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SUMMARY

The Mediterranean fruit fly, *Ceratitis capitata* and peach fruit fly, *Bactrocera zonata* are regard as the most important pests belonging to family Tephritidae which infest many fruit trees in Egypt during the ripping stages. The population densities of these pests on some citrus varieties such as winter citrus (Navel orange) and summer citrus (Valencia orange) during 2005/2006 in three region in Menofia Governorate (Shibin Al-Kom, Ashmoun and El-Sadat regions) was studied. The population densities was conducted on peach trees in Shebin El-kom and El-Sadat region). Also, the survey of the most important parasitoids *Pachycrepoides vindemmiae* (Rondani) (Family Pteromalidae and *Dirhinus giffardii* (Family Chalcididae) in El-Sadat region was checked. However, the biological studies were conducted at Biological control Lab. Econ. Entomo .Dept.Fac.Agric, Menofia Univ. to the parasitoid.

The obtained results can be summarized as:-

A-) Ecological studies of *Ceratitis capitata* and *Bactrocera zonata*

I. Population density of *C. capitata* and *B. zonata*

I.1 Citrus

I.1.1 Shibin El-Kom

I. 1.1. a. Winter citrus (Navel orange)

The obtained results indicated that the population of the fruit fly was low in comparison with peach fruit fly where the value of CTD (the number of attracted flies to a trap in one day) for the fruit fly (0.7 – 6.3 fly). The correlation between the CTD and the mean of temperature and the relative humidity was insignificant. On the other hand, the peach fruit fly population was obviously high in the early season where it reached to the highest level in the end of October where the value of CTD was 33.1 fly and the population was reached to the highest values in the 1st week of December recorded 22.8 fly. The statistical analysis of obtained data

demonstrated that there was very highly significant differences between the values of CTDs and the mean of temperature and relative humidities.

I. 1. 1.b. Summer citrus (Valencia orange)

The obtained results indicated that the population of *C. capitata* was low during March and April till the mid of May and beginning to increase where it recorded the highest population in the first week and the last week of June where the CTD was 32.6 and 16.7 flies, respectively. The correlation between the values of CTD and the average of temperature and relative humidity was insignificant. On the other hand, the population of *B. zonata* was very low where the population was peaked during the late of June and mid of July and late of July. Where the CTD values recorded 2.6, 5.3 and 2.8 flies, respectively. The correlation was significant between the CTD value and the average of temperature and insignificant with the average of relative humidity.

I.1. 2. Ashmoun

I.1.2. a. Winter citrus

The population of both fruit fly and peach fruit fly was low where it recorded two peaks in the fruit fly population in the 2nd week of November and CTD was 7.8 fly and the last week in the same month where the CTD was 3.6 fly and the correlation was insignificant. On the other hand the peach fruit fly population was low recorded one peak in the 3rd week of October recorded CTD 2.14 fly and from the 2nd week of December till the end of February the flies were absent. However, the correlation was highly significant between CTD value and the average of temperatures and it was insignificant with the average of the relative humidities.

I.1. 2 . b. Summer citrus

The population of the *C. capitata* was very high in comparison with that of *B. zonata* in this region where the highest population was recorded during mid of May and mid of June. The value of CTD was 32.4, 39 flies, respectively. The population was still increase till the end of July. The correlation between CTD was negatively insignificant between the average of temperature and average of relative humidity. On the other hand the population density of *B. zonata* was very low and did not recorded any population except in the end of July and the value of CTD was 1.4 fly and the correlation between CTD and the average of temperatures and relative humidities was insignificant.

I.1. 3. El-Sadat

I.1. 3. a. Winter citrus

The obtained results indicated that the values of CTD ranged between 0 – 2.7 flies for the fruit fly population where the highest population was recorded during the late of November where the value of CTD was 2.7 fly and during the period of the second week of January till late of February the pest not recorded any population in this study. The correlation was significant between CTD and the mean of temperatures and insignificant between the CTD and the average of relative humidity. While the population of *B. zonata* was high from the beginning of the season till the first week of December. Where the highest population was 29.4 fly during the middle of October and the population was peaked during the end of October where the value of CTD was 7.4 flies while the third peak of the population was noticed during the first week of December where the CTD was 13.8 flies. On the other hand the population of flies was not recorded from mid of January till the end February. The correlation was highly significant between CTD value and the average of temperature and it was insignificant.

I.1. 3. b. Summer citrus

The obtained results indicated that the population of *C. capitata* was appeared low and then gradually increased from the period of the third week; of April till it recorded the highest population in the third week of May and the value of CTD 54.3 flies and recorded another high population level during the third week of June and the value of CTD was 21.7 flies and then sharply decreased till reaching to zero during the end of July.

I.2 Peach

I.2 .1. Shibin El-Kom

The population of *C. capitata* was recorded high in comparison with that of *B. zonata* where it increased beginning from the first week of June till reaching to the highest level in the beginning of July where the value of CTD was 57.8 flies and the population remaining increased till the end of July. On the other hand the population of *B. zonata* was beginning decrease where the value of CTD ranged between 0 – 4.7 flies and the correlation between the population of both (*B. zonata* and *C. capitata*) and the average of temperature and relative humidity was positively insignificant.

I.2 .1. 2. El-Sadat

The obtained results in this study demonstrated that the population of *C. capitata* on peach trees was very high increased where it recorded four peaks and the values of CTD were 52.7, 61.4, 76.1, 52.6 flies during the third week of April, the end of April, the third week of May and the third week of June, respectively. The statistical analysis indicated that the correlation between the average of temperatures and relative humidities was negatively insignificant. However, the *B. zonata* population was low in comparison with that of *C. capitata* where the value of CTD was ranged between 0– 4.4 flies. Also, the correlation was positively insignificant

between the value of CTD and the average of both temperature and relative humidity.

II- Evaluation the use of orange and mandarin peels as semi artificial diets for rearing the fruit fly *Ceratitis capitata*

This study was conducted for using the orange and mandarin peels as artificial diets for rearing the fruit fly *C. capitata* in laboratory conditions (30 – 32 °C). The obtained results revealed that the using of orange peels as diets decreased the larval duration of insect 8 days but this period increased to reached to 9.5 days in case of using the mandarin peels in comparison with the wheat bran as control.

B- Biological study on the parasitoid of the fruit fly *C. capitata* and the peach fruit fly *B. zonata*

I. The preferable pupal ages of parasitism by *Dirhinus giffardii* on *C. capitata* and *B. zonata*

The obtained results indicated the preferable pupal age of *C. capitata* was 54, 66 and 72 hours, where the ratio of parasitism was 21.7, 16.6 and 20.0 %, respectively. On the other hand the preferable age of *B. zonata* was 42, 48 and 66 hours with parasitism ratios 28.3, 25 and 23.3 %, respectively.

2. The fecundity of the pupal parasitoid *Dirhinus giffardii* on *B. zonata* pupae

In this study, the parasitoid directly exposed daily to the pupae of *B. zonata* till the parasitoid death. The number of emerged flies, the mortality rate of *B. zonata*, the parasitism ratios and the natural parasitoid death were calculated in the laboratory. The obtained results denoted that the highest parasitism ratio was noticed in the ninth day of parasitoid emergence where the parasitism ratio reached to 70 %, also the eleventh and the seventh day where it recorded 77.6 %.

3. Duration of adult females of *Dirhinus giffardii* on pupae of *B. zonata*

The pre-oviposition period of the parasitoid as noticed from the obtained result was one day only, while the oviposition period was ranged between 28 – 39 day with average of 35 day. However, the post-oviposition period of the parasitoid was 3 – 40 day with average of 17 day. The longevity of the *Dirhinus* female was ranged between 43 - 69 day with an average of 53 day.

4. Effect of different kinds of food on the parasitoid *Dirhinus giffardii* under laboratory conditions .

The males of the parasitoid *Dirhinus giffardii*. lived about 7 days without feeding, while the females took 6 days only without feeding. On the other hand, the males of the parasitoid was lasted 16 days when fed on the water tap only but the females lasted 15 days when fed on water only. However, the feeding on 50 % honey + 50 % water increased the longevity of both males and females, where these periods were 92 and 72 days, respectively. While the feeding of the parasitoid on pure honey obviously increased the life of females and males where the period was 106 and 107 days, respectively. The mixing of honey and medical yeast decreased these periods where they took 10 and 12 days for males and females, respectively.

5. Effect of host fruit plant on the parasitism ratio of *C. capitata* and *B. zonata* under laboratory conditions.

The obtained results indicated that the ratio of parasitism on the pupae of *C. capitata* which emerged from the apricot fruits reached to 70 % while the ratio was 72 % on the peach fruit fly pupae on the same host. While on the peach fruits, the ratio of parasitization was 68 and 52 % on both pupae of *C. capitata* and *B. zonata*, respectively. On the other hand and on mango fruits, the ratio of parasitization was reached to 68 % in case of *C. capitata* pupae changed to 84 % in case of *B. zonata* as host.

However, on guava fruits the parasitization ratio recorded 62 and 72 % in case of parasitization on *C. capitata* and *B. zonata* pupae, respectively.