

**A NEW SPECIES OF *TELENOMUS* HALIDAY
(HYMENOPTERA: SCELIONIDAE) ASSOCIATED WITH
EGG BATCHES OF THE PINE PROCESSIONARY MOTH,
THAUMETOPOEA PITYOCAMPA (DENNIS ET
SCHIFFERMÜLLER, 1775) (LEPIDOPTERA:
NOTODONTIDAE), FROM PENINSULAR SPAIN¹**

Jesús Selfa,² Emili López-Sebastián,² Peter N. Buhl,³ Juli Pujade-Villar,⁴
Josep Tormos,⁵ and Miguel Guara⁶

ABSTRACT: *Telenomus thaumetopoeae* Buhl sp. n. is described from northeastern València (Peninsular Spain) taking as starting point females parasitizing the egg-batches of the Pine Processionary Moth, *Thaumetopoea pityocampa* (Dennis et Schiffermüller, 1775). Its morphological affinities with the most closely related species and parasitism data are offered.

KEY WORDS: Hymenoptera, Scelionidae, *Telenomus thaumetopoeae*, endoparasitism, *Thaumetopoea pityocampa*, egg-batches, Spain

Species of *Telenomus* Haliday, 1833, are tiny, 0.5-1.5 mm long, egg parasitoids of Lepidoptera, Hemiptera, Diptera, and Neuroptera. More than 100 Palearctic species have been described, but the true number is probably at least 2-3 times greater. The genus can be divided in distinct species groups defined by both morphological and biological characteristics, all the parasitoids of Lepidoptera forming a monophyletic clade consisting of several species groups *sensu* Johnson (1984). *Telenomus* species are generally bisexual though a few species are known to have extreme female bias, probably thelytokous. The great majority of species lay their eggs in masses, but only very few oviposit single eggs. Both egg shape and surface-borne chemicals seem to be important for host acceptance. Normally only one parasitoid develops per host egg, but for larger hosts 5-10 parasitoids can be reared from a single egg.

No other *Telenomus* species has hitherto been described from *Thaumetopoea* hosts, but as the egg shell clusters of these remain for some years on branches and trunks, they are used by other Lepidoptera as a shelter in which they lay their eggs to escape parasitoids; e.g., in Central Italy, after an outbreak of *Thaumeto-*

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² Universitat de València, Facultat de Ciències Biològiques, Departament de Zoologia, Dr. Moliner 50, E-46100 Burjassot (València), Spain. E-mails (JS): jesus.selfa@uv.es, (EL-S): calderona@olocau.e.telefonica.net.

³ University of Copenhagen, Natural History Museum of Denmark, Zoological Museum, Universitetsparken 15, DK-2100 Copenhagen, Denmark. E-mail: pnbuhl@hotmail.com.

⁴ Universitat de Barcelona, Facultat de Biologia, Departament de Biologia Animal, Avinguda Diagonal 645, E-08028 Barcelona, Spain. E-mail: jpujade@ub.edu.

⁵ Universidad de Salamanca, Facultat de Biología, Área de Zoología, E-37071 Salamanca, Spain. E-mail: tormos@usal.es.

⁶ Universitat de València, Facultat de Ciències Biològiques, Departament de Botànica, Dr. Moliner 50, E-46100 Burjassot (València), Spain. E-mail: miguel.guara@uv.es.

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poea processionea (L.), the geometrid *Operophtera brumata* (L.) was found by Roversi and Bin (1998) to be the most common exploiter of such shelters. Several eggs were laid in each egg shell, but only one was parasitized, either by a *Trichogramma* sp. or by *Telenomus* sp.

As the male of the new species described below is unknown, it has not been possible to assign it to one of the species groups (either the *T. californicus* Ashmead, 1893, *T. arzamae* Riley in Ashmead, 1893, or *T. dalmanni* Ratzeburg, 1844, species group) defined by Johnson (1984) on the basis of male genitalia.

METHODS

Study Areas. The research was focused on a pine forest located in northeastern València (Peninsular Spain) typified as follows: Official name: "Corral de Pija-Pla de l'Albercoquer." Location: 1.7 Km NE from Marines (Serra Calderona). UTM coordinates: 30SYJO898. Size: 6000-8000 m². Altitude: 300 m. Climatic characteristics: subhumid temperate bioclimate (Guara, 2002), and Mediterranean xeric oceanic type with Thermomediterranean thermotype and dry semiarid ombrotype (Rivas-Martínez et al., 2002). Botanical characteristics: Irregular natural mass 5-40 years old, composed of *Pinus halepensis* Mill and spontaneous vegetation belonging to the series *Sinquercto cocciferae-Pistacietum lentisci* with shrubs and endemic species (Crespo, 1989).

Egg parasitism survey. From December 2003 until January 2004, a total of 100 egg-batches (17,420 eggs) of the pine processionary moth were sampled. The collection was randomly carried out at heights of 0-5 m on trees of different ages. The egg-batches previously scaled off were individually preserved at environmental temperature in 6.5 ml vials capped with cotton plugs.

For the egg-batch study and the parasitism rate calculus, adults emerged before and after the diapause period and adults that died inside the opened eggs during the hatching period, were counted using a Leica MZ7.5 (x 40) stereomicroscope located in the Laboratori d'Entomologia (Universitat de València, Spain). Drawings of the new species were made using two stereomicroscopes, the one mentioned previously and one Leitz-Wetzlar model located in the Zoological Museum (University of Copenhagen, Denmark).

RESULTS

Telenomus thaumetopoeae Buhl sp. n. (Figs. 1-4)

Female: Length of body 0.65-0.85 mm. Body dark brown. Antennae and legs dark brown. Most of fore tibiae, apex of femora, base of tibiae and tarsi lighter brown. Head 2.0 times as wide as long (Fig. 1). Occiput and vertex with faint reticulation and densely setose, rounded, without hyperoccipital carina. Frons smooth, with a row of setae along the inner orbits. Antenna (Fig. 1) with A1 nearly as long as A2-A6 combined (16:17), and as long as the distance between the inner orbits on frons; A2 almost twice as long as A3; A3-A4 equal, each 1.5 times as long as wide; A4 1.2 times as long as A5; club about 1.8 times as wide as A3.

Mesosoma (Fig. 2) 1.3 times as long as wide and 1.3 times as wide as high. Mesoscutum without trace of notauli, in the anterior third with faint microsculpture and densely setose, rest of the disc smooth and with setae scattered uniformly. Pro-, meso- and metapleuron smooth. Scutellum entirely smooth. Propodeum almost smooth with a low and wide medial carina.

Forewing about 0.8-0.9 times as long as body, uniformly faintly brownish. 3.5 times as long as wide, with distinct brown venation; postmarginal vein about 2.5 times as long as stigmal vein; marginal cilia at their longest 0.4 times as long as width of wing. Hind wing 8.4 times as long as wide; marginal cilia 1.3 times as long as width of wing.

Metasoma (Fig. 3) 1.0-1.2 times as long as head and mesosoma combined, 0.8 times as wide as mesosoma, 2-3 times as long as wide. T1 2.5 times as wide as long, smooth except for some weak longitudinal striation in the anterior half, and with 2 lateral setae. T2 hardly longer than wide, mostly smooth and weakly striate along the front margin and the apical part. Apical tergites finely longitudinally striated, with few setae. Apex of the ovipositor like in Fig. 4.

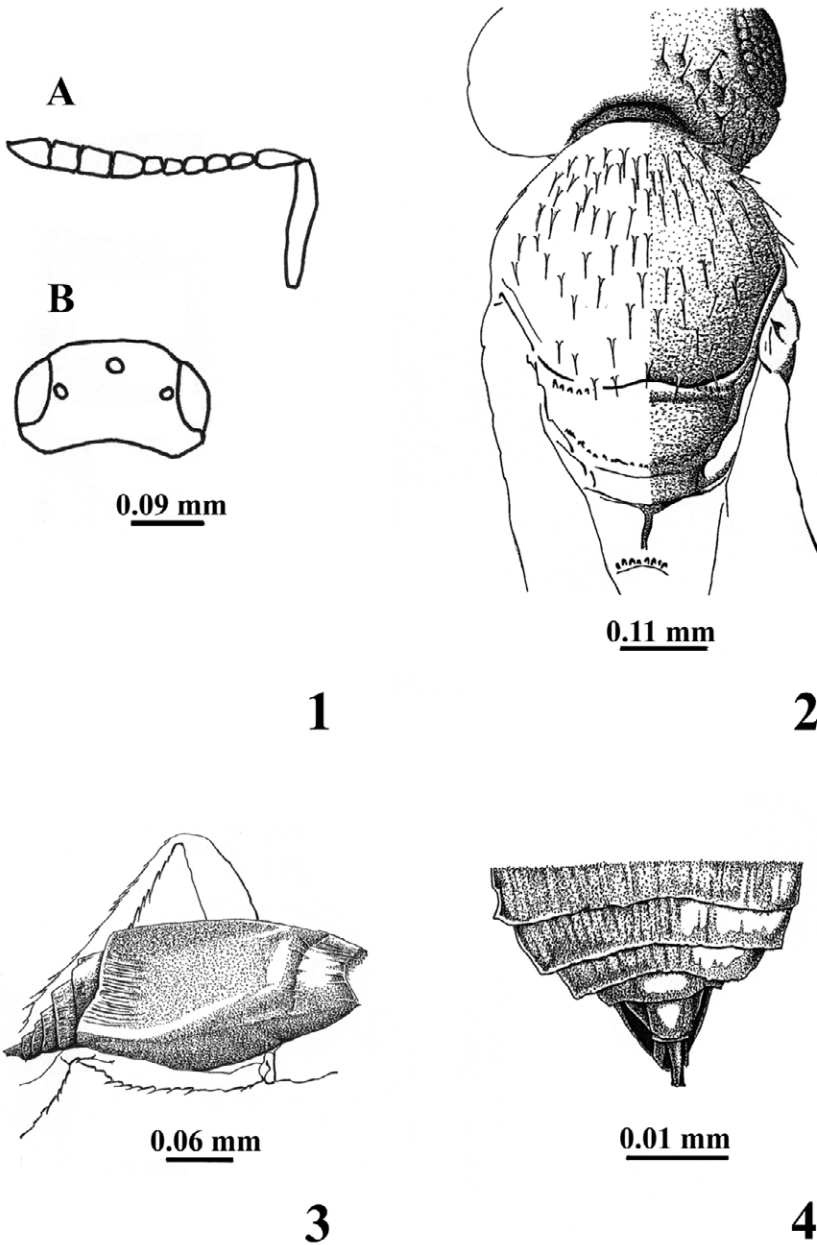
Male: Unknown.

Material Examined: Holotype female, Spain, València, Marines, Corral de Pija-Pla de l'Albercoquer, Serra Calderona, 04.05.2004, Emili López-Sebastián leg., ex. egg-batch of *Thaumetopoea pityocampa*. Paratypes 2 females, 08.05.2004, remaining data as the holotype. Holotype deposited in the Zoological Museum (University of Copenhagen, Denmark) and the two paratypes deposited in the Laboratori d'Entomologia (Universitat de València, Spain).

Egg Parasitism. *Telenomus thaumetopoeae* sporadically appeared as a solitary species, because each female emerged from one egg at the distal part of the same completely scaled egg-batch, with a parasitism rate of 0.0002%. In this survey, other ooparasitoids associated to the pine processionary moth were *Anastatus bifasciatus* (Geoffroy in Fourcroy, 1875), *Baryscapus servadeii* (Domenichini, 1965) and *Ooencyrtus pityocampae* (Mercet, 1921), with parasitism rates of 0.0008%, 19.3% and 3.7%, respectively.

DISCUSSION

Morphological affinities. A distinct species on account of rather flattened and smooth mesoscutum with faint microsculpture and densely setose in the anterior third, a smooth scutellum and long cilia of hind wing in combination with shape of head and antenna. Runs to *Telenomus kolbei* Mayr, 1879, in Kozlov's (1978) key but differs from this species e.g. in having a more flattened and smoother mesoscutum and scutellum, and longer cilia of the hind wing. *T. albatorius* Kozlov et Kononova, 1987, has similar long cilia of the hind wing as *T. thaumetopoeae* but *T. albatorius* has more slender flagellar segments than this, cf. Kozlov and Kononova (1987b). *T. thaumetopoeae* has a rather similar shaped head and antenna as *T. violaceus* Kozlov et Kononova, 1987, but *T. violaceus* has a much more convex mesosoma, cf. Kozlov and Kononova (1987a).



Figs. 1-4. Paratype of *Telenomus thaumetopoeae* Buhl sp. n. 1 (upper left): antenna (A) and head (B) in dorsal view; 2 (upper right): mesosoma in dorsal view; 3 (lower left): metasoma in dorsal view; 4 (lower right): end of metasoma in ventral view.

Egg Parasitism. Over the last few years in our survey area we also observed other sporadic species of Hymenoptera parasitizing egg-batches of *Thaumetopoea pityocampa*, such as *Eupelmus seculatus* (Ferrière, 1954) (López-Sebastián et al., 2002) or *Baryscapus transversalis* Graham, 1991 (López-Sebastián et al., 2003). All of these, including our new species, emerged between March and May well before the first egg-batches of the pine processionary moth appeared in August. This situation allows for the establishing of two hypotheses: these species are polyphagous and attack alternative hosts, such as *E. seculatus* on several Cecidomyiidae and Cynipidae (Askew et al., 2001), or they are hyperparasitoids on the primary ooparasitoid complex associated to *T. pityocampa*, such as *B. transversalis* or *Baryscapus servadeii* and *Ooencyrtus pityocampae* (Bellin et al., 1990; Bellin, 1995; Tsankov et al., 1996). Finally, the preference of *T. thaumetopoeae* for the distal part of the egg-batch is frequently shown by the remaining ooparasitoid species (Alemany et al., 1994; Kitt and Schmidt, 1993; Schmidt et al., 1997a, 1997b; Tiberi, 1990; Tsankov et al., 1995, 1996).

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