.99)
Kutch local	1.08a (0.67)	1.08a (0.67)	1.08a (0.67)
<b>S. Em. ±</b>			
Treatment (T)	0.02	0.02	0.05
Period (P)	0.03	0.03	0.16
Year (Y)	-	-	0.01
T x P	0.07	0.08	0.29
T x Y	-	-	0.02
Y x P	-	-	0.03
T x Y x P	-	-	0.08
<b>C. D. at 5%</b>			
T	0.06	0.07	0.19
P	0.08	0.09	0.52
(Y)	-	-	0.03
T x P	0.20	0.22	0.82
T x Y	-	-	0.06
Y x P	-	-	0.09
T x Y x P	-	-	0.21
C. V. (%)	7.35	8.16	7.78

\*Figures are  $\sqrt{x + 0.5}$  transformed values whereas those in parentheses are re-transformed values  
Treatment means with letter(s) in common are not significant by lsd at 5 % level of significance

#### 4. DISCUSSION

As the isabgol varieties/genotypes assessed for their relative susceptibility against aphid incidence vary from one region to another region and therefore the present finding regarding the susceptibility of varieties/genotypes to the aphid could not be compared and discussed. None of the earlier researcher has studied for screening of the isabgol varieties/genotypes against aphid, except the solitary report of [10] who revealed that none of the isabgol accessions categorized as immune. However, two (MIB-2 and MIB-153) were categorized as resistant, five (MIB-5, MIB-122, MIB-121, MIB-129 and MIB-123) as moderately resistant, two (IR-158 and MIB-125) as susceptible, while one (GJ-2) as highly susceptible to *A. gossypii* attack.

#### 5. CONCLUSION

The varieties/ genotypes evaluated under the study were in the order of susceptibility to aphid incidence as: Gujarat isabgol-3 > Gujarat isabgol-1 > Gujarat isabgol-2 > Niharika > Anand early- 10 > Kutch local.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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