

## V. SUMMARY

Integrated pest management is considered the best method for pest control. This package of control measures includes using of biotic and a biotic factors to obtain the best yield in quality and quantity without or with the least degree of pollution. Also, some trials of using predaceous mites for controlling pests is very important for diminishing destructive plant pests. Biological control becomes the natural substitute to save the serious pollution side effects that the pesticides cause today. Thus the aim of the present study was investigated the role of the a carine predators in controlling phystophagous mites and scale insects in two region at Qaluobia Governorate (Benha & Tukh), also biology of three predatory mites namely: *Agistemus exsretus* Gonzalez (Family : Stigmieidae); *Saniosulus nudus* summers (Family: Eupalopsellidae) and *Typhlodromus athiasae* porath & swirski (Family : Phytoseiidae) were studied in the laboratory at different constant temperatures and kinds of food (mites, insects and pollen grains).

### **The study revealed that:**

#### **I. Ecological studies:**

These studies include:

- A) Population density of phytophagous mites, predaceous mites and scale insects during two years from this study it can be conclude that:

- 1- Population dynamics of *Brevipalpus californicus* had one annual peak of seasonal abundance in June on

leaves of navel orange trees during two successive years.

- 2- The population dynamics of *Phyllocoptruta oleivora* had one annual peak of seasonal abundance in December on leaves during two successive years. This species was moved from leaves to fruit during the period which extended from April to October during two successive years of investigation.
- 3- The population of *Eutetranychus orientalis* had one peak of seasonal abundance in August during two successive years. This species was observed on upper surface of leaves.
- 4- The population density of the three phytophagous mites were positively correlated with average temperatures and negatively correlated with average relative humidity during the two successive years of study.
- 5- The population dynamics of scale insect, *P. zizyphus*, *L. beekii* had one peak in August during the two years. It was negatively correlated with average temperatures and positive correlated with relative humidity.
- 6- The predaceous mites, *T. athiasae*; *C. ornatus*; *A. exsertus* and *S. nudus* were playing an important role in controlling phytophagous mites and scale insects. The population abundance of *T. athiasae*; *C. ornatus* and *S. nudus* had two peaks one in May and another

in November during two successive years while the predaceous mite, *A. exsertus* had three peaks the first peak was in May, the second peak in August and the third peak was in November during two successive years at Benha and Tikh region.

7- The population dynamics of predaceous mites was negative correlated with average temperatures and positive correlated with relative humidity.

B) Relationship between predaceous mites and both phytophagous mites and scale insects.

The obtained results could be summarized as follows:

- 1- An increase of predaceous mites result in decrease of phytophagous mites, the highest numbers of predaceous mites were 1203 and 1144 individuals at Benha and Tikh regions during autumn season corresponded with the lowest numbers of phytophagous mites (179 and 177 individuals) .
- 2- Also, an increase of predaceous mites resulted in decrease in population of scale insects and vice versa. While, the increase of predaceous mites brought an increase in the mortality percentage, of scale insects.
- 3- The population of predaceous mites was affected with the population of phytophagous mites and scale insects during the two successive years of investigation.

## **II. Biological studies of the predaceous mites:**

### **A- *Agistemus exsertus* (Fam. : Stigmaeidae)**

At 28°C and fed on eggs of *T. urticae* gave the shortest life cycle (11.47 days), adult longevity (17.78 days), the highest number of total average and daily rate of deposited eggs per female (72.43 and 6.46 eggs, respectively), and female sex ratio was 66.24% ( no. of females/total).

While, the longest female life cycle (26.17 days), adult longevity (44.17 days), the lowest fecundity (19.00 egg/female), with a daily rate 0.82 egg and lowest sex ratio 47.04% were obtained at 16°C and pollens of date palm.

The total average and daily rate of consumed prey (*T. Urticae* eggs) were 38.60 and 4.91 eggs for female predator immatures and 180.83 and 10.16 eggs for adult female, respectively.

### **B. *Saniosulus nudus* (Fam. : Eupalopsellidae):**

*S. nudus* was reared in laboratory at different temperature, 16, 24, 28, 30 and 32°C and 70 ±5 RH and fed on four diets, *T. urticae* (eggs and immatures), *L. beckii* eggs and date palm pollens.

*T. urticae* (eggs and immatures) and highest temperatures 30°C and 32°C were the most suitable conditions and gave the shortest life cycle, (16.07days), adult longevity 43.32 days, greatest female fecundity, 200.33 egg, with a daily rate 4.87 eggs and highest sex ratio (no. of females / total) 60.98% were obtained rates

from *T. Urticae* eggs were 39.33 food consumption and 372.50 eggs for immatures stages and adult, respectively.

### **C- *Typhlodromus athiasae* (Fam.: Phytoseiidae)**

Eggs of *T. urticae* and 28°C were the most suitable condition to the predaceous mite, *T. athiasae* development resulted in the shortest life cycle (8.90 days), adult longevity 18.27 days and the highest number of total average and daily rate of deposited eggs per female (58.33 and 5.65 eggs, respectively).

The total average and daily rate of consumed prey (eggs of *T. Urticae* and eggs of *L. beckii*) were somewhat similarity (27.67 and 29.83 eggs) for female predator immatures and (172.83 and 188.17 eggs) for adult female, respectively.