SUMMARY

PART I : Ecological studies .

(1) Seasonal abundance of the white peach scale insect, *Pseudulacaspis pentagona* (Targioni-Tozzetti 1886) in relation to the abiotic and biotic factors at Dakahliya .

The Ecological studies were carried out on white peach scale insect, *Pseudulacaspis pentagona* which infest peach orchards at Meet-Ghamer center, Dakahliya Governorate throughout two successive years started from early February 1997 till mid January 1999 .

The most important studies were the seasonal abundance of *P. pentagona* total population and different stages, the monthly variation, its annual generation in relation to the abiotic and biotic factors in addition to the seasonal abundance of *Aphytis* sp as a mortality biotic factors influencing this pest which were necessary when choosing the optimum spraying time for integrated control against this injury pest on peach trees

1- Seasonal abundance of *P. pentagona* (Targioni) total population on peach trees :

The study clearly show that, the insect activity in the second year was 1.15 time of the first year. Where the total annual means were 406.58 and 357.17 individuals /30 branches, respectively .

The study of the first year show that, *P. pentagona* total population has five peaks recorded on mid February, early of April, July, November 1997 and January 1998 .

In the second year were recorded on mid of March, May, July, early November and mid December 1998. On the other hand, four depressive periods were happened on early March, mid of May, August, 19997 and January 1998 in the first year, and on mid of April, August, November 1998 and mid January 1999 in the second year .

2- Seasonal abundance of *P. pentagona* (Targioni) different stages on peach trees .

The study clearly show that the nymphal stage had four high infestation periods through the first and second year. Recorded on mid February, early April, July and November 1997 in the first year and on mid March, early May, early July and mid October 1998 .

The same results were recorded for *P. pentagona* adult females, where it had four annual peaks in the first year happened on mid February, mid March early June 1997 and early January 1998. In the second year, recorded on early February, mid May, mid July, early November and mid December 1998 .

Results concerning the oviposting females followed a curve of three peaks happened on mid of March, July and September 1997. in the first year, and recorded on mid March, early June, mid September and mid November 1998 in the second year .

3- The monthly variations (V.) :

The most favorable periods for *P. pentagona* (Targioni) total population activity were recorded on mid February, early April, July, September 1997, and early January 1998 in the first year. In the second year it recorded on mid March, early of May, July, September and December 1998. These results my be due to the favorable climatic factors occurred during these periods, Max. temperature, Min. temperature, relative humidity and the daily light period. In addition to the biotic factor; of *Aphytis* sp and its parasitism rate which was decreased during these periods .

Five depression period were recorded on early March, mid April, early August, mid November 1997 and mid January 1998 in the first year. During mid April, early June, mid August, November 1998 and mid January 1999 in the second year. These depressive period were as a result

of the unfavorable climatic factors during these period. In addition to the high activity of *Aphytis* sp, where, the parasitism rates ranged between 52.1% and 78% at the same periods .

4- Number of *P. pentagona* (Targioni) generations on peach trees .

The study on *P. pentagona* (Targioni) during two year show that the insect has five annual generations. Recorded on mid February, early of April, July, September and November 1997 in the first year. The last generation was the highest, due to the most preferable efficacy of the combined abiotic and biotic factors. Whereas, the parasitism rate being 15% at the same period .

In the second year of study, the five generations were recorded on mid March, early of May, July mid of August and October (1998), these generations were occurred under the most favorable periods of abiotic factor and biotic factors where the five annual generations of the second studied year were happened at the same depressive times of the *Aphytis* sp; parasitism rates .

(2) Seasonal abundance of *Aphytis* sp as a mortality biotic factor .

1- Seasonal abundance of *P. pentagona* parasitoid; *Aphytis* sp total population on peach trees .

In the first studied year, the total population of *Aphytis* sp. parasite has five peaks ; two main peaks ; the first started from early February till early April, where its top recorded on early March. The second main peak started from early November 1997 till mid January 1998. its top happened on early January 1998. In between, three low peaks were recorded on mid April, early June and early August 1997 .

In the second studied year, the parasitoid total population has a curve of six peaks. The first was recorded (from mid March till early April) its top in early April. The second was recorded (from mid April till early July) its top was on mid May ; the third and fourth were moderate and

recorded on mid July and early September the fifth peak was the lowest one, recorded on early October. The sixth peak was recorded during mid January 1999 .

2- Seasonal abundance of *P. pentagona* **parasitoid ;** *Aphytis* **sp different stages on peach trees .**

The larva stage recorded five annual peaks on early March, mid April, early of June, August 1997 and early January 1998. However, the pupal stage show low density in compared with the larval stage, where it had a curve with five annual peaks registrated on early of February, March, mid of August and October 1997 and mid January 1998 in the first study year.

In the second year, larval stage recorded five peaks on early April, mid of May, July, early September and mid December 1998 .

Whereas, pupal stage recorded two times of high number on early February and mid May 1998. In addition to four other recorded on early April mid July, mid December 1998 and mid January 1999.

3- The parasitic role of *Aphytis* **sp as a biotic mortality factor .**

In the first year data clearly show that, the percentage of parasitism of *Aphytis* sp. immature stages had a curve of five generations appearing on early of February, March and June, mid August 1997 and the highest one on mid January 1998. In the second year, the rate of parasitism has a curve of five generations registrated on April, mid May, early September, mid November 1998 and mid January 1999 .

A) Efficacy of abiotic and biotic factors on the fluctuation of *P. pentagona* **(Targioni) population on peach trees .**

1- (D.Mx.T.) was negative and significant in the first year, and positive insignificant in the second one .

2- (D.Mn.T.) was negative insignificant in the first year, and positive insignificant in the second one .

3- (D.M.R.H.) was positive insignificant in the first year and, negative insignificant in the second one .

4- (D.L.P.) was negative highly significant in the first year but in the second one it was negative and insignificant .

5- Effect of biological factor *(Aphytis* sp.) was negative and highly significant in the first year and in the second year it was negative and insignificant. The combined effect was highly significant in the first year and in significant in the second year. Explained variance (E.V.) record 79.4% in the first year and 17.2% only in the second year .

B) Efficacy of climatic factors on *P. pentagons* **(Targioni) annual generations :**

Effect of (D.Mx.T.): The correlation was negative in case of the first four generations and positive in the fifth generation. However this effect was highly significant in the second generation and significant in the fifth generation but in the other generations it was insignificant. In the second year, the correlation was positive during the first, third, fourth and fifth generations, whereas, it was negative in the second generation. The effect was highly significant during second and fifth generation, significant during the first generation and insignificant in the third and fourth generations .

- Effect of (N.Mn.T.): In the first year, the correlation was positive in the first, third and fifth generations, where it was negative in the second and fourth generations, the correlation was significant during the third generation and highly significant in the second generation, insignificant during the first, fourth and fifth generations .

In the second year, the correlation was positive during the first, fourth and fifth generations and negative during the second and third generations, the relation was highly significant in case of the fifth generation but the other generations had insignificant effect .

- Effect of (D.M.R.H.): In the first year, the correlation was positive in the first and second generation and negative in the other generations. All generations had insignificant effect except the fifth generation which had highly significant effect. In the second year, the correlation was positive during the first, third and fourth generations but negative during the second and fifth generations. The correlation were insignificant during the other five generations .

- Effect of (D.L.P.): In the first year the correlation was positive during the first, third and fifth generations but negative during the second and fourth generations. The relations -was insignificant during all generations except the second generation which was highly significant. In the second year of study, the correlation was positive in first and third generations but it was negative during the other three generations. The relation was highly significant in the first and fifth generation and significant with second generations and insignificant in the third and fourth generations .

C) The efficacy of the climatic factors on the *P. pentagona* (Targoni) associated parasitoid, *Aphytis* sp .

- The day Maximum temperature had positive and insignificant in the first year but negative and significant in the second one .
- The night minimum temperature had positive and insignificant effect. In the first year and negative insignificant in the second one .
- The daily mean relative humidity had positive and insignificant in the first year, but positive and insignificant effect in the second one .
- The day light period had positive and insignificant effect during the first year but it had negative and insignificant effect during the second year of study .

- The combined effect of those indicated four climatic factors revealed insignificant effect on the total population of *Aphytis* sp during the two years of study.
- The experience variance (E.V.) recorded 27.7% in the first year and 15% in the second studied year .

PART II : Toxicological study .

Toxicological studies on *Pseudaulacaspis pentagona* (Targioni) infesting peach trees at Meet-Ghamer, Dakahliya Governorate .

After the ecological study we can reach that the proper time for *P. pentagona* control was when the pest started to increase and its associated parasitoid begin to decrease. This fact means that winter spraying (from mid November till late December) found to be the suitable time for controlling *P. pentagona* (Targioni) infested peach trees .

1- The first experiment (on early December 2000) .

It carried out to evaluate the natural efficacy of five mineral oils; tow Miscible oils (Capl 2 & Super Royal) at the rate of 1.5L /100L water and three winter oils in mayonnaise type (Misrona, Mox and Tiger oils) at rate of 2.5, 2 and 2.5L /100L water, respectively .

1) Bio-residual effect of the tested oils on *P. pentagona* (Targioni) different stages :

Results obtained clearly show that, all tested mineral oils gave satisfactory results against ovipositing females and excellent results against nymphs and adult females especially in case of miscible oils .

Also, data proved that, infestation with *P. pentagona* (Targioni) population increased in untreated trees throughout the monthly periods followed adopted treatments to; 126.53, 122.44 and 154.08% in case of 1st, 2nd and 3rd post treatment counts, respectively .

Statistical analysis of data showed that, differences due to the affects of each stage by various type, concentrations and rate of use of the

tested mineral oils which recorded; one, three and six months after winter spray .

To facilitate the interpretation of data, each post treatment count will be discussed separately as follows :

- The first post treatment count (one month after oil spraying). The pre adults (nymphs) and adult females recorded highly affect, followed by the ovipositing females, the reduction showing 94.80, 93.94 and 83.89%, respectively, with highly significant difference between the first two stages and the last one .
- The second post treatment count (Three months after oils spraying) data clearly indicate that, there are highly significant affect between *P. pentagona* (Targioni) (nymphs & adult females) and ovipositing females. Where, the average reduction being 93.85, 95.44 and 85.11%, respectively.
- The third post treatment count (six months after oils spraying). Data show that adult females recorded the highest reduction (94.61%), followed by the nymphal stage (92.52%) then the gravid females (85.95%) with a significant differences between each stage and other .

2) Bio-residual effect of the tested oils on *P. pentagona* (Targioni) total population :

Data proved that, the tested oils caused highly decrease in the population density throughout and till the end of this experiment i-e; six months from winter spraying, Miscible mineral oils gave excellent results. Also, data show that, infestation with *P. pentagona* (Targioni) total population was increased in the untreated trees throughout the monthly periods followed adopted treatment to 154.08% .

To facilitate the interpretation of data, each treatment will be considered in the following manner :

1) Bio-residual effect of the tested treatment on *P. pentagona* (Targioni) different stages :

Satisfactory result were recorded with all tested toxic materials on *P. pentagona* (Targioni) different stages one month after winter spraying. Also, data clearly show the increase of infestation in untreated peach trees through the monthly periods followed the adopted treatments to; 127.40, 110, 78 and 123.5 in case of 1s` 2nd and 3rd post treatment counts, respectively .

Each post treatment counts could be discussed separately as follows :

- The first post treatment count: Concerning the reduction percentage in the different stages, nymphs, adult females and ovipositing females result proved that good efficacy were recorded with (79.75, 77.41 and 72.52%) with the mentioned stages, respectively, with highly significant difference between the affect of each stage and other .
- The second post treatment count: Results obtained clearly show that, the average reduction in nymphs, adult females and ovipositing females were 83.14, 78.87 and 73.67%, respectively, with highly significant difference between the response of each stage and other .
- The third post treatment count: Data clearly mentioned that, nymphs and adult females recorded good affect with (71.41 & 70.80%) with insignificant between them, followed by the ovipositing females (68.1) with highly significant difference between this stage and the first others.

2) Bio-residual effect of the tested treatments on *P. pentagona* (Targioni) total population :

Results show that, all tested pesticides gave satisfactory results against *P. pentagona* total population. Also, the data showed that infestation with *P. pentagona* total population, as to the untreated trees increased through the monthly periods following adopted treatments to 123.5% .

- The first post treatment count (one month after winter spraying). The results showed that, the best treatment was Malathion which gave (85.49%), followed by Neem (77.85%) and Ashok (72.34%), then Admiral with (70.48%) reduction, with a significant differences between the first three treatments and insignificant between the third and fourth treatments .
- The second post treatment count : the average reduction were highly superior in case of Malathion (84.13%) and Neem (83.34%) with insignificant difference between them, followed by Admiral (78.92%) and poor response, with Ashok (67.85%) with significant difference between the first two treatments and the others .

The third post treatment count : the average reduction recorded good results in case of Malathion (80.57%), followed by Neem (77.13%) However, Admiral and Ashok gave poor efficacy (66.35 and 56.36%). With significant difference between each treatment and others .

3) Deleterious efficacy of the tested pesticides on *P. pentagona* **(Targioni) associated parasitoid,** *Aphytis* **sp on peach trees .**

Results mentioned that, the deleterious effect of tested pesticides on this parasitoid was higher than that in the first experiment. However the reduction percentage in *Aphytis* sp one were month after pesticides spraying 79, 57, 45 and 33% in case of Malathion 57%, Admiral 10%, Neem 50% and Ashok 0.15% one month after pesticides spraying .

The results of the first experiment clearly show the highly efficacy of the local mineral oils in this respect. There fore, these safe and very effective treatments can be used in any successful 1PM programme to control the white peach scale insect, *P. pentagona* (Targioni) infesting deciduous trees to produce high quality and quantity of fruit yield .
Also, to minimize both pollution and control costs .