SUMMARY

SUMMARY

The Mediterranean black scale, *Saissetia oleae* (Oliver) (Homoptera : Coccidae) is one of the most important pests attacking olive trees in Egypt.

The present work aimed to study survey of host plants and natural enemies of *S. oleae* in Egypt and consequently population dynamics of both pest and its enemies.

Also, the present investigation is an attempt to use different pest management techniques for controlling this pest in Egypt.

The results achieved can be summarized as follows:

1. Survey of host plants, distribution and natural enemies of the Mediterranean black scale, *Saissetia oleae*:

In the present study *S. oleae* was collected from 27 host plant species belonging to 22 families from 35 localities in 18 governorates associated 31 natural enemies (12 parasitoids and 20 predators).

Twenty two host plants, nineteen predators and one parasitoid are recorded in this study for the first time in Egypt.

2. Population dynamics of *Saissetia oleae* and its natural enemies:

2.1. Population dynamics of the Mediterranean black scale, *Saissetia oleae* and the number of generations in correlation to the surrounding environmental factors:

The population dynamics of *S. oleae* were studied for two successive years extending from April, 1998 to March, 2000 on olive trees cultivated in Northern Coast. (150 Km. west of Alexandria). The obtained results can be summarized as follows:

2.1.1. *S. oleae* had two peaks per year on olive trees in April and August during both studied years (1998/1999 & 1999/2000).

2.1.2. It has two generations per year. The 1st generation extended from the 1st April, 1998 to 1st Sept. 1998 and from the 1st of April, 1999 until the 1st Oct. 1999 during the first and second years, respectively. The second generation started from 1st Sept. 1998 to 1st Feb., 1999 and from 1st Oct. 1999 to 1st Feb. 2000 in the first and second years, respectively.

2.1.3. Effect of max. & min. temperatures, RH, water vapour and wind speed on activity of *S. oleae* were studied. Statistical analysis of these climatic factors on the population of *S. oleae* during the first year 1998-1999 indicated that the effect of max. temp. factor was highly significant ($R^2 = 0.3509$, $P < 0.01$). Other factors were insignificant. The combination effect of max. temp., RH, water vapour, wind speed was highly significant with ($R^2 = 0.7819$ and $P < 0.01$). During the second year 1999-2000 statistical analysis indicated that wind speed factor had highly significant effect with $R^2 = 0.3914$ and $P < 0.01$, but the other factors were insignificant, while the combination effect of observed max. and min. temp. was highly significant ($R^2 = 0.6346$, $P < 0.01$).

2.1.4. The effect of the three levels of the tree on the distribution of *Saissetia oleae* population was significant. The highest number occurred on the lower level followed by the upper and medium level.

2.1.5. The differences between the five cardinal directions of the trees were significant, the western direction was the preferable direction for this pest.

2.2. Population dynamics of the natural enemies of the Mediterranean black scale, *Saissetia oleae* and the relationship between their population and weather factors:

2.2.1. Parasitoids:

The population dynamics of recorded five parasitoids, *Metaphycus bartletti* Annecke & Mynhardt, *M. flavus* (Howard), *Microterys flavus* (Howard), *Diversinervus elegans* (Silvestri) and *Scutellista cyaneae* (Mots.) were studied in Northern Coast during (1998-1999 & 1999-2000).

The present data showed that, *M. bartletti* was the effective parasitoid of *S. oleae* on olive trees with maximum rates of parasitism 22.7 and 24.5% during 1998-1999 and 1999-2000. Statistical analysis of the data throughout the two years showed highly significant differences between the different parasitoids on *S. oleae*. The results showed that the parasitoid, *M. bartletti* is the best parasitoid in controlling *S. oleae* on olive trees in Northern Coast.

2.2.2. Predators:

The population dynamics of 6 predators were studied here in Northern Coast during (1998-1999 & 1999-2000).

Two peaks were recorded annually for *Chilocorus bipustulatus* L. and *Coccinella undecimpunctata* (L.) while, found one peak in case *Chrysoperla carneae* (Stephens), and *Scymnus syriacus* Mars.

Exochomus flavipes Thrum and *Orius* spp., recorded as a low population throughout the two considered years 1998-1999 & 1999-2000.

3. Efficacy of the used natural compounds and an IGR on the Mediterranean black scale, *Saissetia oleae* and its natural enemies:

3.1. On *Saissetia oleae:*

The efficacy of five natural compounds and an IGR i.e. Buprofezin, M-bed, Neemazal, Jojoba, Biofly and KZ oil on eggs, preadults and adults of *S. oleae* infesting olive trees was studied during 1998 and 1999.

3.1.1. Effect of different chemical compounds on egg stage:

Buprofezin was the most effective compound used against eggs of *S. oleae* followed by Biofly, KZ oil, Neemazal, Jojoba and M-pede. during the two years of investigation.

3.1.2. Effect of different chemical compounds on immature stage:

Results indicated that the preadult stage of *S. oleae* were more susceptible to the chemical compounds used, than any other insect stages.

Buprofezin was the most effective compound on preadult of *S. oleae* and M-pede was the least effective one after 21, 45 and 90 days, during the two years, 1998 and 1999.

3.1.3. Effect of different chemical compounds on adult stage:

The results obtained revealed that the mean reduction percentages in number of adult stage were 61.6, 46.8, 42.6, 41.3, 34.8 & 30.5 and 64.06, 42.3, 37.2, 36.3, 29.8 & 21.7 caused by Buprofezin, Biofly, KZ oil, Jojoba, Neemazal and M-pede during the first and second years, respectively.

Statistical analysis of the data showed highly significant differences between the effect of chemical compounds on adult stage.

3.2. On natural enemies:

3.2.1. Effect of chemical compounds on *Saissetia oleae* parasitoids:

The efficacy of five natural compounds and an IGR i.e. Buprofezin, Biofly, KZ oil, Jojoba, Neemazal and M-pede on four parasitoids (*Metaphycus* sp., *D. elegans, Mi. flavus* and *S. syriacus*) of *S. oleae* was studied. The obtained results clarified

that the buprofezin (IGR) gave toxic effect against all *S. oleae* parasitoids (from 91.6- 100% average reduction in the first year and 89.0-94.2% average reduction in the second year) in the olive farm with two trials of spraying during 1998 and 1999 seasons. While, M-pede, Jojoba, Neemazal and Biofly gave moderate toxic effect against the same parasitoids (39.9-84.4% in the first year and 44.1-79.0% in the second year).

3.2.2. Effect of chemical compounds on *Saissetia oleae* predators :

The efficacy of five natural compounds and an IGR i.e. Buprofezin, Biofly, KZ oil, Jojoba, Neemazal and M-bed on six predators (*C. carneae, C. bipustultus, Orius* spp., *S. syriacus*, *E. flavipes*, *C. undecimpunctata*) of *S. oleae* was studied.

Buprofezin and KZ oil gave toxic effect against all *S. oleae* predators (from 86.3-100% average reduction in the first year, while in the second year gave 82.7-100%), while Jojoba, Neemazal, M-pede and Biofly gave around 70% average reduction against all predators in the two trials 1998 and 1999.