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CURRENT STATUS OF TOMATO LEAFMINER, TUTA ABSOLUTA (MEYRICK) (LEPIDOPTERA: GELECHIIDAE) IN ROMANIA

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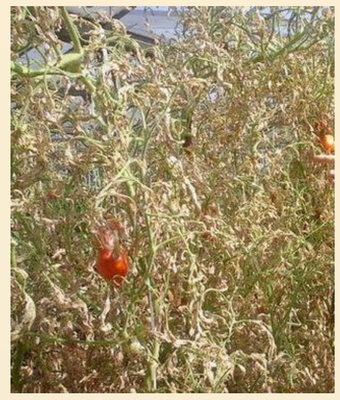


INTRODUCTION

The tomato leafminer, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) has conquered almost 60% of the total area cultivated with tomato. The European Plant Protection Organisation recommended *T. absoluta* as a quarantine organism and it was included in 2004 in A1 list, as a harmful organisms not known to occur in the EPPO area (EPPO, 2004). After entering Europe (2006) and fast spreading, the pest was transferred to A2 list in 2009 (EPPO Database, 2018). Currently, the pest is spread in more than 30 European countries. The United States banned the import of tomatoes from the countries where the pest is known to occur, including Romania, since 2011. In Romania, the pest was found for the first time in 2009. According to the National Phytosanitary Authority, *T. absoluta* was first reported in Botoșani County and then in Maramureş County (Leaotă, 2009), while Băeţan et al. (2013a) reported the first appearance in June 2009, in one market in Oradea city (Oradea County), on tomato imported from Spain. In 2010 the pest spread rapidly in Bihor, Arad, Ilfov and Mureş counties (Cean et Dobrin, 2009). In all these cases the pest was detected on tomatoes, exclusively in protected areas. At the same time, *T. absoluta* larvae have been identified on tomato fruits imported from Spain and Turkey, the respective samples coming from Cluj, Covasna and Vaslui counties (Cean and Dobrin, 2009). The National Phytosanitary Authority of Romania (National Phytosanitary Agency in 2011), developed and implemented in 2011 the "National Pest Control Plan for *Tuta absoluta*", which includes the monitoring plan and valuable information to prevent new outbreaks and to limit the spread. There is no economic threshold for *T. asboluta*, the treatments being applied immediately after the first adults are caught in the pheromone traps. However, as people were not too aware of the plan and measures, the expected effects were unsatisfactory.
The objective of the present paper is to highlight the level of farmers knowledge related to the *T. absoluta* in Romania, and to update the distribution map of this pest in Romania.

MATERIALS AND METHODS

The paper is based on an extended review of data collected from various internet data bases and social media posts. Also, a four questions online survey was carried out in the period February – May 2018, on a sample of maximum 20000 potential respondents.
The social media campaigne included a questionnaire with four questions about the year of first finding, the place of first finding (open field or protected area), the control measures taken by the farmers, what information would they look for in a control guide for *T. absoluta*. The email campaigne included the same set of questions, that was sent by email to around 50 people.

RESULTS AND DISCUSSIONS

The interest and knowledge about Tuta absoluta in the scientific environment

The scarce scientific publications seems not to take in consideration the economic importance of the pest.

- Cean and Dobrin (2009) and Cean (2011), - the identification and spread of this pest,
- Mitrea, 2013 - *T.absoluta* was indicated as a new pest for Oltenia region, on the sandy soils between Olt and Jiu River.
- Boiu-Sicuia *et al.* (2017) found the pest in Muntenia region, Giurgiu and Ilfov counties.
- Băeţan (2015) - a special chapter to this pest in his PhD + four articles about tomato leafminer feeding behaviour and the spread of the pest in western Romania (Băeţan *et al*., 2013a, 2013b, 2015a, 2015b).
- Bratu *et al*. (2015) - spinosad, emamectin-benzoate and imidacloprid;
- Costache *et al*. (2014) - Neem saponins, *Quassia amara* and *Quassia amara*+ potassium salt.
- ten articles were published in the national Plant Health review (Sănătatea plantelor), mainly about the control strategies (Dobrin, 2013; Rinichita, 2016; Rosca, 2018).
- National Phytosanitary Authority, (2018) - a guide for the identification and control strategies of tomatoes grown in greenhouses, where a chapter is dedicated to the ”Integrated Management Toolkit of the harmful organism *Tuta absoluta* Meyrick”.

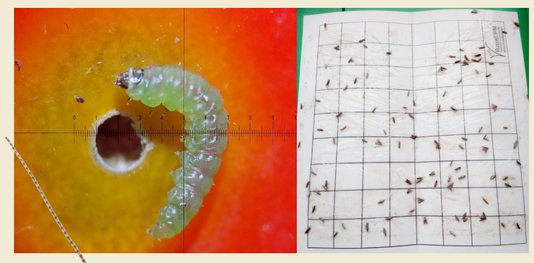
From ~ 20000 possible respondednts, =>8 answers. 7 answers (0,035**The interest and knowledge about *Tuta absoluta* of farmers and hobby producers**
%) on Facebook, 3 enshuring that NO *T. absoluta* was in their crops, in Cluj and Olt counties.
Out of 50 emails, - 4 answers (8% answer rate). Only one farmer agreed to allow us to monitor the population with a feromonal trap (Russel IPM lures), in March 2018, in a speenach plastic tunnel, in Bucharest.

Farmer location	Year	Area of growing	Crop	Control
Bragadiru (Ilfov)	2012	protected area	tomatoes	feromonal traps, emamectin benzoat 9,5 g/kg
	2015	open field	tomatoes	
	2018	protected area	tomatoes seedlings	
Bucharest	2015	protected area	tomatoes	clorantraniliprol
	2018	protected area	spinach	
Bragadiru (Ilfov)	2012	protected area	tomatoes	feromonal traps
Oradea (Bihor)	2012	protected area	tomatoes	formaline*, rotation
Câmpina (Prahova)	2014	protected area	tomatoes	
Sercaia (Brașov) Organic farmer	2016	protected area	tomatoes	sticky traps, repelent herbs macerate
Novaci (Giurgiu)	2013	hidroponics	tomatoes	clorpirifos metil 225 g/l on foil, DiPel®
Gheorghe Lazăr Ialomita	2013	open field	tomatoes, sweet pepper, egg-plants	clorantraniliprol

Updated spread map of *Tuta absolut*a in Romania

Out of the 42 Romanian counties, the presence of *T. absoluta* was indicated in:

- 10 counties - scientific papers,
- 3 counties - pesticides suppliers,
- 2 counties - our citizen science initiative
- 1 county - newspaper article.
- The three counties (Cluj, Covasna and Vaslui) where the pest where only intercepted in the import samples were not mentioned in our current distribution map.



CONCLUSIONS

Out of the 42 Romanian counties, the presence of *T. absoluta* was indicated in 16 counties. The 3 counties (Cluj, Covasna and Vaslui) with interceptions were not mentioned in our current distribution map.
The few respondents to the e-mail and online groups survey were quite open in providing details about their work and the problems they had encountered with the tomato leafminer. There is some reticence in addressing this topic, fact which might be explained by the fear of losing the production, the future clients and even the crop.
The pesticide suppliers were very active in informing farmers about the risk of infestation, pest descriptions, preventing methods, chemical control of the pest. Phytosanitary authorities have developed and implemented the national phytosanitary rules to monitor *T. absoluta* and some local staff (County Phytosanitary Offices) of the National Phytosanitary Authority supports farmers and other people involved in vegetable crops through guides, notifications and phytosanitary warning bulletins.

REFERENCES

Too many, so please see the attached file.

ACKNOWLEDGEMENTS

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