

RELATIONSHIP OF APHIDS AND PREDATORS ON DIFFERENT GENOTYPES OF WHEAT *TRITICUM AESTIVUM* UNDER AGRI ECO-SYSTEM OF BAHAWALPUR

Ghulam Mustafa Aheer, Amjad Ali, Irem and Muazzma Akhtar*

ABSTRACT

Ten genotypes of wheat viz. Inqalab 91, V-2400, V-2278, V-4012, V-2000, V-2333, V-2210, Uqab-2000, Punjnad and V-2237 were sown in the research area of Regional Agricultural Research Institute, Bahawalpur under RCBD, replicated thrice during 2002-2003. All advanced lines/varieties showed statistically significant difference regarding population of aphids, coccinellids, *Chrysoperla carnea* Stephen and syrphusfly. Genotype V-2237 showed maximum population of aphids (73.43 /tiller) followed by Punjnad (72.97/tiller). Inqalab-91 was comparatively resistant showing minimum aphids (42.60/tiller) while all other lines were intermediate with aphids population range of 49.93 to 63.26 per tiller. Maximum population of coccinellids (1.48/tiller) and *C. carnea* (1.30 tiller) was observed on Punjnad, while minimum on V-2278 (0.60 and 0.90/tiller). V-2237 also showed maximum population of syrphusfly (1.10/sweep). Highly significant and positive correlation was observed between the population of predators and aphids.

KEYWORDS: *Triticum aestivum*; genotypes; aphids; predators; Pakistan.

INTRODUCTION

Wheat (*Triticum aestivum* (L.)) is the major crop with largest area under cultivation in Pakistan. It plays a significant role in economic stability of the country. It is cultivated over 8069 thousand hectares with annual production of 19235 thousand tons. Its average yield in 2003 was 2384 kg per hectare (3).

In Pakistan, this crop is severely attacked by aphids, which adversely affect the yield (1,8). Cell sap sucking by aphids reduces the vitality of plants. The

*Entomological Research Institute, AARI, Faisalabad.

infested leaf turns pale, wilt and wear a silky appearance. The honeydew exuded by the insect encourages the snappy growth of sooty fungus on the foliage, which eventually affects the rate of photosynthesis in plants (10). Rebbinge *et al.* (11) reported that 72 percent losses were attributed to the direct sucking by aphids and remaining 20 percent loss was indirect due to fungi.

The aphids problem can be tackled with the application of commonly used insecticides but it is associated with health hazards, environmental pollution and development of resistance in insects against insecticides. It is therefore, advisable to screen wheat varieties/cultivars possessing resistance against aphids.

Ahmed and Nasir (2) reported that among the tested varieties FSD-83 having 10.30 aphids per tiller, proved to be highly susceptible, while Pitic-62 (4.98 aphids/tiller) found to be comparatively resistant. The mean population on remaining varieties (Pak-81, Barani-83, Kohinoor-83 FSD-85, Rawal-87, Chakwal-86 and Pasban-90) ranged between 5.83 and 8.50 aphids per tiller and differed significantly from one another. Anonymous (4) evaluated genotypes of wheat and reported that Iqbal-2000 was susceptible (2.23/tiller) to aphids while MH-97, Uqab-2000, V-99022, V-97046, V-97603, Inqalab-91, V-00183, V-98059, V-98627 and V-00142 were statistically equal with a range of 0.34 to 1.98 aphids per tiller. Anonymous (4,5) observed positive and significant effects of predators, viz. coccinellids, *C. carnea* and syrphusfly on the population of aphids, whereas Krotova (9) found negative correlation between aphids and coccinellids. Non-significant effect of coccinellids on the aphids was observed by Triltsch (12). Anonymous (6) observed positive effect of coccinellids and syrphusfly on the aphids. Fuentes and Niemeyer (7) suggested that use of resistant cultivars and biological control agents could be complementary.

The present research was conducted on ten genotypes of wheat for screening against aphids and finding the relationship between population of aphids and predators.

MATERIALS AND METHODS

Ten genotypes of wheat viz. Inqalab-91, V-2400, V-2278, V-4012, V-2000, V-2333, V-2210, Uqab-2000, Punjnad and V-2237 were sown in the experimental area of Regional Agricultural Research Institute, Bahawalpur, on November 15, 2002 following randomized complete block design with three replications. The plot size was 10 x 7 meter.

Population of aphids and predators (coccinellids and *C. carnea*) was recorded weekly from 15 tillers of randomly selected 15 plants from each plot, whereas population of syrphusfly was recorded by three net sweeps from each plot. The data were analyzed statistically. Correlation between population of aphids and predators was also worked out.

RESULTS AND DISCUSSION

The results (Table 1) revealed significant variation among genotypes of wheat regarding population of aphids, coccinellids, *C. carnea* and syrphusfly. The genotype V-2237 showed maximum aphid population (74.43/tiller) followed by Punjnad (72.97/tiller). Inqalab-91 proved as resistant with minimum population of aphids (42.60/tiller). All other genotypes showed intermediate response with population range of 49.93 to 63.26 per tiller. These findings cannot be compared with those of Ahmed and Nasir (2) and Anonymous (5) due to different set of genotypes.

Table 1. Population of aphids and predators on various advanced lines of wheat.

Genotype	Aphids/tiller	Coccinellids/ tiller	<i>Chrysoperla carnea</i> /tiller	Syrphusfly/sweep
Inqalab-91	42.60 g	0.80 g	0.63 e	0.70 e
V-2400	49.93 f	1.00 ef	0.80 cd	0.47 e
V-2278	55.50 d	0.60 h	0.90 c	0.57 de
V-4012	50.33 f	0.90 fg	0.70 de	0.70 c
V-2000	52.83 e	1.00 ef	0.80 cd	0.60 d
V-2333	63.26 b	1.40 ab	1.10 b	0.90 b
V-2210	57.75 c	1.20 cd	0.70 de	0.70 c
Uqab-2000	58.62 c	1.10 de	1.10 b	0.90 b
Punjnad	72.92 a	1.48 a	1.30 a	1.00 ab
V-2237	74.43 a	1.30 bc	1.10 b	1.10 a
Cd1	1.801218	0.1611059	0.12258	0.104539

Means sharing similar letters are not significantly different by DMR test (P=0.05).

Coccinellids (1.48/tiller) and *C. carnea* (1.30/tiller) were maximum on Punjnad, while these were minimum on V-2278 (0.60/tiller) and Inqalab-91 (0.63/tiller). Maximum population of syrphusfly (1.10/sweep) was observed on V-2237 followed by Punjnad (1.00) against minimum on V-2400 (0.47/sweep).

The results (Table 2) indicated highly significant positive correlation between all predators and aphids. The present results confirm the findings of Anonymous (4) and contradict those of Krovota (9) who reported non-significant effect of coccinellids on aphids population. Similarly, Triltsch (12)

also found non-significant correlation between aphids and coccinellids population on wheat.

Table 2. Correlation between aphids population and predators on wheat during 2002 at Bahawalpur.

	Coccinellid	<i>Chrysoperla carnea</i>	Syrphusfly
Aphid population	0.751**	0.657**	0.777**

** Highly Significant ($P \leq 0.01$)

The present findings partially agree to those of Anonymous (6) who found positive correlation between aphids and predators on wheat with non-significant response.

The present study concludes that biological agents played a significant role in controlling the aphids on wheat. Further artificial release of predators may give a satisfactory control of the pest that suggests encouraging biological control.

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