

Seasonal abundance and population trends of red palm weevil, *rhynchophorus ferrugineus* oliver (coleoptera curculioinidae).

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ABSTRACT

The Seasonal abundance and population trends of red palm weevil, *Rhynchophorus ferrugineus* Oliver (male and females) population was estimated during two successive years (2008 and 2009) by using aggregation pheromone traps in date palm orchards located at Aremnt, Giza Governorate .

The results obtained during the two years of study have clearly showed that adult stage of red palm weevil, *Rhynchophorus ferrugineus* has two peaks of swarming activity on date palm trees throughout the year. In both years, the first peak occurred during March ,while the second one occurred during October.

Number of attracted female was considerable high than attracted males. Correlation analysis indicated there was insignificantly positive correlation between trap catches and infestation date palm .

INTRODUCTION

The date palm, *Phoenix dactylifera* L. (Palmaceae) is the most common and widely cultivated in the arid regions of the Middle East and North Africa.(Abdel-Megeed, *et al.*, 2004) The total number of date palm trees recorded in the ancient life reached about 109 million date palm trees which yielded 4.2 million metric tons. Arab countries however, contain 78.3% of the total world date palm trees which demonstrate 75% of the production .The red palm weevil was recorded as seriously insect pest on date palm trees in Egypt at 1992 (salleh and Gouhar (1993) and El-Garhy ,1996). The threshold zero for red palm weevil development rank within the range of 12-14°C. Scarce numbers of adult weevils were accordingly captured in December and January when low temperature figures were prevailed. The captured number of adults demonstrates the highest figures during the extended from April to June, which harbor the optimum weather factors. The valuable number of trapping adults was achieved during this period was probably due to the earlier simultaneous effect of micro climate factors that affecting the larval stage during summer months El-Sebay (2003) carried out field experiment and stated that, *R. ferrugineus* had two main seasonal activities annually in Egypt. The first adult brood was during April and the second one was during November. It was found that there was no relationship between seasonal population fluctuation and weather factors. Adult females were attracted to the traps after laying eggs. Female's density was more than males and represented 52.8 – 57.8 % of total population in the field and found that, trap provided with ethyl acetate were more effective than regular traps provided with food for weevils attraction. in addition , ethyl acetate saved food costs

and time of maintenance effort approximated 70% of the total cost of trap application.

The objective of this study is based on field experiments to study the following topics (1) seasonal variations of RPW adults (2) The relation between the aggregation pheromone traps catches and the level of infestation with *Rhynchophorus ferrugineus*.

MATERIALS AND METHODS

The experimental date palm orchard, an area of about 3,5 feddan (335 date palm trees) was chosen at Aremnt Giza governorate . The present experiment extended for two successive seasons (2008-2009) .Bucket design traps were used in the present study were inserted slightly in the soil surface. A number of round holes were made to allow adult weevils to enter inside the trap safely and easy .The used traps commonly consists of plastic bucket (9 liter in size). The bucket was punctured around its wall with 4 holes each of 2.5cm diameter at 15cm from the bottom. (Fig 1). The commercially used pheromone “Ferrugineol” is a synthetic pheromone lures (a mixture of 4 - methyl -5 - ananol and 4 - methyl - 5 - nanone ate ratio 9:1) which imported from Chem Tica Natural, Costa Rica was used for the. Pheromone sac was hanged underside the trap top surface.

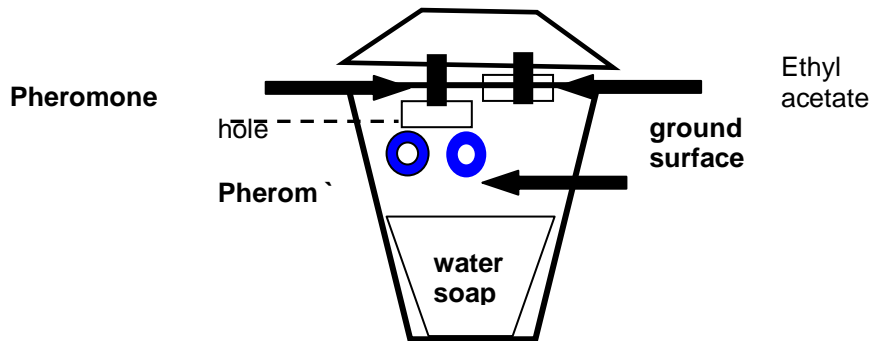


Fig. (1): Diagrammatic drawn of bucket pheromone trap

Selected Kairomone was used as a synergist to activate the potent of releasing ethyl acetate blooms. Ethyl acetate bags however were hanged from the underside surface of the trap top releasing chemicals through a fine plastic tube (as 100 and 128 mg/d). To estimate the seasonal abundance of *R. ferrugineus* four traps were distribution in the experimental orchard, Each traps was for from each other with about 100meter. Number of collected weevils caught in the pheromone traps were weekly counted and sexed, with newly of the mixture every two months. Date palm trees were inspected during the experimental period to determine the number of date palm trees infested with *R. ferrugineus*.

Statistical analysis:

Simple correlation was carried out to determine the relationship between number of adult captured and number of date palm trees infested with *R. ferrugineu* using a computer program at Costat, Correlation (SAS 1985) .

RESULTS AND DISCUSSION

Seasonal abundance and population trends of *R. ferrugineus*

Data tabulated in Table (1) and graphically illustrated in Figures (2 and 3) show the monthly changes in the number of red palm weevil during the tested period from January to December in 2008 and 2009 seasons.

The weevil were first observed in traps with relatively few numbers in January during the first (5 ± 2 individual / traps) and second (2.75 ± 1 individual / traps) seasons. Then the number of captured adults increased gradually after that forming two peaks in both years. In the first year (2008), the first peak occurred in March, the average number of *R. ferrugineus* adults per one traps was (19.5 ± 3.5 individual / traps) .The second peak occurred in October with the mean number of 17.5 ± 2.5 individual / traps

In the second year (2009), seasonal prevalence of *R. ferrugineus* population had approximately similar trend of abundance as in the first year recording two periods of activity with two peaks (figure 3). The first period of activity started from January till June and the first peak of abundance was during March (15.5 ± 5.5 individual / traps). The second period was observed from to August to December with the highest abundance represented by 15.5 ± 3 adults/ traps . Data obtained proved that the reliable number of captured red palm weevil occurred during warm periods which extended from March until November.

Table (1): Monthly total numbers of *R. ferrugineus* adults (male and females) caught by pheromone traps at Gize Gornorate, during 2008-2009

Date	Season 2008				Season 2009			
	No of male	No of Female	Total of adult	No of palm infest.	No of male	No of Female	T. of adult	No of palm infest
January	7	13	20	1	5	6	11	2
February	12	25	37	7	15	23	38	1
March	25	53	78	4	30	34	62	2
April	19	25	44	1	12	29	41	0
May	12	41	53	0	17	30	47	2
June	9	21	30	2	7	16	23	1
July	10	27	37	3	10	19	29	2
August	11	20	31	4	12	14	26	1
September	14	26	40	2	10	18	28	3
October	24	46	70	3	23	38	61	2
November	21	33	54	2	25	32	57	1
December	7	11	18	0	7	12	20	0
Total	171	341	512	29	168	276	444	17

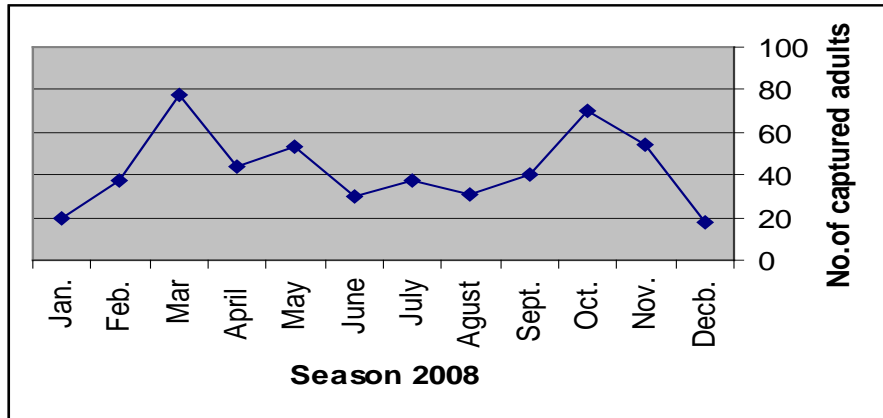


Fig. (2): Monthly total numbers of *R. ferrugineus* adults trap attracted to aggregation pheromone (bioassay every week with newly of mixture every two month during 2008

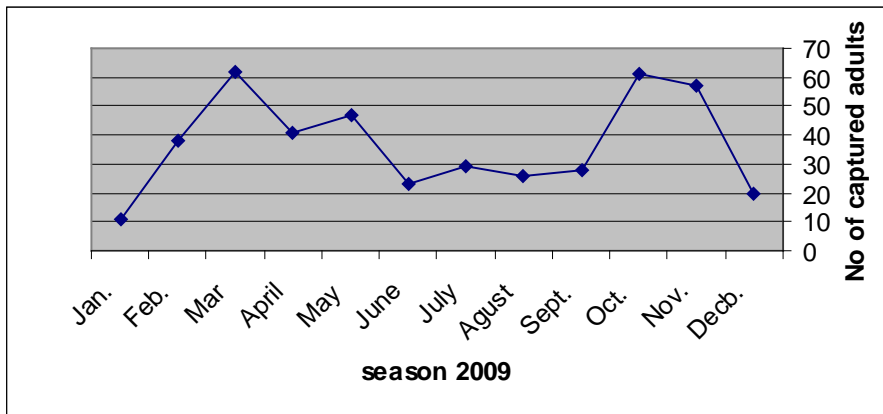


Fig. (3): Monthly total numbers of *R. ferrugineus* adults trap attracted to aggregation pheromone (bioassay every week with newly of mixture every two month during 2009

While, there was scarcely distributed individuals during winter months. The highest level of occurrence expressed as adults caught in aggregating pheromone traps during early spring months i.e. March, April, and May. These results in general agree with the findings of Maralidhoron *et al.* (2000), and Vidyasager *et al.* (2000), , who found that in India the highest population density of the red palm weevil was observed in May (29.6/trap), March (16/trap) and December (4.6/trap). Abbas (2000 and 2005) in Egypt estimated four overlapping generations of red palm weevil adults per year. Vidyasager *et al.* (2000) in Saudi Arabia found that, the peak of the red palm weevil adult populations trapped was immediately after winter season during the months of April and May. A much smaller second peak was observed during October

and November months just before winter. (Gunnawardena and Bandarage, 1995 El Garhy.1996). El Ezaby *et al.* 1998 reported maximum catches in March and April.

Sex ratio.

As indicated from Table (1) and Fig. (4), out of 512 caught weevils in 2008; there were 171 males and 341 females, which represented 1:3. In 2009, number of caught weevils was 444, (168 were males and 276 females) with sex ratio of 1:3.8. Occurrence of females in traps was higher than males all over the year Show that, the highest ratio of females was in March and October , such results are agree with Al-Saoud (2004) who achieved similar sex ratios

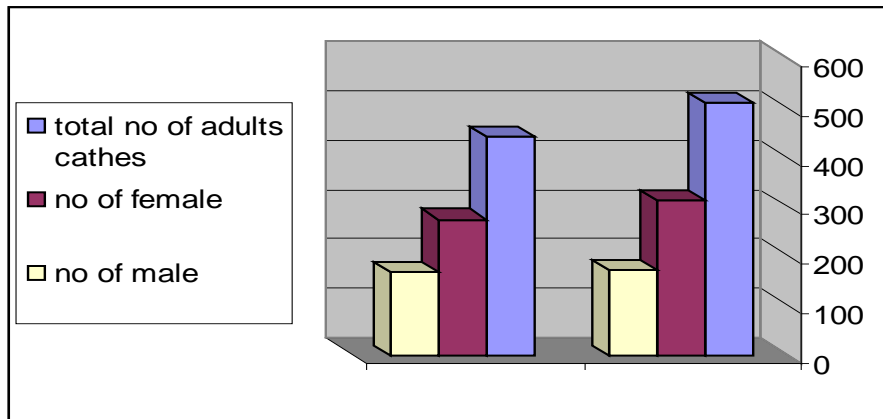


Fig. (4):Total number of attracted females and males in aggregation pheromone traps during seasons 2008 and 2009

The relation between captured RPW adults by aggregation pheromone trap and infestation of trees .

As shown in Table (1) adults captured in trap decreased during second season of proximately 15% and total number of palm infestation was decreased compared with previous year. The obtained illustrated that the infestation in palm trees had positive response to the increase of RPW adults in aggregation pheromone traps during the two years of study (2008 and 2009) ,however “r” values were 0.2268 and 0.2728,during the first and second seasons .Therefore, monitoring have to be carried out for sampling adult population and mass trapping of *R ferrugineus* used during this period, thus giving high reduction in the weevil population size reaching about 70% (Oehlschlager 2004). Hallet *et al.* (1993) it is worth to mention that this mass trapping is successful only when combined with good sanitation and chemical control. It allows to reduce the weevil population and to reduce number of flying adults.

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الوفرة الموسمية لسوسة النخيل الحمراء
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أوضحت الدراسة التي أجريت لرصد التغيرات في الكثافة العددية باستخدام مصائد الجذب
الفرمونية التجميعية لسوسة النخيل الحمراء في مركز أرمنت بمحافظة الجيزة خلال عامي 2008
2009 وجود فترتي لنشاط الحشرة في كلا الموسمين وقد بلغت ذروة النشاط الأولى والثانية
خلال مارس وأكتوبر من كل عام .وجد أن عدد الإناث المنجذبة للمصائد مرتفعا مقارنا بعدد الذكور.
أوضح تحليل الارتباط أن هناك ارتباط موجب غير معنوي بين عدد الحشرات المنجذبة للمصائد
وعدد النخيل المصاب.

قام بتحكيم البحث
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كلية الزراعة – جامعة المنصورة
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