

INFLUENCE OF HOST PLANT SPECIES (ROSE AND BROAD BEAN) ON SOME BIOLOGICAL ASPECTS OF *Tropinota squalida* Scop. (Coleoptera, Scarabaeidae)

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ABSTRACT

The effect of host plants (rose and broad bean) on the development of the hairy rose beetle insect, *Tropinota squalida* Scop. immature and mature stages were studied under laboratory conditions ($25\pm 2^{\circ}\text{C}$ and $70\pm 5\%$ R.H). The incubation period of *T. squalida* eggs, larval duration on both tested host plants was approximately the same. The shortest duration of pupal stages (male and female) was (29.20 ± 0.8 , and 27.1 ± 0.5 day) when reared on rose followed by (35.20 ± 0.9 and 32.85 ± 0.87 day) on broad bean. There are significant differences in duration between the pupal stages which reared on rose and broad bean. Total immature stages of *T. squalid* female and male lasted (118.65 ± 0.9 & 129.43 ± 2.3 day) for female and (112.00 ± 0.80 & 119.35 ± 0.96 day) for male on rose and broad bean respectively. There is a significant difference in duration between the total immature stages which reared on hosts plant. Adult female and male longevity reared on rose was significantly longer than those on broad bean. The average number of deposited eggs /female was significantly affected by host plant. However, female fed on rose laid an average of 30.3 eggs with a daily mean 0.65, while on broad bean, female laid an average of 24.5 eggs with a daily mean 0.58 eggs.

INTRODUCTION

The hairy rose beetle, *Tropinota squalida* Scop. (Coleoptera, Scarabaeidae) is considered one of the most destructive insect pests attacking various crops in Egypt.

This insect is extremely polyphagous and is able to inflict excessive damage to plant roses of winter crops. According to Ali and Ibrahim (1988) it is a serious pest attacks more than 31 plant hosts in Egypt, which include ornamental and medical plants, flowers of fruits, vegetables and many wild plants, especially in areas with light sandy soil. According to Mineo (1965) the pest has one generation per year, the insect spends most of its time in cocoon (7 months) therefore there is only short period when it is available in the open, which has made it difficult to understand its ecology. For the success of integrated pest management control program. It is essential to know several information concerning the biology of the pest. So the present work aims to know some on biological aspects of *T. squalida*.

MATERIALS AND METHODS

Adults of *T. squalida* were obtained from the new reclaimed lands located in El-Esmailia Governorate, and reared under laboratory conditions according to the method of Karam *et al.* (1996). Insects were placed in groups of 15 individuals for both female and males in cylindrical plastic tubes,

filled with moistened soil to about its two thirds, and closed with white lids. Adults were fed on molasses put on saturated pieces of cotton wool and kept under laboratory conditions of $25\pm 2^{\circ}\text{C}$ and $70\pm 5\%$ RH. The soil was moistened every three days and deposited eggs were removed from the soil at each investigation and put in groups of 25 eggs for each plastic cup and left until hatching to the larvae. Newly hatched larvae were transferred to fresh cups (10 larvae each) provided with soil containing cattle dung as food. At the beginning of the second larval instar, larvae were redistributed in additional cups to avoid cannibalism, and a piece of cattle dung was placed on top of the soil surface. On reaching the 3rd larval instar, they were redistributed singly (one larva per cup) in new prepared cups till the pupation and finally the adult emergence. To test the impact of tested host plants on the biology of *T. squalida* adults, newly emerging adults from the previous cultures were placed in groups of 15 individuals for both males and females in cylindrical plastic containers filled with moistened sandy soil to about its two-third closed with muslin lids secured to the top by rubber band. Fresh pieces of broad bean (*Vicia faba* L.) or the petals of rose (*Rosa* spp.) were added as food sources, which were renewed daily. The deposited eggs were collected daily by using fine brush and counted before being distributed individually in plastic cups filled with moistened sandy soil. The newly hatched larvae were placed individually in plastic cups filled with sandy soil and sufficient amount of cattle dung as food till pupation, the soil was moistened daily and renewed twice a week to avoid fecal accumulation. The duration of each larval instars and the pupal stage were recorded. The newly formed pupae were inspected daily by opening a small hole in the earthen cocoon and kept until adult emergence. Data concerning the incubation period of the eggs, duration of the larval and pupal stages as well as adult fecundity (F1 generation) were calculated. Eggs, larvae and pupae resulting from F1 generation adults were kept individually to determine their sex ratio after adult emergence..

Statistical analysis: was done by using one way ANOVA program.

RESULTS AND DISCUSSION

As shown in (Table 1) obtained data revealed that the incubation period of both female and male eggs lasted (21.0 & 20.2) and (23.0 & 19.2) days, when fed on rose and broad bean plants respectively (under laboratory conditions of $25\pm 2^{\circ}\text{C}$ and $70\pm 5\%$ R.H). Statistical analysis showed that no significant differences for the eggs incubation period for both sexes female and male, when fed on the above mentioned hosts, (Table, 1). Duration of 1st, 2nd and 3rd larval female instars was 17.1, 19.2 and 32.5 days on rose plants, while those reared on broad bean lasted 18.5, 19.5 and 33.23 days. Male larval instars was (16.30, 17.5 and 30.90) days on rose plants (17.60 18.9 and 31.7) days on broad bean plants.

The duration of larval stage was shorter on rose plants than on broad bean plants for both sexes (Table 1), whereas female larval duration on rose and broad bean plants lasted (68.45 & 71.23 days), while, male larval duration was (64.7 & 67.3 days), when reared on the above mentioned plant hosts respectively. Statistical analysis ($P > 0.05$) cleared that no significant differences between larval instars periods for both sexes female and male, when they reared on the afore mentioned hosts. On the contrary, There are significant differences in duration between the pupal stages which reared on rose and broad bean. The shortest duration of pupal stages (male and female) (29.20 ± 0.8 , and 27.1 ± 0.5) when reared on rose followed by (35.20 ± 0.9 and 32.85 ± 0.87) on broad bean.

As the same trend, Total immature stage of both female and male was shorter when reared on rose than broad bean plants, However female and male total immature stages lasted (118.65 & 112.60) and (129.43 & 119.35) days when its reared on afore mentioned plants hosts respectively. Similar results were obtained by Sherief (1992) and Karam *et al.* (1996). Table (2) showed that they stated that biological developmental stages of *T. squalida* were affected by the different plant hosts. Oviposition period and fecundity were significantly affected by host plant, however female oviposition period lasted (46.9 & 41.6 days) and deposited with on average number of (30.3 & 24.5 eggs) with a daily mean of (0.65 & 0.58 eggs). These results agree with that obtained by Abou Baker *et al.* (1989) they reported that fecundity of *T. squalida* was affected by different types of food, they found that females produced the largest number of eggs when feed on 10% honey solution followed by concentrated honey and flower of *Pelargonium zonal*. Also Kamel (1988 and 1993) mentioned that females of *T. squalida* deposited high number of eggs when reared on banana followed by green bean flowers, molasses, and cauliflower and diluted honey.

Generally, it could be concluded that the biology of scarabidae *T. squalida* was affected by the host plant species the beetle showed on rose than broad bean plants. so, rose plants approved to be more favorable host plant for rearing *T. squalida*.

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تأثير العائل النباتي (الورد و الفول البلدى) على بعض الخصائص البيولوجيه لآفه جعل الورد الزغبى

سامية عبد الفتاح ياسين ، نفين فوزى عرفات و أفتخار السيد ابو حطب
معهد بحوث وقاية النباتات - الدقى - جيزة - مصر

تعتبر حشرة جعل الورد الزغبى *T.squalida* إحدى أهم الآفات الحشرية الضارة التى تسبب خسائر كبيرة في الإنتاج لمختلف المحاصيل الزراعية مثل نباتات الخضر و الزينة وبعض المحاصيل الحقلية والبستانية في مصر. وتهدف الدراسة لمعرفة تأثير العوامل النباتية على بعض المظاهر البيولوجية لحشرة جعل الورد الزغبى عند تربيته تحت ظروف معملية على نباتات الورد والفول البلدى. حيث أوضحت الدراسة أن العوائل النباتية لها تأثير معنوي على الأطوار الغير كاملة والكاملة للحشرة حيث كان التأثير واضحا على طور العذراء وفترة وضع البيض ومعدل وضع البيض ولم تؤثر على فترات ما قبل أو بعد وضع البيض. ولقد اثبتت الدراسة ان نبات الورد يعتبر من العوائل المفضلة لجعل الورد حيث يمكن استخدامه كعائل عند عمل تربيته للآفة.

قام بتحكيم البحث

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Table (1): Mean duration (days) of different developmental stages of *T. squalida* in relation to host plant (rose and broad bean) at 25±2°C and 70±5%RH.

Host plant	Sex	Average period of different developmental stages (in days) ±SE						
		Incubation Period	Larval instars			Total larval duration	Pupal Duration	Total immature stage
			1 st	2 nd	3 rd			
Rose	Female	21.00±0.8a (19-21)	17.10±0. 9 (14-18)	19.20±0. 6 (12-19)	32. 5±0.15 (31-32)	68.45± 0.84 (57-69)	29.20± 0.8 (25-30)	118.65±0.9 (101-120)
	Male	20.20±0.26a (18-20)	16.30±0.29 (15-18)	17.5±0.19 (18-19)	30.90±0.20 (28-30)	64. 70± 0.5 (61-67)	27.1± 0.5 (25-28)	112.00±0.80 (104-115)
broad bean	Female	23.0±0.2a (18-21)	18.50±0.40 (15-19)	19.50±0.50 (17-20)	33.23±0.15 (30-32)	71.23±0.89 (62-71)	35.20±0.9 (30-35)	129.43±2.3 (110-127)
	Male	19.20±0.11a (17-20)	17.60±0.29 (14-18)	18.08±0.33 (18-19)	31.7±0.65 (29-33)	67.30±0.85 (61-70)	32.8 5±0.87 (29-33)	119.35±0.96 (103-119)
L.S.D.,(0.05)	Female	3. 1				5.8	4.9	6.8
	Male	3. 2				6.2	5.4	5.9

Numbers between brackets = collection

Table (2): Average longevity of F1 generation (in days) and fecundity of *T. squalida* females resulting from adults reared on rose and broad bean under laboratory conditions (25±2°C and 70±5%RH).

Host plant	Pre-oviposition (♀)	Oviposition (♀)	Post-oviposition (♀)	Total longevity(♀)	Total longevity(♂)	Average number of deposited eggs/female	Daily mean
Rose	221.50 ± 0.70a	46.90 ± 3.10a	38.50 ± 0.8a	306.90 ± 0.9a	270.6±0.7a	30.30±5.90a	0.65
broad bean	224.50±0.93a	41.60±5.20b	42. 9 ± 0.99a	309.0±0.4a	269.9±0.4b	24.50± 3.50b	0.58
L.S.D 0.05	8.1	2.7	6.2	18.5	5.7	3.1	

Means in columns followed with different letters are significantly different at 5% level of probability