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**DAMAGE AND LOSSES ASSESSMENT BY SOME LAND
SNAILS ON SOME PLANTINGS IN CERTAIN
RESTRUCTURED REGIONS AND ITS CONTROL**

Submitted By

Soheir Mohamed Abd El-Haleim

B.Sc. of Agricultural Science (Pomology), Faculty of Agriculture,

Cairo University, 2001

M.Sc. in Agricultural Sciences (Zoology Agriculture), Faculty of Agriculture,

Cairo University, 2007

A Thesis Submitted in Partial Fulfillment

Of

The Requirement for the Doctor of Philosophy Degree

In

Environmental Sciences

Department of Environmental Agricultural Sciences

Institute of Environmental Studies and Research

Ain Shams University

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APPROVAL SHEET

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ABSTRACT

Soheir Mohamed Abd El-haleim Mohamed: Damage and losses assessment by some land snails on some plantings in certain restructured regions and its control. Unpublished Ph.D. Thesis, Institute of Environmental Studies & Research, Ain Shams University, 2022.

The present research includes studying some ecological studies, food consumption and preferences, damage assessment in addition to toxicological studies of applying several plant extracts, natural compounds and chemical pesticides on the terrestrial snail species *Eobania vermiculata*. Terrestrial snails infested many field crops, vegetables, fruits and ornamental plants at Giza and Beheira Governorates. Ecological studies indicated that, three species of terrestrial snails are belonging to family (Helicidae), *Eobania vermiculata* and *Theba pisana* were recorded at Nobaria district, Beheira Governorate and the heavy infestation of *E. vermiculata* and *T. pisana* were recorded on fruit trees, such as Orange, Mango and Apple. While *Eobania vermiculata* and *Monacha obstructa* were recorded at Mansouria Village, Giza Governorate and the heavy infestation of *M. obstructa* was recorded on cucumber and Egyptian clover. Also, *E. vermiculata* was recorded heavy infestation on fruit trees, orange, mango, grape and pear.

The population dynamics was carried out during two successive seasons (2018-2019 and 2019-2020) at Nobaria district, Beheira Governorate. Results revealed that, the highest population density of *E. vermiculata* was detected in March (2018-2019) and (2019-2020) on orange trees 107.40 and 92.00 snails 10 trees⁻¹ respectively. The correlations between some climatic factors, showed significant effect on number of *E. vermiculata* during season (2019-2020) on apple and Mango. On the other hand, the highest population density of *T. pisana* was recorded in Spring season especially in March (2018-2019) on orange trees 61.10 snails 10 trees⁻¹. Also, temperature showed significant effect on number of *T. pisana* in orange and apple but high significant in

mango during (2018-2019) season and relative humidity showed significant effect during (2019-2020) season.

The population dynamics of *M. obstructa* on fruit trees at Mansoria Village, Giza Governorate. Results revealed that, the highest population density of *M. obstructa* was detected in March (2018-2019) on orange trees. The correlations between some climatic factors, temperature showed significant effect of *M. obstructa* in orange during two successive seasons (2018-2019) and (2019-2020), while showed significant effect of relative humidity during season (2019-2020). The population dynamics of *E. vermiculata* showed the highest population density was recorded

in March (2018-2019) on orange trees. The correlations between some climatic factors, on orange and mango, temperature showed significant effect on numbers of *E. vermiculata* during (2018-2019). Also, was recorded highly significant effect on the population dynamic of *E. vermiculata* in apple trees, while temperature during (2019-2020) season showed significant effect on the population dynamic of *E. vermiculata* in orange and apple, also was recorded highly significant in mango trees during (2019-2020) season . Relative humidity showed non-significant effect on number of *E. vermiculata* during the two tested seasons.

The damage caused by *E. vermiculata* showed the highest damage in field crops was recorded on sunflower leaves with damage percentage 37.13% comparing with other plant crops while the lowest damage percentage was recorded on potos leaves 8.22 %.

Effect of food type on daily food consumption of *E. vermiculata* was reached to its peak when snails fed on cabbage leaves with a general mean 4.64 ± 0.10 gm day⁻¹. While on field crops, the highest food consumption was recorded on broad bean during the five days with general mean 0.85 ± 0.09 gm day⁻¹. Concerning of fruit leaves, guava was recorded slightly food consumption with general mean 0.46 ± 0.03 gm day⁻¹ comparing with orange and mango. In ornamental plants, the highest food consumption was recorded

on peper mint and basil with general mean 0.54 ± 0.05 and 0.53 ± 0.08 gm day⁻¹, respectevily.

The toxicological studies under laboratory conditions, showed the methomyl and Lambda-cyhalothrin were the most effective compounds against *E. vermiculata*, followed by Repcar, Top-nine, and Techno oil, while Berna Star and Nema Ultra Chem come in the last rank. The tested compounds caused fluctuated effect whether increasing or decreasing on all the studies parameters such as total protein content, alkaline and acid phosphatase activity as well. However, the Techno oil and the Berna Star caused severe decreasing on total protein content and acid phosphatase activities (ACP), followed by Top-nine, Repcar, Chitosan 5% (Nema Ultra Chem) and plant extracts both tested natural compounds and plant extracts recorded satisfying results compared with methomyl and Lambada-cyhalothrin effect. The toicological studies under field conditions showed that Goldben 90% Sp exhibited the highest reduction percentage 69.70 % in comaricon with other treatments all compounds while Berna Star give low effective reduction percentage during the experiment period and thus that can be used in the pest controlling programs against terrestrial snails to reduce the environmental pollution.

Key words: Terrestrial snails, population dynamic, survey, food consumption, damage, natural origin compounds, biochemical studies.

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