IRAC International *Tuta absoluta* Task Team: Project Closure
January 2019

Tuta absoluta (Meyrick) (Lepidoptera: Gelechiidae) is a pest of great global economic importance. As an invasive species, from its South American origin, *Tuta* has crossed borders and is devastating tomato production in protected and open fields spreading to Europe, Africa and the Middle East. Recently, it has been reported in India. Given its aggressive nature and crop destruction potential, it has quickly become a key pest of concern in these new geographies. Its primary host is tomato, although potato, aubergine, common bean, and various wild solanaceous plants are also suitable hosts. *T. absoluta* is characterized by high reproduction potential, capable of attacking all above ground plant parts, and can cause up to 100% crop destruction.

Tuta resistance to a range of mode of action groups are already known from L. America countries where this has been a key pest for decades. However, since *Tuta* is a newly invasive species in most countries, biological control is less effective and will take time to develop. Thus, risk for insecticide resistance development is high for *Tuta absoluta*, since management of the pest relies mainly on chemical control with a limited number of effective insecticides. Observations of reduced control had been reported in parts of Europe throughout since 2010, however extensive field failures and collection of resistant field populations of *T. absoluta* to diamide chemistry were observed in 2014 in Sicily.

The International Insecticide Resistance Action Committee (IRAC) has been actively involved in managing *Tuta* resistance. Member companies and country resistance action groups have been actively monitoring populations for resistance, promoting IRM rotation strategies in customer communications, and recommending the integration of IPM practices into tomato greenhouse production since 2007 when *Tuta absoluta* was first found in the Mediterranean basin. Once diamide resistance occurred on a large scale in Italy and *Tuta* invasion into African countries continued to escalate, IRAC International agreed to coordinate a regional *Tuta* Task Team.

The objective of the Task Team was to provide cross-industry advice for *Tuta* pest management practices and IRM recommendations in selected Europe, Middle East, and African countries. Regional country IRAC teams worked with IRAC International and key academic influencers to design a regional *Tuta* pest control program complete with IRM recommendations that would be communicated and implemented locally to the industry. The core Task Team included approximately 20 global and country representatives from BASF, DuPont (currently FMC Agricultural Solutions), Dow (currently Corteva Agriscience), Syngenta, and Adama. Academic researchers from Spain, Antonio Monserrat and Pablo Bielza, provided additional expertise to the Task Team. The countries where the *Tuta* Task Teams decided to focus implementing best management pest control recommendations were Spain, Italy, Greece, Turkey, Israel, Morocco, and the Republic of South Africa. Six of these countries have organized active IRAC teams that aided in

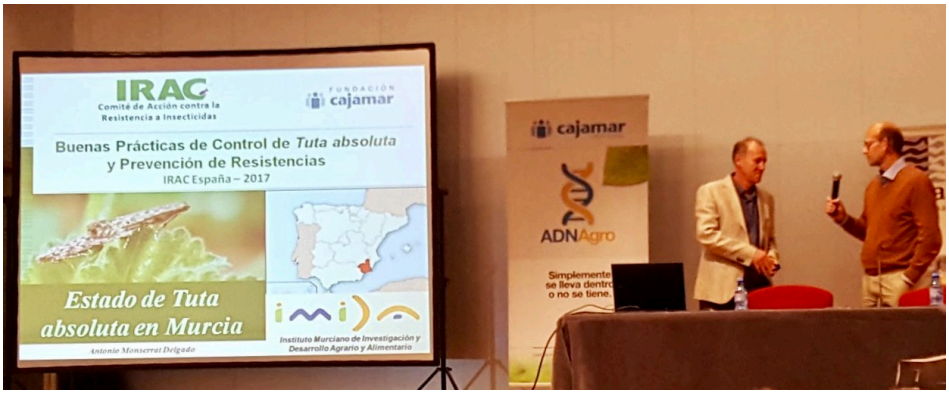
coordinating communication and training programs for the final recommendations. The core team met in Malaga, Spain in October 2016 to complete the project plan. Country and global IRAC members identified country leaders, target audiences, and country-specific organizations and opportunities to communicate/educate growers. The technical training document was also finalized as a 140-page slide set titled "Best Management Practices to Control *Tuta absoluta* recommendations to Mange Insect Resistance". The training document was arranged into 12 chapters seen below:

1. Update *Tuta* presence and pest status globally
2. Recognize *Tuta* life stages, life cycle, damage, and plant symptoms
3. *Tuta* control products, resistance publications, and method to evaluate efficacy
4. Monitor *Tuta* populations
5. Integrate key *Tuta* control strategies
6. Understand Action Thresholds for chemical and microbiological control
7. Maximize pest control using adjuvants and app tech equipment
8. Understand Insecticide Resistance Management Principles
9. Implement Insecticide Resistance Management Strategies
10. Grower adoption of *Tuta* IRM: Factors that influence Growers
11. Examples of country MoA alternation programs
12. Country IRM execution guidelines

The seven country teams began to implement the *Tuta* training program in 2017 and continued through 2018. The country teams followed different courses of action choosing available resources that would expedite delivering the best control practices and IRM recommends to growers.

Some examples:

- **IRAC Spain** is very active and member companies incorporated *Tuta* technical material into their internal training programs. Spain IRAC organized a series of conferences and training events in key locations aimed at technicians and farmers using the Institute of Agrifood Research and Technology, CAJAMAR, the Institut of Recerca i Tecnologia Agroalimentàries, IRTA, and associations of produce exporters.



- **Turkey** used their local agricultural industry board ZIMIT to provide resourcing and coordinate the dissemination of technical material.
- **Italy** coordinated activities through their IRAC country resistance group. Member companies included IRM recommends in their customer communications and created industry brochures and posters with common rotational spray programs. Italy's Agrofarma association cooperated to increase credibility and communication capabilities and facilitate participation of other interested companies.
- **Israel** worked with their country resistance action group, local ag cooperative, academic influencers and local companies.
- **Greece** educated thier field biologists through seminars, engaged Dr Roditakis, global *Tuta* expert, in country education efforts, and companes included IRM recommends in advertised rotational schemes.
- **The Republic of South Africa** formed a task team combined with industry groups. They designed simple presentations for training extension officers highlighting IPM practices and multiple Mode of Action rotation. Funding for students who can assist in scouting and communicating recommends is under proposal.
- **Morocco** worked mainly through industry chemical companies to communicate recommend-dations to growers through major influencers. Developed a simpler training slide set.

Throughout 2017 and 2018, audio meetings were scheduled to ensure inter-company and inter-country interactions. Progress, issues, and ideas were shared.

With the close of 2018 we will consider the objectives of the *Tuta* Task Team to have been met with seven countries implementing updated pest control practices in compliance with IRM principles. There is no plan to continue coordination at the IRAC International level. A technical training document (slide set) is available with numerous examples of how country teams can coordinate training for grower implementation. Based on experiences from this project, IRAC International plans to produce a publication that documents differences in grower practices that greatly accelerated or delayed *Tuta* resistance. Additionally, learnings from the *Tuta* Task Team will guide the update of the IRAC *Tuta* brochure last published in 2011: (*Tuta absoluta* – The Tomato Leafminer: Recommendations for Sustainable and Effective Resistance Management).