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بسم الله الرحمن الرحيم

HANAA ALY

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التوثيق الإلكتروني والميكروفيلم

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SOME BIOLOGICAL AND ECOLOGICAL ASPECTS OF *EUZOPHERA OSSEATELLA* ON CERTAIN SOLANACEAE PLANTS IN EGYPT

By

SAMAR MAGDY MOHAMED ABBAS

B.Sc. Agric. Sc. (Entomology), Fac. Agric., Ain Shams University, 2015

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Approval Sheet

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ABSTRACT

Samar Magdy Mohamed Abbas: Some biological and ecological aspects of *Euzophera osseatella* on certain Solanaceae plants in Egypt. Unpublished M. Sc. Thesis, Department of Plant Protection, Faculty of Agriculture, Ain Shams University, 2020.

Some biological and ecological aspects were studied on the eggplant stem borer, *Euzophera osseatella* Treit. (Lepidoptera: Pyralidae) under laboratory and controlled conditions. The mean generation time (T) of *E. osseatella* averaged 54.22 days. The net reproductive rate (R_o), the intrinsic rate of increase (r_m) and the finite rate of increase (exp.rm/ λ) were 28.09, 0.062 and 1.063, respectively. The generation doubling time (Dt) reached 14.01 days. The development zero of egg, larva, pupa, immature stages, preoviposition period and generation duration was 9.8, 13.9, 11.1, 13.5, 18.2 and 12.8℃, respectively. The corresponding thermal units averaged 119.0, 413.8, 301.9, 762.5, 18.2 and 854.8 DDs. *E. osseatella* had four annually field generations at Damanhur region in El-Beheira Governorate. The larval hibernation began from 18th Oct. to 24th Feb., took 129 days and required thermal units of 414.5 DDs. The oviposition period was the longest (11.6 days) at 20℃, while it was the shortest (1.6 days) at 30℃. The total number of eggs/female reached 66.6, 148.6, 138.2 and 44.8 at 15, 20, 25 and 30℃, respectively. The female lived 19.0, 26.2, 6.6, 4.2 and 2.4 days at 15, 20, 25, 30 and 35℃, respectively. The male longevity was the longest (23.2 days) at 20℃, whereas it was the shortest (2.8 days) at 35℃. The longest oviposition period (11.6 days) was in females offered 10% sugar solution and the shortest (2.8 days) was in those deprived of the food. The fecundity amounted to 148.6, 145.0 and 68.6 eggs/female supplied with 10% sugar solution, water and kept fasting, respectively. The female survived 26.2, 13.6 and 10.0 days at the three previous regimes, respectively. The longest male longevity (23.2 days) was when provided with 10% sugar solution and the shortest (7.8 days) was when left starved. The total

number of emerged moths was 24, 21, 15, 14, 14 and 12 moths on Nov., Dec., Jan., Feb., Mar. and Apr., respectively during 2017/2018. The seasonal mean number of emerged moths amounted to 16.7. The sex ratio of males to females was 1:1, 1:0.9, 1:0.9, 1:0.6, 1:0.4 and 1:0.3 in the previous six months, respectively. The general mean of the sex ratio of males to females reached 1:0.7. The duration of the male emergence lasted 17.4, 29.5, 29.8, 24.4, 14.2 and 12.9 days on Nov., Dec., Jan., Feb., Mar. and Apr. at 24.7, 23.3, 22.8, 24.2, 26.7 and 27.3℃, respectively. The corresponding duration of the female emergence took 18.7, 30.1, 26.4, 24.2, 13.5 and 13.7 days in the above mentioned six months at the same temperatures. The seasonal mean duration of the male (21.4 days) was approximately equal to that of the female (21.1 days). There was a highly significant difference among mean durations of each sex. The total number of emerged moths was 20, 18, 15, 14, 13 and 11 moths on Nov., Dec., Jan., Feb., Mar. and Apr., respectively during 2018/2019. The general mean number of emerged moths reached 15.2. The sex ratio of males to females reached 1:1, 1:1, 1:0.9, 1:0.6, 1:0.4 and 1:0.4 in the above mentioned six months, respectively. The seasonal mean of the sex ratio of males to females was also 1:0.7. The period of the male emergence took 17.7, 27.9, 29.3, 22.4, 13.7 and 12.5 days on Nov., Dec., Jan., Feb., Mar. and Apr. at 28.3, 23.9, 21.7, 22.8, 24.8 and 26.3℃, respectively. The corresponding period of the female emergence lasted 19.6, 29.9, 25.9, 21.2, 9.5 and 13.3 days in the previous six months at the same temperatures. The general mean time of the male (20.6 days) was nearly similar to that of the female (19.9 days). Mean durations of any sex also showed a highly significant difference. The larval infestation rate in eggplant stems reached 100, 100, 85.7, 83.3, 66.7 and 50.0% on Nov., Dec., Jan., Feb., Mar. and Apr., respectively during 2017/2018. The general mean of the infestation percentage was 81%. The infestation percentage was 100, 85.7, 85.7, 83.3, 50.0 and 33.3% on Nov., Dec., Jan., Feb., Mar. and Apr., respectively during 2018/2019. The seasonal mean of the infestation rate reached 73%. *Pimpla roborator* Fab., *Blaesoxipha*

(*Agriella*) *algeriensis* (Townsend), *Drosophila busckii* Coq. and *Anatrichus erinaceus* Loew were surveyed parasitizing *E. osseatella* larvae in eggplant stems. *P. roborator*, *D. busckii* and *A. erinaceus* are solitary ectoparasitoids, while *B. algeriensis* is a solitary endoparasitoid. The total number of emerged adults of *P. roborator*, *B. algeriensis*, *D. busckii* and *A. erinaceus* was 4, 1, 3 and 1 on Nov., Nov., both Feb. and Mar. as well as Nov., respectively during 2017/2018. The general mean number of these parasitic species reached 0.7, 0.2, 0.5 and 0.2 adult, respectively. The corresponding sex ratio of males to females of these parasitoids amounted to 1:1, 0:1, 1:0.5 and 0:1. The total number of emerged adults of *P. roborator*, *B. algeriensis*, *D. busckii* and *A. erinaceus* reached 2, 1, 1 and 1 on Nov., Dec., Feb. and Dec., respectively during 2018/2019. The seasonal mean number of these parasitic insects was 0.3, 0.2, 0.2 and 0.2 adult, respectively. These parasitoids had the corresponding sex ratio of males to females of 1:1, 0:1, 0:1 and 0:1. The parasitism percentage of *P. roborator*, *B. algeriensis*, *D. busckii* and *A. erinaceus* on *E. osseatella* larvae reached 13.3, 3.3, 19.2 and 3.3% on Nov., Nov., both Feb. and Mar. as well as Nov., respectively during 2017/2018. The general mean of the parasitism rate for these parasitoid species amounted to 2.2, 0.6, 3.2 and 0.6%, respectively. *P. roborator*, *B. algeriensis*, *D. busckii* and *A. erinaceus* showed the parasitism percentage of 9.1, 4.5, 6.7 and 4.5% on Nov., Dec., Feb. and Dec., respectively during 2018/2019. The corresponding seasonal mean of the parasitism rate was 1.5, 0.8, 1.1 and 0.8%.

Key words: Eggplant, biological aspects, ecological aspects, *Euzophera osseatella*, *Pimpla roborator*, *Blaesoxipha algeriensis*, *Drosophila busckii*, *Anatrichus erinaceus*.

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