Boletín de la Sociedad Entomológica Aragonesa (S.E.A.), nº **55** (31/12/2014): 7–17.

THE GENUS *TORYMOIDES* WALKER IN SPAIN, WITH DESCRIPTIONS OF TWO NEW SPECIES (HYMENOPTERA: CHALCIDOIDEA: TORYMIDAE)

Antoni Ribes[†]

c/ Lleida 36, 25170 Torres de Segre, Lleida, Spain.

[†] **Nota editorial:** Antonio Ribes falleció de forma sorpresiva el pasado día 2 de diciembre de 2014, a los 46 años de edad. Ha dejado varios artículos en prensa, como el presente, y un enorme volumen de trabajo en curso que esperamos encuentre quien lo prosiga. En un próximo número ofreceremos una necrológica que en estos momentos, por razones de plazos, nos resulta imposible presentar. Descanse en Paz.

Abstract: Two new species of *Torymoides* Walker are described from Spain. *Torymoides navasi* **sp.n.** was reared from galls of *Rhopalomyia navasi* (Diptera: Cecidomyiidae) on *Artemisia herba-alba*. *Torymoides camphorosmae* **sp.n.** was reared from galls of *Contarinia camphorosmae* (Diptera: Cecidomyiidae) on *Camphorosma monspeliaca*. Included are observations and new host data for *Torymoides violaceus* (Nikol'skaya), *T. confluens* (Bouček) and *T. kiesenwetteri* (Mayr).
Key words: Hymenoptera, Chalcidoidea, Torymidae, *Torymoides,* new species, Spain.

El género *Torymoides* Walker en España, con descripción de dos especies nuevas (Hymenoptera: Chalcidoidea: Torymidae)
Resumen: Se describen dos especies nuevas de *Torymoides* Walker. *Torymoides navasi* **sp.n.** se obtuvo emergiendo de agallas de *Rhopalomyia navasi* (Diptera: Cecidomyiidae) en *Artemisia herba-alba*. *Torymoides camphorosmae* **sp.n.** se obtuvo emergiendo de agallas de *Contarinia camphorosmae* (Diptera: Cecidomyiidae) en *Camphorosma monspeliaca*. Se incluyen observaciones y datos de nuevos huéspedes para *Torymoides violaceus* (Nikol'skaya), *T. confluens* (Bouček) y *T. kiesenwetteri* (Mayr).
Palabras clave: Hymenoptera, Chalcidoidea, Torymidae, *Torymoides*, especie nueva, España.

Taxonomy/Taxonomía: *Torymoides navasi* **sp.n.**, *Torymoides camphorosmae* **sp.n.**

Introduction

The genus *Torymoides* was described by Walker (1871: 37-38) within the family Torymidae, with *Torymoides amabilis* Walker, 1871 as its type species (by monotypy). It is cosmopolitan and currently includes 56 recognized species (Noyes, 2014), 19 of them in the Palaearctic region. The generic limits of *Torymoides* were revised by Grissell (1995), who synonymized several genera, including *Ameromicrus* Nikol'skaya, under *Torymoides*; other genera had been synonymized previously by Bouček (1988). *Torymoides* is now characterized by having 2 or more anelli, unmodified hind-tibial spurs and propodeum and, as in other genera of the tribe Torymoidini, by having an occipital carina extending below the hypostoma, a relatively long marginal vein, a straight anterior metapleural margin, and simple or barely toothed hind femora (Grissell, 1995). *Ameromicrus*, now a synonym of *Torymoides* but still considered a valid genus by Zerova & Seryogina (1999), is characterized by edentate posterior femora, a short and almost smooth propodeum, a finely reticulate mesosoma, and the forewings, usually partly darkened in females or in both sexes but sometimes hyaline. The species of *Torymoides* usually parasitize Cecidomyiidae in galls on herbaceous plants; they also attack Tephritidae in Asteraceae heads (Grissell, 1995), and they have also been recorded, although rarely, as parasitoids of Torymidae in Pinaceae seeds but are more likely to be actually associated with Cecidomyiidae inside the cones (Grissell, 2005). The species originally described under *Ameromicrus* are mainly associated with Cecidomyiidae in steppe habitats; their distribution area mainly comprises Central Asia but extends to the entire Palaearctic. Keys to the West Palaearctic species of *Torymoides* (as *Ameromicrus*) were published by Bouček (1970), Doğanlar (1989) and Zerova & Seryogina (1993, 2001). Zerova & Seryogina (1993) classified the species of *Ameromicrus* in two species-groups, the *violaceus*-group and the *confluens*-group. Two species of *Torymoides* have been recorded so far from Spain, *T. kiesenwetteri* (Mayr, 1874), and *T. violaceus* (Nikol'skaya, 1954); the Spanish material of the latter differs in some respects from the original description (Askew *et al.*, 2001).

Materials and methods

Specimens of two new species of *Torymoides* were found in Lleida province, Spain, during a survey of the Chalcidoidea of the region. They emerged from cecidomyiid galls, one on *Artemisia herba-alba* Asso and the other on *Camphorosma monspeliaca* L. Specimens identified as *Torymoides violaceus* (Nikol'skaya, 1954) also emerged from Cecidomyiidae galls on *Artemisia herba-alba*, and *T. confluens* (Bouček, 1970) was reared from an unknown host on *Salsola vermiculata* L. Samples of galls were collected at several locations and at different seasons of the year. Plant samples were stored indoors in polythene bags, controlled for condensation and fungal growth, and checked periodically for chalcid emergences.

The specimens of Chalcidoidea that emerged from the galls were either killed with ethyl acetate, or placed directly in ethanol. The specimens in ethanol were dried using HMDS (Hexamethyldisilazane), and mounted on cards. Some antennae and wings were placed on microscope slides for detailed

examination, using PVA (Polyvinyl alcohol) as the mounting medium. Card-mounted specimens were examined using a stereomicroscope with a maximum magnification of 90×, and a 144-LED ring as a light source. Measurements were taken mostly at maximum magnification, with an eye-piece micrometer with a scale of 10 mm divided by 100 units. Measurements of the females were taken from the holotype and several paratypes, the range of values for each measurement was evaluated, and any extreme value considered erroneous was either checked for accuracy or discarded. Photographs of whole specimens were taken with a compact digital camera placed over a trinocular stereomicroscope. Details of antennae and wings were similarly taken from slides with a trinocular optical microscope. Multiple images of each photograph were combined using CombineZ5 software (Alan Hadley, micropics.org.uk). Scanning electron microphotographs (SEM) were taken of HMDS-dried and gold-coated dissected specimen parts using DSM940A Zeiss equipment (high vacuum technique), at the "Servei de Microscòpia Electrònica de la Universitat de Lleida" (UdL).

The terminology used in the description follows Hymenoptera Anatomy Consortium (2013), except for *dorsellum*, which is used instead of its synonym *metascutellum*, and *anellus* instead of its synonym *annellus*. The following abbreviations are used for morphological terms in the text: F1-F6, funicle segments 1-6; OD, ocellar diameter; OOL, ocular-ocellar length; POL, posterior ocellar length.

Measurements of the mesosoma were taken as follows: length in dorsal or lateral view from the pronotal collar to the apex of the propodeum; width in dorsal view between the lateral lobes of the mesoscutum, excluding the tegulae; height in lateral view from the lower part of the mesopleuron adjacent to the mid coxa to the dorsal surface of the scutellum.

Results and discussion

Key to females of the Spanish *Torymoides* species

1. Forewings in both sexes hyaline; metafemur with a small subapical tooth; mesoscutum with relatively dense and fine cross-striation; tibiae yellowish; ovipositor sheaths as long as gaster plus half the mesosoma, or longer (*kiesenwetteri* group)..... *T. kiesenwetteri* (Mayr)

– Forewings in females with dark markings; metafemur not toothed; mesoscutum withfinely reticulate sculpture; tibiae dark..... 2

2. Forewing in both sexes with dark markings forming a ring or semicircle which encloses a round or elliptical clear spot (fig. 3d); metafemur about 3× as long as broad (*confluens* group) 3

– Forewing in females with two unconnected dark marks, one behind the prestigma and the other across the stigmal vein, with the clear area between them extending to the posterior margin of the wing (fig. 1d); metafemur almost 4 to 5× as long as broad (*violaceus* group)..... 4

3. Antenna with clavate flagellum, F1 anelliform, F1 to F4 strongly transverse, F5-F6 slightly transverse or subquadrate ..... *T. camphorosmae* Ribes **sp. n.**

– Antenna with flagellum almost filiform, F1 not anelliform, F2-F6 subquadrate or slightly longer than broad ....*T. confluens* (Bouček)

4. Ovipositor sheath about 1.2–1.3× longer than rest of body, 2.9–3.4× length of mesosoma and 4.0–4.5× length of metatibia; forewing markings small, each much narrower than the clear space between them .... *T. navasi* Ribes **sp. n.**

– Ovipositor sheath only about 0.5–0.7× length of rest of body (almost as long as rest of body in Asian specimens), 1.4× length of mesosoma and less than 2.0× length of metatibia; forewing markings usually extending at least halfway across wing and as broad as or broader than the clear space between them ..... *T. violaceus* (Nikol'skaya)

Torymoides violaceus (Nikol'skaya, 1954)

Torymoides violaceus was originally described as the type species of the genus *Ameromicrus*, based on specimens reared from galls of *Asphondylia mikii* Wachtl on *Medicago sativa* pods from the north of the Caucasus region, and collected by sweeping on *Lotus* sp. in Kazakhstan (Nikol'skaya & Kyao, 1954). *T. bifasciatus* (Szelényi) was described from Mongolia (Szelényi, 1973), and later synonymized with *T. violaceus* (Szelényi, 1982). Other host records have been published from Ukraine, including *Dasineura loewii* (Mik) galls on *Euphorbia stepposa* Zoz ex Prokh., unknown galls on *Suaeda latifolia*, and *Rhopalomyia artemisiae* (Bouché) galls on an unknown plant (possibly *Artemisia campestris* L.) (Zerova & Seryogina, 1993, 1999), extending its distribution area from Bulgaria to Mongolia. The variability of this species from all host sources was studied by Zerova & Seryogina (1995); both the markings on the forewings and, partly, the body colour were very variable, but other morphological characters, such as antennal shape, wing vein proportions and ovipositor length, remained constant.

In Spain this species was recorded from the Monegros region as *T.* ?*violaceus* (Askew *et al.*, 2001), based mostly on specimens swept from *Artemisia herba-alba*. It was noted that the Spanish material differed from the original description of *T. violaceus* and the type of *T. bifasciatus* in having a shorter ovipositor and more extensive pilosity on the basal cell and basal vein, and had a disjunct distribution range. However, this form was later considered to be conspecific with *T. violaceus*, as both the pilosity at the base of the forewing and ovipositor length seem to be variable (R.R.Askew, pers.comm.).

In the study region (Lleida) it has been reared from galls of *Rhopalomyia ambrosinae* Gagné on *Artemisia herba-alba*, as well as from *A. herba-alba* infrutescences possibly containing hidden galls, and it is frequently collected by sweeping *A. herba-alba*. The markings of the forewings show considerable variation in this species: the dark area extends almost to the posterior margin of the forewing in strongly marked specimens, whilst at the other extreme it is reduced to small spots below the venation; rarely, the forewings are almost hyaline. This degree of variation is similar to that described from Ukraine in specimens reared from *Rhopalomyia artemisiae* galls and other hosts (Zerova & Seryogina, 1995); in the latter study, the variation in the intensity of forewing darkening was attributed in part to the time that had elapsed since the emergence of the specimens, with wings being lightly coloured just after emergence but progressively darkening with age. In the material examined the reared specimens usually have paler forewings, whilst in specimens collected by sweeping in the field the forewings vary from pale to very dark. The length of the ovipositor in the specimens examined for this

study is similar to that of the Monegros material, between 0.5–0.7× as long as the rest of the body, and shorter than in specimens from eastern Europe, in which it is between 0.75–1.00× as long as the rest of the body.

T. violaceus may actually be a species complex. This is suggested mainly by the dissimilar hosts of the type material of *T. violaceus* reared from *Medicago sativa* L., and the forms associated with *Artemisia* and *Suaeda* in steppe habitats. The form from *Medicago sativa* was described as having an ovipositor almost as long as the rest of the body, as in *T. bifasciatus*, while the forms from Ukraine from other hosts are usually pictured with the ovipositor 0.75× as long as the rest of the body, still slightly longer than in the specimens from Spain. Apparently, there are no other morphological differences between these forms, but further studies or molecular analysis could clarify their status. For the moment, the specimens from Spain are considered to be conspecific with *T. violaceus* taking into account both their morphological similarity (excluding ovipositor length) and the similar host galls on various *Artemisia* species in western and eastern Europe.

EXAMINED MATERIAL. 40 ♀♀ 31 ♂♂ (*leg.* A. Ribes). **SPAIN: Huesca:** Fraga (UTM 31T BF58), 4 ♂♂, reared from *Rhopalomyia ambrosinae* galls on *Artemisia herba-alba*, col. 29.iii.2011, em. 10.iv-9.v.2011; **Lleida:** Aitona (UTM 31T BF89), 7 ♀♀, 2 ♂♂, sweeping vegetation, col. 18.vi.2010; 5 ♀♀, 10 ♂♂, sweeping *Artemisia herba-alba*, col. 27.v.2011; Torres de Segre (UTM 31T BF99), 4 ♀♀, reared from *Artemisia herba-alba* infrutescences, col. 28.ii.2012, em. 21.v-28.vi.2012; 4 ♀♀, 2 ♂♂, reared from *Artemisia herba-alba* infrutescences, col. 29.i.2013, em. 11.vi-18.vi.2013; Utxesa (UTM 31T BF99), 4 ♀♀, 10 ♂♂, sweeping *Artemisia herba-alba*, col. 1.iv.2011; 16 ♀♀, 3 ♂♂, reared from *Artemisia herba-alba* infrutescences, col. 4.i.2011, em. 10.v-22.v.2011.

Torymoides navasi sp.n.

DIAGNOSIS. Body dark violaceous. Forewing with dark markings of variable extent, one below the prestigma and another across the stigmal vein (fig. 1d). Antennae with 2 anelli and 6 flagellar segments, subquadrate at base and slightly transverse at apex. Ovipositor sheaths very long, 1.2–1.3× as long as rest of body.

DESCRIPTION.

Female: Body length, excluding ovipositor, 1.6–2.3 mm, ovipositor sheaths 2–2.9mm. (fig. 1a). Head and mesosoma dark violaceous, gaster dark bronze, tegulae dark. Antennae with scape brown-testaceous at base and on anterior side, dark brown dorsally and at apex, flagellum dark brown. Forewings with two dark clouds of variable size near prestigma and stigmal vein, venation brown with darker prestigma and stigmal vein. Legs with femora and tibiae blackish, anterior tarsi brown, mid and posterior tarsi testaceous with last tarsomere dark.

Head 1.12–1.15× as broad as mesoscutum, in dorsal view 2.20–2.23× as broad as long, temples 0.2× as long as eye. POL 2.15–2.45× OOL, OOL 1.50–1.75× OD. Eyes 1.45–1.50× as long as broad, separated by 0.95–1.00× their length, eyes with extremely short and sparse hairs. Head in frontal view (fig. 2a) transverse oval, 1.15–1.22× wider than high. Gena rounded, converging, malar space 0.38–0.41× length of eye, malar sulcus straight. Clypeus slightly produced, anterior margin straight (fig. 2b). Mouth opening 1.60–1.75× as broad as malar space. Frontovertex and lower face finely reticulate-imbricate, scrobal depression laterally smooth. Vertex with short fine setae, frons and lower face with setae more conspicuous, thick and slightly flattened (fig. 2b). Head in posterior view with occipital carina present (fig. 2c).

Antennae (fig. 1e) inserted high on face, nearly equidistant from clypeus and median ocellus, lower margin of toruli distinctly above level of ventral margin of eyes. Scape short, not reaching median ocellus, 3.8–5.0× as long as broad, 0.60–0.65× as long as length of eye. Pedicel plus flagellum 1.05–1.12× as long as breadth of head, and 1.20–1.25× as long as breadth of mesoscutum. Pedicel in profile 1.6–2.0× as long as broad. Flagellum with 2 transverse anelli and 6 funicular segments, first anellus slightly shorter and narrower than second. Funicle filiform, proximally 1.4–1.5× as broad as pedicel, distally slightly thickening, F6 1.15–1.25× as broad as F1. F1-F3 subquadrate and of similar length, F4-F6 progressively shorter and slightly transverse, F1-F6 1.00–1.08×, 0.90–1.05×, 0.90–1.05×, 0.80–0.97×, 0.75–0.93× and 0.67–0.88× as long as broad respectively. Clava 3-segmented, barely broader than F6, 2.1–2.3× as long as broad, 1.25–1.45× as long as F5 plus F6. Flagellum with sensilla placed in 1 row on each segment, setae long and decumbent.

Mesosoma (fig. 1c, 2e) in dorsal view 1.35–1.45× as long as broad, in lateral view 1.35× as long as high, propodeum strongly sloping at about 60º with respect to the plane of mesoscutum and scutellum. Pronotum 0.20–0.24× as long as mesoscutum, with collar rounded at margin, the anterior part strongly sloping. Mesoscutum (fig. 2e) transverse, 1.5–1.6× as broad as long, and 1.07–1.17× as long as scutellum, surface dull with fine and dense reticulate-imbricate sculpture, areoles transversely elongate on anterior half, mesoscutal setae inconspicuous, decumbent. Notauli very shallow, indistinct, reaching posterior margin slightly laterad of scutello-axillary sutures. Mesoscutellar suture curved, with median lobe of mesoscutum produced backwards. Scutellum (fig. 2f) moderately convex, 0.97–1.03× as long as broad, finely reticulate, setae on scutellum inconspicuous, decumbent, posterior margin of scutellum shortly bordered, border smooth, not punctured. Dorsellum narrow, smooth. Propodeum (fig. 2g) medially strongly emarginate, 2.4–2.5× as long as dorsellum and 0.33× as long as scutellum, laterally 0.55× length of scutellum, surface almost smooth, with very weak superficial lateral reticulation, median carina absent, anterior margin of propodeum with several short vertical submedial carinulae separating small indistinct alveoli. Propodeal spiracles small, short oval, separated from hind margin of metanotum by less than their diameter, callus with many setae. Mesepimeron glabrous, divided by transepimeral sulcus; the sulcus is long, curved and moderately deep; upper mesepimeron smooth, lower mesepimeron almost smooth (fig. 2d). Mesepisternum alutaceous, pubescent anteriorly and at lower third, metapleuron pubescent. Hind coxa (fig. 2d) bare dorsally at base, 2.65–2.80× as long as broad. Fore and hind femora not broadened, 3.6–4.0× and 3.85–4.15× as long as broad respectively, hind femur (fig. 2h) with edentate lower margin. Hind tibia with 2 apical spurs, inner spur 0.43–0.50× as long as basitarsus and as long as apical width of tibia, outer spur very short.

Forewing (fig.1d) 2.15–2.25× as long as broad. Costal cell 8–9× as long as broad, its lower surface with a medially

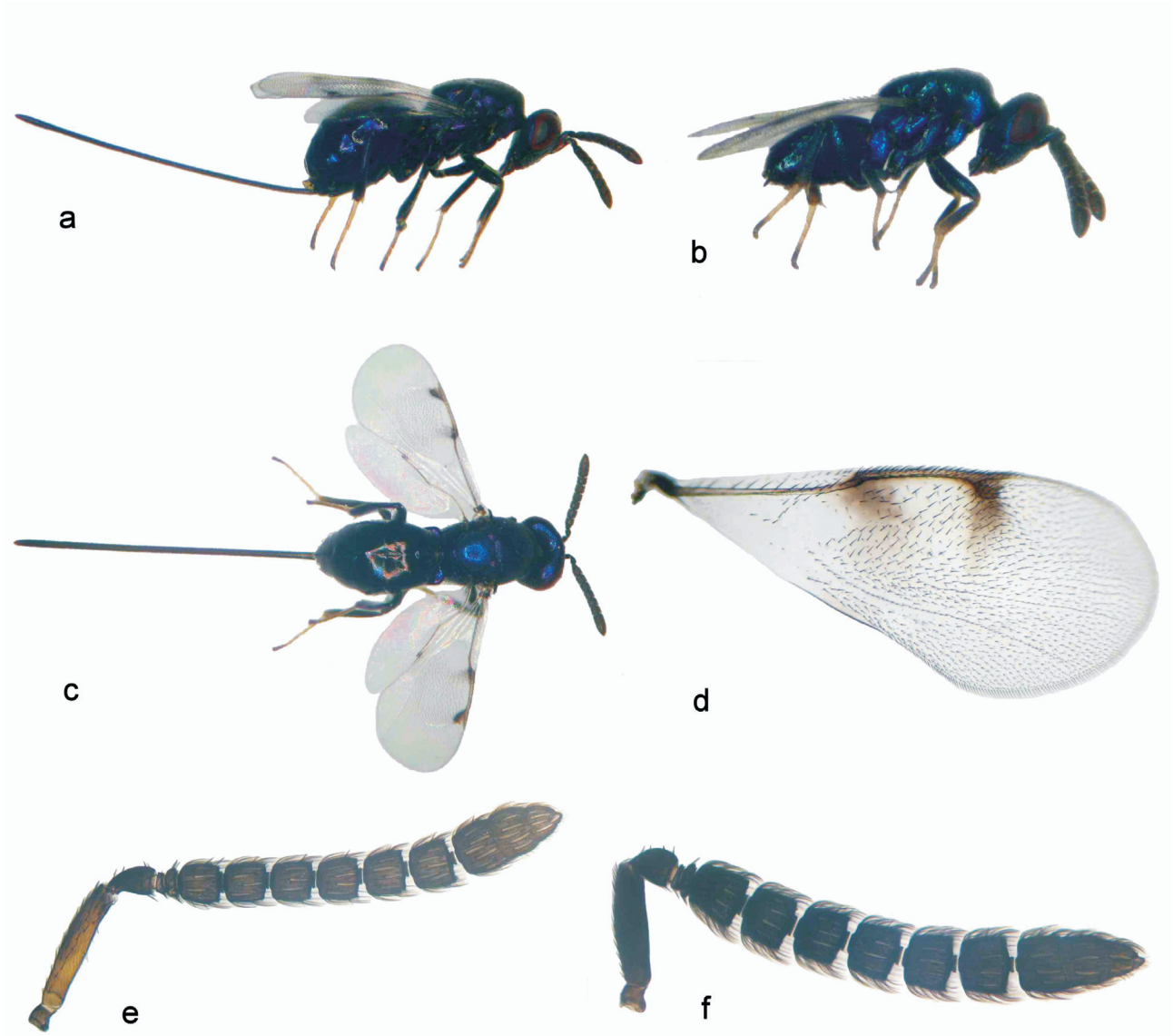

Fig. 1. *Torymoides navasi* sp. n. a) female, lateral view; b) male, lateral view; c) female, dorsal view; d) female forewing; e) female antenna; f) male antenna. // *Torymoides navasi* sp. n. a) hembra, aspecto lateral; b) macho, aspecto lateral; c) hembra, aspecto dorsal; d) ala anterior de la hembra; e) antena de la hembra; f) antena del macho.

interrupted row of setae, sparsely setose at base and at apex, its upper surface with a short row of 5–8 setae at margin near apex. Submarginal vein with 11–17 dorsal setae. Marginal vein 0.65–0.70× as long as costal cell, and 4.5–5.4× as long as stigmal vein. Stigmal vein at an angle of about 40° to the costal wing margin, very short and with a long uncus. Postmarginal vein 1.2–1.5× as long as stigmal vein, and 0.23–0.35× as long as marginal vein. Basal fold with 4–6 setae, basal cell open posteriorly, with 2–5 setae at apex of mediocubital fold, upper surface with 1–5 setae at apex near basal fold and below submarginal vein, and with several sparse hair-bases on its lower surface. Speculum of moderate size, reaching the prestigma, open below. Wing pilosity dark, moderately dense beyond speculum. Marginal cilia very short, 0.20–0.25× as long as stigmal vein. Hindwings rounded at apex, with marginal cilia 0.1× as long as wing width.

Gaster (fig. 1c) oval, 1.6–2.2× as long as broad (excluding ovipositor sheaths), 1.20–1.35× as long as mesosoma and 0.90–1.05× as long as head plus mesosoma. Gaster 0.9–1.1× as broad as mesosoma. Hypopygium very long, reaching 0.87–0.90× length of gaster. Gaster with subapical tergite concave at posterior margin, last tergite transverse. First tergite reaching 0.37–0.44× length of gaster, with a median longitudinal groove on basal half, the posterior margin strongly produced and medially emarginate-incised, tergites 2-3 with a straight and medially emarginate posterior margin. Ovipositor sheaths very long, 1.2–1.3× as long as rest of body, 2.4–2.7× as long as gaster, 2.9–3.4× as long as mesosoma, and 4.0–4.5× as long as hind tibia.

Male: Similar to the female, differing in the structure of gaster and antennae and in having hyaline forewings. Body length (fig. 1b) 1.1–1.9 mm. Antennae (fig. 1f) with shorter and slightly transverse funicular segments, and dense outstanding setation. Scape 3.7–3.8× as long as broad. F1-F6 0.95–1.00×, 0.9×, 0.85–0.9×, 0.8–0.9×, 0.75–0.9× and 0.7–0.9× as long as broad respectively. Fore and hind femora (fig. 2i) not enlarged, 3.6–3.9× and 3.4–4.3× as long as broad respectively. Gaster 1.9–2.2× as long as broad, 0.9–1.0× as long as mesosoma and 0.70–0.75× as long as head plus mesosoma.

TYPE MATERIAL.

HOLOTYPE. SPAIN: Aitona (Lleida), UTM 31T BF89, 120 m, 1 ♀, reared from *Rhopalomyia navasi* Tavares galls on *Artemisia herba-alba*, collected 18.v.2013, emerged 21.vi.2013 (*leg.* A. Ribes).

ALLOTYPE. SPAIN: 1 ♂, data as for holotype.

PARATYPES. 37 ♀♀, 12 ♂♂; **SPAIN: Lleida:** Aitona (UTM 31T BF89), 5 ♀♀ 4 ♂♂, galls collected 27.v.2011, em. 1-16.vi.2011 (*leg.* A. Ribes); 32 ♀♀, 8 ♂♂, same data as holotype, except emergence dates 10.vi-7.vii.2013.

The holotype, allotype and some paratypes are deposited in the Museo Nacional de Ciencias Naturales, Madrid, and the remaining paratypes in the author's collection.

ADDITIONAL MATERIAL. 42 ♀♀ 30 ♂♂, all specimens reared from *Rhopalomyia navasi* galls on *Artemisia herba-alba* (*leg.* A. Ribes). **SPAIN: Huesca:** Fraga (UTM 31T BF58), 2 ♂♂, galls collected 29.iii.2011, em. 10.iv.2011; **Lleida:** Aitona (UTM 31T BF89), 6 ♀♀ 14 ♂♂, galls collected 27.v.2011, em. 1-16.vi.2011; 6 ♀♀ 2 ♂♂, galls collected 3.ix.2012, em. 24.v-8.vi.2013; 27 ♀♀, 12 ♂♂, same data as holotype, except emergence dates 19.v-7.vii.2013; La Granja d'Escarp (UTM 31T BF78), 2 ♀♀, galls collected 11.i.2007, em. 24.ii-3.iii.2007 (forced); Sarroca (UTM 31T BF99), 1 ♀, swept 13.vii.2011.

ETYMOLOGY. Named after the cecidomyiid galls from which individuals of the new species emerged.

DIFFERENTIAL DIAGNOSIS. *T. navasi* belongs to the *violaceus* species-group, with the female forewing having 2 infuscate markings, the dark areas not joined; the male forewing is hyaline. It is similar to *T. violaceus* but differing in the much longer ovipositor, 1.2–1.3× as long as rest of body (0.75–1.00× as long as rest of body in typical specimens of *T. violaceus*, 0.5–0.7× as long as rest of body in Spanish specimens). In *T. navasi* the dark areas on the forewings are usually small, varying between two dark spots, each much narrower than the clear space between them (fig. 1d) or with the dark area reduced to only a dark spot below the prestigma (fig. 1c). In *T. violaceus*, the size and intensity of the dark areas are also variable, sometimes reduced in a similar way but frequently extending as a transverse band halfway across the wing or almost reaching the posterior margin of the wing, and as broad as or broader than the clear space between them. Also, in *T. navasi* the female hypopygium is longer, reaching 0.87–0.90× length of gaster, the hypopygial lateral lobes long and narrow (hypopygium reaching 0.75× length of gaster, and hypopygial lateral lobes shorter and broader in *T. violaceus*), and the mesosoma is more elongate, 1.35–1.45× as long as broad (1.3× as long as broad in *T. violaceus*). *T. navasi* and *T.violaceus* have been reared from galls of different Cecidomyiidae on *Artemisia herba-alba*, as indicated below. *T. navasi* resembles *T. fuscus* Zhao & Xiao from China (Xiao & Zhao, 2010), differing in the longer ovipositor, less elongate mesosoma and blackish tibiae (ovipositor 1.8–2.0× as long as gaster, not longer than rest of body, mesosoma 1.57× as long as broad, and tibiae yellowish brown in *T. fuscus*). Other *Torymoides* species with a very long ovipositor, 1.2–1.5× as long as body, are *T. longicaudis* (Zerova & Seryogina) from Turkmenistan, T. *hyalipennis* (Szelényi) from Mongolia and *T. piceae* (Kamijo) from Japan, but these species differ in their entirely hyaline female forewings. Males of *T. navasi* are very similar to those of *T. violaceus*, having a flagellum which is thicker at the base, 1.5–1.6× as broad as the pedicel and nearly filiform, F6 1.05–1.10× as broad as F1 (flagellum less thick at base, 1.3–1.4× as broad as pedicel, and more clavate at apex, F6 1.2× as broad as F1 in *T. violaceus*).

BIOLOGY. *T. navasi* has been reared from galls of *Rhopalomyia navasi* (Cecidomyiidae) on *Artemisia herba-alba*. It was common in these galls, together with the previously known parasitoids *Torymus canariensis* Hedqvist, *T. ruschkai* (Hoffmeyer) and others. *T. navasi* is thought to be a primary parasitoid of cecidomyiid larvae. Apparently it is univoltine, emerging in May-June from the galls collected in autumn, winter or late spring. The sex ratio of the specimens was variable, usually biased towards females: of 120 specimens emerging from all samples, 65% were females, although males predominated in some samples.

Differences in biology have also been found between *T. navasi* and the related species *T. violaceus*, both associated with cecidomyiid galls on *A. herba-alba*. *T. navasi* always emerged from galls of *Rhopalomyia navasi* and was absent from other types of galls on this plant. In contrast, *T. violaceus* emerged from galls of *R. ambrosinae*, and from infrutescences in which small galls could have been hidden, but it was absent from *R. navasi* galls. The different ovipositor length may be related to the shape of the galls, with the long ovipositor of *T. navasi* adapted to the big, woolly, white galls of *R. navasi* (Medianero *et al.*, 2007, figs 1G, 1H), and the shorter ovipositor of *T. violaceus* adapted to the small, gregarious galls of *R. ambrosinae* (Medianero *et al.*, 2007, figs 1A, 1B) and other similar galls.

Torymoides camphorosmae sp.n.

DIAGNOSIS. Body dark bronze. Forewing with two dark markings near prestigma and stigmal vein, joined on the wing disc to form a broad semicircular pattern enclosing a small hyaline spot (fig. 3d). Antennae with 2 anelli and 6 flagellar segments, F1-F4 strongly transverse, F5-F6 subquadrate. Ovipositor sheaths 1.00–1.15× as long as gaster, and 1.75–2.00× as long as hind tibia.

DESCRIPTION.

Female: Body length, excluding ovipositor, 1.3–1.7 mm, ovipositor sheaths 0.65–1.00mm. (fig. 3a). Head, mesosoma and gaster dark metallic bronze, tegulae dark. Antenna with scape testaceous, pedicel pale brown to dark brown, flagellum pale brown at base and slightly darkening at apex, clava dark brown, more or less contrasting with paler flagellum. Forewings with two dark areas, one below prestigma and the other across stigmal vein, which join to form a broad semicircular pattern enclosing a small hyaline spot, venation dark brown. Legs with coxae and femora coloured as body, tibiae pale brown to testaceous, hind tibia usually brown (paler at apex), tarsi with 2-3 basal segments testaceous and dark at apex.

Head 1.10–1.13× as broad as mesoscutum, in dorsal view 1.95–2.05× as broad as long, temples broad, 0.28–0.30× as long as eye. POL 1.6–2.1× OOL, OOL 2.40–2.75× OD. Eyes 1.45–1.55× as long as broad, separated by 0.95–1.10× their length, with extremely short and sparse hairs. Head in frontal view (fig. 4a) transverse oval, 1.1–1.2× wider than high. Gena rounded, converging, malar space 0.44–0.48× length of eye, malar sulcus straight. Clypeus slightly bilobed (fig. 4b). Mouth opening 1.67–1.74× as broad as malar space. Frontovertex and lower face finely reticulate-imbricate,

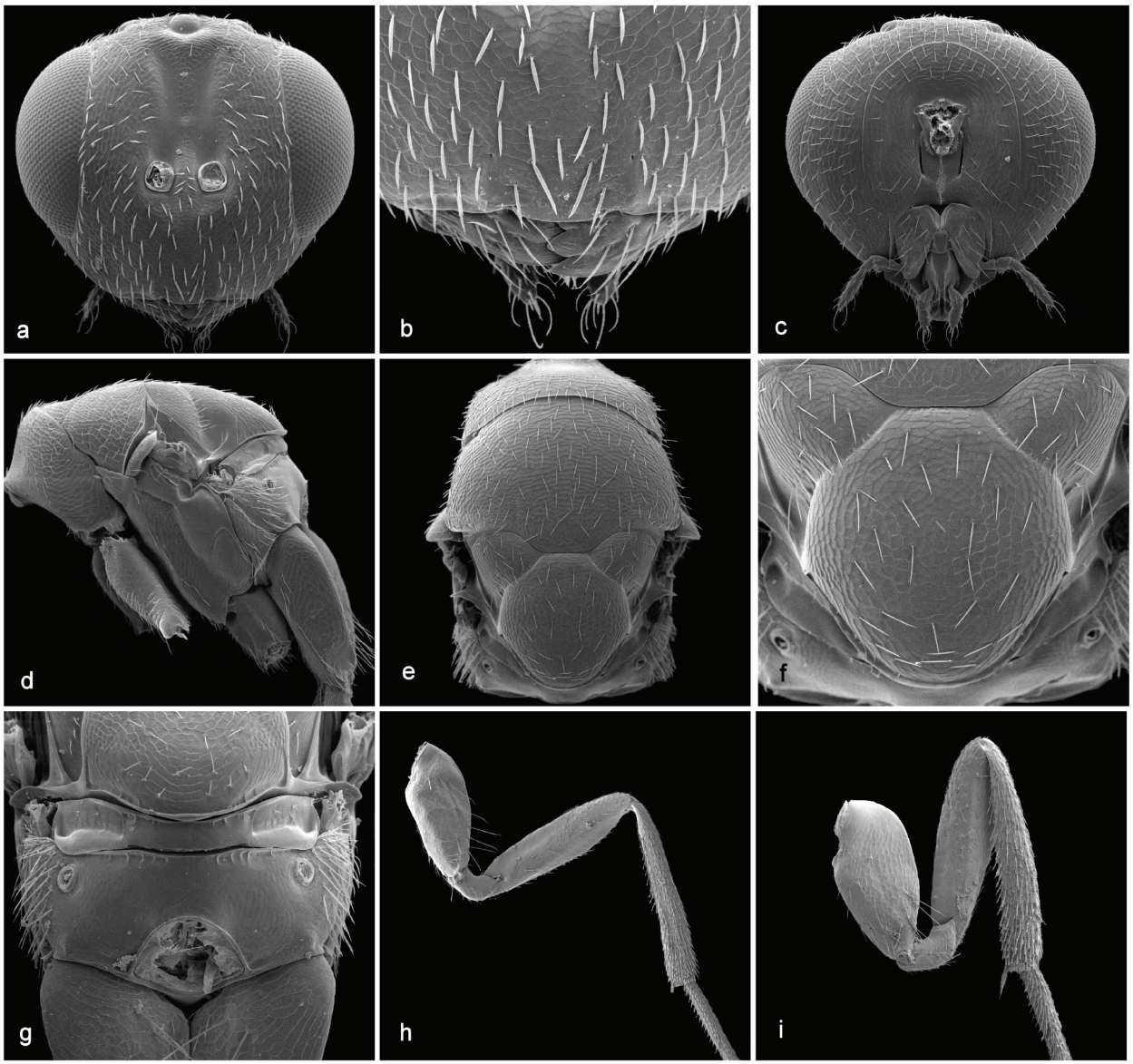

Fig. 2. *Torymoides navasi* sp. n., female SEM microphotographs. a) head, frontal view; b) clypeus; c) head, posterior view; d) mesosoma, lateral view; e) mesosoma, dorsal view; f) scutellum; g) propodeum; h) hind leg; i) male hind leg. // *Torymoides navasi* sp. n., hembra, microfotografías SEM. a) cabeza, aspecto frontal; b) clípeo; c) cabeza, aspecto occipital; d) mesosoma, aspecto lateral; e) mesosoma, aspecto dorsal; f) escutelo; g) propodeo; h) pata posterior; i) pata posterior del macho.

scrobal depression smooth. Vertex with short fine setae, frons and lower face with setae more conspicuous, thick and slightly flattened (fig. 4b). Head in posterior view with occipital carina present (fig. 4c).

Antennae (fig. 3e) with lower margin of toruli at level of ventral margin of eyes. Scape short, not reaching median ocellus, 4.7–5.4× as long as broad, 0.70–0.74× as long as length of eye and 0.7–0.8× as long as length of funicle. Pedicel plus flagellum 0.97–1.00× as long as breadth of head, and 1.1× as long as breadth of mesoscutum. Pedicel in profile 2.0–2.3× as long as broad. Flagellum with 2 anelli and 6 funicular segments, first anellus narrower and less transverse than second. Funicle clavate, proximally slightly (0.85–0.95×) narrower than pedicel, distally strongly thickening, F6 1.6–1.9× as broad as F1. F1-F4 strongly transverse, F1 anelliform and similar to second anellus, 0.52–0.63× as long as broad, F1 0.60–0.65× as long as combined lengths of anelli, F1 plus anelli 0.55–0.73× as long as pedicel. Funicular segments 2-4 strongly transverse but progressively longer, F2-F4 0.50–0.85×, 0.65–0.90× and 0.7–0.9× as long as broad respectively, F5-F6 barely transverse and usually distinctly longer than previous segments, F5 0.8–0.9× as long as broad and F6 0.85–0.95× as long as broad. Clava 3-segmented, slightly broader than F6, 2.0–2.3× as long as broad, 0.5–0.6× as long as funicle. Flagellum with sensilla placed in 1 row on each segment, setae short and adpressed.

Mesosoma (fig. 3c, 4e) in dorsal view 1.35× as long as broad, in lateral view 1.3× as long as high, propodeum strongly sloping at about 60º with respect to the plane of mesoscutum and scutellum. Pronotum 0.30–0.38× as long as mesoscutum, with collar rounded at margin, the anterior part strongly sloping. Mesoscutum (fig. 4e) transverse, 1.5–1.9× as broad as long, and 0.9–1.2× as long as scutellum, surface dull with fine and dense reticulate-imbricate sculpture, more or less transverse on anterior half, mesoscutal setae inconspicuous, short, pale and decumbent. Notauli shallow, slightly indicated in their entire length, reaching posterior margin slightly laterad of scutello-axillary sutures. Mesoscutellar suture almost

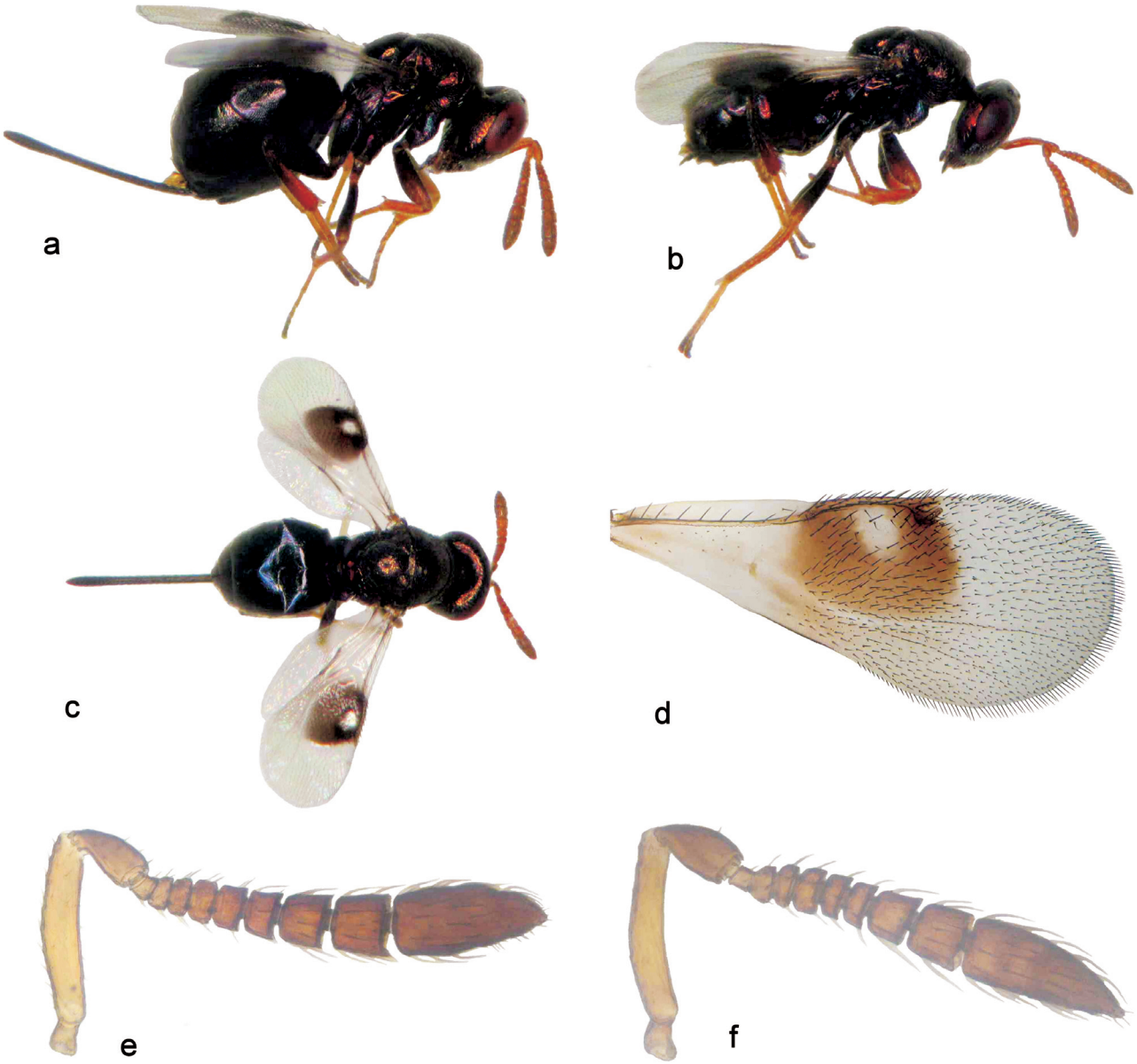

Fig. 3. *Torymoides camphorosmae* sp. n. a) female, lateral view; b) male, lateral view; c) female, dorsal view; d) female forewing; e) female antenna; f) male antenna. // *Torymoides camphorosmae* sp. n. a) hembra, aspecto lateral; b) macho, aspecto lateral; c) hembra, aspecto dorsal; d) ala anterior de la hembra; e) antena de la hembra; f) antena del macho.

straight. Scutellum (fig. 4f) moderately convex, 0.95–1.05× as long as broad, finely reticulate, setae on scutellum short and decumbent. Dorsellum coriaceous, narrow. Propodeum (fig. 4g) medially emarginate, 2.0–2.3× as long as dorsellum and 0.33–0.38× as long as scutellum, with weak superficial lateral reticulation and almost smooth medially, median carina absent, anterior margin of propodeum with several short vertical submedial carinulae separating small indistinct alveoli. Propodeal spiracles small, short oval, separated from hind margin of metanotum by less than half their diameter, callus with sparse setae. Mesepimeron glabrous, divided by transepimeral sulcus; the sulcus is long, curved and moderately shallow; upper mesepimeron smooth, lower mesepimeron alutaceous (fig. 4d). Mesepisternum alutaceous, pubescent anteriorly at lower third, metapleuron with short hairs. Hind coxa (fig. 4d) bare dorsally at base, 2.35–2.65× as long as broad. Fore and hind femora (fig. 4h) broadened, 3.0–3.5× and 3.1–3.3× as long as broad respectively. Hind femur with edentate lower margin. Hind tibia with 2 apical spurs, inner spur 0.4–0.5× as long as basitarsus, slightly shorter than or as long as apical width of tibia, outer spur very short.

Forewing (fig.3d) 2.3–2.4× as long as broad. Costal cell 8–9× as long as broad, its lower surface sometimes glabrous or usually with a single seta at apical third, its upper surface glabrous. Submarginal vein with 7–9 dorsal setae. Marginal vein short, 0.55–0.60× as long as costal cell, and 3.9–5.1× as long as stigmal vein, not thickened, 10.3–11.6× as long as broad. Stigmal vein at an angle of 45–50° to the costal wing margin, very short and with a long uncus. Postmarginal vein short, 0.75–0.90× as long as stigmal vein, and 0.18–0.23× as long as marginal vein. Basal fold usually bare or sometimes with 1 seta, basal cell open below, with several sparse hair-bases on its surface. Speculum of mode-

rate size to small, only reaching the prestigma, open below. Wing pilosity short, dark, moderately dense beyond speculum, but sparse on hyaline spot inside dark area of forewing. Marginal cilia relatively long, 0.60–0.75× as long as stigmal vein. Hindwings rounded at apex, with marginal cilia 0.21–0.25× as long as wing width.

Gaster (fig. 3c) short oval, 1.3–1.4× as long as broad excluding ovipositor sheaths (up to 2× as long as broad in dry specimens with a collapsed gaster), 1.25–1.30× as long as mesosoma and 0.95–1.00× as long as head plus mesosoma. Gaster 1.25–1.30× as broad as mesosoma in fresh specimens, or narrower than mesosoma with a collapsed gaster. Hypopygium long, reaching 0.8–0.9× length of gaster. Gaster with subapical tergite concave at posterior margin, last tergite transverse, tergite T1 reaching 0.30–0.35× length of gaster, with posterior margin produced and strongly emarginate-incised medially, tergites 2-3 with posterior margin straight and slightly incised. Ovipositor sheaths 1.00–1.15× as long as gaster, 1.25–1.45× as long as mesosoma, and 1.75–2.00× as long as hind tibia.

Male: Similar to the female, differing in gaster structure and femur width. Markings on forewings as in the female. Body length (fig. 3b) 1.05–1.70 mm. Antennae (fig. 3f) with less transverse first anellus, and more transverse basal funicular segments. Scape 4.3–5.3× as long as broad. First anellus subquadrate, second anellus transverse. F1-F6 0.45–0.6×, 0.5–0.7×, 0.5–0.75×, 0.5–0.8×, 0.80–0.82× and 0.8–0.9× as long as broad respectively. Fore and hind femora (fig. 4i) more enlarged, 2.7–2.9× and 1.8–2.0× as long as broad respectively. Gaster 1.3–1.4× as long as broad, 1.0–1.1× as long as mesosoma and 0.75–0.80× as long as head plus mesosoma.

Type material.

Holotype. SPAIN: Utxesa (Lleida), UTM 31T BF99, 140 m, 1 ♀, reared from *Camphorosma monspeliaca* stems, containing galls of *Contarinia camphorosmae* (Tavares) (Cecidomyiidae), collected 10.vii.2013, emerged 23.vii.2013 (*leg.* A. Ribes).

Allotype. SPAIN: 1 ♂, data as for holotype.

Paratypes. 17 ♀♀, 8 ♂♂, all specimens reared from *Camphorosma monspeliaca* stems, containing galls of *Contarinia camphorosmae* (*leg*. A. Ribes). **SPAIN: Lleida:** Alfès (UTM 31T CG00), 1 ♂, stems collected 22.iii.2013, em. 26.iv.2013; Utxesa, 4 ♀♀, 1 ♂, same data as holotype, except emergence dates 13.vii-4.viii.2013; 13 ♀♀, 6 ♂♂, same data as holotype, except stems collected 4.vi.2013, emergence dates 20.vi-15.x.2013 and 19.v.2014.

The holotype, allotype and some paratypes are deposited in the Museo Nacional de Ciencias Naturales, Madrid, and the remaining paratypes in the author's collection.

Additional material. 10 ♀♀ 8 ♂♂, all specimens reared from *Camphorosma monspeliaca* stems, containing galls of *Contarinia camphorosmae* (*leg.* A. Ribes). **SPAIN: Lleida:** Utxesa, 1 ♀ 4 ♂♂, same data as holotype, except emergence dates 13.vii-5.viii.2013; 9 ♀♀, 4 ♂♂, same data as holotype, except stems collected 4.vi.2013, emergence dates 20.vi-15.x.2013 and 19-27.v.2014.

Etymology. Named after the host plant associated with its host species.

Differential diagnosis. *T. camphorosmae* belongs to the *confluens* species-group, in which the forewings have, in both sexes, 2 infuscate markings, joined to form a semicircular arc on the wing disc. It is similar to *T. confluens* Bouček, differing in the female antennae with much shorter and transverse funicle segments. *T. camphorosmae* has F1-F2 transverse anelliform, similar in shape to the second anellus, and following segments progressively broader with F5-F6 barely transverse or subquadrate. In *T. confluens* only F1 is reduced and slightly transverse, but it is much broader than the second anellus, and smaller than F2, which is subquadrate, like the following segments. Also, in *T. camphorosmae* the flagellum is distinctly claviform, with F6 much broader than F1 (funicle almost filiform in *T. confluens*), the ovipositor is shorter, 1.00–1.15× as long as the gaster (as long as the gaster plus half the mesosoma in *T. confluens*), the body is smaller, 1.3–1.7 mm excluding ovipositor (1.8–2.0 mm in *T. confluens*), and they might also have different biology. *T. confluens* is distributed from Central Asia to Georgia, Dagestan and Azerbaijan, and in Spain (see below). It is associated with unknown cecidomyiid galls on *Salsola* sp. (Zerova & Seryogina, 1993). *T. camphorosmae* also resembles other species in the *confluens* group from Central Asia, i.e. *T. bouceki* (Zerova & Seryogina), *T. eltonicus* (Zerova & Seryogina) and *T. nikolskayae* (Zerova & Seryogina), in having similar antennae with very transverse basal funicular segments, but these species have different biology. *T. camphorosmae* differs from *T. bouceki* in the long and slim marginal vein (short and thick in *T. bouceki*, which is associated with *Salsola laricina*). It differs from *T. eltonicus* in the shorter ovipositor, barely longer than the gaster (ovipositor almost as long as rest of body in *T. eltonicus*, which is associated with *Salsola* sp.), and it differs from *T. nikolskayae* in the shorter ovipositor, and in having the postmarginal vein shorter than the radial vein (ovipositor almost as long as gaster plus mesosoma, and postmarginal vein much longer than radial vein in *T. nikolskayae*, which is associated with *Ceratoides* sp.). Males of *T. camphorosmae* differ from *T. confluens* in having antennae with F1-F2 distinctly transverse, and the pale brown scape and pedicel (F2 as long as broad, and scape and pedicel dark metallic in *T. confluens*).

Biology. *T. camphorosmae* has been reared from *Camphorosma monspeliaca* stems containing galls of *Contarinia camphorosmae*. These galls were described from the Monegros region (Tavares, 1920), and are inconspicuous, located in axillar and terminal buds, hidden by tufts of modified leaves, but barely larger than ungalled buds from which normal tufts of leaves arise. *T. camphorosmae* was the dominant parasitoid in these galls, and is probably a primary parasitoid of cecidomyiid larvae. The species is apparently univoltine, emerging in June-August from the galls collected in late spring. Some specimens emerged the year after the galls were collected, either due to delayed development or because they were cultured on fresh galls in the sample containers. The sex ratio of the specimens was somewhat biased towards females: of the 44 specimens emerging from all samples, 63% were females.

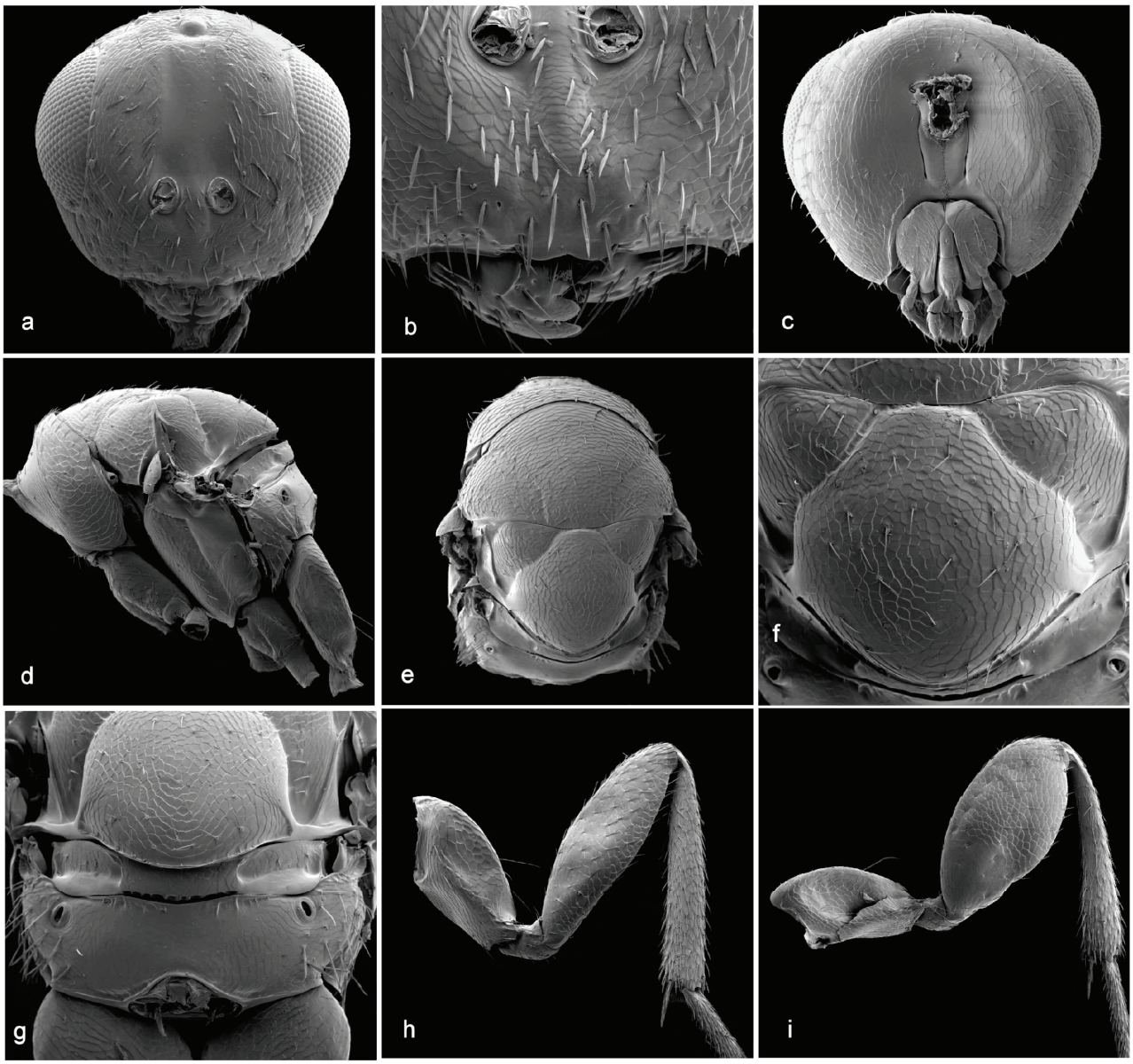

Fig. 4. *Torymoides camphorosmae* sp. n., female SEM microphotographs. a) head, frontal view; b) clypeus; c) head, posterior view; d) mesosoma, lateral view; e) mesosoma, dorsal view; f) scutellum; g) propodeum; h) hind leg; i) male hind leg. // *Torymoides camphorosmae* sp. n., hembra, microfotografías SEM. a) cabeza, aspecto frontal; b) clípeo; c) cabeza, aspecto occipital; d) mesosoma, aspecto lateral; e) mesosoma, aspecto dorsal; f) escutelo; g) propodeo; h) pata posterior; i) pata posterior del macho.

Torymoides confluens (Bouček, 1970)

T. confluens was originally described in the genus *Ameromicrus* on the basis of two females; the holotype of the species was collected by sweeping on semidesert vegetation in Azerbaijan and the paratype was collected in Georgia. Zerova & Seryogina (1993) also report the species from Dagestan in the localities and report rearing the species from unidentified cecidomyiid galls on *Salsola* sp.

The addition of *T. confluens* to the Spanish fauna rests upon a single rearing of the species from *Salsola vermiculata* from Madrid. Five females, which agree very well with the original description of *T. confluens*, and five males were sent to R.R. Askew for identification by M.R. Shaw. The specimens had been reared by G.E. King and were labelled 'Madrid, Ciempozuelos 600m ex *Bazaria* 30.9–1.x.00 GE King *leg.*' with the reverse of the label stating 'g.v. 27-vi-01 *Salsola vermiculata*' (i.e. the parasitoids emerged at the end of June, 2001). The word *Bazaria* may refer to *Gymnancyla ruscinonella* (Ragonot) (=*B. ruscinonella*) (Lepidoptera, Pyralidae), but this is an unlikely host for *T. confluens*, and the specimens are much more likely to have emerged from overlooked cecidomyiid galls present on the *Salsola* plants on which the pyralid larvae were feeding.

Torymoides kiesenwetteri (Mayr, 1874)

T. kiesenwetteri was for a long time in the genus *Dimeromicrus* Crawford, a genus synonymized with *Torymoides* by Bouček (1988). It belongs to the *kiesenwetteri* species-group, which is characterized by the posterior femora with a subapical tooth, mesoscutum with relatively dense and fine crossstriation with intermixed piliferous punctures, and hyaline forewings (Bouček, 1988). *T. kiesenwetteri* is a parasitoid of Tephritidae in Asteraceae heads, specially in galls of *Myopites* spp. on *Dittrichia, Inula* and *Pulicaria*, as well as in other Tephritidae (Noyes, 2014); a detailed account of its biology in Italy was published by Rivosecchi (1960). Its distribution

extends from southern Europe to southern Asia, and in Spain it has been previously recorded from Catalonia (Pujade, 1994), the Canary Islands (Báez & Askew, 1999), the Monegros region (Askew *et al.*, 2001) and Madrid (Cobo *et al.*, 2014).

T. kiesenwetteri has been frequently reared in the study region from heads of *Dittrichia viscosa* (L.) with galls of *Myopites stylatus* (Fabricius), and from *Inula crithmoides* L. heads containing *Myopites eximia* Séguy galls. It has occasionally emerged from the heads of other Asteraceae and one species of Labiatae, which are new host records. From *Sonchus oleraceus* L. it emerged with *Ensina sonchi* (L.) and *Tephritis formosa* (Loew), possibly being associated with the latter, which is a larger and more abundant species. From *Leucanthemum vulgare* Lam. it emerged with numerous specimens of *Dioxyna bidentis* (Robineau-Desvoidy). It has also emerged from samples of *Helichrysum stoechas* (L.): these did not contain any Tephritidae, but from some of them emerged specimens of *Actinoptera* sp., which formed galls at the apices of stems and is a possible host. In addition, it has emerged from the infrutescences of *Phlomis lychnitis* L. (Labiatae), together with *Aciura coryli* (Rossi), and has been reared, in Huesca province (*leg.* R.R.Askew), from the flower heads of *Arctium* sp., another new host record.

EXAMINED MATERIAL. 36 ♀♀ 26 ♂♂ (*leg*. A.Ribes). **SPAIN: Castelló:** Vinaròs (UTM 31T BE98), 1 ♀, reared from *Leucanthemum vulgare* heads, col. 7.vi.2012, em. 10.vi.2012; **Lleida:** Ager (UTM 31T CG15), 4 ♂♂, reared from *Helichrysum stoechas* infrutescences, col. 29.vi.2007, em. 5-12.vii.2007; Aitona (UTM 31T BF89), 2 ♀♀, swept 18.vi.2010 and 9.vi.2011; 1 ♀, reared from *Phlomis lychnitis* infrutescences, col. 13.vi.2013, em. 22.vi.2013; Alfès (UTM 31T CG00), 1 ♀, 1 ♂, reared from *Phlomis lychnitis* infrutescences, col. 31.v.2012, em. 6.vi.2012; Castelldans (UTM 31T CF09), 1 ♀, 1 ♂, reared from *Sonchus oleraceus* heads, col. 20.vi.2014, em. 2.vii.2014; Granadella (UTM 31T CF08), 1 ♂, reared from *Helichrysum stoechas* infrutescences, col. 13.vi.2006, em. 21.vi.2006; Torres de Segre (UTM 31T BG80), 2 ♀♀, reared from *Dittrichia viscosa* heads, col. 30.x.2007, em. 2008; 11 ♀♀, 5 ♂♂, reared from *Inula crithmoides* heads, col. 19.xi.2012, em. 16-23.iv.2013; Torres de Segre (UTM 31T BG90), 3 ♂♂, reared from *Myopites stylatus* galls on *Dittrichia viscosa*, col. 3.i.2011, em. 2011; 4 ♀♀, 1 ♂, swept 1.x.2011, 5.x.2012, 2.ix.2013 and 16.ix.2013; **Tarragona:** La Selva del Camp (UTM 31T CF46), 13 ♀♀, 10 ♂♂, reared from *Myopites stylatus* galls on *Dittrichia viscosa*, col. 11.i.2011, em. 10.iv.2011.

ADDITIONAL MATERIAL. 17 ♀♀ 10 ♂♂ (coll. R.R. Askew). **SPAIN: Guadalajara:** Sacedón, 1 ♀, swept 12.vii.1996, *leg.* R.R.Askew; **Guipúzcoa:** Orio, 1 ♂, swept 12.ix.1964, leg. R.R.Askew; **Huesca:** Bielsa, 2 ♀♀, reared from *Arctium* sp. heads, *leg.* R.R.Askew, 2001; **Islas Baleares:** IBIZA, 3 ♀♀, reared from *Myopites* galls on *Dittrichia viscosa*, *leg.* M. Boness, 1988; MALLORCA, 2 ♀♀, reared from *Myopites* galls on *Inula* sp., *leg.* M.Boness, 1982; 2 ♀♀, 4 ♂♂, reared from *Myopites* galls on *Dittrichia viscosa*, *leg.* M.Boness, 1992; **Málaga:** Calahonda, 2 ♀♀, malaise trap vii.1989, *leg.* L.Lockey; **Santa Cruz de Tenerife:** TENERIFE, 3 ♀♀, 5 ♂♂, swept 23-24.iii.1999, *leg.* R.R.Askew; **Soria:** Calatañazor, 2 ♀♀, swept 28.vi.2007, *leg.* R.R.Askew.

Acknowledgements

I am grateful to Richard R. Askew, England, for providing the records of some species and critically reviewing an earlier draft of this paper. I am also grateful to Xavier Calomarde, from the "Servei de Microscòpia Electrònica de la Universitat de Lleida" (UdL), for his assistance in taking the SEM microphotographs, and to J. Blasco-Zumeta, G.E. King and M.R. Shaw for providing material for this study.

References

ASKEW, R.R., J. BLASCO-ZUMETA & J. PUJADE-VILLAR 2001. *Chalcidoidea y Mymarommatidae (Hymenoptera) de un sabinar de Juniperus thurifera L. en Los Monegros, Zaragoza. Monografías Sociedad Entomológica Aragonesa*, **4.** Sociedad Entomológica Aragonesa, Zaragoza, 76 pp.

BÁEZ, M. & R.R. ASKEW 1999. New records of Chalcidoidea (Hymenoptera) from the Canary Islands. *Boletín de la Asociación Española de Entomología*, **23**(1-2): 65-82.

BOUČEK, Z. 1970. On some new or otherwise interesting Torymidae, Ormyridae, Eurytomidae and Pteromalidae (Hym.) mainly from the Mediterranean subregion. *Bollettino del Laboratorio di Entomologia Agraria 'Filippo Silvestri', Portici*, **27** (1969): 27-54.

BOUČEK, Z. 1988. Australasian Chalcidoidea (Hymenoptera). *A biosystematic revision of genera of fourteen families, with a reclassification of species.* CAB International, Wallingford, Oxon, U.K., Cambrian News Ltd; Aberystwyth, Wales, 832 pp.

COBO, A., M. GONZÁLEZ-NÚÑEZ, I. SÁNCHEZ-RAMOS & S. PASCUAL 2014. Selection of non-target tephritids for risk evaluation in classical biocontrol programmes against the olive fruit fly. *Journal of Applied Entomology.* DOI: 10.1111/jen.12145.

DOĞANLAR, M. 1989. Two new species of *Ameromicrus* Nikolskaja (Hymenoptera: Torymidae) from Adana district, Turkey. *Türkiye Entomoloji Dergisi*, **13**: 141-146.

GRISSELL, E. E. 1995. Toryminae (Hymenoptera: Chalcidoidea: Torymidae): a redefinition, generic classification and annotated world catalog of species. *Memoirs on Entomology, International*, **2**: i-iii + 1-470.

GRISSELL, E. E. 2005. A new species of *Torymoides* (Hymenoptera: Torymidae), with an overview of Nearctic species. *Acta Societatis Zoologicae Bohemicae* **69**(1-4): 113-119.

MEDIANERO, E., L. A. PARRA, I. SÁNCHEZ & J. L. NIEVES-ALDREY 2007. Agallas inducidas por insectos en especies de *Artemisia* (Asteraceae) en España, con especial referencia a la comunidad de Madrid. *Boletín de la Sociedad Entomológica Aragonesa*, **41**: 291-302.

NIKOL'SKAYA, M. N. & N. N. KYAO 1954. Chalcid fauna of the middle course of the river Ural and its economic importance. *Trudy Zoologicheskogo Instituta. Akademiya Nauk SSSR*, **16**: 404-416.

NOYES, J.S. 2014. Universal Chalcidoidea Database. World Wide Web electronic publication. http://www.nhm.ac.uk/chalcidoids [accessed August 2014].

PUJADE, J. 1994. Complex parasitari de *Myopites limbardae* Schiner, 1864 (Diptera: Tephritidae) detectat al nord-est Ibèric (Hym.: Eupelmidae, Pteromalidae, Torymidae, Eurytomidae). *Sessió Conjunta d'Entomologia ICHN-SCL*, **8**(1993): 49-60.

RIVOSECCHI, L. 1960. Note sui parassiti dei Tripetidi: *Dimeromicrus kiesenwetteri* Mayr (Chalcidoidea, Torymidae) ed altri calcidoidei del litorale marittimo delle Marche. *Parassitologia, Rome*, **2**: 287-293.

SZELÉNYI, G. 1973. On the torymid-fauna of Mongolia (Hymenoptera: Chalcidoidea). *Acta Zoologica Academiae Scientiarum Hungaricae*, **19**(1/2): 181-203.

SZELÉNYI, G. 1982. Further data to the torymid, pteromalid and eulophid fauna of the Hortobagy National Park, Hungary (Hymenoptera: Chalcidoidea). *Acta Zoologica Academiae Scientiarum Hungaricae*, **28**: 379-388.

TAVARES, J. S. 1920. Espécies novas de Cynípides e Cecidomyias da Península Ibérica e descripção de algumas já conhecidas. III série. *Brotéria, Série Zoológica*, **18**(2): 43-79.

WALKER, F. 1871. *Notes on Chalcidiae. Part III. Torymidae and Chalcididae*. Pp 37-54. E.W. Janson, London.

XIAO, H. & Y. X. ZHAO 2010. The genus *Torymoides* Walker in China, with description of a new species (Hymenoptera: Torymidae). *Oriental Insects*, **44**: 1-10.

ZEROVA, M. D. & L.Y. SERYOGINA 1993. A taxonomic analysis of the genus *Ameromicrus* (Hymenoptera, Torymidae). *Vestnik Zoologii*, **4**: 20-28.

ZEROVA, M. D. & L. Y. SERYOGINA 1995. On colour variability in *Ameromicrus violaceus* (Hymenoptera, Torymidae). *Zhurnal Ukrayns'kogo Entomologichnogo Tovaristva*, **1**(3-4): 63-68.

ZEROVA, M. D. & L.Y. SERYOGINA 1999. Torymid chalcidoid wasps (Hymenoptera, Chalcidoidea, Torymidae) of tribes Podagrionini and Monodontomerini of the Ukrainian fauna. *Vestnik Zoologii, Supplement*, **13**: 1-130.

ZEROVA, M. D. & L. Y. SERYOGINA 2001. A review of species of the genus *Ameromicrus* (Hymenoptera, Torymidae) with description of a new species from Turkmenistan. *Zoologicheskiy Zhurnal*, **80**(10): 1273-1275.