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SCREENING OF DIFFERENT GENOTYPES OF BLOND PSYLLIUM FOR RESISTANCE AGAINST APHID, *RHOPALOSIPHUM MAIDIS* (FITCH)

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ABSTRACT

The experiment on screening of different genotypes of blond psyllium, *Plantago ovata* Forsk. for resistance against aphid, *Rhopalosiphum maidis* (Fitch) was conducted at S.K.N. College of Agriculture, Jobner. Out of nine genotypes of blond psyllium (GI–2, HI–2, RI–9808, RI–3026, RI–3025, RI–89, RI–9709, Jalore Local and Barmer Local) screened against aphid, *R. maidis*. Based on the statistical categorization (^X±ó) of mean pooled aphid population, the genotype RI–9808 was found to be least susceptible (<34.59 aphids/ tiller) and RI–3025 and RI–3026 as highly susceptible (>45.67 aphids/ tiller). The rest of the genotypes were found as moderately susceptible. The order of different genotypes possessing increasing population of aphid was found to be RI–9808, RI–89, Jalore local, Barmer local, RI–9709, GI–2, HI–2, RI–3025 and RI–3026. The bio–physical parameters of different blond psyllium genotypes, *viz*., mean plant height (cm), tillers per plant, spike length (cm), days to 50 per cent flowering and number of spikes per plant revealed negative significant correlation with aphid population (r=–0.86, –0.95, –0.77, –0.63 and –0.87, respectively). The days to maturity of different blond psyllium genotypes did not reveal significant correlation with the mean aphid population on different genotypes.

Key words: Blond psyllium, genotypes, aphid, *Rhopalosiphum maidis*, susceptible.

INTRODUCTION

Among the insect pests causing damage to blond psyllium crop are aphid, *Rhopalosiphum maidis* (Fitch), field cricket, *Gryllus* sp.; whitefly, *Bemisia tabaci* (Genn.); *Aphis gossypii* Glov, and field termites, *Odontotermes obesus* Rambur and *Microtermes obesi* Holmgren (Jindla *et al*., 1984; Sagar, 1989 and Kumawat, 2008). Meagre information is available in the literature on the management of insect pests infesting blond psyllium. The crop is severely damaged by the aphid, *R. maidis* through sucking of the cell sap which weakens the plants. This insect also discharges honey dew which favours the growth of sooty mould. The photosynthetic proficiency of the plant is adversely affected by the presence of sooty mould on leaves. Substantial losses due to insect pests which have not been fully investigated could be prevented at minimum cost and without hazards to man and desirable components of environment. Such an approach envisages the necessity of understanding the ecological back ground while considering the entire spectrum of control methodology. Complete details of abiotic and biotic characteristics of environment of the pest must be fully investigated and appropriated. The chemical control has been suggested by some researchers to combat the insect pests of blond psyllium but due to one or the other reasons, it could not become universal remedy for the protection of the crop. The cultivation of resistant varieties involves no additional cost for insect pest management as the morphological characters of different varieties of crops are associated with feeding and oviposition deterrent for insect pests; making a variety resistant. It is well known that certain genotypes of crops are less attacked by a specific insect pest than others because of natural resistance.

MATERIALS AND METHODS

The crop was raised in a simple randomized block design with nine genotypes (GI–2, HI–2, RI–9808, RI–3026, RI–3025, RI–89, RI–9709, Jalore Local and Barmer Local) and each replicated thrice. The plot size was 3.0 x 0.6 sqm accommodating two rows at row to row and plant to plant spacings of 30 cm and 5 cm, respectively. The observations on aphid population were recorded right from their appearance to harvesting of the crop at weekly interval. The population of aphid was recorded in early morning hours. Five plants were randomly selected and tagged in each plot and the population of aphids were counted on one tiller per plant visually (absolute counting). The biophysical parameters, *viz.,* plant height, number of tillers per plant, spike length, days to 50 per cent flowering, days

of maturity and number of spikes per plant of each genotype was recorded for correlation studies.

The data obtained on aphid population from experimental field were transformed into log (X + 1) values and subjected to statistical analysis (analysis of variance). The peak aphid population of blond psyllium genotypes recorded in the crop season was categorised on the basis of formula as under:

$$X \pm \sigma$$

Where,

X = Mean of the peak aphid population

σ = Standard deviation

RESULTS AND DISCUSSION

Population of aphid, *R. maidis* on different genotypes: The population of aphid, *R. maidis* on different genotypes of blond psyllium, *P. ovata* has been presented in Table 1, Fig.1 (pooled data of*Rabi,* 2006–07 and *Rabi,* 2007–08). The first mean observation on aphid population was recorded on 6th January. The population on 13th January on different genotypes of blond psyllium was in the range of 3.50 to 7.50 aphids/ tiller. The genotype having low population was RI–9808 (3.50 aphids/ tiller). The genotypes having highest population were RI–3025 (7.50 aphids/ tiller) and RI–3026 (7.04 aphids/ tiller) which were found at par each other. The genotypes in middle order were found, *viz*., RI–89, Jalore local, Barmer local, HI–2 and GI–2, which were found at par each other (non significant group). On 20th January the population on different genotypes ranged from 10.63 to 15.87 aphids/ tiller. It was minimum on genotype RI–9808 which was followed by RI–9709, RI–89 and Barmer local. The genotypes RI–3026 harboured maximum population (15.87 aphids/ tiller) which was found a non significant group together with RI–3025, HI–2 and GI–2. A progressive increase was recorded on 27th January in which the aphid population ranged from 19.24 to 27.87 aphids/ tiller. The population was minimum on genotype RI–9808 (19.24 aphids/ tiller) which was found at par with RI–9709 (20.87 aphids / tiller). The highest population was recorded on genotype RI–3026 (27.87 aphids/ tiller) which formed a non significant group with genotype RI–3025, HI–2, GI–2, Barmer local RI–89 and Jalore local.

On 3rd February, the population on different genotypes of blond psyllium ranged from 33.58 to 53.73 aphids/ tiller.

Table 1. Population of aphid, *Rhopalosiphum maidis* (Fitch) on different genotypes of blond psyllium, *Plantago ovata* Forsk. (Pooled, Rabi, 2006–07 and Rabi, 2007–08)

S. No.	Genotypes	Mean aphid population per tiller									
		6th Jan.	13th Jan.	20th Jan.	27th Jan.	3rd Feb.	10th Feb.	17th Feb.	24th Feb.	3rd March	Mean
1.	GI–2	1.24 –	5.73 (0.83)	14.23 (1.18)	25.90 (1.43)	48.94 (1.70)	102.87 (2.02)	83.57 (1.93)	48.84 (1.70)	36.14 (1.57)	43.24
2.	HI–2	1.24 –	5.50 (0.81)	14.87 (1.20)	26.03 (1.43)	48.14 (1.69)	101.17 (2.01)	82.77 (1.92)	49.34 (1.70)	39.80 (1.61)	43.36
3.	RI–9808	0.90 –	3.50 (0.65)	10.63 (1.07)	19.24 (1.31)	33.58 (1.54)	73.20 (1.87)	54.70 (1.75)	37.13 (1.58)	24.15 (1.40)	30.20
4.	RI–3026	1.64 –	7.04 (0.91)	15.87 (1.23)	27.87 (1.46)	53.73 (1.74)	106.90 (2.03)	87.14 (1.95)	55.74 (1.75)	45.33 (1.67)	47.20
5.	RI–3025	1.57 –	7.50 (0.93)	15.20 (1.21)	27.44 (1.45)	51.53 (1.72)	104.33 (2.02)	84.87 (1.93)	52.73 (1.73)	44.60 (1.66)	45.86
6.	RI–89	1.30 –	4.90 (0.77)	13.10 (1.15)	24.90 (1.41)	37.04 (1.58)	92.94 (1.97)	59.27 (1.78)	40.34 (1.62)	26.17 (1.43)	35.23
7.	RI–9709	1.37 –	4.70 (0.76)	12.70 (1.14)	20.87 (1.34)	47.14 (1.68)	98.87 (2.00)	80.77 (1.91)	46.27 (1.67)	41.04 (1.62)	41.59
8.	Jalore Local	1.30 –	5.40 (0.81)	13.37 (1.16)	24.77 (1.41)	36.93 (1.58)	96.87 (1.99)	62.10 (1.80)	41.87 (1.63)	27.60 (1.46)	36.46
9.	Barmer Local	1.27 –	5.40 (0.81)	13.27 (1.15)	25.54 (1.42)	36.27 (1.57)	98.60 (2.00)	73.08 (1.87)	42.40 (1.64)	28.00 (1.46)	38.04
	SEm±	–	0.02	0.02	0.02	0.03	0.03	0.04	0.05	0.04	–
	CD (p = 0.05)	–	0.06	0.05	0.06	0.08	0.08	0.13	0.14	0.13	–

Figures in parentheses are log (x+1); * Peak population of aphid during the crop season

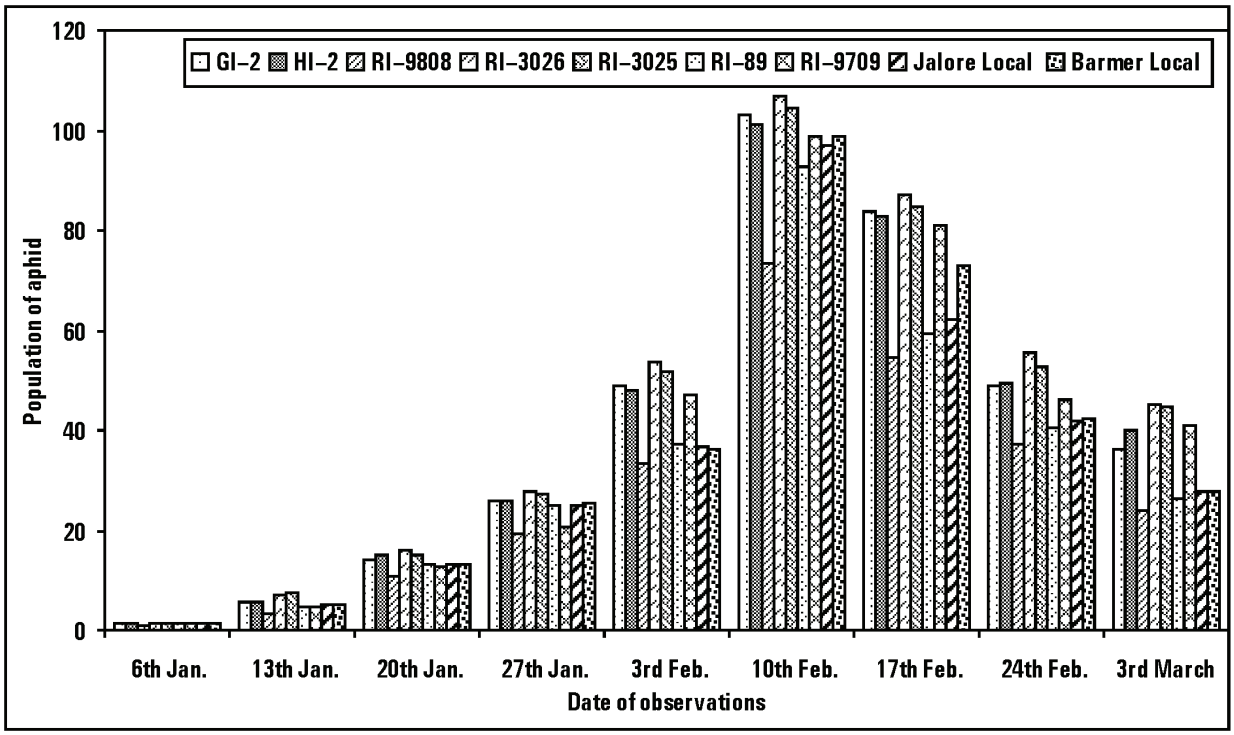

Figure 1. Population of aphid, *Rhopalosiphum maidis* (Fitch) on different genotypes of blond psyllium, *Plantago ovata* Forsk. (Pooled)

It was minimum on genotypes RI–9808 which formed a non significant group with genotypes Barmer local, RI–89 and Jalore local. The rest of the genotypes including RI–3026, RI–3025, GI–2, HI–2 and RI–9709 possessed high aphid population which formed a non significant group.

The aphid population peaked on 10th February and ranged from 73.20 to 106.90 aphids/ tiller. The maximum population was harboured by genotypes RI–3026 which showed non significant difference with RI–3025, GI–2, HI–2, RI–9709, Barmer local, Jalore local and RI–89. The minimum population was recorded on RI–9808 (73.20 aphids/ tiller) which showed significant difference with other genotypes. A gradual decreasing trend in aphid population was evident on 17th February in which the population ranged from 54.70 to 87.14 aphids/ tiller. It was minimum on genotype RI–9808 which was found at par with RI–89, Jalore local and Barmer local. The genotype possessing highest population was RI–3026 (87.14 aphids/ tiller) which was found at par with RI–3025, GI–2, HI–2, RI–9709 and Barmer local. Further decline in population was evident on 24th February. The degree of aphid incidence was more or less same with that of previous observation.

Table 2. Biophysical parameters of different genotypes of blond psyllium (Pooled, Rabi, 2006–07 and Rabi, 2007–08)

Treatments	Mean Aphid population/ tiller	Mean plant height (cm)	Tillers/ plant	Spike length (cm)	Days to 50% flowering	Maturity (days)	No. of spikes/ plant
GI–2	43.24	33.04	5.47	4.33	70.50	118.17	29.99
HI–2	43.36	33.24	5.27	4.23	70.67	119.33	28.50
RI–9808	30.20	35.76	6.90	4.67	70.67	118.50	39.97
RI–3026	47.20	31.40	4.77	3.45	69.17	116.50	28.53
RI–3025	45.86	32.47	5.27	3.65	69.67	117.00	30.07
RI–89	35.23	33.27	6.60	4.64	71.67	118.67	34.70
RI–9709	41.59	33.37	5.47	4.64	71.00	119.17	34.27
Jalore Local	36.46	33.18	6.40	4.26	70.34	118.33	31.97
Barmer Local	38.04	33.57	5.60	4.53	71.00	118.50	31.87
Correlation coefficient (r)	–0.86	0.95	–0.77	–0.63	NS	0.87	

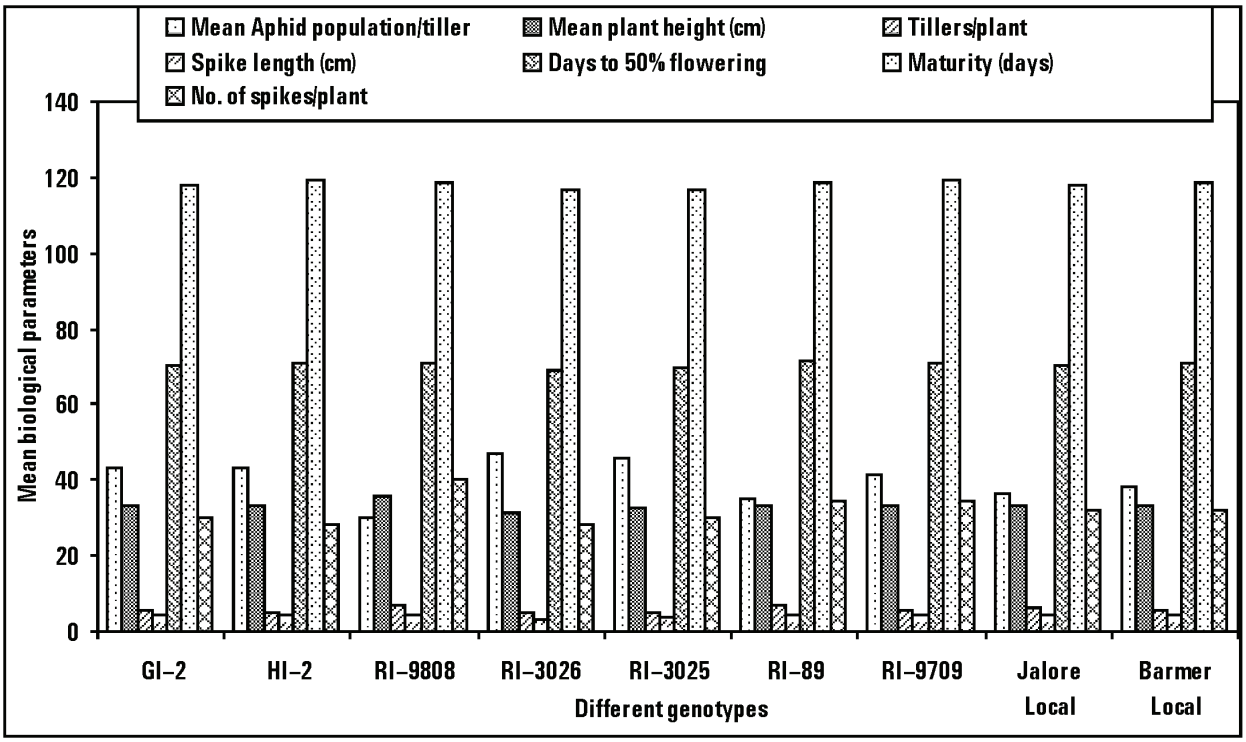

Figure 2. Biophysical parameters of different genotypes of blond psyllium (Pooled)

The population vanished after 3rd March. The order of different genotypes possessing increasing population of aphid was found to be RI–9808, RI–89, Jalore local, Barmer local, RI–9709, GI–2, HI–2, RI–3025 and RI–3026.

Based on the statistical categorization ($X \pm \sigma$) of mean pooled aphid population, the genotype RI–9808 was found to be least susceptible (<34.59 aphids/ tiller) and RI–3025 and RI–3026 as highly susceptible (>45.67 aphids/ tiller). The rest of the genotypes were found as moderately susceptible. The order of different genotypes possessing increasing population of aphid was found to be RI–9808, RI–89, Jalore local, Barmer local, RI–9709, GI–2, HI–2, RI–3025 and RI–3026.

Bio–physical parameters of different genotypes: The bio–physical parameters of various blond psyllium genotypes in two consecutive years have been presented in Table 2, Fig.2. The mean plant height (cm), tillers per plant, spike length (cm), days to 50 per cent flowering and number of spikes per plant revealed negative significant correlation (r=–0.86, –0.95, –0.77, –0.63 and –0.87, respectively). The days to maturity of different blond psyllium genotypes did not reveal significant correlation with the mean aphid population on different genotypes.

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