

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

By

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**A thesis submitted in partial fulfillment**

**Of**

**The requirements for the degree of  
Doctor of Philosophy**

**in**

**Agricultural Sciences  
(Economic Entomology)**

**Department of Plant Protection  
Faculty of Agriculture  
Ain Shams University**

**2017**

**Approval Sheet**

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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<sup>2</sup> leaflet) and the lowest number was on Alissa (3.8 and 3.2 trichome/1mm<sup>2</sup> 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 14<sup>th</sup> and May 21<sup>st</sup>; respectively. While in summer season, was recorded on July 9<sup>th</sup> and Aug. 20<sup>th</sup>. In 2014, the highest activity of this pest on Alissa and Logain cultivars was recorded on Apr. 22<sup>nd</sup> and Mar. 25<sup>th</sup> while in summer 2014, was recorded on Aug. 12<sup>th</sup> 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. Generally, 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, Susceptibility, Glandular trichome, essential oil, Acylsugars, Weather factors, Predators, Bioagents, *Bacillus thuringiensis*, *Trichogramma evanescens*, PCR, Genbank.

## ACKNOWLEDGMENTS

I express my deep thanks to **ALLAH**, who fulfill hopes, facilitate help to all of his creations and to all who request.

I am deeply indebted to **Prof. Dr. Azza kamal Emam**, Professor of Economic Entomology, Faculty of Agriculture, Ain-Shams University for suggesting the research work, kind supervision, faithful encouragement, and valuable advice. Her door has always been open for me and other young researchers. Without her unconditional support, encouragement and guidance this work could not be achieved.

I would like to express my deep thanks also to **Dr. Ashraf Helmi Fathi**, Associated Professor of Economic Entomology, Faculty of Agriculture, Ain- Shams University for his kind supervision, sincere assistance, kind encouragement and advice during the progress of this study.

I also express my deep gratitude to **Prof. Dr. Sami Sayed El Badawy**, Head of Research, Plant Protection Research Institute, Agric. Research Center, Ministry of Agriculture, for his kind supervision, sincere assistance, kind encouragement and precious advice during the progress of this study.

Sincere appreciation is due to **Prof. Dr. Saad Mohammed Moussa**, Head of Insect Molecular Biology and Biotechnology, Plant Protection Research Institute, Agric. Research Center, Ministry of Agriculture, for his kind supervision, allowing me to use his lab facilities and chemicals that were used throughout my research work and presenting the result of DNA part.

Special thanks for **Prof. Mohamed M. Abou-Setta** Head of Research, Plant Protection Research Institute, Agric. Research Center, Ministry of Agriculture, for his enthusiasm, support and advice, friendship, knowledge and continuous help in statistical analysis of the data. His help in presenting the obtained results is appreciated.

I would like to express my deep thanks also **Prof. Tarek Raies Amin** Head of Research, Plant Protection Research Institute, Agric. Research Center, Ministry of Agriculture, for his help in chemical analysis and support.

Thanks are also due to **Dr. Mahmoud Magdy Elmosallamy**, Lecturer of Genetics, Department of Genetics, Faculty of Agriculture, Ain- Shams University for his help in PCR amplification of insect pest samples and gel electrophoresis.

Also, I would thank **Dr. Manal Farouk**, from AGRI for her help in DNA data analysis and support.

My thanks extend to staff members of **Plant Protection Department**, Faculty of Agriculture, Ain- Shams University, staff members of Pests **Physiology Department** and **Insect Molecular Biology** and Biotechnology Unit at Plant Protection Research Institute, Agric. Research Center and staff members of **Qaha Farm**, Qalyubiya Governorate, Egypt.

Finally, I am indebted forever to my parents, my **daughter** and members of my **family** through their help, support and continuous encouragement, during this work to come out.



# CONTENTS

	Page
<b>I. INTRODUCTION</b>	<b>1</b>
<b>II. REVIEW OF LITERATURE</b>	<b>4</b>
2.1. Taxonomic history and synonyms of the tomato leaf miner, <i>Tuta absoluta</i>	4
2.2. Distribution maps of <i>T. absoluta</i> on tomato plant	4
2.3. Host plants of <i>T. absoluta</i>	6
2.4. Susceptibility of tomato cultivars to infestation with <i>Tuta bsoluta</i>	6
2.4.1. Role of trichomes in plant defense	7
2.4.2. Role of Allelochemicals in plant defense	9
2.4.2.1. Volatile compounds (Terpenes).	9
2.4.2.2. Acylsugar.	10
2.4.2.3. Alkaloids	11
2.4.2.4. Flavonoids	11
2.4.2.5. Phenols	11
2.4.2.5. Carbohydrates and Proteins	12
2.5. Crop damage by <i>T. absoluta</i>	13
2.6. Seasonal abundance of <i>T. absoluta</i> on tomato plant	14
2.7. The effect of some biotic and abiotic factors on population fluctuation of <i>T. absoluta</i> .	15
2.8. Biological control of <i>T. absoluta</i>	19
2.8.1. <i>Trichogramma</i>	19
2.8.2. <i>Bacillus thuringiensis</i>	21
2.9. Molecular Identification of <i>T. absoluta</i>	23
<b>III. MATERIALS AND METHODS</b>	<b>27</b>
3.1. Ecological studies	27
3.1.1. Experimental area and design	27
3.1.2. Sampling procedures	27
3.1.3. Preferences of certain solanaceous plants to <i>T.</i>	28

	<b>Page</b>
<i>absoluta</i> infestation	
3.1.4.Susceptibility of certain tomato cultivars to <i>T. absoluta</i> infestation	<b>28</b>
3.1.5.Seasonal abundance	<b>28</b>
3.1.6.Degrees of damage	<b>28</b>
3.2.Control studies	<b>29</b>
3.3.Scanning of leaflet surface features	<b>29</b>
3.4.Determination of Secondary Metabolites in Tomato leaves	<b>30</b>
3.4.1.Isolation and identification of Tomato leaves volatile compounds	<b>30</b>
3.4.2.Assessment of acylsugar contents in tomato leaves	<b>31</b>
3.4.3.Determination of total phenolic compounds	<b>32</b>
3.4.4.Determination of total flavonoids content	<b>33</b>
3.4.5.Determination of total alkaloids content	<b>33</b>
3.4.6.Determination of total protein content	<b>35</b>
3.4.7.Determination of total carbohydrates content	<b>35</b>
3.5.Meteorological data	<b>36</b>
3.6.Statistical Analysis	<b>36</b>
3.7.Molecular identification of <i>T. absoluta</i>	<b>36</b>
3.7.1. Sample collection	<b>36</b>
3.7.2. DNA extraction	<b>37</b>
3.7.3. Cytochrome oxidase subunit I gene(mtDNA COI ) sequencing	<b>38</b>
3.7.4. PCR reaction mixture for 50 ml reaction	<b>38</b>
3.7.5. Agarose gel electrophoresis of PCR products	<b>38</b>
<b>IV. Results and Discussion</b>	<b>41</b>
4.1.Host preference of <i>T. absoluta</i> on certain solanaceous plants.	<b>41</b>
4.2.Susceptibility of certain tomato cultivars to <i>T. absoluta</i> infestation	<b>46</b>

4.2.1. Early summer plantation	46
4.2.2. Summer plantation	46
4.3. Effect of tomato leaflet trichomes on <i>T. absoluta</i> infestation	56
4.4. Relation between mean number of glandular trichomes on tomato cultivars leaflets and percent damaged fruits by <i>T. absoluta</i>	57
4.5. Role of Allelochemicals in tomato leaflets resistance of tomato cultivars against <i>T. absoluta</i> infestation	60
4.5.1. Volatile compounds	60
4.5.2. Acylsugars	71
4.5.3. Phenolics, Flavonoids and Alkaloids contents	72
4.5.4. Total carbohydrates and proteins contents	73
4.6. Seasonal abundance of <i>T. absoluta</i> on Alissa and Logain tomato hybrids	80
4.6.1. Early summer plantation, 2013	80
4.6.2. Summer plantation, 2013	80
4.6.3. Early summer plantation, 2014	85
4.6.4. Summer plantation, 2014	85
4.7. Relation of some weather factors and population dynamics of <i>T. absoluta</i> as well as its predator <i>N. tenuis</i>	90
4.7.1. On Alissa tomato hybrid	90
4.7.2. On Logain tomato hybrid	94
4.8. Control studies	99
4.9. Molecular identification of <i>T. absoluta</i>	103
V. Summary	108
VI. References	117
VII. ARABIC Summary	

## LIST OF TABLES

No.	Title	Page
1	Weekly mean numbers of <i>T. absoluta</i> larvae/10 leaflets on four solanaceous plants during 2013 early summer plantation, at Qaha, Qalyubiya Governorate.	43
2	Weekly mean numbers of <i>T. absoluta</i> larvae/10 leaflets on four solanaceous plants during 2013 summer plantation, at Qaha, Qalyubiya Governorate.	43
3	Weekly mean numbers of <i>T. absoluta</i> larvae/10 leaflets on four solanaceous plants during 2014 early summer plantation, at Qaha, Qalyubiya Governorate.	44
4	Weekly mean numbers of <i>T. absoluta</i> larvae/10 leaflets on four solanaceous plants during 2014 summer plantation, at Qaha, Qalyubiya Governorate.	44
5	Weekly mean numbers of <i>T. absoluta</i> larvae/10 leaflets on five cultivars of tomatoes during 2013 early summer plantation at Qaha, Qalyubiya Governorate.	49
6	Weekly mean numbers of <i>T. absoluta</i> larvae/10 leaflets on five cultivars of tomatoes during 2013 summer plantation at Qaha, Qalyubiya Governorate.	49
7	Weekly mean numbers of <i>T. absoluta</i> larva/10 leaflets on five cultivars of tomatoes during 2014 early summer plantation at Qaha, Qalyubiya Governorate.	51
8	Weekly mean numbers of <i>T. absoluta</i> larvae/10 leaflets on five cultivars of tomatoes during 2014 summer plantation at Qaha, Qalyubiya Governorate.	51
9	Annual mean numbers of <i>T. absoluta</i> larvae/10 leaflets on five cultivars of tomato plants during early and summer plantations of year 2013 & 2014 at Qaha, Qalyubiya Governorate.	52

<b>No.</b>	<b>Title</b>	<b>Page</b>
<b>10</b>	Seasonal mean numbers of <i>T. absoluta</i> larvae/10 leaflets on five cultivars of tomato plants during early and summer plantations of year 2013-2014 at Qaha, Qalyubiya Governorate.	<b>53</b>
<b>11</b>	Total mean numbers of <i>T. absoluta</i> larvae on five Cultivars of tomato plants during early and summer plantations 2013 & 2014 at Qaha farm, Qalyubiya Governorate.	<b>54</b>
<b>12</b>	Factorial analysis of obtained data (Table 9,10 & 11).	<b>55</b>
<b>13</b>	Density and dimensions of trichomes of five tomato cultivars in relation to mean number of <i>T. absoluta</i> .	<b>85</b>
<b>14</b>	Relation between mean number of glandular trichomes on tomato cultivars leaflet and percent of damaged fruits during 2013 and 2014 plantations.	<b>85</b>
<b>15</b>	Chemical composition of essential oils from leaves of four tomato cultivars.	<b>65</b>
<b>16</b>	GC-MS. Fragmentation of major hydrocarbon components in four tomato cultivars (Alissa, Logain, Super strain and G. S)	<b>66</b>
<b>17</b>	Role of major active hydrocarbon components in the susceptibility degree of Logain and Alissa tomato cultivars to <i>T. absoluta</i> infestation.	<b>70</b>
<b>18</b>	Relationship between the glandular trichomes densities and the amount of their acylsugar secretions and mean of <i>Tuta absoluta</i> larvae in the leaflets of four tested tomato cultivars.	<b>76</b>
<b>19</b>	Comparison between the Phenolics, Flavonoids and Alkaloids contents with the mean number of <i>Tuta absoluta</i> larvae in the leaflets of four tested tomato cultivars.	<b>76</b>

<b>No.</b>	<b>Title</b>	<b>Page</b>
<b>20</b>	Comparison between the Carbohydrates and Proteins contents with the mean number of <i>Tuta absoluta</i> larvae in the leaflets of four tested tomato cultivars.	<b>76</b>
<b>21</b>	Weekly mean numbers of <i>T. absoluta</i> larvae/10 leaflets on Alissa and Logain tomato cultivars and associated predator with the corresponding weather factors during 2013 early summer plantation, at Qaha, Qalyubiya Governorate.	<b>82</b>
<b>22</b>	Weekly mean numbers of <i>T. absoluta</i> larvae/10 leaflets on Alissa and Logain tomato cultivars and associated predator with the corresponding weather factors during 2013 summer plantation, at Qaha, Qalyubiya Governorate.	<b>82</b>
<b>23</b>	Weekly mean numbers of <i>T. absoluta</i> larvae/10 leaflets on Alissa and Logain tomato cultivars and associated predator with the corresponding weather factors during 2014 early summer plantation, at Qaha, Qalyubiya Governorate.	<b>87</b>
<b>24</b>	Weekly mean numbers of <i>T. absoluta</i> larvae/10 leaflets on Alissa and Logain tomato cultivars and associated predator with the corresponding weather factors during 2014 summer plantation, at Qaha, Qalyubiya Governorate.	<b>87</b>
<b>25</b>	Simple correlation and partial regression values as well as explained variance of some biotic and abiotic factors and the population dynamics of <i>T. absoluta</i> on Alissa tomato hybrid during early and summer plantations, 2013-2014.	<b>93</b>
<b>26</b>	Simple correlation and partial regression values as well as explained variance of some biotic and abiotic factors and the population dynamics of <i>T. absoluta</i> on Logain tomato hybrid during early and summer plantations, 2013-2014.	<b>98</b>
<b>27</b>	Mean numbers of <i>T. absoluta</i> larvae/10 leaflets and reduction percent according to the control study on Alissa F1 tomato hybrid during 2014 early summer plantation.	<b>101</b>

<b>No.</b>	<b>Title</b>	<b>Page</b>
<b>28</b>	Mean numbers of <i>T. absoluta</i> larvae/10 leaflets and reduction percent according to the control study on Alissa F1 tomato hybrid during 2015 early summer plantation.	<b>101</b>
<b>29</b>	Factorial analysis of controlling <i>T. absoluta</i> over two years using different treatments.	<b>102</b>
<b>30</b>	Cytochrome oxidase subunit I (COI) gene of the Egyptian <i>T. absoluta</i> biotype compared with other sequences from National Center for Biotechnology Information (NCBI)	<b>107</b>