

SUSCEPTIBILITY OF CERTAIN WHEAT CULTIVARS TO INFESTATION WITH CEREAL APHIDS AND GLASSY CLOVER SNAILS

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Abstract

Field experiments were carried out at Etay El-Baroud Agric. Res. Station Farm (El-Beheira Governorate) during two successive wheat seasons (2010/11 and 2011/12) to study the relative susceptibility of some wheat cultivars to infestation with cereal aphids and glassy clover snails. The results revealed that, three cultivars; Misr 2, Giza 168 and Gemmeiza 7 had the least infestation by cereal aphids (37.3, 62.2 and 65.2 aphids/10 plants, respectively). On the other hand, three cultivars; Misr 2, Giza 168 and Gemmeiza 11 had the least infestation by glassy clover snails (5.6, 6.0 and 9.4 snails / 50x50 cm², respectively). Finally, two cultivars Misr 2 and Giza 168 proved the least infestation by cereal aphids and glassy clover snails.

INTRODUCTION

Wheat (*Triticum aestivum* L.) is the most important grain crop all over the world. In Egypt, it is the main winter cereal crop which gained a particular importance for human consumption. Cultivated in about 3.05 million feddan produced about 8.4 million tons with an average of 18.3 ardab / feddan in 2010/11 season. However, there is still a gap between production and consumption of wheat in the Egypt. Aphid is considered as one of the most serious pests attacking wheat causing damage to the plants either directly by sucking juice or indirectly as a vector of diseases, yield losses due to infestation with aphids differed from 7.5 to 18.7% (Tantawi,1985).

In recent years, the land snails has became one of the serious pests of wheat. The land snails caused damage to wheat crop by 43.2% after three months from germination (Mahmoud and Awad, 2008). Because of the cost and the ineffectiveness of controlling wheat pests with insecticides, the wheat breeding program has tried to incorporate varietals resistance for pest infestation into wheat cultivars.

The aim of the present investigation was to screen certain cultivars for infestation with cereal aphids and glassy clover snails in order to identify new sources of resistance variety.

MATERIALS AND METHODS

Thirteen bread wheat cultivars were evaluated for resistance to four cereal aphid species and two species of the glassy clover snail, during 2010/11 and 2011/12 seasons.

These cultivars were Sakha 93, Sakha 94, Gemmeiza 7, Gemmeiza 9, Gemmeiza 10, Gemmeiza 11, Misr 1, Misr 2, Giza 168, Sids 1, Sids 12, Sids 13 and Shandaweel 1. All cultivars were sown on Nov.27th in the first season and Nov.23th in the second season at Etay El-Baroud Agric. Res. Station Farm, El-Beheira governorate.

The aphid species were *Rhopalosiphum padi* (L.), *Schizaphis graminum* (Rondani), *Rhopalosiphum maidis* (Fitch) and *Sitobion avenae* (Fab.), while the glassy clover snails were *Monacha cartusiana* (Muller) and *Monacha obstructa* (Ferussac).

The experimental area was divided into plots 10.5 m² each, each cultivar was replicated four times in a complete randomized blocks design. All plots received the usual recommended agricultural treatments and no chemicals were used for controlling wheat pests throughout the whole period of the study.

Aphid species and glassy clover snails were counted biweekly on each wheat cultivar along the period from seedling appearance till dryness of the plants. Ten plants were picked up at random from each plot to record number of the cereal aphids. As for snails, two quadrates simple size (50x50 cm² / quadrate) were randomly chosen; at early morning, from each plot to record their number and all snails found on soil surface in the quadrate were also counted (Baker, 1988). The collected data were statistically analyzed according to Steel *et. al.*(1997). Analysis of variance were made to determine the significant differences among cultivars.

RESULTS AND DISCUSSION

1. Cereal aphids

Table (1) shows that the number of cereal aphids in second season (2011/12) was relatively higher than that of first season (2010/11). The different species of aphid found in the wheat field were : The bird cherry-oat aphid *R. padi* represent the highest overall density (49.84%), followed by greenbug *S. graminum* (33.01%). The least species appeared were english grain aphid *S. avenae* (12.54%) and corn leaf aphid *R. maidis* (4.61%). These results agree with those of Abou-Elhagag and Abdelhafez (1998), Abdel-Aziz *et. al.* (2002), El-Rawy *et. al.* (2007) and Khaled and El-Rawy (2012) who stated that the wheat cultivars are usually attacked by a complex of cereal aphid species including *R. padi*, *S. graminum*, *S. avenae* and *R. maidis*.

The highest general total mean number of cereal aphid species was recorded on Sakha 93 cultivar (229.8 aphids/10 plants) followed by Sids 13 cultivar (229.4 aphids/10 plants), then Gemmeiza 9 cultivar (199.9 aphids/10 plants) and Misr 1 cultivar (198.3 aphids/10 plants). On the other

hand, Misr 2, Giza 168 and Gemmeiza 7 cultivars demonstrated the lowest number of cereal aphid species on the basis of general mean of number; 37.3, 62.2 and 65.2 aphids/10 plants, respectively. Several researches were carried out to study genotypic difference in wheat resistance to cereal aphids (Ali *et. al.*, 1985, Salem and Khalafalla, 1998, Abou-Elhagag and Abdelhafez, 1999, Abdel-Aziz *et al.*, 2002, Ruchira and Sharma, 2002, El-Rawy *et. al.*, 2007 and Khaled and El-Rawy, 2012).

The obtained data in Table (3) reveal that, the total tow seasons mean number of cereal aphids showed a gradual increase perform with 61.6 and 138.4 aphids / 10 plants during January and February, respectively to reach during March its maximum with 206.8 aphids/10 plants then the mean number decline in April to 122.9 aphids / 10 plants. The lowest number which was recorded in January (61.6 aphids/10 plants) , this may be due to the low temperature during this month than the other ones. These results are in agreement with those of Hussien (1993), Abou-Elhagag and Abdelhafez (1998) and Abdel-Aziz *et al.*(2002) found that the maximum population density of cereal aphids occurred during March on wheat plants, the peak of cereal aphids appeared during this month due to the favorable weather conditions prevailing during this month.

2- Glassy clover snails

Data illustrated in Table (2) showed that, the number of the glassy clover snails in first season (2010/11) was relatively higher to that of second season (2011/12). The two species of the glassy clover snail in the wheat field were *M. cartusiana* found in higher density levels (83.56%) and *M. obstructa* found in lower density levels (16.44%). These results agree with those of El-Deeb *et. al.* (1996), El-Deeb *et. al.* (1999), Metwally *et. al.* (2002) and Azzam (2006) who stated that the wheat plants are usually attacked by a complex of glassy clover snails including *M. cartusiana* and *M. obstructa* .

The highest general mean number of the two species was recorded on Gemmeiza 7 cultivar (28.9 snails / 50 x 50 cm²) followed in descending order by Gemmeiza 9 cultivar (25.0 snails), then Sakha 93 cultivar (21.1 snails) and Shandaweel 1 cultivar (19.7snails). On the other hand, Misr 2, Giza 168 and Gemmeiza 11 cultivars demonstrated the lowest numbers of the two species on the basis of general mean of numbers (5.6, 6.0 and 9.4 snails / 50 x 50 cm², respectively).

Data in Table (3) reveal that, the number of the two species of glassy clover snail showed a gradual increase to reach 29.2 snails / 50X50 cm² during April followed downwards by March (23.0 snails / 50X50 cm²), then February (12.5 snails / 50X50 cm²). While the lowest numbers were recorded in December and January (2.9

and 5.0 snails / 50X50 cm², respectively), this may be due to the low temperature during these months than the other ones. These results are in agreement with those obtained by El-Deeb *et al.*(1996), El-Deeb *et. al.* (1999), Metwally *et. al.* (2002) and Mahmoud and Awad (2008) , they mentioned that the highest population density of land snails was observed during April on wheat plants due to the suitable climatic conditions during this month.

A short glance to the data in Tables (1 and 2) reveals that, two cultivars Misr 2 and Giza 168 proved least infestation by cereal aphids and glassy clover snails.

Table 2. Annually mean numbers of *M.cartusiana* and *M. obstructa* / 50 x 50 cm² of wheat cultivars , 2010/11 and 2011/12 seasons .

Cultivar	2010 / 11			2011 / 12			Mean		
	<i>M. cartusiana</i>	<i>M. obstructa</i>	Total	<i>M. cartusiana</i>	<i>M. obstructa</i>	Total	<i>M. cartusiana</i>	<i>M. obstructa</i>	Total
Sakha 93	20.0	4.7	24.7 bc	14.5	2.9	17.4 c	17.3	3.8	21.1 c
Sakha 94	14.3	2.6	16.9 d	9.7	1.5	11.2 d	12.0	2.1	14.1d
Gemmeiza 7	25.2	6.5	31.7 a	21.9	4.1	26.0 a	23.6	5.3	28.9 a
Gemmeiza 9	24.4	3.4	27.8 b	18.5	3.6	22.1 b	21.5	3.5	25.0 b
Gemmeiza 10	15.5	2.8	18.3 d	7.7	1.9	9.6 de	11.6	2.4	14.0 d
Gemmeiza 11	10.2	1.5	11.7 e	6.1	1.0	7.1 ef	8.2	1.2	9.4 ef
Misr 1	12.1	2.5	14.6 e	8.4	1.5	9.9 de	10.3	2.0	12.3 de
Misr 2	5.0	0.8	5.8 f	4.9	0.5	5.4 f	5.0	0.6	5.6 f
Giza 168	6.2	1.0	7.2 f	3.9	0.8	4.7 f	5.1	0.9	6.0 f
Sids 1	10.5	2.0	12.5 e	6.4	1.3	7.7 def	8.5	1.6	10.1 e
Sids 12	11.8	2.2	14.0 e	9.0	1.4	10.4 de	10.4	1.8	12.2 de
Sids 13	12.0	2.4	14.4 e	6.3	1.1	7.4 def	9.1	1.8	10.9 de
Shandaweel 1	18.3	4.2	22.5 c	13.7	3.1	16.8 c	16.0	3.7	19.7 c
Mean	14.3	2.8	-	10.1	1.9	-	12.2	2.4	-
% Population	83.63	16.37	-	84.17	15.83	-	83.56	16.44	-
LSD 0.05	-		3.74	-		3.91	-		3.85

Mean followed by the same letter(s) in each column within each treatment are not significantly differed.

Table 3 . Population density of aphids and glassy clover snails , 2010/11 and 2011/12 seasons .

Months	Aphids / 10 plants			Glassy clover snails/50x50 cm ²		
	2010/11	2011/12	Mean	2010/11	2011/12	Mean
December	-	-	-	3.8	2.0	2.9 d
January	22.4	100.8	61.6 d	6.3	3.8	5.0 d
February	126.0	150.9	138.4 b	14.4	10.6	12.5 c
March	192.4	221.3	206.8 a	27.6	18.4	23.0 b
April	115.2	130.6	122.9 c	33.4	25.0	29.2 a
General mean	114.0	150.9	-	17.1	12.0	-
LSD 0.05			11.5			3.7

Mean followed by the same letter(s) in each column within each treatment are not significantly differed.

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قابلية بعض أصناف القمح للإصابة بالمن وقوقع البرسيم الزجاجي

عادل محمد الراوي

معهد بحوث وقاية النباتات - مركز البحوث الزراعية - الدقي - جيزة - مصر.

أجريت التجارب بمزرعة محطة البحوث الزراعية بأيتاي البارود (البحيرة) خلال موسمي 2010 / 11 ، 2011 / 12 بهدف دراسة القابلية النسبية لبعض أصناف القمح للإصابة بالمن وقوقع البرسيم الزجاجي .

أوضحت النتائج المتحصل عليها ما يلي :

أن الثلاثة أصناف مصر 2 ، جيزة 168 ، جميزة 7 كانوا أقل إصابة بحشرات المن (37.3 ، 62.2 ، 65.2 حشرة من / 10 نباتات بالترتيب) وعلى الجانب الآخر وجد أن الثلاثة أصناف مصر 2 ، جيزة 168 ، جميزة 11 كانوا أقل إصابة بقوقع البرسيم الزجاجي (5.6 ، 6.0 ، 9.4 قوقع / 50 x 50 سم² بالترتيب).
وكننتيجة نهائية لهذا البحث فقد وجد أن صنف القمح مصر 2 ، جيزة 168 كانا أقل إصابة بحشرات المن وقوقع البرسيم الزجاجي .