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STUDIES ON THE FLUCTUATION OF OCCURRENCE OF MANGO BRONZE BEETLE, *CHRYSOBOTHRIS DORSATA* F, IN EGYPT (COLEOPTERA : BUPRESTIDAE)

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Abstract

Seasonal abundance of *C.dorsata* beetle on mango trees and the influence of certain climatic factors on the occurrence of insect were studied during 1997 and 1998. The beetle occurred throughout the period from the 2nd half of March until the 1st half of October. Two peaks of beetle activity were recorded annually during the 1st half of May and the 2nd half of June 1997 and during the 1st half of April and the 1st half of August 1998.

Statistical analysis showed significant correlation between the number of emerged beetles and each of Max. Temp., Min. Temp. and R.H.% during the 1st occurrence 1997, while the correlation was only significnt with Max. Temp. and Min. Temp. during the 2nd occurrence 1998. On the other hand, tested climatic factors not show any influence on the number of emerged beetles during the 2nd occurrence 1997 and the 1st occurrence 1998.

INTRODUCTION

The mango bronze beetle, *Chrysobothris dorsata* F. (Col.: Buprestidae) is one of more important economic cambium borers attacking several hosts of fruit and wood trees. In Egypt, some investigators (Shalaby 1958; Nour 1963; Alfieri 1976; Moussa 1977; Batt 1989 and 1999; Okil 1991; Tadros, 1994) mentioned that hosts of *C.dorsata* are citrus, nut, acacia, peach, casuarina, fig, mulberry, pounciana, apricot, apple, mango, pear, willow and lebbek trees. The larvae bore directly under the bark in the cambium of trunk and main branches. Galleries are flattened oval shaped, shallow, sinuous and extended in bark and outer sap wood, where they become filled with compact saw mixed with pellets of woody excrements, the bark becomes loose, gets detached from the stem, the infested trees become extremely weak and die.

MATERIALS AND METHODS

An orchard of infested mango trees with *C.dorsata* beetle was selected at Al-Mansouryia village, Giza Governorate. Twenty infested trees were randomly chosen, the

old exit holes were marked at the end of December 1996 by coloured pen, continued examinations were carried out, new exit holes of emerged beetles were marked and recorded at two week intervals throughout 1997 and 1998. Occurrence periods and emergence peaks were estimated.

The influence of minimum temperature (Min. Temp.), maximum temperature (Max. Temp.) and relative humidity (R.H.%) on population fluctuations of *C.dorsata* beetle during the different occurrence periods of 1997 and 1998 was studied, statistical analysis was made according to Fisher (1950).

RESULTS AND DISCUSSION

Seasonal abundance: Data on the occurrence of *C.dorsata* beetle during 1997 and 1998 are summarized in Table 1 and graphically illustrated in Fig 1. Data showed that the active period of *C.dorsata* beetle occurred throughout the period from the second half of March until the first half of October of each year. In 1997, population fluctuations during activity period evident that a main peak of emerged beetles was observed at the first half of May when the percentage of emerged beetles was 16.4% from annual population, while small peak was obtained at the second half of June when the percentage of emerged beetles was 10% from annual population. In 1998, the principal peak of emergence appeared at the first half of April when the percentage of emergence reached 20.5% from annual population, while least peak of population cleared at the first half of August when the percentage of population density decreased to 6.4% from annual population. In this respect, Hanna *et al.* (1992) mentioned that *C.dorsata* has one adult brood annually on orange trees (at Fayoum Governorate) from late April to mid September in 1986 and from late April to late September 1987. The respective peaks were recorded on the second and first half of June. Abd El-Latif (1995) mentioned that one brood of *C.dorsata* beetle on apricot trees (at Fayoum Governorate) from the first half of April to the second half of July, the beetles reached the peak during the first half of May and appeared with few individuals at the second half of September and the first half of October in both years of study (1991 & 1992).

Influence of certain climatic factors on the population of *C.dorsata* beetle: Simple correlation between climatic factors and the number of emerged beetles from infested mango trees at Giza Governorate during different occurrence periods in 1997 and 1998 are also demonestrated in Table 1.

In 1997, statistical analysis of data during the first occurrence period (from the

2nd half of March to the 1st half of June) showed significant correlation between tested climatic factors and number of emerged beetles (r = 0.637, 0.595 and -0.798 for Min. Temp., Max. Temp. and R.H. %, respectively), while there was no correlation between these factors and number of emerged beetles during the second occurrence period (from the 1st half of June to the 1st half of October).

In 1998, the correlation during the first occurrence period (from the 2nd half of March to the 2nd half of July) revealed the same trend of the second occurrence 1997, while during the second occurrence 1998 (from the 2nd half of July to the 1st half of October), highly significant correlation was noticed between the number of emerged beetles and both minimum and maximum temperature (r = 0.822 and 0.989 for Min. Temp. and Max. Temp., respectivily). The relative humidity has no influence on the population of emerged beetles.

In this respect, Hanna et al (1992) mentioned that the separate effect of weather factors on activity of *C.dorsata* beetle was insignificant for minimum and maximum temperature, while it was highly significant and negative during 1986 and 1987. Abd El-Latif (1995) found also, that each of weather factors showed insignificant influence on *C.dorsata* population densities during 1991 and 1992.

Table 1. The occurrence periods, date of peaks, simple correlation (r) and regression (b) values between climatic factors and population of *C.dorsata* beetle emerging from mango trees at Giza Governorate during 1997 and 1998.

Year	Occurrence Period			Peaks		Climatic Factors					
						Max.Temp.		Min.Temp.		R.H.%	
	No.	From	To	Date	Emergence %	r	b	r	b	r	b
1997	1	2nd half of Mar.	1st half of Jun.	1st half of May	16.4%	0.637 *	1.05	0.595 *	1.038	-0.798 **	-1.007
	2	1st half of Jun.	1st half of Oct.	2nd half of Jun.	10%	0.316	0.493	0.339	0.309	-0.307	-0.213
1998	1	2nd half of Mar.	2nd half of Jul.	1st half of Apr.	20.5%	0.205	0.214	0.163	0.151	-0.110	-0.139
	2	2nd half of Jul.	1st half of Oct.	1st half of Aug.	6.4%	0.822 **	0.494	0.989 **	0.553	-0.091	-0.042

* Significant at the level of 0.05

** Significant at the level of 0.01

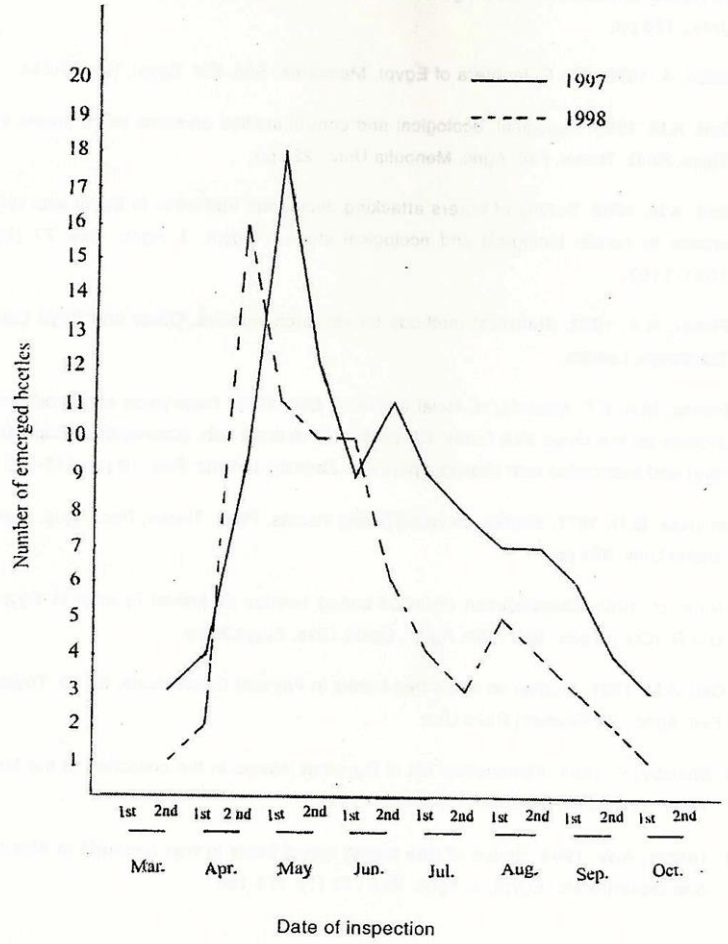

Fig. 1. Half monthly numbers of *C.dorsata* beetles emerging from 20 infested mango trees at Al-Mansouryia (Giza Governorate) during 1997 and 1998.

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دراسات علي النشاط الموسمي لخنفساء المانجو البرونزية كريزوبوثرس دورساتا في مصر (رتبة غمدية الاجنحة : بوبرستيدي)

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تعتبر خنفساء المانجو البرونزية (كريزوبوثرس دورساتا) احدي ناخرات الكامبيوم التي تصيب عوائل مختلفة من أشجار الفاكهة والأشجار الخشبية .. وقد تم دراسة الوفرة الموسمية لهذه الخنفساء علي أشجار المانجو وكذلك درس تأثير بعض العوامل الجوية علي تقليات التعداد وقد وجد أن:

- تكون الخنافس متوفرة طوال الفترة الممتدة من النصف الثاني من مارس حتي النصف الاول من أكتوبر، وقد سجل خلال هذه الفترة قمتين للنشاط سنويا: كانت القمة الاولي في النصف الاول من مايو ١٩٩٧ والنصف الاول من ابريل ١٩٩٨، بينما كانت القمة الثانية في النصف الثاني من يونيو ١٩٩٧ والنصف الاول من اغسطس ١٩٩٨.

- وجد ارتباط معنوي بين عدد الخنافس الخارجة خلال الحدوث الأول ١٩٩٧ وكل من الحرارة الصغري والعظمي والرطوبة النسبية، بينما كان هذا الارتباط غير معنوي في الحدوث الثاني ١٩٩٧. أيضا لم يكن هناك ارتباط بين عوامل المناخ وتعداد الخنافس الخارجة خلال الحدوث الاول ١٩٩٨ ، بينما وجد ارتباط عالي بين التعداد والحرارة الصغري والعظمي في الحدوث الثاني ١٩٩٨ ولم يظهر تأثير للرطوبة النسبية خلال هذا الحدوث.