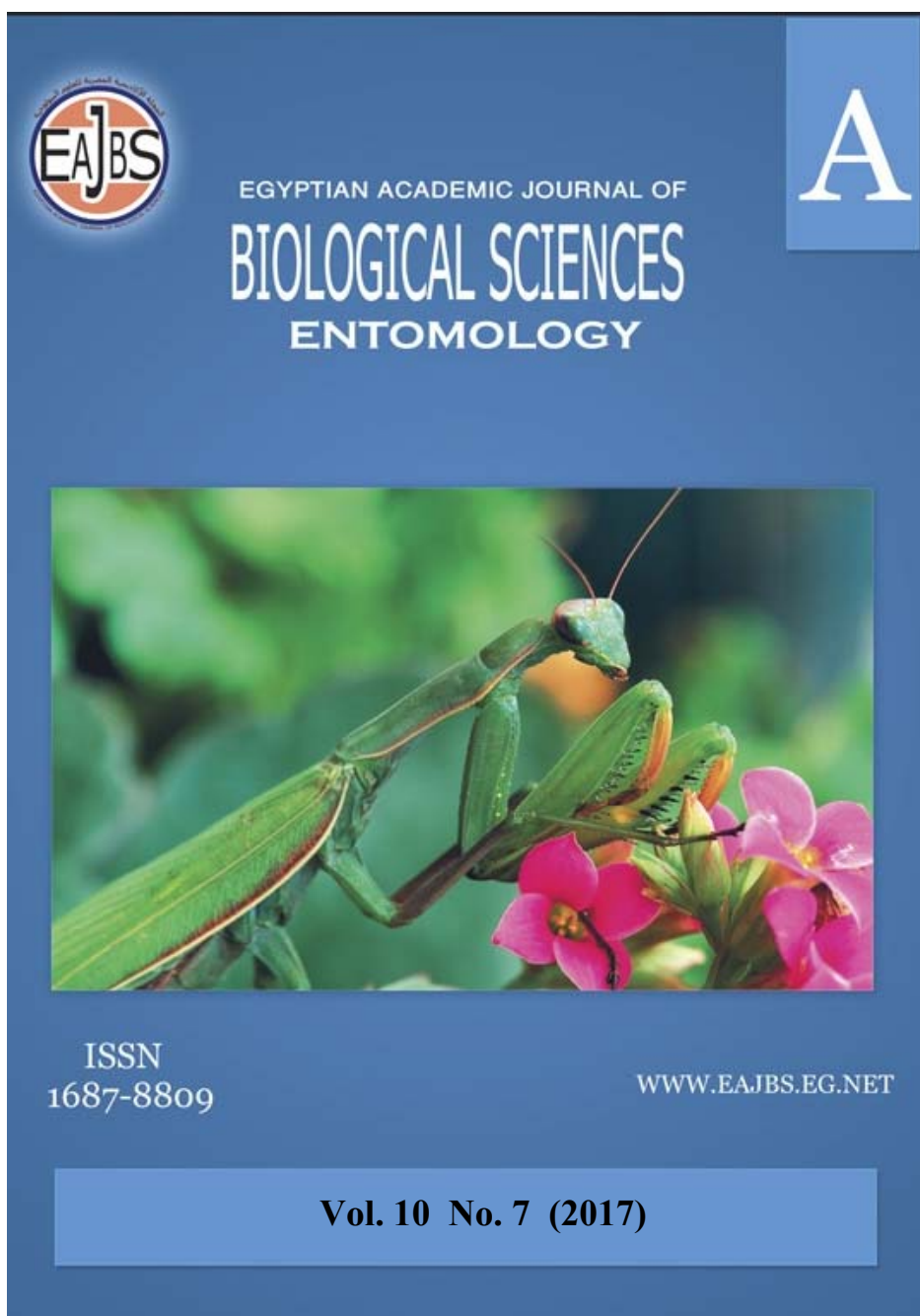


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**Evaluation Studies of Some Extracted Substances From Date Palm Tissues
on Its Attracting Potential of The Red Palm Weevil, *Rhynchophorus
ferrugineus* (Olivier) (Coleoptera: Curculionidae)**

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ARTICLE INFO

Article History

Received: 14/10/2017

Accepted: 13/11/2017

Keywords:

Date palm tree, Red
Palm Weevil (RPW),
*Rhynchophorus
ferrugineus*,
Kairomones

ABSTRACT

The red palm weevil, *Rhynchophorus ferrugineus* (Olivier) (Coleoptera: Curculionidae) is the most serious and destructive insect pest for date palm trees. Relative weevil trap attracting potential date palm tissues extracted substances on *R. ferrugineus* was evaluated in date plantations at El-Mansoria village, Giza Governorate, Egypt. Results indicated that the amino acids and indols attracted the adults of red palm weevils more than phenols. Moreover, sugars attracted the least number of adults compared with other substances.

INTRODUCTION

The date palm, *Phoenix dactylifera* L. is a monocotyledonous woody perennial tree belongs to the family: Arecaceae (McCurrach, 1960). The total number of date palm trees recorded in the past ancient time reached about 109 million 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 (Abdel-Megeed *et al.*, 2004). The red palm weevil (RPW), *Rhynchophorus ferrugineus* (Olivier) (Coleoptera: Curculionidae) is an economically important invasive tissue-boring pest of various palm species in many parts of the world. Nowadays, the date palm crop in Eastern Arab countries is under threat. This insect was firstly discovered attacking date palm in United Arab Emirates in 1986 and progressively spread to Gulf area and North Africa as the latest record since 1992 in Egypt. RPW is described as a pest of 26 date palm species belonging to 16 different genera (Malumphy and Moran, 2009).

In the field, the male of RPW produces a pheromone which causes the weevils to aggregate on damage trees (Gunawardena and Bandarage, 1995). The larvae can only feed on soft tissue, tree crown, and upper part of the trunk and at the base of petioles. They not only bore into the decaying tissue of dying palm, but can also attack healthy palm. Tunneling and feeding by the larvae enervate the infected trees, which die as a consequence of the build up numerous generations attained by

the insects (Ferry and Gomez, 2002). Infestation is problematic because RPW is difficult to be detected until the crown of the date palm tree collapse. The infected trees can die in a few months. The present work was undertaken for evaluation of efficiency of extracted substances from date palm tree tissues on attracting RPW adults; male and female, compared to those adults attracted to traps contained ethyl acetate.

MATERIALS AND METHODS

Trapping adult red palm weevils (RPW):

For trapping, 10 plastic buckets with diameter of the top and bottom were 26 and 20 cm, respectively. Each trap and its lid had four equidistant circular openings (3 cm diameter) to allow weevils' entrance. All traps contained one pheromone (Ferro-lure: 4-methyl-5-nonanol and 4-methyl-5-nonanone) from Chem. Tica, Int., Costa Rica, that was four suspended at the inner side of the lid with a wire near a bottle contains 40 cm³ of sugar, Indol, Phenol, amino acids, and acetyl acetate as kairomones. At the bottom of the bucket, two bottles filled with water for humidity were placed. Traps were buried in the ground to the level of the openings. The distance between traps was 100 meter at three meter away from the date palm. Attracted adult weevils from traps were collected and transferred to petri dishes with wet cheese cloth and sugar cane mulch. Laid eggs were counted daily till the last day of oviposition period for collected females. Attracted females were collected and transferred daily.

Date palm tree tissues constitute extraction:

1. Digestion:

Ten grams of tissues of infested date palm trees (Zaghloul, Barhy, and Samany varieties) were added to 50 cm³ of Hexane. The solution was incubated in room temperature for 7-10 days for complete digestion. The solution was then divided into five replicates for further investigation. All experiments were carried at Central Laboratory for Date Palm Research and Development (C.L.D.P.R.D), Agricultural Research Center, Giza, Egypt.

2. Extraction:

Phenols were extracted according to the method described by Daniel and George (1972) and A.O.A.C. (2000). Indoles were extracted according to previously described Larsen *et al.* (1962) and Selim *et al.* (1998). Reducing sugars were extracted according to method of Lane and Eynon described in A. O. A. A. (1970). Amino acids were extracted as described by Steinke (1997).

3. Statistical analysis:

Means were tested for significance by the one way analysis of variance (ANOVA) using Costat Statistics 6.0, release 6.303 software. When the ANOVA Statistics were significant at ($P \leq 0.01$), means were compared by the Duncan's multiple range test using Costat Statistics 6.0.

RESULTS AND DISCUSSION

Data presented in Table (1) showed that the effect of extracted sugar, Indol, Phenol, and amino acids from date palm tissues and acetyl acetate as kairomones on number of laid eggs/female that was collected from traps. Results showed that the

highest number of laid eggs was obtained from females attracted to traps contained amino acids followed by acetyl acetate traps. Results also showed that lowest number of laid eggs/female was obtained from phenols traps. The obtained results was harmony with Abraham *et al.* (2001) which found that the average life of female captured was three months and the number of eggs laid was 320 eggs. Similar results were obtained by Abbas (2005).

Table (1): Number of laid eggs/female attracted to traps contained extracted substances from date palm tree tissues and acetyl acetate.

Date	Sugars	Indols	Phenols	Amino acids	Acetyl acetate
March	124	102	12	199	284
April	105	216	26	224	215
May	101	202	22	209	254
June	124	213	24	244	212
July	112	206	20	203	204
August	195	107	30	195	223
September	174	154	22	190	205
October	185	201	26	205	195
November	148	250	18	278	155
December	154	246	14	274	250
January	143	215	22	250	270
February	175	234	21	214	124
Average	145.00 ^b	195.50 ^a	21.41 ^c	223.75 ^a	215.91 ^a

Note: Total of five traps in respective months.

Data presented in Table (2) showed that the effect of extracted sugar, Indol, phenol, and amino acids from date palm tissues and acetyl acetate as kairomones on females longevity of red palm weevil adult females that were collected from traps. Results showed that the longest life span was observed in females attracted to traps contained acetyl acetate and amino acids traps. Results also showed that shortest life span of female was obtained from phenol traps.

Table (2): Female longevity of RPW attracted to traps contained extracted substances from date palm tree tissues and acetyl acetate.

Date	Sugars	Indols	Phenols	Amino acids	Acetyl acetate
March	12	34	4	72	98
April	24	56	16	67	124
May	38	58	12	76	134
June	34	55	14	57	116
July	40	43	12	54	105
August	42	45	5	64	114
September	33	44	3	50	88
October	26	32	2	44	78
November	36	45	4	48	104
December	25	38	3	53	122
January	16	32	6	46	143
February	12	36	8	54	145
Average	28.16 ^d	43.16 ^c	7.41 ^e	75.08 ^b	114.25 ^a

Note: Total of five traps in respective months.

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ARABIC SUMMARY

تقييم بعض مستخلصات أنسجة نخيل البلح وتأثيرها على قدرة جذب الحشرات الكاملة لسوسة النخيل الحمراء

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تعتبر سوسة النخيل الحمراء من أخطر الآفات المدمرة لنخيل البلح في مصر، أجريت الدراسة في مزرعة خاصة للنخيل بمنطقة المنصورة بالجيزة، لتقدير قدرة مستخلصات أنسجة النخيل على جذب سوسة النخيل الحمراء أظهرت النتائج أن كل من الأحماض الأمينية والإندولات كانت أكثر جاذبية من السكريات المستخلصة، كما أوضحت النتائج أن الفينولات أقل جاذبية لأعداد الحشرات الكاملة مقارنة بالمركبات الأخرى.