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Authors: Cruz Roblero, Elías Neptalí, Vera, Alfredo Castillo, and Malo, Edi A.

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FIRST REPORT OF *TECIA SOLANIVORA* (LEPIDOPTERA: GELECHIIDAE) ATTACKING THE POTATO *SOLANUM TUBEROSUM* IN MEXICO

ELÍAS NEPTALÍ CRUZ ROBLERO¹, ALFREDO CASTILLO VERA¹ AND EDI A. MALO¹

¹Departamento de Entomología Tropical, El Colegio de la Frontera Sur, Carretera Antiguo Aeropuerto km 2.5, CP 30700, Tapachula, Chiapas, México

The Guatemalan moth, *Tecia solanivora* Povolny (Lepidoptera: Gelechiidae), was first registered in Guatemala and most recently invaded and became a key pest of the potato, *Solanum tuberosum* L., in Central and South America (Povolny 1973; Puillandre et al. 2008). Recently, this pest has been detected in the Canary Islands, Spain (Barragán et al. 2004), and it was included in the list of pests recommended for regulation as quarantine pests (OEPP/EPPO 2005). The larvae of the moth mine inside potato tubers, and adult moths hide in soil crevices during daytime. Chemical products are inadequate for the control of *T. solanivora*, because of the cryptic habits of the pests and continuous insecticide spraying also impacts on environmental and human health. Until recently, *T. solanivora* was not present in Mexico (OEPP/EPPO 2005).

In 2009 the surface area of land dedicated to potato crops in Mexico was 54,141.36 ha, with a production of 1,500,497 ton, mainly in the states

of Sinaloa, Sonora, Estado de Mexico, Puebla, Nuevo Leon and Chihuahua (SIAP 2009). Chiapas has 2 potato cropping zones, one in the municipality of San Cristobal de las Casas with potato fields at Chenaló, Chamula, Larrainzar, and Zinacantan, and another in the municipality of Motozintla (Niquivil) with potato fields at El Porvenir, Siltepec, La Grandeza, Tapachula (Pavencul), and Cacahoatán (Benito Juárez), where there are small-holder farmers producing potatoes (Fig. 1). In Guatemala, there are many regions producing potatoes, principally in the San Marcos Department, where there is a high degree of potato crop infestation. The Mexico-Guatemala border is very porous due to the lack of sanitary control at many points along this boundary. Many pests of worldwide importance have been introduced to Mexico, through this border, including the coffee berry borer, *Hypothenemus hampei* (Ferrari), the Africanized honey bee, *Apis mellifera scutellata* (Ruttner), and the Mediterranean fruit fly, *Ceratitis capitata* Wiedemann (Villaseñor-Luque 1987; Moffett et al. 1987; Schwarz et al. 1989). Therefore, we consider essential the monitoring of *T. solanivora* in potato crops close to this border to establish any presence of this pest in Mexico. To demonstrate this, in Nov 2010 we carried out a field inspection in El Porvenir, a community localized at an altitude of 2800 masl, 17 km from the border with Guatemala. This municipality has about 600 potato farmers each cultivating an area of 0.06-0.37 ha, with an average yield of 1.6 t/ha. Although the 'Rosita' and 'CX' varieties are cultivated, the main one is 'Toyocan', which was imported from Guatemala 5 years ago. We examined material that will be used as seed, and we found that of 232 potatoes examined, 32 were infested with *T. solanivora* larvae and pupa.

In this same locality during Mar 2011, we placed 4 white delta plastic traps (Pherotech, Delta, BC) each baited with a white rubber septum containing the sex pheromone (Nesbitt et al. 1985; Bosa et. al. 2005, 2006) formulated by Chemtica (Heredia, Costa Rica) when the potato plants were 10 d old. Traps were placed on a wooden stake at 60 cm above ground in the potato field for a trapping duration of 1 mo. We captured a total of 189.7 males/trap/night of *T. solanivora* with a mean (\pm SEM) of 7.9 ± 2.12 males/trap/night. Table 1 shows the mean number caught by each delta trap by night. Voucher specimens were placed in the insect collection held at El Colegio de la Frontera Sur, Tapachula, México. The intro-

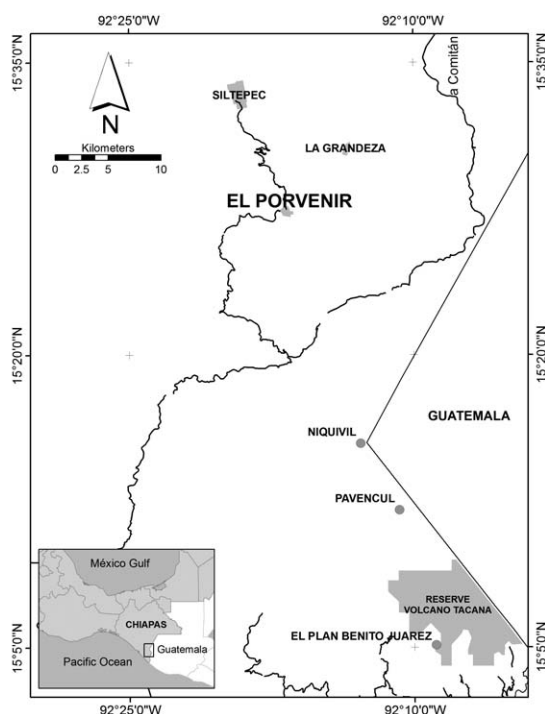


Fig. 1. Distribution of the potato crop and location of the site where *Tecia solanivora* was detected in Chiapas, Mexico.

TABLE 1. MEAN NUMBERS OF *TECIA SOLANIVORA* MALES CAUGHT WITH DELTA TRAPS BAITED WITH COMMERCIAL SEX PHEROMONE IN FOUR POTATO FIELDS IN EL PORVENIR, CHIAPAS, MEXICO.

Altitude (masl)	Geographical point		Mean No. Males/trap/night	Standard Error
	N	W		
2868	15° 20' 52"	92° 16' 24"	14.83	5.72
2898	15° 26' 57"	92° 16' 22'	5.11	1.81
2892	15° 26' 59"	92° 16' 24"	4.00	2.43
2892	15° 27' 03"	92° 16' 24"	7.66	5.21

duction of this pest to Mexico was probably due to seed introduced from Guatemala, which is an activity common in these marginal areas. The low production of potatoes of Chiapas State (1.6%) is not significant compared with national production. However, the presence of *T. solanivora* in the mountains of coastal Chiapas means that there is the possibility that the pest may already be distributed throughout the country. The establishment of this pest will have a drastic effect on the economy of potato farmers, primarily in central and northern Mexico.

For the first time, we report the presence in Mexico of the Guatemalan moth, *Tecia solanivora*, the foremost pest of potato tubers. Once its presence is confirmed it is necessary to identify to what extent it has spread in this country in order to design strategies that will decrease the negative impact on crop productivity in the regions where it is already present and to limit its dispersion towards pest-free areas.

REFERENCES CITED

BARRAGÁN, A., MOLLET, A., AND ONORE, G. 2004. La teigne du Guatemala en Equateur. Comprendre une invasion biologique réussie outre-Atlantique pour la prévenir en Europe. *Phytoma* 569: 52-54.

BOSA, F., COTES, A., FUKUMOTO, T., BENGTSOON, M., AND WITZGALL, P. 2005. Pheromone-mediated communication disruption in Guatemalan potato moth *Tecia solanivora* Povolny (Lepidoptera: Gelechiidae). *Entomol. Exp. Appl.* 114:137-142.

BOSA, F., COTES, F., OSORIO, P., FUKUMOTO, T., BENGTSOON, M., AND WITZGALL, P. 2006. Disruption

of pheromone communication in *Tecia solanivora* (Lepidoptera: Gelechiidae): Flight tunnel and field studies. *J. Econ. Entomol.* 99: 1245-1250.

NESBITT, B., BEEVOR, P., CORK, A., HALL, D., MURILLO, R., AND LEAL, H. 1985. Identification of components of the female sex pheromone of the potato tuber moth, *Scrobipalopsis solanivora*. *Entomol. Exp. Appl.* 38: 81-85.

MOFFETT, J. O., DALE, L. M., THOMAS, A., AND FIERRO, M. M. 1987. The Africanized bee in Chiapas, México. *Am. Bee J.* 127:517-519.

OEPP/EPPO. 2005. EPPO Standard. *Tecia solanivora*. OEPP/EPPO Bull. 35: 399-401.

POVOLNY, D. 1973. *Scrobipalopsis solanivora* sp. n. A new pest of potato (*Solanum tuberosum*) from Central America. *Acta Univ. Agric. Fac. Agron.* 21: 145-146.

PULLANDRE, N., DUPAS, S., DANGLES, O., ZEDDAM, J.-L., CAPDEVIELLE-DULAC, C., BARBIN, K., TORRES-LEGUIZAMON, M., AND SILVAIN, J.-F. 2008. Genetic bottleneck in invasive species: the potato tuber moth adds to the list. *Biol. Invasions* 10: 319-333.

SIAP (SERVICIO DE INFORMACIÓN Y ESTADÍSTICA AGROALIMENTARIA Y PESQUERA). 2009. Anuario Estadístico de la Producción Agrícola 2006 en México. El cultivo de papa. Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación. México, D.F. (en línea). Disponible en <http://www.siap.gob.mx/>. (Revisado el 6 de Junio de 2011).

SCHWARZ, A., LIEDO, P., AND HENDRICH, J. 1989. Sterile Insect Technique. Current Programme in México *In* Robinson, A. S.; Hooper, G. [eds.] *Fruit Flies, Their Biology, Natural Enemies and Control*. World Crop Pests, Volume 3B. Elsevier-Science Publishers B. V., Amsterdam. pp. 375-386.

VILLASEÑOR LUQUE, A. 1987. Caficultura moderna en México. Ed. Futura, S.A. México. 469 p.