Occurrence of Tuta absoluta (Lepidoptera: Gelechiidae) in the Malnad and Hyderabad-Karnataka Regions of Karnataka, India

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Occurrence of *Tuta absoluta* (Lepidoptera: Gelechiidae) in the Malnad and Hyderabad-Karnataka Regions of Karnataka, India

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In spite of India's strong quarantine measures, another new insect pest has entered India. It has been identified as *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae), a native of South America. Outside South America, *T. absoluta* was reported first in Spain during 2006 (Desneux et al. 2011). Since then, *T. absoluta* has spread to some European and North African Mediterranean Basin countries, where it has become a serious threat to tomato production in both greenhouse and outdoor tomato (*Solanum lycopersicum* L.; Solanales: Solanaceae) crops (Desneux et al. 2010). The pest is reported to cause damage to other solanaceous vegetables, including eggplant (*Solanum melongena* L.; Solanales: Solanaceae), potato (*Solanum tuberosum* L.; Solanales: Solanaceae), and pepper (*Capsicum annuum* L.; Solanales: Solanaceae), as well as tobacco (*Nicotiana tabacum* L.; Solanales: Solanaceae), solanaceous weeds, and the garden bean (*Phaseolus vulgaris* L.; Fabales: Fabaceae) (Ferracini et al. 2012).

During Jan and Feb 2015, *T. absoluta* was detected in the Malnad and Hyderabad-Karnataka Regions of Karnataka State. The Malnad Region covers the western part of Karnataka State (22°N to 8°N, 74.5°E to 76°E), and the Hyderabad-Karnataka (16°N to 18.5°N, 76° to 77.5°E) Region forms the northern part of Karnataka State. A survey was done in growers' fields in various villages separated at least by 5 to 10 km. Damage of *T. absoluta* was observed both on leaves and fruits of tomato, and on potato leaves. The larvae were found between the upper and lower leaf epidermis, feeding on mesophyll tissues and causing mines or blotches on leaves. Infested fruits had pinholes, and larvae were found inside feeding on the pulp. Also, secondary infections by pathogens were noticed in the infested fruits. In each field per location, incidence was recorded in 3 randomly selected patches of 5 m^2 area. Approximately 85 plants (plant spacing 60 × 45 cm) existed in each 5 m^2 patch. In each 5 m^2 area, 6 to 52% of plants showed at least one of the symptoms mentioned above (Table 1). In each patch, 5 plants were selected randomly, and for each plant the number of leaves and fruits showing symptoms and total number of leaves and fruits were counted. The percentage of leaves showing symptoms was determined from the samples. Results showed that on the leaves, the damage was confined mainly to the top portion of the plant. On average, 2.7 to 60.7 leaves per plant showed symptoms. Furthermore, 1.2 to 12.6 fruits per plant showed pinhole symptoms. While recording the damaged leaves and fruits per plant, we also recorded the numbers of live larvae present inside the leaf mines and damaged fruits. An average density of 0.8 to 8.8 larvae was recorded per plant. In Chikmagalur, the incidence of the pest on potato was minor. Of the 3 potato fields surveyed, 2 fields were infested. In each 5 m^2 area, 3.3 to 5.1% of plants showed symptoms of the tomato leafminer. On average, 3.2 to 4.6 leaves per plant showed symptoms of infestation. Communication with tomato growers revealed that they had applied several of the newer insecticides at 7 to 14 day intervals, mainly for the management of tomato serpentine leafminer, *Liriomyza trifolii* Burgess (Diptera: Agromyzidae), and the tomato fruit borer *Helicoverpa armigera* Hübner (Lepidoptera: Noctuidae). In spite of application of insecticides, incidence of *T. absoluta* was observed. This indicates that introduced populations probably already bear resistance against several insecticides with different modes of action. The infested leaves, along with the larvae and pupae, were collected and reared to the adult stage. The identity of the species was confirmed by comparing the male genitalia with the descriptions in Roditakis et al. (2010).

Summary

In Jan and Feb 2015, the tomato leafminer, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae), was found to have entered and established in the Malnad and Hyderabad-Karnataka Regions of Karnataka, India, where it is infesting tomato and potato crops. To our knowledge, this is the first record of *T. absoluta* in these regions of India. The incidence recorded appears to be comparatively small at some locations, but this damaging insect may spread to other regions of India and cause serious crop loss in the future. Probably, the introduced populations are resistant to various insecticides, and management of insecticide-resistant populations poses additional problems.

Key Words: invasive species; *Solanum lycopersicum*; *Solanum tuberosum*; tomato leafminer

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Table 1. Incidence of the tomato leaf miner, *Tuta absoluta*, on tomato and potato in the Malnad Region (Shimoga and Chikmagalur Districts) and in the Hyderabad-Karnataka Region (Yadgir District) of India during Jan and Feb 2015.

Site no.	District and crop	Place/village name	Field/ location	% plants showing damage	Number of damaged leaves/plant[a]	Number of damaged fruits /plant[a]	Number of live larvae/plant
1	Shivamoga (tomato) 13°93'N, 75°56'E	Kommanalu 14°02'N, 75°96'E	1	9.8	5.8	2.2	1.5
			2	15.7	4.5	1.6	2.3
			3	14.1	6.3	1.2	1.9
		Savalanga 14°06'N, 75°31'E	1	12.9	5.2	3.1	2.2
			2	16.5	8.3	2.5	3.9
			3	11.4	6.8	1.9	1.8
		Nyamathi 14°14'N, 75°56'E	1	10.6	7.3	1.3	2.8
			2	9.4	5.6	1.2	1.6
		Agriculture College campus 13°93'N, 75°56'E	1	6.3	2.7	1.5	0.8
2	Chikmagalur (potato) 13°18'N, 75°49'E	Beekanahalli 13°30'N, 75°8'E	1	3.3	3.2	—	1.8
		Karkipete 13°50'N, 75°90'E	2	5.1	4.6	—	2.2
3	Yadgir 1 6°77'N, 77°13'E	ARS, Kawadimatti	1	52.2	60.7	12.6	8.8
		Evuru	1	38.3	31.1	8.8	6.5
		Hotapete	1	1.5	9.6	—	2.2
			2	9.1	15.2	2.4	4.8

[a]Average of 15 plants

Sumario

En enero y febrero de 2015, la polilla del tomate, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae), se encontró que habia entrado y estableció en las regiones de Malnad y Hyderabad-Karnataka de Karnataka, India. Hasta donde sabemos, este es el primer registro de *Tuta absoluta* en estas regiones de la India. La incidencia registrada parece ser relativamente pequeña en algunos lugares, pero puede extenderse a otras regiones de la India y causar daños graves en el futuro. Es probable que las poblaciones introducidas son resistentes a diversos insecticidas, y el manejo de las poblaciones resistentes a los insecticidas plantea problemas adicionales.

Palabras Clave: especies invasoras; *Solanum lycopersicum*; *Solanum tuberosum*; polilla del tomate

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