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## **Biological and ecological studies on certain insect pests on alfalfa at Assiut Governorate**

**A Thesis submitted in partial fulfillment of the requirements for the  
degree of Master of Science**

**In  
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**Submitted by**

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## Abstract

The present investigations were carried out in Assiut during the period from November 2018 to October 2019 to study some ecological aspects of insect pests inhabiting alfalfa and the associated natural enemies. In addition, laboratory studies were conducted to elucidate the effect of constant temperatures on the development of *Phytocoris* sp. (Heteroptera: Miridae)

### 1- Ecological Studies:

Results indicated the presence of 31 species of arthropods belonging to 23 families and 15 orders. Twenty species from the species collected are considered pests causing damage, 11 beneficial arthropods as well as unidentified species of true spiders. Intensive and extensive observations indicated that collected species can be classified as sucking pests, leaf feeders, and leaf miners. In general, 9 orders (Orthoptera, Thysanoptera, Hemiptera-Heteroptera, Hemiptera- Sternorrhyncha, Coleoptera, Lepidoptera, Diptera, Collembolla and Acarina) and 13 families (Gryllotalpidae, Agromyzidae, Curculionidae, Lygaeidae, Miridae, Pentatomidae, Aleyrodidae, Aphididae, Cicadellidae, Acridiidae, Noctuidae, Thripidae and Tetranychidae) were recorded inhabiting alfalfa plantations in Assiut. The most important serious pests were the complex of aphid species i.e. *Aphis cracivora* Koch., *Myzus persicae* (Sulz.) and *Therioaphis trifolii* (Monell). Nine of the captured species were identified as entomophagous. They are belonging to 5 orders (Dermaptera, Hemiptera-Heteroptera, Neuroptera, Coleoptera, and Diptera as well as some of the unidentified species of true spiders) and 8 families (Labiduridae, Anthocoridae, Chrysopidae, Coccinellidae, Lygaeidae, Staphylinidae, Nabidae and Syrphidae). The green lacewing, *Chrysoperla carnea* (Steph.), the hover fly, *Syrphus corolla* F. and the lady beetles, *Coccinella undecimpunctata* L., were the most abundant predators.

### 2- Biological studies on *Phytocoris* sp. (Hemiptera: Heteroptera: Miridae)

Data indicated that the incubation period of *Phytocoris* eggs decreased significantly with the increase in temperatures. The duration of egg stage varied from 10.42 days at 22°C to 7.51 days at 27°C days. The eggs exposed to 22°C exhibited hatchability of 97.28% while at 27°C it was 96.35%. The index of efficiency for development of the egg stage was markedly higher (24.55) at 27°C than that of 22°C temperature. This may suggest that constant temperature of 27°C is the most favourable temperature for the development of the egg stage. The threshold temperature for egg stage of *Phytocoris* was 9.09°C. Thermal requirements for the development were about 134.46 Day-degrees. The duration of nymphal instar varied from 20.40 days at 22 °C to 14.48 days at 27°C. It could be concluded from the data obtained that higher temperature (27°C) is the most suitable condition for the development and survival of the nymphal stage of *Phytocoris*. The calculated temperature thresholds for nymphal instars were 9.83, 9.76, 8.80, 9.79, and 9.43 for 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup> nymphal instars, respectively, consequently, these instars requires 60.61, 43.45, 41.31, 46.64 and 61.84 day-degrees. This stage requires about 249.49 day-degrees in order to complete its development. The total developmental period from egg to adult was affected significantly by temperature. The foregoing results concerning the duration, survival and index of efficiency in relation to temperatures indicated clearly that the highest examined temperature (27°C) was the most favorable temperature for the development of the pest. The calculated developmental threshold is about 9.55°C. By using this value as a base temperature, averages of about 383.72 day-degrees were needed for the development of one generation of *Phytocoris* sp.

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