بسم الله الرحمن الرحيم

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شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

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Ecological and biological studies on aphids and their associated predatory spiders on two field crops at Qalubyia governorate, Egypt.

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Abstract

The seasonal dynamics of the cowpea aphid, *Aphis craccivora* (Koch) and the corn leaf aphid, *Rhopalosiphum maidis* (Fitch) on the broad bean and maize crop, respectively, were investigated at Qaha research Station, Qalubyia governorate, Egypt during two successive years, 2017 and 2018. Infestation of broad bean and maize started in January and May or June, respectively. The monthly collected number and percent abundance of most movable life stages gradually increased to reach peaks in March and August then decreased in the next month at the end of the season of each of the broad bean and maize, respectively. Immatures were the most dominant life stages collected in each month than adults, followed by unwinged and winged adult females descendingly but no adult males were collected throughout the broad bean and maize seasons in each year. Generally, the total collected number of each life stage of *A. craccivora* and *R. maidis* infested each of the broad bean and maize was higher in 2018 than 2017 and on broad bean than maize in each year.

Twenty six spider species belonging to 20 genera and 10 families of order Araneae were associated with the two aphids, *A. craccivora* and *R. maidis* and were collected on broad bean and maize crops, at Qaha research station in Qalubyia governorate, Egypt during the two successive years, 2017 and 2018. During the

period of study, Philodromidae was the most abundant family of the total collected spiders (1486) on the two crops followed by Salticidae, Theridiidae, Thomisidae then Lycosidae followed by Cheiracnthidae and Araneidae, Linyphiidae, Dictynidae and Aglenidae.

On maize, the collected families did not include Dictynidae and Aglenidae in both years of study. The numbers of the monthly and total collected spiders of each family and species, percent occurrence and hence abundance of each family and species varied on the studied crops in each season. However, nearly 50% of the collected spider genera and species were common associates of both *A. craccivora* and *R. maidis* on broad beans and maize, respectively in one or both years of study.

Generally, in parallel with aphids on each of broad bean and maize, most of the spider families and the total number of collected spiders and some species started appearance with relatively small numbers in winter (January) and late spring to early summer (May and June) then gradually increased to reach peaks in March and August, then decreased at the end of each season in April and September, respectively. The total number of spiders collected was higher in 2018 than 2017 and on broad bean (421&357) than maize (362&346) in each year of study.

The effect of temperature and prey quality of aphid species life stage and their basic nutritional components on food consumption, predation rate and duration of development of spiderlings of *Thanatus albini* reared on a monotypic diet of immatures or adult females of each of *Aphis craccivora* and *Rhopalosiphum maidis* were studied at 3 different temperatures of 15, 27 and 35±2˚C and RH of 60-70%. Also, effects of the prey quality of the monotypic diet of each aphid on the tested parameters were studied in spiderlings of *Thomisus spinifer* and on reproduction in adult females of both spider species at 27˚C.

Of the three tested temperatures, 27˚C was considered as the optimum temperature for aphid consumption and predation rate of spiderlings of *Th. albini* when fed on each of the two aphid species, due to increasing the two parameters and prolonging spiderling durations. Also, life, development of spiderlings and female reproduction of each of *Th. albini* and *T. spinifer* were maintained and completed at the optimum temperature of 27 by feeding on immatures or adult females' aphid (except the first three spiderlings) of each of *A. craccivora* and *R. maidis* in *Th. albini* and only of *R. maidis* in *T. spinifer*.

The two spider species showed efficacy as predators, consuming higher numbers of immatures than adults of each of the two aphid species with more consumption of *A. craccivora* than *R. maidis* in *Th. albini* and only of *R. maidis* in *T. spinifer* with the refusal of feeding on *A. craccivora*. The number of

consumed aphids by each spider species was increased by increasing the age of the spiderling stage.

Quantitative analysis of the basic nutritional components showed a higher concentration of total protein and carbohydrate in adult females than immatures of each aphid species but no significant difference between each of the immatures and adult females of the two aphid species. The significance of the obtained results was discussed.

Keywords:

Aphis craccivora, *Rhopalosiphum maidis*, Seasonal dynamics, Spiders, Survey

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