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THERMAL REQUIREMENTS FOR DEVELOPMENT OF *Aphis nerii* BOYER DE FONSCOLOMBE AND ITS PREDATOR *Cydonia vicina isis* MULS.

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ABSTRACT

Laboratory experiments were conducted in Economic Entomology Department, Faculty of Agriculture, Mansoura University to estimate the heat requirements for *Aphis nerii* Boyer de Fonscolombe. attacking oleander shrubs at Mansoura district and its *predator Cydonia vicina isis* Muls.

The results assured that, the lower development threshold for the nymphal stage was 13.11 ºC , and the thermal units expressed as degree-days (dd's) required for nymphal stage were 98.53, 95.12 and 102.74 (dd's) at 20ºC, 25ºC and 28ºC, respectively and the adult stages needed about 129.92, 140.66 and 153.27 day-degrees to complete their development on the three tested degree temperatures, respectively.

The results indicated that the lower development threshold of the adults s were 12^0C, 14^0C for male and female, respectively and the degree day's at 20^0C, 25^0C and 28^0C, were 538.4, 721.6 and 609.6 for male and 467.4, 610.5, and 565.6 for female.

INTRODUCTION

Oleander aphid is universal, being found in tropical to warm temperate regions throughout the world. This species probably originated in the Mediterranean region, the origin of its host of Apocynaceae, the mean host of milkweed aphid is *Nerium oleander* as common ornamental shrub in Egypt. The coccinellidea predator *C. vicina isis* is an important prdator prey on *A. nerii* (Abdel-Salam, 2004) Temperature is considering an important environmental factors that affect the survival rate through each immature stage of the history and hence the rate of survival from egg to adult emergence(Meats,1984).

Studying of this parameter is essential for *A. nerii* and *C. vicina isis isis* to obtain a useful and good forecasting and prediction of the insects population.

Each development stage of an organism has its own total heat requirement. Development can be estimated by accumulating degree-days between the maximum and minimum temperatures throughout the season. E*ach* species requires a defined number of degree-days that known as the biofix date varies with the species biofix points were usually based on some specific events such as first trap catch or first occurrence of the pest. Once the biofix point is established, the degree-days can be accumulated. Degree-days will allow for predicting pest occurrence and used as a tool for scheduling sprays and beneficial insect release at the optimum time to obtain best results, to monitor pest activity and to determent the best sampling times(Herms,2007). Therefore this investigation was conducted to study the thermal requirements for development of *A. nerii* and its prdator *C. vicina isis*.

MATERIALS AND METHODS

The experiments were conducted in a neglected area grown with *Lantana camara* L. (without chemical treatment) located at the experimental farm, Faculty of Agriculture, Mansoura University.

Rearing the oleander aphid

Ten apterous, of *A. nerii* was confined in glass Petri dishes (9 cm in diameter) on oleander leaves to produce nymphs. Each Petri dish was provided with a layer of moistened filter paper to provide humidity. All nymphs produced within 24 hours were assumed uniform age. There were 20 replicates for each test with three degrees of temperatures (20, 25 and 28). The experiment conducted under relative humidity (60.0±5.0%). The leaves were replaced every two days. Each first nymph instar was placed on new leaves of oleander plant in a separate Petri dish and observed to determine the developmental time of nymphal instars and total days taken to reach the adult stage. The presence of exuviae was used to determine molting. The pre-reproductive, reproductive, and post-reproductive periods were determined.

Developmental times for each life stage, as well as the total nymphal stage, were used to calculate developmental rates (1/development time) which were regressed against temperatures. Regression parameters and slopes were used to estimate the minimum temperature threshold for development (t_o) and the thermal constant (dd's), as described by Campbell *et al.* (1974).

Rearing the coccinellid predator *C. vicina isis*

1- Immature stages:

Adults of *C. vicina isis* was collected from the fields and reared on *A. nerii*. The eggs were collected daily, and monitored until hatching. Hatched larvae were reared individually to avoid cannibalism in Petri- dishes (9 cm in diameter) in the incubator at 20±1, 25±1 and 28±1^{o}C. The relative humidity was 60.0±5% with each temperature. Twenty larvae from the predator were reared on *A. nerii* and each one was considered a replicate. Developmental times for eggs, total larval stage, pupal stage as were used to calculate development rates, which were regressed against temperature. The regression parameters and slopes were used to estimate the lower temperature threshold for development (t_o) and the thermal constant (dds), as described by Campbell *et al.* (1974).

2. Adult stage:

After emergence from the pupae, the predatory adults were sexed and then introduced singly into a Petri dish then fed on the oleander aphid species until development was completed.

The regression parameters and slopes were used to estimate the lower temperature threshold for development (t_o) and the thermal constant (dds), as described by Campbell *et al.* (1974).

Statistical analysis:

Data were analyzed by the analysis of variance (ANOVA) and Duncan multiple range test.