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A NEW SPECIES OF PARASITOID WASP OF THE GENUS *ENCARSIA* (HYMENOPTERA: APHELINIDAE) FROM TAMAULIPAS, MEXICO

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RESUMEN

Se describe *Encarsia pinella* sp. nov., criada de la escama diaspidina *Melanaspis* sp. sobre *Pinus* spp. en la Reserva "El Cielo", Tamaulipas, México. Se incluyen claves para determinar las hembras de dos grupos taxonómicos de especies del género *Encarsia* y de seis especies que parasitan escamas en México.
Palabras Clave: Aphelinidae, *Encarsia*, parasitoide, *Melanaspis*, control biológico.

ABSTRACT

Encarsia pinella sp. nov., reared from the diaspine scale *Melanaspis* sp. on *Pinus* spp. in the Reserve "El Cielo", Tamaulipas, México, is described. Keys to two taxonomic groups of species of the genus *Encarsia* (females) and six species of scales parasitoids in Mexico are given.
Key Words: Aphelinidae, *Encarsia*, parasitoid, *Melanaspis,* biological control.

INTRODUCTION

Over 240 *Encarsia* species have been described throughout the world (Woolley, 1997; Hayat, 1998; Huang & Polaszek, 1998). Thirty species have been recorded in México (Myartseva & Ruíz, in press). Thirteen species of Mexican *Encarsia* are distributed in Nearctic and Neotropical regions, seven species in the Oriental region also, six species are Cosmopolitan, and one species is known in the Nearctic region only. At present, *E. townsendi* Howard, 1907, *E. paracitrella* Evans & Polaszek, 1997 and *E. unicitrella* Evans & Polaszek, 1997 are three species only known to occur in México (Schauff *et al*., 1996; Evans & Polaszek, 1997).

This fauna includes 25 species of whiteflies parasitoids and five species of scales parasitoids. From them, ten species were introduced at different times into México for biological control of whiteflies and armored scales (Homoptera: Aleyrodidae and Diaspididae), economic pests damaging field crops. *Encarsia aurantii* (Howard, 1894),

E. citrina (Craw, 1891*), E. formosa* Gahan, 1924, *E. perniciosi* (Tower, 1913) and *E. sophia* (Girault & Dodd, 1915) have been used successfully for biological control in several countries and have become widely distributed via introductions (Kennett *et al*., 1999).

The genus *Encarsia* Foerster includes primary parasitoids of whiteflies, scale insects and hormaphidine aphids, but one species is known to be parasitoid of Lepidoptera eggs (Polaszek, 1991). Thus, *Encarsia* species have important significance as natural enemies of Aleyrodidae and Diaspididae. Two *Encarsia* species from five known species have been reported in México as introduced parasitoids of scale insects of the family Diaspididae: *E. aurantii* (Howard) against *Chrysomphalus aonidum* (Linnaeus) and *E. perniciosi* (Tower) against *Aonidiella aurantii* (Maskell) (García-Martell, 1973). The new species described here, is the sixth species of the genus *Encarsia* attacking diaspine scales in México.

Keys to species groups of the genus *Encarsia* and to six species (females) parasitoids of scales in Mexico and description of a new species follow, where abbreviations used are: R - radicle, S - scape, P - pedicel, F - flagellar segment of antenna, T - abdominal tergite.

KEY TO SPECIES GROUPS AND MEXICAN SPECIES OF *ENCARSIA* (FEMALES) PARASITOIDS OF SCALES (DIASPIDIDAE)

1. Fore wing with an asetose area around stigmal vein; marginal fringe longer than maximum width of wing; side lobes of mesoscutum with one seta each . . . . . ***citrina* group**
- Fore wing without an asetose area around stigmal vein; marginal fringe not longer than maximum width of wing; side lobes of mesoscutum with two or three setae each . . . . . ***aurantii* group**

***citrina* group**

1. Fore wing with more or less parallel sides beyond venation and with apex broadly rounded; submarginal vein with two setae; marginal vein with 4-6 setae. Cosmopolitan . . . . . *E. citrina* (Craw, 1891)
- Fore wing abruptly narrowed beyond venation and with apex narrowly rounded; submarginal vein with one seta; marginal vein with 3-4 setae. Cosmopolitan . . . . . *E. lounsburyi* (Berlese and Paoli, 1916)

***aurantii* group**

1. P longer than F3; legs with only hind coxae brown 2
- P subequal to F3; legs with more parts brown, at least middle coxae and hind femora brown 3

2. F2 distinctly longer than F3; ovipositor slightly longer than middle tibia, with base inserted on the level of T2; marginal vein with 7 setae along anterior margin; base of gaster (T1-T2) yellow; sheaths of ovipositor dark brown. Nearctic, Neotropical, Oriental . . . . . *E. elongata* (Dozier, 1937)
- F2 subequal to F3; ovipositor slightly shorter than middle tibia, with base inserted on the level of T6; marginal vein with 5 setae along anterior margin; base of gaster (T1-T2) brown; sheaths of ovipositor pale. Nearly Cosmopolitan . . . . . *E. aurantii* (Howard, 1894)
3. Face yellow, with a distinct brown cross-band above toruli; F1 quadrate, P about 2 times longer than F1; midlobe of mesoscutum with 4 pairs of setae; ovipositor shorter than middle tibia. Nearly Cosmopolitan . . . . . *E. perniciosi* (Tower, 1913)
- Face fully brown; F1 about 2 times as long as wide; P subequal to F1; midlobe of mesoscutum with 7-8 pairs of setae; ovipositor longer than middle tibia. México . . . . . *E. pinella* Myartseva sp.nov.

***Encarsia pinella* Myartseva, sp. nov.**

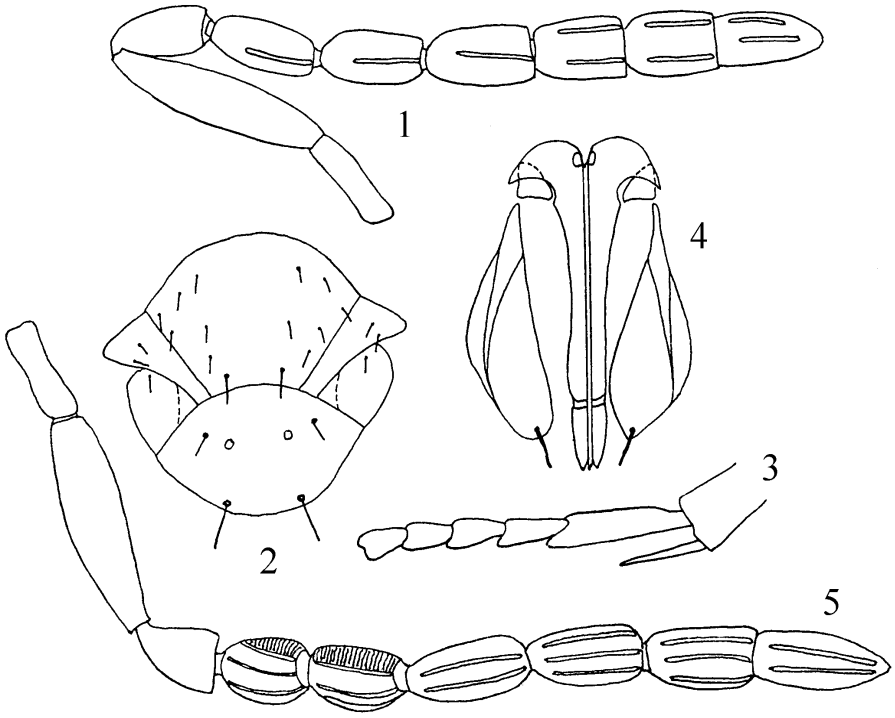
(Figs. 1-5)

Female. Body length: 0.67-0.92 mm (holotype, 0.85 mm).

Coloration. Head including face dark brown; frontovertex, occiput above foramen, band around eyes dark yellow; two triangular spots behind posterior ocelli and postocellar bars fuscous; ocelli reddish. Antennae pale brown except fuscous middle part of scape, pedicel paler. Mesoscutum brown, side lobes yellow; scutellum light yellow except fuscous anterior margin; axillae, propodeum, gaster dark brown. Legs dark brown except tibiae and tarsi light yellow. Wings hyaline, venation slightly infuscate. Ovipositor brown, sheaths light brown.

Structure. Head not wider than mesosoma, 2 times as wide as long and slightly wider than height. Frontovertex about 1.5 times as wide as long, its width about 2/3 head width. Ocelli in small obtuse triangle, posterior ocelli separated from eyes and occipital margin by about equal distance. Facial cavity not deep. Antennae (Fig. 1) inserted immediately under level of eyes base. Distance between toruli equal to oral margin and 2 times as short as distance to eye. Antennal segments R-F6 with the following ratios of length to width: R-2.9, S-5.0, P-2.0, F1-2.4, F2-2.3, F3-2.0,(F4-F6)-4.2; relative lengths of flagellar segments to length of F1: P-0.9, F2-0.9, F3-1.0,(F4-F6)-2.3. F1-F6 with following number of linear sensilla: F1-1, F2-1, F3-1, F4-2, F5-2, F6-2. Club slightly shorter than funicle. Mesosoma with thin reticulate sculpture on mesoscutum and scutellum. Mesoscutum about 1.5 times as wide as long, with 7-8 pairs of slender setae arranged as in Fig. 2. Scutellum slightly more 1.5 times as wide as long. Scutellar sensilla separated by a distance of 5-6 diameters of one sensillum. Distance between anterior setae longer than that between posterior setae. Posterior setae about 2 times longer than anterior setae. Each axilla

with one seta, side lobe with two setae. Fore wing 2.5 times as long as wide, without an asetose area around stigmal vein, length of marginal fringe about 1/5 width of wing; discal setae uniformly distributed, base of wing with 2-3 setae under distal part of submarginal vein, costal cell with 5-8 short setae. Submarginal vein slightly longer than marginal vein. Marginal vein with 7 setae along anterior margin. Hind wing about 5 times as long as wide, its marginal fringe slightly shorter than maximum width of wing. Tarsal formula 5-5-5. Tibial spur (Fig. 3) of middle leg 0.7 times corresponding basitarsus, which is slightly longer than 2^{nd}+3^{rd} tarsi combined. Metasoma in length equal to mesosoma length. Ovipositor (Fig. 4) not exserted, longer than middle tibia and basitarsus combined, its base inserted on the level of T3; sheaths about 3.3 times shorter than inner plates.



Figures1-5

Encarsia pinella sp. nov.: **1**- female antenna, **2**- mesosoma, dorsal, **3**- midtibial spur and basitarsus, **4-** ovipositor, **5** -male antenna.

Male. Body length: 0.50-0.87 mm.

Coloration. Similar to female.

Structure. Antennae (Fig.5) inserted immediately above lower level of eyes. Antennal segments having the following length to width ratios: R-3.0, S-3.8, P-1.7, F1-1.3, F2-1.7, F3-1.9, F4-2.0, F5-2.0, F6-2.3; relative lengths of flagellar segments to length of F: P-1.0, F2-1.1, F3-1.2, F4-1.3, F5-1.3,F6-1.3. F1-F6 with two linear sensillae each. F1-F2 with specific sensorial area on side with thin transversal strips; club slightly shorter than F3+F4 combined. Fore wing 2.3 times as long as wide.

Comments. *Encarsia pinella*, sp. nov. is similar in coloration and some structures to the widely distributed parasitoid of scales *Encarsia perniciosi* (Tower), but can be distinguished from this species by correlation of length of antenna segments: F2 subequal in length to F1; head fully brown; midlobe of mesoscutum with 7-8 pairs of setae; the male has a specific sensorial area with transversal strips on F1-F2; in *E. perniciosi* F2 of antenna about twice as long as F1, head yellow, with brown cross-band above toruli; midlobe of mesoscutum with 4 pairs of setae; the male antenna without specific sensorial area on F1-F2.

E. pinella appears close also to *E. ectophaga* Silvestri, described from Argentina on scale *Chrysomphalus dictyospermi* (Merg.), in coloration and elongate antennal segments. It differs from *E. ectophaga* by having 7 pairs of mesoscutal setae, specific sensorial area with transversal strips on F1-F2 and separated F5-F6 claval segments of the male antennae. *E.ectophaga* has 3 pairs of setae on the midlobe of the mesoscutum, the F5 and F6 antennal segments of the male fused and F1-F2 without specific sensorial area.

The new species *E. pinella* is placed in the *aurantii* group, according to key to species groups of *Encarsia* by Hayat (1998).

Etymology. The species name is derived from the plant locality of parasitoid host: Latin *Pinus* - pine.

Material examined. Holotype: Female, reared from diaspine scale *Melanaspis* sp. (Homoptera: Diaspididae) on *Pinus* spp., México, Tamaulipas, Gómez Farías, Reserve "El Cielo", La Perra (1900 m), 23-X-1998 by author. Paratypes: 16 females, 1 male with the same data as holotype on cards and 4 females and 1 male on slides.

Specimens deposition. Holotype, 4 paratype females and 1 paratype male deposited in the collection of US National Museum (USNM), Washington, D.C., USA; 3 paratype females deposited in the entomological collection of the Department of Zoology, Institute of Biology, Universidad Nacional Autónoma de México (UNAM), México, D.F.; 3 paratype females on cards and 4 on slides, and 1 paratype male on slide deposited in the Insects Museum of Unidad Académica Multidisciplinaria Agronomía y Ciencias, Universidad Autónoma de Tamaulipas, Ciudad Victoria, Tamaulipas, México; 3 paratype females in the Museum of Natural History (BMNH), London, UK; 3 paratype females in the collection of the Zoological Institute, Russian Academy of Sciences (ZIN), Sanct Petersburg, Russia.

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LITERATURE CITED

Evans, G.A. & A. Polaszek. 1997. Additions to the *Encarsia* parasitoids (Hymenoptera: Chalcidoidea: Aphelinidae) of the *Bemisia tabaci* complex (Hemiptera: Aleyrodidae). *Bull. Entomol. Res.* 87:563-571.

García-Martell, C. 1973. Primera lista de Insectos Entomófagos de Interés Agrícola en México. *Fitófilo* 26(68):1-41.

Hayat, M. 1998. Aphelinidae of India (Hymenoptera:Chalcidoidea): a taxonomic revision. *Memoirs on Entomology, International*. 13:1-416.

Huang, J. & A. Polaszek. 1998. A revision of the Chinese species of *Encarsia* Foerster (Hymenoptera: Aphelinidae): parasitoids of whiteflies, scale insects and aphids (Hemiptera: Aleyrodidae, Diaspididae, Aphidoidea). *Nat. Hist.* 32: 1825-1966.

Kennett, C.E., J.A. McMurtry & J.W. Beardsley. 1999. Biological control in subtropical and tropical crops. Pp. 713-742. *In*: Bellows, Thomas S. & T.W. Fisher (Eds.). 1999. *Handbook of biological control. Principles and applications of biological control.* Acad. Press. San Diego, California, USA. 1046 pp.

Myartseva, S.N. & E. Ruíz C. Annotated checklist of the aphelinids (Hymenoptera: Chalcidoidea: Aphelinidae) of México. *Folia Entomol. Mex.* (in press).

Polaszek, A. 1991. Egg parasitism in Aphelinidae (Hymenoptera: Chalcidoidea) with special reference to *Centrodora* and *Encarsia* species. *Bull. Entomol. Res.* 81:97-106.

Schauff, M.E., G.A. Evans & 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.

Woolley, J.B. 1997. Aphelinidae. Pp. 134-150. *In*: Gibson, G.A.P., J.T.Huber and J.B. Woolley (Eds.). 1997. *Annotated keys to the genera of Nearctic Chalcidoidea (Hymenoptera).* NRC Res. Press. Ottawa, Ontario, Canada. 794 pp.

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