A NEW SPECIES OF THE GENUS *SINOE* (LEPIDOPTERA: GELECHIIDAE: LITINI) FROM FLORIDA

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Abstract

A new species of Gelechiidae, *Sinoe capsana* **sp. nov.**, is reported from southern Florida, USA. All specimens were recently caught in pheromone traps near tomato fields during an early detection survey for the tomato leafminer, *Tuta absoluta* (Meyrick), a pest native to South America that does not occur in North America. *Sinoe capsana* **sp. nov**. is described and imagos and male genitalia are illustrated**.**

Key Words: Nearctic, Litini, new species, southern Florida, tomato leaf miner

Resumen

Se reporta una especie nueva de Gelechiidae, *Sinoe capsana* **sp. nov**., del sur de Florida, EEUU. Todos los especímenes fueron colectados con trampas de feromona cerca de campos de tomate en un programa de detección temprana del minador del tomate, *Tuta absoluta* (Meyrick), una plaga de Sudamérica que no ocurre en Norteamérica. Se describe la especie nueva, y el imago y la genitalia de los machos son ilustrados.

Palabras Clave: Neártico, Litini, especie nueva, sur de Florida, minador de la hoja del tomate

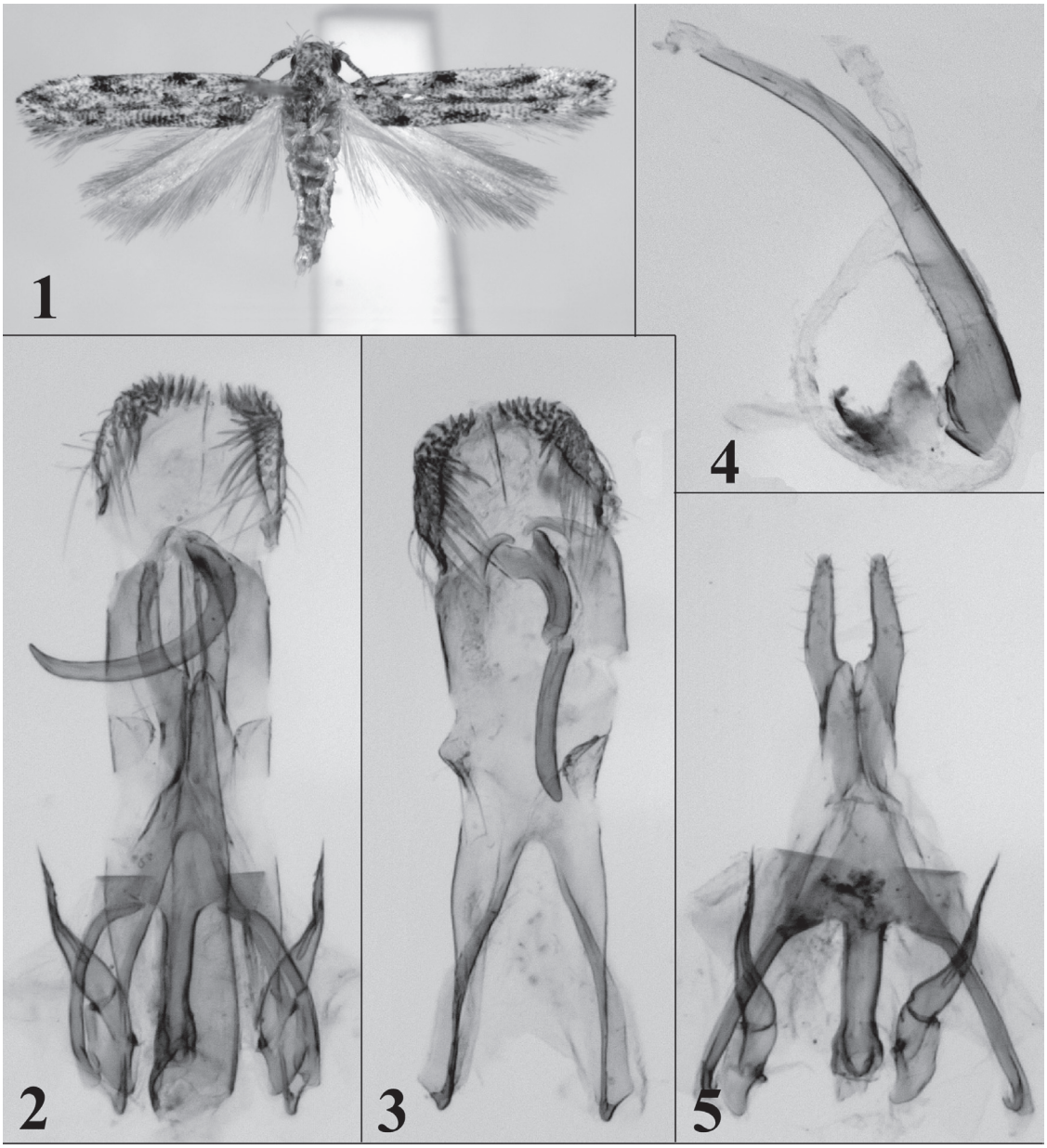
Four species in the genus *Sinoe* Chambers were recently treated by the first author (Lee & Brown 2012) with identification keys. After the paper was submitted, we received many specimens of *Sinoe* caught in pheromone traps from a survey for a pest species that does not occur in North America, the tomato leaf miner, *Tuta absoluta* (Meyrick). The first traps in this survey were installed on the edges of tomato fields during 2010 in southwestern Florida, USA, and in 2011 and 2012 more traps were installed in other areas in the state. The first moths appeared in one trap in southeast Florida in large numbers in 2011. These moths were considered at first as a possible invasive species from the Neotropical Region; therefore several additional traps were placed and monitored near to the initial detection sites.

After corresponding with Vitor Becker (Brazil), an authority on Gelechiidae of the Neotropical Region, and examining specimens deposited at the Florida State Collection of Arthropods (FSCA) in Gainesville, Florida, it became evident that the specimens from south Florida represent a new species. No older material of this species from Florida was found at FSCA or other collections. However, the gelechiid fauna of the Neotropical Region is poorly known, and it remains uncertain if this species is native to Florida or an introduction from the Caribbean or other Neotropical area. Only 4 species in the genus *Sinoe* are known in the Nearctic Region.

Sinoe is superficially defined by the following combination of characters: forewing with subbasal fascia having raised scales and directed obliquely from dorsum towards costa, R_5 and M_1 stalked, M_2 and M_3 connate, CuA_1 and CuA_2 present; the male with bilaterally symmetrical vinculum and valva, valva divided into costal and saccular parts, vinculum a narrow sclerite, gnathos hook shaped with basal and median articulations; the female with a signum (Lee & Brown 2012).

Materials and Methods

Delta traps (Fig. 6) with ISCAlure-Tuta™ pheromone (0.5 mg) (ISCA Technologies, Inc., Riverside, California) were operated during a Florida Cooperative Agricultural Pest Survey (CAPS) for the tomato leaf miner, *Tuta absoluta* (Meyrick). A few traps were operated for a short time in 2010 in southwestern Florida. The formal survey was initiated in April 2011 and continued in 2012. Most traps were installed at the edge of fields of tomato (*Solanum lycopersicum* L.; Solanales: Solanaceae) and usually were serviced every 2



Figs. 1-5. Adult and male genitalia of *Sinoe capsana* **sp. nov**. Lee. 1. Adult dorsal view; 2. Whole structure of male genitalia; 3. Tegumen; 4. Phallus; 5. Vinculum and valva.

weeks, including the period after harvest of tomatoes (Fig. 7). Dissection and slide mounting methods for genitalia followed Clarke (1941), except preparations were stained in eosin and mounted in Euparal. A Leica MS 5 Stereo-Microscope (with magnifications 6.4-16X) was used for examining specimens and slide mounts. Images were made with a Leica stereoscope with Image Pro Plus 5.1, a program for autoformatting. Measurements were made with an ocular micrometer in the stereomicroscope. Terminology for genitalia follows Klots (1970) with modification by Kristensen (2003) for use of phallus instead of aedeagus.

Results

Sinoe capsana **sp. nov.** Lee (Figs. 1-5)

Description

Adult (Fig. 1). Wing length 7-8 mm. Head and thorax white mixed with gray and brown. Antennae

brownish gray, 2/3 length of forewing, each flagellomere with basal row of scales dark brown and apical row whitish gray. Labial palpi with outer side of second segment dark brown with two white annuli beyond middle and at tip, inner side white; outer side of third segment white with three dark brown annuli at base, middle and tip, inner side with one dark brown spot at 1/3 and one dark brown annulus at tip. Forewing light gray to brown, costa with three dark brown spots at base, 1/3 length, and 2/3 length; subbasal fascia dark brown near dorsum almost extending 1/4 across the width of the forewing; discal cell with three small dark brown spots; apical area with a small dark brown spot beyond discal cell; dorsum with dark brown spots at 1/3 length and 2/3 length. Hindwing light gray or brown with silvery brown or gray fringe.

Male Genitalia (Figs. 2-5). Uncus squared, apical corners slightly rounded, slightly concave medially, 0.5 × length of gnathos; gnathos hook-shaped, 0.5 × length of tegumen; valva with costal part short, almost 1/3 × length of phallus, with bulbous base; saccular part absent; vinculum projecting posteriorly as pair of digitate processes, apices rounded, sparsely setose from base to apex, almost 1/3 × length of phallus; phallus 1.5 × length of valval costa, without cornuti, fulcrum slightly developed.

Female Genitalia. Unknown.

Diagnosis

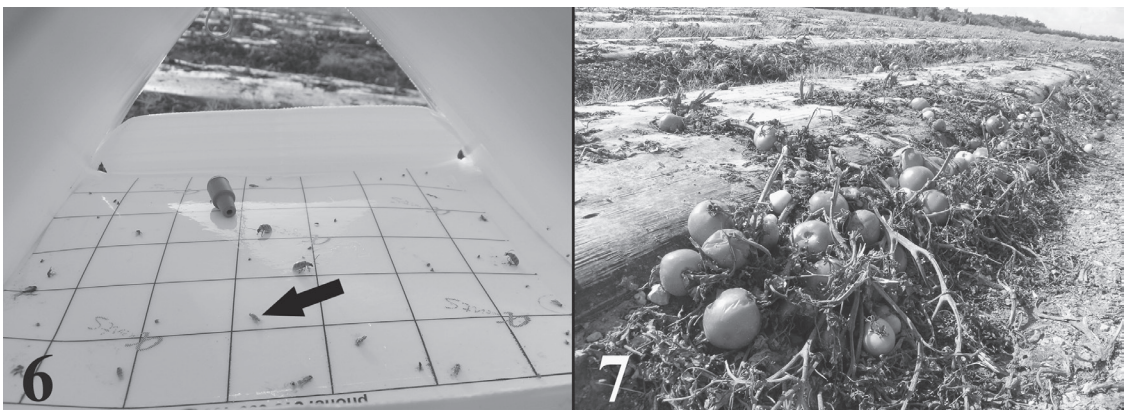
Sinoe capsana can be distinguished from all allies by the forewing having a dark brown subbasal fascia near dorsum almost extending toward 1/4 across the width of the forewing. The male genitalia differ from *S. robiniella* by having the uncus squared, apical corners slightly rounded, slightly concave medially; from *S. chambersi* by having the costal part of valve short, almost 1/3 × length of phallus; from *S. kwakae* by having the saccular part of valva absent and the phallus with slightly developed fulcrum.

Type Material

HOLOTYPE. Male, USA, Florida, Miami-Dade Co., Homestead, SW 207 Ave., N 25.41092° W -80.52543°, Trap No. J3, 2 Jun 2011, J. Brambila (genitalia slide SLEE0755). Deposited in USNM (U.S. National Museum of Natural History).

PARATYPES (n = 47). USA: Florida. **Collier Co.:** 2685 SR 29N, Immokalee, 26.46055N, -81.47960W, Trap No. TA-D-0013b, 31 May 2011, B. Kostyk (6 ♂). **Miami-Dade Co.:** Same as holotype (7 ♂); Florida City, 37710 SW 217 Ave., N 25.41075° W -80.5255°, Trap No. CTA15, 8 Jun 2011, A. Derksen (6 ♂); same, 8-9 Jun 2011 (2 ♂); Florida City, SW 217 Ave. + SW 392 St., N 25.41452° W -80.5255°, Trap No. CTA14, 8-9 Jun 2011, A. Derksen (3 ♂); Homestead, N 25.42198° W -80.52121°, Trap No. CTA2, 9 May 2011, A. Derksen (6 ♂); Miami, 22301 SW 162 Ave., N 25.55903° W -80.4517°, Trap No. CTA17, 8-9 Jun 2011, A. Derksen (5 ♂); Miami, 22295 SW 162 Ave., Castellow Hammock, N 25.55910° W -80.45177°, Trap No. 9, Jan 2012, A. Derksen (2 ♂). **Lee Co.:** Ft. Myers, 20900 SR 82, N 26.52414° W -81.61514°, Trap No. TA-D-0023b, 17 May 2011, D. Gaskill (1 ♂, genitalia slide SLEE0754); Ft. Myers, 20900 SR, 82, N 26.52929° W -81.61443°, Trap. No. TA-D-00023a, 17 May 2011, D. Gaskill (2 ♂). **Manatee Co.:** 75th Street W., Bradenton, N 27.45190° W -82.64506°, Trap. No. TA-D0028a, 2 Jun 2011, D. Gaskill (7 ♂). Deposited in ASUHIC (Hasbrouck Insect Collections at Arizona State University), FSCA, MEM (Mississippi Entomological Museum), and USNM.

OTHER EXAMINED SPECIMENS. USA, Florida. **Collier Co.:** Immokalee, 2685 SR 29N, N



Figs. 6-7. Delta trap and tomato field where *Sinoe capsana* **sp. nov**. Lee were collected; 6. Delta trap with pheromone plug (the arrow pointing to one specimen of *Sinoe capsana* sp. nov. Lee), photo taken 2 Jun 2011; 7. Field site in Homestead, Florida where first specimens of *Sinoe capsana* **sp. nov**. Lee were trapped, showing general appearance of tomato field after harvest, photo taken 1 Jun 2011.

26.46055° W -81.47960, Trap No. TA-D-0013b, 31 May 2011, B. Kostyk (7 ♂). Manatee Co., Bradenton, 75th St. W., N 27.45190° W -82.64506°, Trap No. TA-D0028a, 2 Jun. 2011, A. Derksen (10 ♂). **Miami-Dade Co.**, Homestead, Trap CTA5, N 25.41092° W -80.52543°, 25 Apr 2011, A. Derksen (38 specimens); same, 9 May 2011, 290 specimens; Homestead, 16800 SW 264 St., N 25.52466° W -80.46239°, Trap No. C-TA-0008, 28 Dec 2011, A. Derksen (5 ♂); Homestead, 15980 SW 248 St., N 25.53435° W -80.45068°, Trap No. TA-C-0006, 6 Feb 2012, A. Derksen (3 ♂); Homestead, 15980 SW 248 St., N 25.53516° W -80.45062°, Trap No. TA-C-0005, 6 Feb 2012, A. Derksen (4 ♂); Miami, 22295 SW 162 Ave., Castellow Hammock, N 25.55910° W -80.45177°, Trap No. TA-C-0003, 9 Jan 2012, A. Derksen (2 ♂).

Distribution and Flight Period

This species has only been found in southern Florida. Specimens were collected during Dec - Jul in Florida.

Biology

Host data are lacking for this species. All specimens were collected in traps with pheromones.

Etymology

The specific epithet is in reference to the Florida CAPS program which ran the survey for the tomato leaf miner in Florida.

Acknowledgments

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References Cited

Klots, A. B. 1970. Lepidoptera, pp. 115-130 *In* S. L. Tuxen [ed.], Taxonomist's glossary of genitalia in insects. Munksgaard, Copenhagen. 359 pp.

Kristensen, N. P. 2003. Skeleton and muscles: adults, pp. 39-131 *In* N. P. Kristensen [ed.], Lepidoptera, Moths and Butterflies. Vol. 2. Morphology, Physiology, and Development. The Handbook of Zoology/Handbuch der Zoologie. Walter de Gruyter. Berlin and New York. 564 pp.

Lee, S., and Brown, R. L. 2012. Review of the genus *Sinoe* (Lepidoptera: Gelechiidae) with descriptions of two new species. Zootaxa 3332: 49-59.