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Title of Thesis: Ecological Studies And Evaluation Of Some Biocides And
Plant Oils On The Tomato Leafminer, *Tuta absoluta* (Meyrick) [Gelechiidae:
Lepidoptera] At Fayoum Governorate

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ABSTRACT

This work concerned to through a light on population fluctuation of the South American tomato pinworm, *Tuta absoluta*, in relation with some weather factors in Fayoum Governorate on tomato crop (*Solanum lycopersicum* L.) cultivated in four successive plantations during ٢٠١١/٠١٢ and ٢٠١٢/٠١٣. Associated natural enemies recorded during the ٢ years were represented by the Staphlinidae predator (*Atheta* sp) and ٣ Hymenopterous parasitoid insect species belong to Order Hymenoptera (*Bracon* sp, *Halticoptera* sp and *Apanteles* sp). The entomopatogenous bacteria *Bacillus* sp (Bacillales: Bacillaceae) was also isolated from dead and moribund larvae.

In summer plantations, weekly collected samples of tomato compound leaves and fruits during ٢٠١١ season indicated the absence completely of infestation, where no larvae were observed on all of the collected sample during all season round. However, during the second summer of ٢٠١٢, slight infestations were recorded on tomato leaves during the former ٤ weeks of the season. No infestations (larvae) were observed on the fruits during all remained period of the season.

In winter plantations, examination for infested leaflets began after ١٠ days of transplanting, slight infestations began to appear around Mid Nov, fluctuated slightly during the successive weeks until the half of Feb, followed by obvious excesses to record one period of activity extended from end of Feb until end of the season (the Third week of May). The recorded of both periods were ٤١٠ and

618 larvae / 20 leaves, respectively observed at mid of April and end of Feb, respectively.

Regarding the fruits infestations, during the first season, 2011/12, infestation began appears for end of April until the 3rd week of May. The record infestations were fluctuated from 35 to 49 larvae / 20 fruits.

In second season fruits infestations began to appear in the 3rd week of Dec (5 larvae / 20 fruits), fluctuated during the successive weeks (4 wks.) until end of season to record the highest infestation (45 larvae / 20 fruits) in the first week of May.

Statistical analyses by using simple correlation (r) and regression coefficients (b) indicated that temperature affected significantly on number of mines recorded on both leaves and fruits. However, the effect of temperature was positive in the first season, 2011/2012 and negative in the season one, 2012/2013.

Under the laboratory conditions toxicity of the recommended chemical insecticide (Lannat) and two biocides, (Spinosad and Dipel) additional to four plant volatile oils (Marjoram, Clove, Camphor and Mustard) were used against the 5th larval instar of *T. absoluta*. Toxicity lines were drawn, from which LCs values were determined. Spinosad was the highest toxic material, followed by Dipel, then Lannat. Thereafter, toxicity reduced sharply for the experimented volatile oils, where calculated values of LC₅₀ were higher obviously than those recorded for the mentioned insecticides. The results indicated that Marjoram oil was the most toxic oil, followed by Clove then Camphor while Mustard was the least toxic one.

Double mixtures of each of the mentioned insecticides and volatile oils, by using LC₅₀ of each materials, were used for determining the synergistic or antagonistic effects of such materials on each other. Latent effect of toxicity were evaluated by observing the survive larvae after 24hrs treatment to record the mortalities, additional to longevity and fecundity of possible emerged adults.

Mixtures of the recommended insecticides with each of the experimented volatile oils appeared synergistic effects, except the mixture of Lannat with Clove appeared antagonistic effect, while the mixture with Camphor appeared no effect. Few of the survived larvae after treatment with some mixtures could emerged to the adult stage; however, they failed to deposit eggs. On the other hand, double mixtures of the experimented oils appeared antagonistic effect.

Key words: Tomato-*Tuta absoluta*, population dynamics, natural enemies, volatile oils, Lannat, biocides, Spinosad and Dipel.