CONTENTS

V. SUMMARY AND CONCLUSION

1. Survey and Monitoring Fig Tree Borers:

The survey studies included the following major borers; *Paropta paradoxa* (Lepidoptera: Cossidae), *Hesperophanes griseus* (Coleoptera: Cerambycidae) and *Hypoborus ficus* (Coleoptera: Scolytidae).

1.1. Monitoring the carpenter worm, *Paropta paradoxa* (Lepidoptera: Cossidae):

Data indicated that moths started to emerge two weeks earlier in 2001 (3rd week of April) than 2000 season (1st week of May). Only one peak was detected during the 2nd half of June 2001 or 1st half of July 2000 with secondary peaks during the 2nd half of July 2001 and 2nd half of August 2000 and 2001. Summer months recorded the maximum flight activity, (5.04-5.34 moths/ tree). The seasonal cycle consisted of an activity season prevailing for about 6 months (from late April or early May to early or late October). The southeastern direction was the most preferred for moth emergence. The direct effect of DMxT on the moth activity was significant in 2000 but during 2001, it was insignificant. The effect of DMnT and DMRH on the moth activity was significant during 2000 and 2001. The effect of DMWS was significant during 2000 but it was insignificant during 2001.

1.2. Monitoring the fig longicorn beetle, *Hesperophanes griseus* (Coleoptera: Cerambycidae):

The Data indicated that in 2000, beetles started to emerge during the 3rd week of April, while it was in the 2nd week of April in 2001. Three

peaks were showed, the first peak was in the 1st half of June 2000 and the 2nd half of May 2001 seasons. The 2nd and 3rd peaks were during the 2nd half of July and 1st half of September in 2000, and during 1st half of July and 2nd half of September in 2001. Summer and spring months reported the highest number of beetles' activity (3.28-3.40 and 3.50-4.14 beetles / tree during 2000 and 2001 season, respectively). The seasonal cycle included an activity period of about 7.5 months, from 2nd half of April until the 1st half of November in 2000, and from 1st half of April until the 2nd half of November in 2001.The southeastern direction was the most preferred for *H. griseus* beetles emergence. The direct effect of DMxT, DMnT, DMT, and DMWS on beetles' activity was insignificant in 2000 but during 2001, it was significant. The effect of DMRH on beetles' activity period was significant during the two respective years.

1.3. Monitoring the fig shot-hole bark beetle *Hypoborus ficus* (Coleoptera: Scolytidae):

Beetles of *H. ficus* began to emerge in fig orchard during 1st week of March 2000 and during the 4th week of February 2001. Four peaks were observed during 2nd half of April, 2nd half of May, 1st half of July and 2nd half of October, respectively, during 2000. On the other hand, five peaks were noticed during 2001, during 1st half of May, 1st half of June, 2nd half of July, 1st half of September and 1st half of October, respectively. Summer months ranked the maximum flight number, (176.70-187.78 beetles/tree). The seasonal cycle included an activity period of about 10.5 months, from 1st half of March until the 1st half of January in 2000 and from 2nd half of February until the 2nd half of December in 2001. Major activity numbers

were from the west direction (124.70-157.34 beetles. The direct effect of DMxT, DMnT, DMT and DMRH on beetles' activity was significant, during 2000 and 2001, respectively. The effect of DMWS on the beetles' activity period was significant during 2000, but it was insignificant during 2001.

2. Survey and Monitoring of Associated Natural Enemies:

The associated parasitoid of *H. ficus* [*Cephalonomia* sp. (Hymenoptera: Bethylidae)] as well as *Phloeocopus andresi*, (Coleoptera: Cleridae)] and the orb weaving spider *Uloborus* sp. Predators of *H. griseus* and *H. ficus*, respectively were studied under laboratory conditions from samples brought from fig orchard at Agamy district, Alexandria governorate. The parasitoid *Cephalonomia* sp. is recorded in Egypt on *H. ficus* for the first time.

2.1.: Population fluctuation of the host, *H. ficus*, and its associated parasitoid, *Cephalonomia* sp.(Hymenoptera: Bethylideae):

H. ficus beetles began to emerge during late-February or the 1st half of March. Five peaks were observed in 1st half of May, July, August, October and November, in 2000. In 2001, four peaks were noticed in 1st half of April, 2nd half of May, 1st half of July and 1st half of October. The activity period of the associated parasitoid *Cephalonomia* sp. showed 3 peaks almost coinciding with the host insect.

The direct effect of mean temperature on the host insect population was positively significant but positively insignificant with the parasitoid in 2000. The same effect was positively insignificant on the host insect and its parasitoid during 2001. The direct effect of relative humidity was positively insignificant on the host insect population but negatively insignificant on the

parasitoid in 2000. The same effect was insignificantly negative with the host insect but positively insignificant with the parasitoid in 2001. Moreover, there was insignificant correlation between the mean number of the host insect and the parasitoid.

2.2. Population fluctuation of the prey insect, *H. griseus*, and its associated predator, *Phloecopus andresi* (Coleoptera: Cleridae):

Beetles of *H. griseus* began to emerge during the 1st or 2nd half of April. The 1st peak was during the 2nd half of May and the 1st half of June. The second peak was during the 2nd half of September beetles stopped emerging during November and December. The activity peak of the predator was during 1st half of September 2000. In 2001, the peak was earlier during the 2nd half of August.

The direct effect of mean temperature on the prey insect and its predator was positively insignificant in 2000 season. However, in 2001, the same effect was positively significant with the host insect but positively insignificant with the predator. The direct effect of relative humidity was insignificantly negative with the prey insect. The same effect was insignificantly positive with the predator. Moreover, there was insignificant correlation between the mean number of the prey insect and the predator.

2.3. Population fluctuation of the prey insect *H. ficus* and its associated predator spider *Uloborus* sp.:

H. ficus beetles started to emerge during the 2nd half of February or 1st half of March. Five peaks were observed in 2000. However, in 2001 season 4 peaks were detected. The activity period of the associated predator often synchronized with the insect host, from 2nd half of March until 2nd

half of September with one peak during 2nd half of July in 2000 or from 1st half of April until 2nd half of October with one noticed peak during 1st half of August in 2001 season.

The direct effect of mean temperature on both the prey insect and its predator was positively significant in 2000, but in 2001 the same effect was positively insignificant on the host insect, while highly significantly positive on the predator. The direct effect of relative humidity was positively insignificant on the prey insect and its predator in 2000, however the same effect was positively insignificant on the host insect but negatively insignificant on the predator during 2001. Moreover, there was positive insignificant correlation between the mean number of the insect host and the predator in 2000, but it was negatively insignificant in 2001.

3. Control Measure Studies:

Statistical analysis and grouping of one year treatments reflected that there were significant differences between treatments. The data were classified according to infestation reduction into superior, sufficient, moderate, reasonable and least groups. The superior groups for *P. paradoxa* resulted in 80.6- 93.2% of infestation reduction , worming treatment only was of a high value it resulted in 70.5% of infestation reduction when applied for two successive seasons as a single treatment while the combined treatment including dormant pruning, worming and local chemical paintings resulted in higher percentage (93.2%). In case of *H. griseus* ranged between 79.0-81.1%, the local chemical painting treatment only resulted in 69.4% of infestation reduction when applied for two successive years, while the combined treatment including dormant pruning, worming and local chemical treatment resulted in 81.1%. The superior group for *H. ficus* was (76.7-

93.2%) , dormant pruning only decreased infestation by 76.72% when applied for two successive seasons, while dormant pruning, worming and local chemical spraying resulted in 93.2% when applied together as a combined treatment.