TAXONOMIC ASPECTS OF *TUTA ABSOLUTA* (LEPIDOPTERA: GELECHIIDAE) AND THE ROLE OF SOME BIOAGENTS IN CONTROLLING IT ON TOMATO PLANT IN EGYPT

By

SALEM MOHAMED SALEM AWAD

B.Sc. Agric. Sci. (Entomology), Ain-Shams University, 2002
M.Sc. Agric. Sci. (Entomology), Fac. Agric., Al-Azhar University, 2009

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This thesis for Ph.D. degree has been approved by:

Dr. Mohamed Abd El-Ghaffar Mahmoud …….
Prof. Emeritus of Economic Entomology, Faculty of Agriculture, Al-Azhar University

Dr. Mohamed Salem Abd-el Wahed …….
Prof. Emeritus of Economic Entomology, Faculty of Agriculture, Ain Shams University

Dr. Ashraf Helmi Fathi …….
Associate Prof. of Economic Entomology, Faculty of Agriculture, Ain Shams University.

Dr. Azza kamal Abd El Rhman Emam …….
Prof. Emeritus of Economic Entomology, Faculty of Agriculture, Ain Shams University

Date of Examination: / /2017

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Under the supervision of:

Dr. Azza kamal Abd El Rhman Emam
Prof. Emeritus of Economic Entomology, Department of Plant Protection Faculty of Agriculture, Ain Shams University (Principal Supervisor)

Dr. Ashraf Helmi Fathi
Associate Prof. of Economic Entomology, Department of Plant Protection Faculty of Agriculture, Ain Shams University

Dr. Sami Sayed El Badawy
Head of Research, Department of Physiology pests, Plant Protection Research Institute, Agric, Research Center

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ABSTRACT

Tomato plants are considered one of the most important economic vegetable crops in the world. Tomato plants infested with many important pests especially the tomato borer, *Tuta absoluta* which causes severe loss in yield. It also infest other Solanaceae crops such as potatoes and eggplants. This study aimed to cover some ecological aspects and control of *T. absoluta* on certain Solanaceae plants and commercial tomato cultivars and identifying this pest using Cytochrome c oxidase subunit I gene (MT-COI). The field study was done at Qaha region, Qalyubiya Governorate. According to host preference tomato hybrid Alissa F1 harbored the most relative density of *T. absoluta* larvae compared with pepper, eggplant and potato throughout two successive years 2013 and 2014. The susceptibility of five tomato cultivars; Alissa F1, Super strain B, G.S 12 F1, E603 F1(Logain) and Indos were also studied in early summer and summer plantations; 2013 and 2014. The highest seasonal mean number was recorded on Alissa F1cultivar with mean numbers of 5.53 larvae/10 leaflets for the two seasons, 2013 and 2014. While the lowest mean number (2.99 larvae/10 leaflets) was recorded on Logain (E603 F1) cultivar, for the two seasons. The highest mean number of glandular trichome type on underside of tomato leaflets was detected in Logain cultivar (22.6 trichome/1mm^2 leaflet) and the lowest number was on Alissa (3.8 and 3.2 trichome/1mm^2 leaflet). This trichome type related significantly and negatively with the mean number of larvae pest. In addition, chemical analysis of leaflets for the tested cultivars revealed that Logain tomato cv. leaflets had high contents of essential oil, acylsuger, flavonoids, phenolics, carbohydrates and protein compounds than the

high susceptible cultivars; Alissa cv. Secondary, the presence of the repellence and toxic volatile compounds (Two hydrocarbons; octacosane and hexacosane) in Logain tomato cv. while Alissa cv. had high content of the attractant hydrocarbon tetracosane. Fruits tomatoes damaged by *T. absoluta* larvae on investigated tomato cultivars were studied at harvesting stage of early summer plantation in 2013 and 2014, the highest percentage of damage was significantly found in Alissa F1(36.00% and 42.84%) while the lowest percentage of damage was detected on Logain (14.78% and 7.11%) in both years. In addition, the glandular trichomes was negatively and significantly correlated with mean percentage of damaged fruits by *T. absoluta*. The seasonal abundance of *T. absoluta* on Alissa and Logain cultivars was studied in early and summer seasons, 2013 and 2014. In 2013 early summer, the highest population density of *T. absoluta* on Alissa and Logain cultivars was recorded on May 14th and May 21st ; respectively. While in summer season, was recorded on July 9th and Aug. 20th . In 2014, the highest activity of this pest on Alissa and Logain cultivars was recorded on Apr. 22nd and Mar. 25th while in summer 2014, was recorded on Aug. 12th for both cultivars.

Effect of some weather factors (maximum, minimum temperatures and relative humidity) and the predator, *Nesidiocoris tenuis* on population dynamics of *T. absoluta* was studied on Alissa F1 and Logain cultivars during early and summer plantations; 2013 and 2014. Generaly, simple correlation indicated insignificant relationship between the weekly average maximum, minimum temperature and relative humidity. While, the predator was correlated significantly and positively with the mean number of this pest in both plantation seasons throughout both studied years. The use of some bio-agents for controlling *T. absoluta* were done. *Bacillus thuringiensis* was used against larval infestation while *Trichogramma evanescens* was used against *T. absoluta* eggs on Alissa cultivar during the early summer season of 2014 and 2015. *T. evanescens* proved to be more potent than *B. thuringiensis* in controlling *T. absoluta*. Results of PCR amplifications of five samples collected from, Aswan,

Minya, El sharkia, Kafr El Sheikh and Sinai using with the Cytochrome c oxidase subunit I gene (MT-COI) were analyzed and sequenced. The sequences were blasted into GenBank database and showed that only one biotype present in Egypt.

Keywords: *Tuta absoluta*, Tomato plant, Solanaceae crops, Host preference, Susceptibilty, Glandulare trichome, essential oil, Acylsugars, Weather factors, Predators, Bioagents, *Bacillus thuringiensis*, *Trichogramma evanescens*, PCR, Genbank.

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