

A NEW SPECIES OF *ENCARSIA* (HYMENOPTERA:
APHELINIDAE) FROM COSTA RICA

GREGORY A. EVANS¹ AND CARLOS L. ANGULO²

¹Entomology and Nematology Department, University of Florida, Gainesville, Florida

²Museo de Insectos, CIPROC, Universidad de Costa Rica, San Jose, Costa

ABSTRACT

Encarsia costaricensis Evans and Angulo, reared from the greenhouse whitefly, *Trialeurodes vaporariorum* from Costa Rica, is described and illustrated. New host and distribution records are reported for *Encarsia lycopersici* De Santis reared from *T. vaporariorum* on tomato (*Lycopersicon esculentum* L.) from Brazil.

Key Words: Chayote, greenhouse whitefly, biological control, aphelinid, *Encarsia*, *Trialeurodes*, *Sechium*

RESUMEN

Se describe e ilustra *Encarsia costaricensis* Evans and Angulo, criado de la mosca blanca *Trialeurodes vaporariorum* en Costa Rica. Se reportan un nuevo hospedero y localidad para *Encarsia lycopersici* De Santis, criado de *T. vaporariorum* sobre el tomate (*Lycopersicon esculentum* L.) en Brasil.

Chayote, *Sechium edule* Swartz., is a perennial, vinaceous cucurbit, commonly grown by homeowners and small farmers in many Latin American countries. The economic importance of this vegetable in the region has increased in recent years due to the commercialization of the crop and a rapidly expanding export market. Researchers at the University of Costa Rica studied the ecology of the chayote plantations of the Cartago Province of Costa Rica during the period of November 1993 to August 1994. The natural enemies of pests attacking the crop were studied to provide farmers with alternative pest management measures and minimize the use of agrochemicals. Samples of chayote leaves, infested with pupae of greenhouse whitefly, *Trialeurodes vaporariorum* (Westwood), were collected from the field and held for parasitoid emergence. Several parasitoid species emerged from the samples including a new species of *Encarsia* that is here described.

Over 170 *Encarsia* species have been described throughout the world (Hayat 1989), but little is known of the Central American fauna of this important genus of parasitoids of primarily whiteflies and diaspine scales. Polaszek et al. (1992) and Schauff et al. (1996) reported Central American distribution records for several species of *Encarsia* known from other regions of the world. *Encarsia costaricensis* is only the second *Encarsia* species to be described from Central America. Previously, Polaszek (Mound et al. 1994) described *Encarsia sueloderi* from Costa Rica. Worldwide, seven species of *Encarsia* have been reported to parasitize *T. vaporariorum* (Schauff et al. 1996). In addition, specimens of *Encarsia lycopersici* De Santis, reared from *T. vaporariorum* on tomato (*Lycopersicon esculentum* L.) from Brasilia, Brazil, were recently sent by R. de Oliveira to the senior author for identification. This species was described from an unknown species of whitefly on tomato from Argentina (De Santis 1957). Despite the widespread use and success of *Encarsia formosa* Gahan as a biological control agent, the greenhouse whitefly remains an economic pest in field crops and greenhouses in many areas of the world. Trials with *E. costaricensis* may be warranted in these areas.

Encarsia costaricensis Evans and Angulo, sp. nov. (Figs. 1-7)

Female (Figs. 1-5)

Body Length: range 0.80-0.92, mean=0.86 mm. (x=5 specimens).

Coloration: (Fig. 2) Body entirely yellow except posterior margin of pronotum, distal two-thirds of scape, pedicel and flagellum, brownish; legs yellow; forewing hyaline, slightly infuscate basally.

Structure (holotype): **Head** - antenna (Fig. 3) consisting of radicle (R), scape (S), pedicel (P), 3 funicular segments (F1-3) and 3 club segments (F4-6) each having the following length/width ratios: R:2.0, S:3.8, P:1.6, F1:2.9, F2:2.7, F3:2.5, F4:1.8, F5:1.8 and F6:2.0; relative lengths of segments R-F6 to length of F1: R:0.6, S:2.1, P:0.7, F1:1.0, F2:0.9, F3:1.0, F4:0.9, F5:0.9 and F6:1.0; F1 to F6 with 0,1,1,2,3,3 linear sen-

silla, respectively; vertex reticulate; mandible Fig. 5) tridentate. **Mesosoma** - mesoscutum 1.4 times as wide as long with small, broad, hexagonal sculpturing and 4 pairs of slender setae; each side lobe with 3 setae; each axilla with 1 long, stout seta; scutellum with 2 pairs of setae, the anterior pair (Sc1) 0.7 times as long as the posterior pair (Sc2); distance between placoid sensillae 1.5 times as wide as the diameter of 1 sensillum; endophragma reaching base of metasomal tergite I; tibial spur of middle leg (Fig. 4) 0.5 times as long as corresponding basitarsus, the latter with 4 long spines; tarsal formula 5-5-5; forewing (Fig. 1) with 9 basal group setae, 2 long and slender submarginal vein setae; marginal vein with 6-7 long and slender setae along the anterior margin, 2 pterostigmal setae at its base and 10 setae along its interior; stigmal vein bulbous with 2 large setae; discal setae dense, uniformly distributed; longest seta on marginal fringe about $0.25 \times$ greatest width of wing. **Metasoma** - dorsum with imbricate lateral margins on tergites I-III, base of tergite I striate; tergite I-VII with 0,1,1,1,3,3 and 3 pairs of setae, respectively; venter with 2 pairs of setae on sternite II and 3 pairs of setae on sternite III; ovipositor arising at base of tergite IV, $1.1 \times$ length of tibia of middle leg; valvulae III $0.26 \times$ length of ovipositor.

Male

Body Length: range 0.60-0.69, mean=0.61 mm (x=8 specimens).

Coloration: (Fig. 6) Head yellow with dark brown base; body dark brown with lateral margins of mesoscutum, side lobes, base of axillae, scutellum and legs, yellow; antennae brownish; fore wing hyaline with slightly infuscate base.

Structure: Antenna (Fig. 7) consisting of radical, scape, pedicel and 5-segmented flagellum (F5-F6 partially fused) having the following length/width ratios: R:1.8, S:4.2, P:1.5, F1:2.2, F2:2.1, F3:2.1, F4:2.1 and F5-6:3.2, respectively; relative lengths of segments R-F6 to length of F1: R:0.5, S:1.6, P:0.5, F1:1.0, F2:1.0, F3:1.0, F4:1.0 and F5-6:1.6, respectively. Body setation similar to that of female except mesoscutum sometimes with one extra seta.

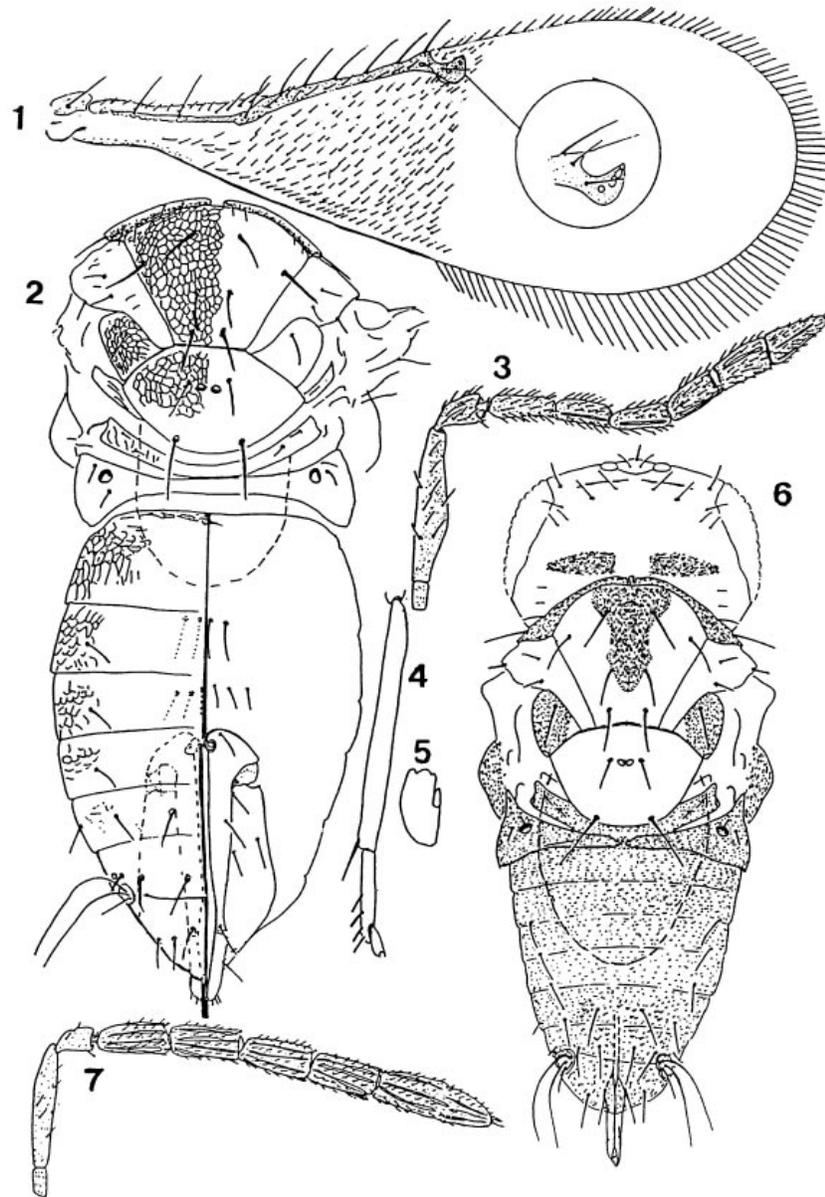
Distribution: **Costa Rica.**

Host: *Trialeurodes vaporariorum*.

Holotype: Female reared from *Trialeurodes vaporariorum* on *Sechium edule*, COSTA RICA, Paraiso de Cartago, 4 II 1994 by C. L. Angulo. *Paratypes:* 6 females and 7 males with the same data as holotype.

Specimens deposition: Holotype, 2 paratype females and 2 paratype males deposited in the U.S. National Museum, Washington, D.C. (USNM); 2 paratype females and 3 paratype males deposited in the Natural History Museum, London, UK (BMNH); 1 paratype female and 1 paratype male deposited in the Museo de Insectos, Universidad de Costa Rica, San Jose, Costa Rica.

Comments: *Encarsia costaricensis* Evans and Angulo is placed in the *Encarsia strenua* species group for having the scutellar sensillae separated by less than twice the diameter of one sensillum, all tarsi 5-segmented and antennal club 3-segmented. It is most similar to *Encarsia transvena* (Timberlake) in coloration and structure, but differs from *E. transvena* by having the pedicel and flagellum brownish, the F1 antennal segment more elongate, almost 3 times as long as wide, and the forewing discal setae more-or-less uniform in length. In *E. transvena*, the pedicel and flagellum are yellow, the F1 segment is approximately 2 times as long as wide, and there is a small area of longer setae along the posterior margin of the forewing disk. *E. costaricensis* is similar to *E. lycopersici* in having brownish antennae and the scutellar sensillae separated by less than twice the diameter of one sensillum, but differs from this species by having the forewing hyaline, the metasoma yellow and the club distinctly 3-



Figs. 1-7. *Encarsia costaricensis* (1-5) holotype female, (6-7) male: 1) fore wing, with stigmal vein enlargement and discal setae excluded, 2) habitus with metasoma divided right side venter, left side dorsum, 3) antenna, 4) tibia II and basitarsus, 5) mandible, 6) habitus, 7) antenna.

segmented. In *E. lycopersici*, the area under the marginal vein is infusate, the metasoma is brown, and the club is 2-segmented.

ACKNOWLEDGMENTS

The authors thank the Instituto Interamericano para la Cooperacion con la Agricultura (IICA) and the Programa Regional de Reforzamiento a la Investigacion Agromonica sobre los granos en Centroamerica (PRIAG) for their financial support for the ecological study; J. W. Huang for sample separation and specimen preparation; P. Hanson, G. Viggiani and A. Polaszek for their advise; and J. Heraty and two anonymous reviewers for their comments and review of this manuscript. Financial support for the senior author provided by the National Biological Control Institute. This is Florida Agricultural Experiment Station Journal Series No. R-05156.

REFERENCES CITED

- DE SANTIS, L. 1957. La fauna Argentina de afelinidos, III. Notas del Museo de La Plata, Zoologia 172: 101-106.
- HAYAT, M. 1989. A revision of the species of *Encarsia* Foerster (Hymenoptera: Aphelinidae) from India and the adjacent countries. Oriental Insects 20: 1-131.
- MOUND, L. A., J. H. MARTIN, AND A. POLASZEK. 1994. The insect fauna of *Selaginella* (Pteridophyta: Lycopsidea), with descriptions of three new species. J. Nat. History 28(6): 1403-1415.
- POLASZEK, A., G. A. EVANS, AND F. D. BENNETT. 1992. *Encarsia* parasitoids of *Bemisia tabaci* - a preliminary guide to identification. Bull. Entomol. Res. 82: 375-392.
- SCHAUFF, M. E., G. A. EVANS, AND J. M. HERATY. 1996. A pictorial guide to the species of *Encarsia* parasitic on whiteflies (Homoptera: Aleyrodidae) in North America. Proc. Entomol. Soc. Wash. 98(1): 1-35.

