

FOOD PREFERENCE OF *TRIBOLIUM CONFUSUM* (DUVAL) (COLEOPTERA : TENEBRIONIDAE) UNDER LABORATORY CONDITIONS

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(Manuscript received 4 September 2006)

Abstract

This study was carried out in Laboratory of Plant Protection Department, Faculty of Agricultural, Omar El-Mokhtar University. It was found that *Tribolium confusum* preferred date palm than rice or rice flour also, it preferred date palm classifies (Seeidy Gallo) than Degla and Bacrary classifies. The results show that the insect preferred the external part of date palm fruit than the internal part (internal tissue and seed of date palm fruit), also, it preferred date palm fruit which containing more relative humidity than the less relative humidity.

INTRODUCTION

Red and confused flour beetles attack stored grain products such as flour, cereals, meal, crackers, beans, spices, pasta, cake mix, dried pet food, dried flowers, chocolate, nuts, seeds, and even dried museum specimens (Via 1999, Weston and Rattlingourd 2000). These beetles have chewing mouthparts, but do not bite or sting. The red flour beetle may elicit an allergic response (Alanko *et al.*, 2000), but is not known to spread disease and does not feed on or damage the structure of a home or furniture. The confused flour beetle apparently received this name due to confusion over about its identity as it is so similar to the red flour beetle at first glance (Walter). *Tribolium confusum* Dual was considered the important stored products insects, which attacking cereals stored product materials. The evolution of the single classify due to geographical distribution, which have specific ecological and biological factors, such as the main pest in specific region (location) will be the minor pest in another region (location) or have several host or wide hosts (El-Aly, 1987). The ecological and biological factors affect on the population dynamics of insects such as behaviour of feeding and the kinds of food, size of population, days of evolution and the competition between the individuals inside the species. Several authors such as (El-Azawy, *et al.*, 1983 and Hill 1990) studied these sides but still few, therefore this work aimed to gave more information about food preference of *Tribolium confusum* under laboratory conditions.

MATERIALS AND METHODS

Tribolium confusum adults used in food preference study, the stock culture from Plant Protection Department, Faculty of Agricultural, Omar El-Mokhtar University. Transparent plastic cages with caves (rooms), with dimensions (9 x 1.3 cm). The cage divided into four caves or rooms, which separated between each room by sheet of carton, this cage covered with a cover with holes (0.2 mm). Wheat flour or rice or date palm (Seeidy Gallo, Deghaa and Bacrary) was putted in each cave except one (empty) and replicated three times. This work was carried out by taken ten adults of *T. confusum* and put in the empty cage and then put in incubator ($27 \pm 2^\circ\text{C}$ and 60-65% R.H.).

Food preference of *T. confusum* adults were carried out by exposing these adults to three parts of date palm (nucleus, internal parts of tissues and empty) of Seeidy Gallo. The data was recorded daily till seven days, and calculate the average numbers of attracted insects to each part of Seeidy Gallo.

Food preference of *T. confusum* adults were carried out by exposing these adults to Seeidy Gallo date palm, which contain different levels of relative humidity (90, 80, 70 and 50%). The data was recorded daily till seven days, and calculate the average numbers of attracted insects to each R. H. level of Seeidy Gallo date palm.

The data was recorded daily till seven days and statistically by analysis of variance (ANOVA) and the means were compared by L.S.D. test at 0.05 levels (SAS program, 1988).

RESULTS AND DISCUSSION

Data in Table (1) show that *T. confusum* insects preferred date palm than rice and flour. The average numbers of attracted insects to date palm reached (6.47), then (2.33 insects) attracted to rice and at the end (0.85 insects) to flour.

Statistical analysis in Table (1) revealed differences between the different kinds of food that proved highly significant among food. Low significant differences between examined days ($\text{LSD} = 1.02098$).

Also, data in Table (2) indicated that *T. confusum* insects preferred date palm (Seeidy Gallo) than other date palm classifies, which reached the average numbers of attracted insects to Seeidy Gallo classify (4.14 insects), then Degla classify with average numbers (three insects) attracted and at the end (2.238 insects) to Bacrary.

Statistical analysis in Table (2) revealed differences between the Seeidy Gallo classify and other two date palm classifies. Also, a little number of insects stays in the empty cave.

Results in Table (3) indicated that *T. confusum* adults preferred external parts of tissues between nucleolus and peel of the date palm. The average numbers of attracted insects to this part reached (4.43 insects), then the nucleolus part (3.095 insects) and the internal part of tissues (core) at the end part (2.0 insects).

Table 1. Food preference of *T. confusum* adults on the three kinds of food.

Days	Flour	Rice	Date palm	Empty
1	1.0	2.0	6.0	1.0
2	0.0	2.0	7.6	0.3
3	1.3	2.0	6.6	0.0
4	0.6	2.6	6.3	0.3
5	0.6	3.3	6.0	0.0
6	1.6	2.3	6.0	0.3
7	0.3	2.3	6.6	0.6
	0.857 ^a	2.33 ^b	6.476 ^c	0.380 ^a

LSD = 1.02098

Table 2. Food preference of *T. confusum* adults on the three kinds of date palm (Seeidy Gallo, Degla and Bacrary).

Days	Seeidy Gallo	Degla	Bacrary	Empty
1	4.6	2.6	1.6	1.0
2	5.6	3.0	0.6	0.6
3	4.0	3.0	2.0	1.0
4	3.3	3.3	3.0	0.3
5	4.3	3.3	1.6	0.6
6	3.0	2.3	4.0	0.3
7	4.0	3.0	3.0	0.0
	4.142 ^c	3.00 ^b	2.238 ^b	0.5235 ^a

LSD = 1.31173

Table 3. Food preference of *T. confusum* adults on the three parts of date palm classify (Seeidy Gallo).

Days	Nucleus	Internal parts of tissues (core)	External parts of tissues (peel)	Empty
1	5.0	2.0	3.0	0.3
2	3.0	1.3	4.3	1.3
3	2.6	2.0	5.0	0.3
4	4.0	2.3	3.3	0.3
5	2.3	2.0	5.0	1.0
6	2.0	2.6	5.0	0.3
7	2.6	1.6	5.3	0.3
	3.095 ^c	2.00 ^b	4.43 ^d	0.523 ^a

LSD = 0.895

Table 4. Food preference of *T. confusum* inset on the date palm varied from involving relative humidity.

Days	High RH	Medium RH	Low RH	Empty
1	2.0	6.3	1.3	0.3
2	2.6	5.0	2.0	0.3
3	4.6	2.0	2.6	0.6
4	3.6	3.6	2.3	0.3
5	3.0	4.3	1.6	0.63
6	2.0	5.0	1.6	1.3
7	3.6	4.3	2.0	0.0
	3.10 ^c	4.39 ^b	1.10 ^d	0.5238 ^d

LSD = 0.7043

Statistical analysis in Table (3) revealed differences between the different parts of date palm that proved highly significant.

Also, the data in Table (4) mentioned that *T. confusum* adults preferred the date palm which involved with medium relative humidity (40-50%) than, which reached the average numbers of attracted insects to this location (4.39 insects), then the location of date palm, which containing on highly relative humidity (70-80%) with average numbers (3.10 insects) and at the end (1.10 insects) to 50% relative humidity.

Also, statistical analysis in Table (4) revealed differences between the three relative humidity levels of date palm that proved highly significant. No significant differences between examined days (LSD = 0.7043).

The obtained results are agreement with those obtained by El-Aly *et al.*, (1987) they mentioned that the food specificity as a stages of evolution on the specific part of plant as suitable part of food and suitable also for evolution and other biological factors, also, El-Faytory and Yossief (2000) studied the competition, food preference, temperatures and kinds of food on some of stored product insects.

Also, William and Mills (1980), noticed that the removal peel maize seeds are preferable to rice beetle than the normal seeds. While, Cho and Sy (1983) found that the rice beetle preferred rice with peel than rice without peel and found high relationship between that and evolution of populations.

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التفضيل الغذائي لحشرة خنفساء الطحين المتشابهة

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أجريت الدراسة في قسم وقاية النبات كلية الزراعة جامعة عمر المختار، حيث أوضحت النتائج أن خنفساء الطحين المتشابهة فضلت التغذية علي أنواع التمر المختلفة علي الأرز والدقيق. في حين فضلت في التغذية صنف التمر صعيدي جالو علي صنف التمر دجلة وبكراري. كما أنها فضلت الجزء اللحمي الخارجي للثمرة عن الأنسجة الداخلية والبذرة. وكذلك فضلت التمر متوسط الرطوبة (٤٠-٥٠%) علي التمر ذي الرطوبة العالية (٧٠-٨٠%) أو منخفض الرطوبة (١٠-٢٠%).