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5. SUMMARY

Faba bean, (*Vicia faba* L.) is one of the most important leguminous crops in Egypt. Aphids are of the most important insect pests attacking faba bean plants in the field causing severe damage and loss in the yield. Therefore, the present work was carried out on *Aphis craccivora* Koch infesting faba bean plants at the experimental farm of Sakha Agric. Res. Station during two successive growing seasons, 2001/2002 and 2002/2003 to study.

1. The population fluctuation of cowpea aphid, *A. craccivora* in faba bean fields and their relation to associated predators and some weather factors.
2. The horizontal distribution fields of *A. craccivora* and associated predators in faba bean fields.
3. Effect of weeds existing in faba bean fields on *A. craccivora* and associated predators.
4. Effect of certain compounds on cowpea aphid, *A. craccivora* in laboratory and in faba bean fields.
5. Effect of *A. craccivora* infestation on the essential compounds and pH value of faba bean plants.

The obtained results could be summarized as follows:

1. Population fluctuation of *A. craccivora* in faba bean fields:

The Population density of *A. craccivora* were significantly higher in the first season than in the second one.

The aphid population started to appear on faba bean plants in the last week of November in the first and second season. Three peaks of abundance were recorded in the 4th week of December, the 3rd week of January and the 2nd week of February represented by 106.65, 40.40 and 64.20 aphids/10 plants, respectively, for the first season. In the second season, four peaks of abundance took place in the 4th week of December, the 2nd week of January, the 2nd week of February and the 1st week of March by means of 62.80, 36.65, 40.40 and 45.40 aphids/10 plants, respectively.

After, that, the population tended to decline until the end of the growing season in the last week of March.

2. Population fluctuation of aphid-specific predators in faba bean fields:

The obtained results cleared that four predatory species, *Ch. carnea*, *P. alfierii*, *Scymnus* spp. and *C. undecimpunctata*

were observed in faba bean fields during the two tested seasons. The first predator was the most dominant followed by *P. alfierii* and *Scymnus* spp., while *C. undecimpunctata* was the least. The predatory complex recorded three peaks of 14.00, 8.50 and 11.00 predators/10 plants in the 4th week of December, the 3rd week of January and 2nd week of February, respectively during the first season, while in the second season, three peaks were recorded in the 4th week of December, the 2nd week of January and 1st week of March with means of 12.00, 7.25 and 10.5 predators/10 plants, respectively. The predators associated with *A. craccivora* were significantly higher in the first season than in the second one.

3. Effect of biological and physical environmental factors on the population density of *A. craccivora* in faba bean fields:

3.1. Effect of predators:

Statistical analysis showed that each of *Ch. carnea*, *P. alfierii* and *Scymnus* spp. had highly positive significant effect on aphid population during the two seasons, while *C. undecimpunctata* induced negative and insignificant effect. The effect of predatory complex on aphid population was positive highly significant during the two seasons.

3.2. Effect of temperature:

The temperature induced positive significant effect on the aphid population in the first season, while the effect was insignificant in the second season.

3.3. Effect of relative humidity:

The relative humidity had insignificant effect on the population of aphids during the two tested seasons.

3.4. Effect of wind speed:

The effect of wind speed on the aphid population was insignificant.

3.5. The combined effect of predators and the three climatic factors:

The combined effect of the predatory complex and the three considered climatic factors as a percentage of explained variance on aphid population was more pronounced in the first season than in the second one. This effect was 90.5 and 83.3% in the first and second season, respectively.

4. Horizontal distribution of *A. craccivora* and associated predators in faba bean fields:

The given results revealed that *A. craccivora* preferred northern, southern and western sides of faba bean field during

the two experimental seasons. The highest number of predators population was observed in southern and western sides in the first season and southern, western and northern side in the second season.

The middle of the field received the lowest number of both aphid and associated predators population.

5. Effect of weeds existing in faba bean fields on *A. craccivora* and associated predators:

The results indicated that the weed removal from faba bean field delayed the initial infestation of faba bean plants with aphid as well as the occurrence of predators in both seasons. Also, the faba bean plants in the field infested with weeds harboured higher number of aphids and associated predators than those in weed-free field.

6. Effect of *A. craccivora* infestation on the essential compounds and pH value of faba bean plants:

The obtained results indicated that aphid infestation decreased the pH value and contents of glucose and proteins by 8.26%, 14.59% and 29.9%, respectively and increased the total carbohydrates and total lipids by 12.87% and 17.53%, respectively after 30 days of planting. After 60 days of planting, the aphids decreased the contents of glucose and total

carbohydrates by 13.03% and 14.33, respectively and increased the pH, total proteins and total lipids by 2.88%, 31.29% and 51.45%, respectively.

It can be concluded that the aphid infestation decreases the contents of glucose and increases the total lipids.

7. Effect of certain compounds on *A. craccivora*:

A. In laboratory:

The results showed that malathion was the most toxic compound against both laboratory and field strains of *A. craccivora*. Biofly was the least toxic one against laboratory and field strains.

The toxicity lines for Kemesol and Neemix against the field strain showed lower slope values than laboratory strain, while the reverse was noticed for biofly and malathion, because of low homogeneity among the field population of *A. craccivora*.

B. In the field:

The given results indicated that Malathion caused the highest initial effect by 90.68% reduction in aphid population followed by Kemesol (68.8% reduction), while Bio-fly and Neemix caused low initial effect by 26.73 and 27.63%