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**STUDIES ON SUGARCANE SUSCEPTIBILITY FOR INFESTATION WITH RED PALM
WEEVIL, *RHYNCHOPHORUS FERRUGINEUS*. OLIVIER (COLEOPTERA:
CURCULIONIDAE)**

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ABSTRACT

The present work deals with studying the sugarcane infestation with the red palm weevil in the field. The obtained results showed that the female adults could not infest the stalks of sugarcane plants due to the adult's inability to lay their eggs on the external layer and feeding also found adults died on green house. In the laboratory, it was found that the stalk mechanical wounds enhance the female adults to lay their eggs and their newly hatching larvae bore into the stalks forming tunnels. Also, mechanical infestation could be achieved by both placing eggs or different larvae stage on wounded parts. Studies revealed that the life cycle was completed during 3 months, egg hatching ranged between 3-5 days, larvae duration 40-73 days, pupae took about 16-27 days, adult weevils duration was 40-70 and laid number of egg 130-220 egg under 29 C. The female adults of red palm weevil *R. ferrugineus* can complete life cycle in sugarcane pieces in laboratory during 3-4 month.

Key-words: *Rhynchophorus ferrugineus*, sugarcane, egg laying, life cycle.

RESUME

Ce travail traite de l'infestation de la canne à sucre par le charançon rouge du palmier au champ. Les résultats montrent que les femelles ne peuvent pas l'infester car elles sont incapables de pondre dans les couches supérieures des tiges intactes et les adultes meurent sans pouvoir s'y nourrir. Au laboratoire, la blessure mécanique des tiges permet la ponte et les larves néonates peuvent y creuser. L'infestation peut y être déclenchée en plaçant des œufs et des larves de tous stades sur les blessures. Nos études montrent que le cycle de développement est réalisé en 3 mois avec 3-5 jours pour l'œuf, 40-73 jours pour la larve et 16-27 jours pour la nymphe. L'adulte vit 40 à 70 jours avec une fécondité de 130 à 220 œufs à 29°C.

Mots-clés: *Rhynchophorus ferrugineus*, canne à sucre, ponte, cycle de vie.

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 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 a serious insect pest on date palm trees in Egypt at 1992 Saleh, (1992). The red palm weevil is usually reared in the laboratory on cut pieces of petioles or tender stem of coconut and other palms Rahalkar *et al.* (1972). have reported that sugarcane stems can serve as good laboratory substitute for coconut in rearing this weevil. Based on this observation, removed) and 130,217 trees at Ismaelia (32,354 trees were removed). The total infested trees in Egypt were 216,118 and 60,527 removed, El-Sebay, (2007). Huston (1922) revealed that *R. ferrugineus*, whole life cycle completed by 4-5 months and may be shorter at the coastal regions. Reported that, under laboratory conditions, life cycle lasted 8-10.5 weeks. El-Ezaby (1997) stated that the insect had 3 generations per year. The shortest generation was the first (100.5 days) and the longest was the third (127.8 days) at temperatures between 25 and 27°C. Hussein (1998) in Egypt carried out biological studies and concluded that *R ferrugineus* underwent 3 annual generations per year. The objective of this study was studying the sugarcane infestation with the red palm weevil in the field, laboratory and probabilities of completing life cycle.

MATERIALS AND METHODS

The present laboratory studies were carried out in late Dr. Yousry El-Sebay Laboratory Researches of Red Palm Weevil at Kassasin, Ismailia Governorate, Egypt.

Studied infestation sugarcane in field with red palm weevil

A green house Fig (1) cultivated with sugarcane (9 month age) was chosen to release 300 newly emerged adult weevil (150 female, 150 male).The walls of the green house were made from perforated ting plastic material and area (5 meter x5 meter).Inspection sugarcane was conducted 3 months after release.

Studied stalk sugarcane infestation

Randomly selects stalks of the green house were cut into small pieces 20 cm length. Each 2 pieces were kept in plastic boxes (25 cm length, 25 cm width, 15 cm height),and used 5 replicates The pieces in such replicates were tightly covered with plastic from one end, while the other terminal end was left bare; each plastic box was supposed to 18 adults. Similarly, other treatment was carried out 5 replicates, while, in this case the two terminal ends were tightly covered with plastic from both directions.

Life cycle in sugarcane pieces in laboratory

Newly hatched ten larvae were immediately transferred into plastic box containing pieces of sugarcane stem ten replicate were used. Four days later, larvae were transferred to new similar food. The last larval instars prior to pupation were placed in plastic boxes with similar food until making cocoon. The obtained cocoons were daily inspected and emerged adults were collected soon after emergence, pairs adult (♂ and ♀), were placed in separate cups and provided with sugarcane stem until egg lying. Daily numbers of deposited eggs was recorded and oviposition period was counted per each female.

RESULTS AND DISCUSSION

Studied on sugarcane infestation in field

Obtained data revealed that, *R. ferrugineus* female adults could not infest the stalks of sugarcane plants in green house. It was obvious that females were not able to lay their eggs on the stalk surface, also considerable number of died weevil were recorded and no observed sugarcane infestation.

Studied stalk sugarcane on infestation

Data obtained in Fig (2) clarified that eggs of adults weevil were laid on the bore terminal end of cutting, newly hatching larvae were observed boring into the cuttings and constructing tunnels, later, full grown larvae were recorded at the other direction to pupate and from typical cocoon.

In treatment (2) data graphically illustrated in Fig (3) revealed that, inspection of cutting in treatment one showed that no egg were laid by adult females of *R. ferrugineus* as results no infestation occurred.

Effect of food suitability for rearing red palm weevil survivors

The data tabulated in Table (I), and Fig (4) reveal that the highest percentages of egg hatchability occurred at 29°C (90%), it was the incubation period of the eggs varied from 3-5 days and average 4 days. Show the changes in the longevity of the larval instars of the red palm weevil. The present study reveals that an average of 56.5 days, it was ranged between 40 to 73 days, obtained when fed on sugarcane stem slices. The pupae it is a well-known fact that *R. ferrugineus* larvae make its cocoons from fibrous stands and still inside until adult emergence. The period between the first appearance of the pre-pupal stage followed by larval pupation and emergence of adults. The pre-pupa lasted for 4 days, and ranged between 3 to 5 days, while the pupa demonstrated the following averages 21.5 days until adult of emergence.

Longevity and fecundity of females

The data tabulated in Table (II), revealed that biological parameters expressed as longevity of adult females in days were 55.0. Weevil ranged between 40-70 days. The number of eggs laid by one female averaged 175 eggs was achieved (range between 130-220). An intermediate oviposition period of 42 days while the preposition period estimated at 6.5 days and the post preposition period at 8 days. Completing one generation was found to be 3 month. The result agrees with [3] have reported that sugarcane stems can serve as good laboratory substitute for coconut in rearing this weevil. Based on this observation, Rahalkar *et al.* (1972) stated that the insect had 3 generations per year. The shortest generation was the first (100.5 days) and the longest was the third (127.8 days) at temperatures between 25 and 27°C. The previous studies on *R. ferrugineus* in general agree with the finding of Rahalkar (1985), Hussein (1998), El-Ezaby (1997) and Salama and Abdel-Razek (2002) working in India, Saudi Arabia and Egypt.

CONCLUSIONS

The female adults of red palm weevil *R. ferrugineus* could not infest of sugarcane plants due to the adult's inability to lay their eggs on the external layer and feeding but cane completed life cycle in sugarcane pieces in laboratory.

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Table (I): Duration of the development stages of *R. ferrugineus* survivors when fed on sugarcane at 29°C

Durée des stades de *R. ferrugineus* survivants nourris sur canne à sucre à 29°C

Days	Eggs	Larva	Pre pupa	Pupa	Adult
Mean Duration	3	56.5	4	21.5	55
Range	3-5	40-73	3-5	16-27	40-70

Table (II): Numbers of deposited eggs, and duration pre-, post-, oviposition phases for RPW females on sugarcane

Nombres d'œufs pondus et durées des phases d'oviposition (pre- et post-), chez des femelles CRP sur canne à sucre

Rep.	No. of deposited eggs	Female adult stage (days)		
		Pre-ovi.	Oviposition	Post ovi.
1	161	5	41	10
2	190	7	50	5
3	144	8	38	7
4	182	6	35	8
5	198	6	42	7

Figure 1 : Sugarcane cultivated in green house

Canne à sucre cultivée en serre



Fig (2): RPW larvae feeding in sugarcane stems at the level of cut areas and pupation place
Larves Larves s'alimentant sur tiges de canne à sucre au niveau des zones coupées et site de nymphose



Fig (3) Died adults on intact sugarcane with covered cut ends
Adultes morts sur canne à sucre intacte et extrémités coupées protégées



Fig (4) : Larvae feeding in sugarcane stalks
Larves s'alimentant sur tiges de canne à sucre

