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TWO NEW HERB GALL WASPS FROM SPAIN, INCLUDING THE DESCRIPTION OF A NEW SPECIES OF *AULACIDEA* ASHMEAD, 1897 (HYMENOPTERA, CYNIPIDAE, "AYLACINI") INDUCING GALLS ON *SERRATULA NUDICAULIS* L. DC (ASTERACEAE)

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ABSTRACT

J. L. Nieves-Aldrey. 2012. Two new herb gall wasps from Spain, including the description of a new species of *Aulacidea* Ashmead, 1897 (Hymenoptera, Cynipidae, "Aylacini") inducing galls on *Serratula nudicaulis* L. DC (Asteraceae). *Graellsia*, 68(2): 325-339.

Two new species of herb gall wasps are recorded from Spain, which induce galls on flower heads of *Serratula nudicaulis* L. DC (Asteraceae). *Isocolus serratulae* (Mayr, 1882) is recorded for the first time in Spain, while a new species of *Aulacidea* Ashmead, 1897, *Aulacidea pilarae* **sp. n.**, is described. This new species is similar to *Aulacidea serratulae* Diakontschuk, 1984, which is found throughout Oriental Europe. However, those two congeneric species may be distinguished by the morphology of the adults.

Key words: Aylacini; *Aulacidea*; *Isocolus;* herb gall wasps; new species; *Serratula*; Madrid; galls.

RESUMEN

J. L. Nieves-Aldrey. 2012. Dos nuevas especies de avispas de las agallas en plantas herbáceas para España, incluyendo la descripción de una especie nueva de *Aulacidea* Ashmead, 1897 (Hymenoptera, Cynipidae, Aylacini), que inducen agallas en *Serratula nudicaulis* L. DC (Asteraceae). *Graellsia*, 68(2): 325-339 (en inglés).

Se citan dos nuevas especies de avispas de las agallas en plantas herbáceas para España. Las dos especies inducen agallas en cabezuelas florales de *Serratula nudicaulis* L. DC (Asteraceae) y se han encontrado en el valle del Lozoya (Madrid, España Central). *Isocolus serratulae* (Mayr, 1882) se cita por primera vez para la Península Ibérica y se describe una especie nueva de *Aulacidea* Ashmead, 1897: *A. pilarae* **sp. n.** La nueva especie es similar a *Aulacidea serratulae* Diakontschuk, 1984 citada de Europa oriental, diferenciándose por la morfología de los adultos.

Palabras clave: Aylacini; *Aulacidea*; *Isocolus*; especie nueva; *Serratula*; Madrid; agallas.

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Introduction

While the great majority of gall wasps, commonly known as oak gall wasps (Hymenoptera Cynipidae, Cynipini), induce galls on plants of the Fagaceae family, (predominantly on *Quercus* spp) other species, which are classified within the tribe "Aylacini", induce galls on herbs and shrubs of the families Asteraceae, Papaveraceae, Lamiaceae, Valerianaceae and Rosaceae. Phylogenetic analyses have found strong evidence that the tribe is not monophyletic, unlike the tribes Diplolepidini (rose gall wasps) or Cynipini (oak gall wasps). However until a new classification of the Cynipidae is formally proposed, this group is still in use. With regard to the estimated world diversity of this cynipid group, Liljeblad (2002) listed 21 genera and 157 species; more recently, Melika (2006) reduced these numbers to 18 genera and 122 species based on newly proposed synonymies. These numbers have increased in recent years primarily because of descriptions of new herb gall wasp species from Iran, the Middle East and the Iberian Peninsula (Melika & Gharei, 2006; Takavoli & Melika, 2006; Nieves-Aldrey *et al*., 2008, Karimpour *et al*., 2008). The "Aylacini" is a tribe with a predominantly Palaearctic distribution. The Western European aylacin genera were revised by Nieves-Aldrey (1994), who later revised the species of the Iberian Peninsula (Nieves-Aldrey, 2001). In the latter work, 33 species were listed, while new species were later added to the Iberian list, resulting in a list of 40 species recorded from Iberia.

One of the primary, more distinctive and species-rich lineages within the "Aylacini" is the *Isocolus Neaylax* lineage (Liljeblad & Ronquist, 1998; Nylander *et al*., 2004), which includes two of the more representative aylacini genera, namely the *Aulacidea* Ashmead, 1897 and *Isocolus* Förster, 1869 genera. Both genera include species associated primarily with plants of the Asteraceae family.

The genus *Aulacidea* was erected by Ashmead (1897) for the Nearctic species *A. harringtoni*, a species that induces galls in the stems of *Mulgedium* and *Lactuca* (Asteraceae). *Aulacidea* comprises 34 species worldwide; of these, 27 have a Palaearctic distribution. Five of these species are, however, of dubious taxonomic status (see Table I). Most species of *Aulacidea* induce galls on plants of the family Asteraceae, with the exception of two species recorded in the Lamiaceae (genera *Salvia* and *Phlomis*) and one in *Eryngium* (Apiaceae). The genus *Isocolus* is represented by 23 species distributed in the Palaearctic region only (Liljeblad, 2002; Melika, 2006; Melika & Gharaei, 2006; Karimpour *et al.,* 2008). All of the known species of *Isocolus* induce galls in plants of the Asteraceae family. Approximately 53% of the species are associated

Table 1.– The Palaearctic species of *Aulacidea.* Species recorded in the Iberian Peninsula are underlined. [1]Transferred to *Phanacis* (Nieves-Aldrey, 2008). [2]Synonymised with *Cecconia valerianellae* (Melika, 2006). [3]Transferred to *Neaylax* (Melika, 2006). Questionable species are marked with an *.

Tabla 1.– Listado de especies paleárticas de *Aulacidea*. Las especies citadas en la Península Ibérica figuran subrayadas. [1]Transferida a *Phanacis* (Nieves-Aldrey, 2008). [2]Sinonimizada con *Cecconia valerianellae* (Melika, 2006). [3]Transferida a *Neaylax* (Melika, 2006). Con el símbolo (*) se señalan las especies de estatus cuestionable o dudoso.

Species of *Aulacidea*	host plant
A. abdominalis (Thomson, 1877)	?
A. acroptilonica Tyurabaev, 1979	*Acroptilon*
A. andrei (Kieffer, 1900)*	*Hypochaeris*
A. arnicae Hoffmeyer, 1930	*Arnica*
A. ascanica Diakontshuk, 1984	*Serratula*
A. diakontschukae Melika & Klymenko, 2005	*Phlomis*
A. discolor Diakontshuk, 1988	*Echinops, Centaurea*
A. follioti Barbotin, 1972	*Sonchus*
A. freesei Nieves-Aldrey, 1995	*Silybum*
A. hieracii (Bouché, 1834)	*Hieracium*
A. irani Melika & Gharaei, 2006	*Echinops??*
A. kiefferi Cotte, 1915[1]	*Carthamus lanatus*
A. koelpiniae Diakontshuk, 1988	*Koelpinia*
A. laurae Nieves-Aldrey, 1992	*Podospermum*
A. lutigea Diakontshuk, 2003[2]	*Atriplex?*
A. nibletti Quinlan & Askew, 1969	*Hieracium*
A. parvula Diakontshuk, 1984	*Eryngium, Echinops*
	Cousinia, Centaurea
A. phlomica Belizin, 1959	*Phlomis*
A. pilosellae (Kieffer, 1901)	*Hieracium*
A. pumila (Giraud, 1859) *	?
A. rubi Diakontshuk, 2003	*Rubus*?
A. schlechtendali (Rübsaamen, 1896) *	*Hieracium*
A. scorzonerae (Giraud, 1859)	*Scorzonera*
A. serratulae Diakontshuk, 1984	*Serratula*
A. subterminalis Niblett, 1946	*Hieracium*
A. tavakolii Melika, 2008	*Tragopogon*
A. taurica (Belizin, 1954)*	?
A. tobiasi Melika, 2004	*Saussurea*
A. tragopogonis (Thomson, 1877)	*Tragopogon*
A. verticillica Belizin, 1959[3]	*Salvia*

Table 2.– The Palaearctic species of *Isocolus*, indicating their host plant genera, all of them of the botanic family Asteraceae. Species recorded in the Iberian Peninsula are underlined.

Tabla 2.– Listado de las especies paleárticas de *Isocolus*, con indicación de sus géneros de plantas hospedadoras, todos de la familia Asteraceae. Las especies citadas en la Península Ibérica están subrayadas.

Species of *Isocolus*	host plant
I. beheni Melika & Karimpour, 2008	*Centaurea*
I. belizini Diakontschuk, 1981	*Chartolepis*
I. brunneus Diakontschuk, 1982	*Inula*
I. carthami Diakontschuk, 2003	*Carthamus*
I. centaureae Diakontschuk, 1982	*Centaurea*
I. cirsii Diakontschuk, 1987	*Cirsium*
I. cousiniae Diakontshuk, 1988	*Cousinia*
I. fitchi (Kieffer, 1898)	*Centaurea*
I. flavus Diakontshuk, 1982	*Centaurea*
I. freidbergi Melika, 2008	*Centaurea*
I. jaceae (Schenck, 1863)	*Centaurea*
I. karimpouri Melika & Tavakoli, 2008	*Serratula*
I. lichtensteini (Mayr, 1882)	*Centaurea*
I. leuzeae Nieves-Aldrey & Parra, 2003	*Leuzea*
I. phaeopappucii Diakontschuk, 1983	*Centaurea*
I. ponticus Diakontschuk, 1982	*Centaurea*
I. ruthenicae (Diakontshuk, 1983)	*Centaurea*
I. scabiosae (Giraud, 1859)	*Centaurea*
I. serratulae (Mayr, 1882)	*Serratula*
I. similis Diakontshuk, 1982	*Centaurea*
I. tinctorius Melika & Gharaei, 2006	*Carthamus*
I. volgensis Diakontshuk, 1982	*Centaurea*

with species of *Centaurea*, with the remainder associated with species of *Carthamus*, *Chartolepis*, *Cousinia*, *Cirsium*, *Inula*, *Leuzea* and *Serratula* (Table 2).

Eight species of *Aulacidea* and five species of *Isocolus* have been recorded in the Iberian Peninsula (Nieves-Aldrey, 2001) (Tables 1, 2). These species represent 30% and 22%, respectively, of the Palaearctic diversity of these genera. In this study, two more species of herb gall wasps are added to the Iberian list of cynipids. These species were found in the Valle de Lozoya, a natural area in the Guadarrama mountains in Northern Madrid (Spain), galling flower heads of *Serratula nudicaulis*. Two aylacini species were reared from these galls; one of them, *Isocolus serratulae* (Mayr, 1882), had never been observed before in the Iberian peninsula. The second species, belonging to the genus *Aulacidea,* was an undescribed species.

Materials and Methods

The studied wasps were reared from galls collected in the field in Valle del Lozoya, Madrid, Spain. Adults emerged from galls in rearing cages under laboratory conditions. Freshly collected galls were dissected, and their contents (larvae and adults) were identified and photographed. Adult insects were dissected in 70% ethanol, air dried, mounted on a stub and coated with gold. Micrographs of several standardised views were taken with a scanning electron microscope (FEI QUANTA 200) using a high-vacuum technique.

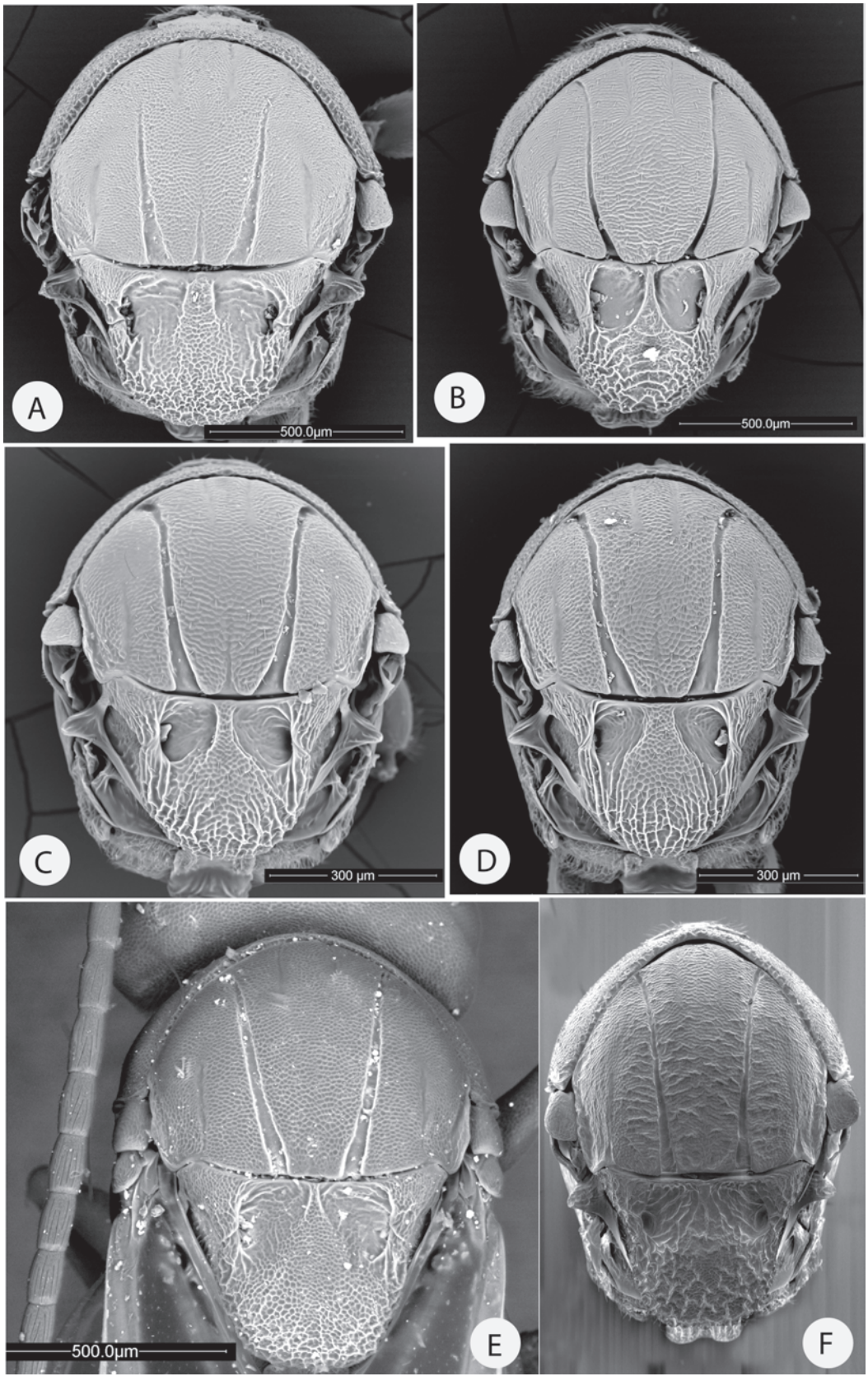
Type specimens of the related species *Aulacidea ascanica*, *Aulacidea serratulae* and *Aylax ascanica*, synonymised with *Isocolus serratulae* by Melika (2006), borrowed from the Diakontschuk collection (George Melika) were also examined. For observation by SEM, these type specimens were not dissected but were instead directly observed using a low vacuum (voltage) technique, without coating.

The forewings of dissected specimens were mounted in Euparal on slides and examined by stereomicroscopy. Images of forewings, adult habitus, galls, and dissected galls were taken with a Nikon digital camera attached to a Leica stereomicroscope. Terminology of the morphological structures and abbreviations follow Ronquist & Nordlander (1989), Ronquist (1995), Nieves-Aldrey (2001) and Liljeblad *et al*. (2008). Scanning electron microscopy photographs from this paper will be deposited in Morphbank ("http://morphbank.net").

Results

Isocolus serratulae (Mayr, 1882)
Aulax serratulae Mayr, 1882: 9

This species was re-described by Nieves-Aldrey (1994) and transferred to *Isocolus* Förster from *Aylax* Hartig. More recently, Melika (2006) provided further morphological diagnostic data and synonymised *Aylax ascanica* Diakontschuk, 1983 with *Iocolus serratulae* (Mayr). Furthermore, Melika (2006) noted the similarity between *I. serratulae, I. lichtensteini* and *I. leuzeae*. However, this analysis failed to provide sufficient diagnostic characteristics for separating these three species. We provide these characteristics below.


A
500.0µm
B
500.0µm
C
300 µm
D
300 µm
500.0µm
E
F

Key for the Iberian species of *Isocolus*

In the key for the identification of the Iberian species of *Isocolus* by Nieves-Aldrey (2001), *I. serratulae* runs to the couplet including *I. lichtensteini* and *I. leuzeae* as follows:

1. Second metasomal tergite with a basal lateral patch of setae. Micropunctures on metasomal tergites almost invisible , extended only from the posterior part of third metasomal tergite. Mesoscutum with reticulate sculpture (Figs. 1A, 1B, 1C). R1 reaching anterior margin of wing; apical margin of forewing with a fringe of very short setae. Galls in stems or flower heads of species of *Centaurea*, *Leuzea* and *Serratula* **2**

• Second metasomal tergite without a basal lateral patch of setae. Micropunctures on metasomal tergites conspicuous, covering the entire third metasomal tergite and subsequent tergites. Mesoscutum with strong rugulose sculpture (Fig. 1F). R1 not quite reaching the anterior margin of the wing; No fringe of setae in the apical margin of the forewing. Galls in flower heads of species of *Centaurea* ..... ***Isocolus scabiosae****

2. Scutellar foveae with rugulose sculpture; with their anterior margins broadly separated and indistinctly margined posteriorly (Fig. 1A). Notauli faint anteriorly (Fig. 1A). Mesoscutum with coriaceous reticulate sculpture. Galls in achenes of *Leuzea conifera* ..... ***Isocolus leuzeae***

• Scutellar foveae smooth and shining, with their anterior margins closer and posterior margins well defined (Figs. 1B, 1C). Notauli complete (Figs. 1B, 1C). Mesoscutum with alutaceous sculpture. Galls in stems of *Centaurea aspera* and *C. melitensis* or in flower heads of *Serratula* **3**

3. Septum anteriorly separating the scutellar foveae narrow (Fig. 1B). Notauli strongly bowed, narrower posteriorly; median mesoscutal impression indistinct (Fig. 1B) ..... ***Isocolus lichtensteini***

• Septum separating the scutellar foveae broad (Figs. 1C, 1D). Notauli not quite bowed, broad posteriorly; median mesoscutal impression present but short (Figs 1C, 1D) ..... ***Isocolus serratulae***

* Under this couplet is a complex of closely related species that induce galls on the stems and flower heads of *Centaurea scabiosa* L.

Aulacidea serratulae (Mayr) was re-described and figured by Nieves-Aldrey (1994). Here, we provide additional morphological data based on the Iberian samples, supported with SEM images.

Female.

Head, anterior view (Fig. 2A). Radiating striae from clypeus absent medially on face, stopping close reaching inner margins of compound eyes. Ventral margin of clypeus not projected over mandibles. Ocellar triangle slightly raised. Antennae have 13 segments (Fig. 1C); F1 0.9 as long as F2.

Mesonotum dorsal view (Fig. 1C). Scutellar foveae widely separated anteriorly. Mesoscutum with weak alutaceous sculpture. Notauli broad posteriorly and smooth; median mesoscutal impression visible in posterior one fifth of mesoscutum.

Mesopleuron thoroughly longitudinally costulate, almost glabrous (Fig. 2B). Metanotum (Fig. 2E). Metascutellum conspicuously constricted medially. Bar ventral to metanotal trough almost smooth. Metanotal trough narrow and densely pubescent.

Metapectal-propodeal complex. Metapleural sulcus meeting anterior margin of metapectal-propodeal complex at approximately mid-height of the latter. Lateral propodeal carinae broad and parallel. Lateral propodeal area smooth and densely pubescent; median propodeal area smooth and weakly pubescent. Nucha dorsally with some irregular longitudinal costulae.

Legs. Tarsal claw (Fig. 2F) simple, without basal lobe or tooth.

Forewing. Radial cell 2.4 times longer than wide; open along anterior margin, R1 and Rs reaching margin of wing (Fig. 6D); Rs slightly bowed; areolet present; vein Rs+M weakly pigmented, but visible, are directed towards lower 1/3 of median vein. Apical margin of wing has a very short fringe of setae.

Metasoma (Fig. 2G). Second metasomal tergite basally with a lateral patch of setae. Micropunctures on metasomal tergites not quite visible, extended only from the posterior part of third metasomal tergite.

◀ Fig. 1.– Mesoscutum dorsal view (adult SEM) of European species of *Isocolus*: (A) *Isocolus leuzeae,* female. (B) *I. lichtensteini,* female. (C) *Isocolus serratulae*, female from Spain. (D) *I. serratulae*, male from Spain. (E) *I. serratulae*, female from Ukraine. (F) *I. scabiosae*, female.

Fig. 1.– Mesoescudo en visión dorsal (SEM del adulto) de las especies europeas de *Isocolus*: (A) *Isocolus leuzeae*, hembra. (B) *I. lichtensteini*, hembra. (C) *Isocolus serratulae*, hembra colectada en España. (D) *I. serratulae*, macho colectado en España. (E) *I. serratulae*, hembra procedente de Ucrania. (F) *I. scabiosae*, hembra.

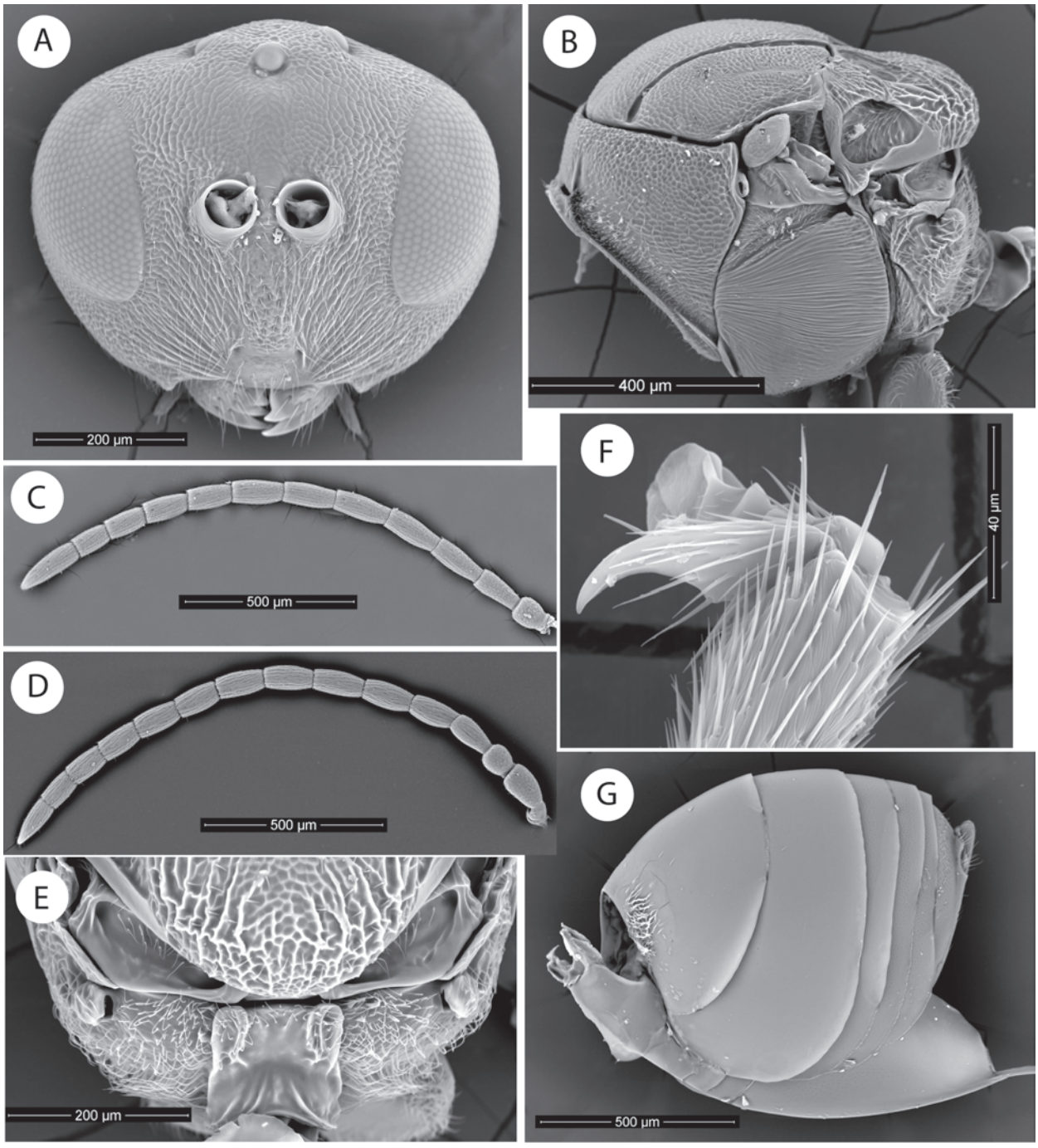


Fig. 2.– *Isocolus serratulae*, adult (SEM). (A) Head anterior view. (B) Mesosoma lateral view (C) Female antenna (D) Male antenna (E) Propodeum (F) Metatarsal claw (G) Female metasoma lateral view.

Fig. 2.– *Isocolus serratulae*, (SEM del adulto). (A) Cabeza en visión anterior. (B) Mesosoma en visión lateral (C) Antena de la hembra (D) Antena del macho (E) Propodeo (F) Uña metatarsal (G) Metasoma de la hembra en visión lateral.

Male.

Differs from female in the antennae, with 14 antennomeres (Fig. 2D). Placodeal sensillae in all flagellomeres. Septum separating scutellar foveae broader (Fig. 1D).

DISTRIBUTION. The species was described by Mayr (1882) from material collected by Rogenhofer on *Serratula heterophylla* (Desf.). However, the gall produced on this plant was not described (Nieves-Aldrey, 1994). Since the description, the species, including galls, has been found in the Ukraine by Zerova *et al*. (1988) and, more recently, under the name *Aylax ascanica*, which was synonymised with *I. serratulae* by Melika (2006). We were able to examine one female of *A. ascanica* identified as *Isocolus serratulae* by Melika and it is conspecific with the Iberian material of *I. serratulae* in most characteristics, except for the weaker convergent inner margins of the notauli and the fact that the septum anteriorly separating the scutellar foveae is not as wide in the Ukrainian specimen.

The record of *I. serratulae* in Spain greatly enlarges the distribution of this species in Europe. The host plant is also present in France and Italy, where this cynipid species may also reside.

BIOLOGY. *Aylax ascanica* was recorded on flower heads of *Serratula xeranthemoides* M. B., *Serratula radiata* (Waldst & Kit.) and *Serratula bracteifolia* (Iljin) Stank, which were later assigned by Melika (2006) to *Isocolus serratulae*.

In the sole locality in which the species was found in Spain, the species is abundant in galling flower heads of *Serratula nudicaulis*. The achenes are transformed into unilocular oval galls with tough walls and then fused to form a solid mass. The galled mass remains enclosed by the flower head's involucral bracts during the winter (Figs. 7C-D).

Aulacidea pilarae Nieves-Aldrey **sp. n.**

(Figs. 3, 4, 6A, 6C)

TYPE MATERIAL. Holotype female in Museo Nacional de Ciencias Naturales, Madrid, card mounted, SPAIN, Madrid, Valle del Lozoya, Alameda del Valle, 40º55´28.09´´N 3º50´41.36´´O, 1130 m; ex gall in flower heads of *Serratula nudicaulis* (L.) DC. (Asteraceae), gall collected on 12/II/2011, insect emerged III/2011, J. L. Nieves-Aldrey leg. Paratypes: 13♂♂, 4♀♀; 3♂♂, 1♀, same data as holotype; 7♂♂ same data as holotype excepting gall collected 20/II/2010, insects emerged III/2010; 3♂♂, 3♀♀, same data as holotype excepting gall collected 28/VI/2009, insects emerged II/2010, in Museo Nacional de Ciencias Naturales, Madrid (catalogue number 2155); 1♂, 1♀ paratypes in Pest Diagnostic Laboratory (PDL), Tanakajd, Hungary (curator G. Melika).

DESCRIPTION. Body length, measured from anterior margin of head to posterior margin of metasoma, 2.6 mm (range, 2.5-2.8; N = 4) for females; 1.8 mm (range, 1.5-2.1; N = 8) for males. Coloration entirely black, excepting antennal flagellum, the coxae apically, apical half of femora and tarsi almost entirely, which are light brown. Forewing hyaline, with brown veins. Females and males have a similar coloration.

Female.

Head in dorsal view about 2 times wider than long. Gena not expanded behind compound eye. POL 1.4 times longer than OOL, posterior ocellus separated from inner orbit of eye by about two times its diameter. Head in anterior view (Fig. 3A) rounded, 1.2 times wider than high, genae not expanded. Face with short white setae, sparsed medially on frons. Face with radiating carinae from clypeus, reaching ventral margin of eye and ventral margin of toruli; the carinae are absent on a broad band medially on the face (Fig. 3A). Clypeus square, ventral margin not projecting over mandibles. Anterior tentorial pits visible; epistomal sulcus and clypeo-pleurostomal lines indistinct. Malar space 0.5 times height of compound eye. Toruli situated slightly below mid-height of compound eye; distance between antennal rim and compound as width of antennal socket including rim. Frons, vertex weakly coriaceous without punctures or carinae (Fig. 3A). Occiput coriaceous (Fig. 3B). Ocellar plate slightly raised. Gula relatively short; distance between occipital foramen and oral foramen no longer than the height of the occipital foramen. Hypostomal sulci meeting at the hypostomata (Fig. 3B).

Mouthparts (Fig. 3B). Mandibles strong, exposed; right mandible with three teeth; left with two teeth. Cardo of maxilla visible, maxillary stipes about two times longer than wide. Maxillary palp five-segmented. Labial palp three-segmented.

Antenna 0.6 times as long as body; with 13 segments (Fig. 3C); flagellum not broadening towards apex; with short setae and placodeal sensilla visible on all flagellar segments except F1 (Fig. 3D). Relative lengths of antennal segments: 18:12:19:22:22:22:20:20:19:19:18:16:30; Pedicel slightly longer than wide, 0.6 as long as F1; F1 0.8 times as long as F2. Last flagellomere about three

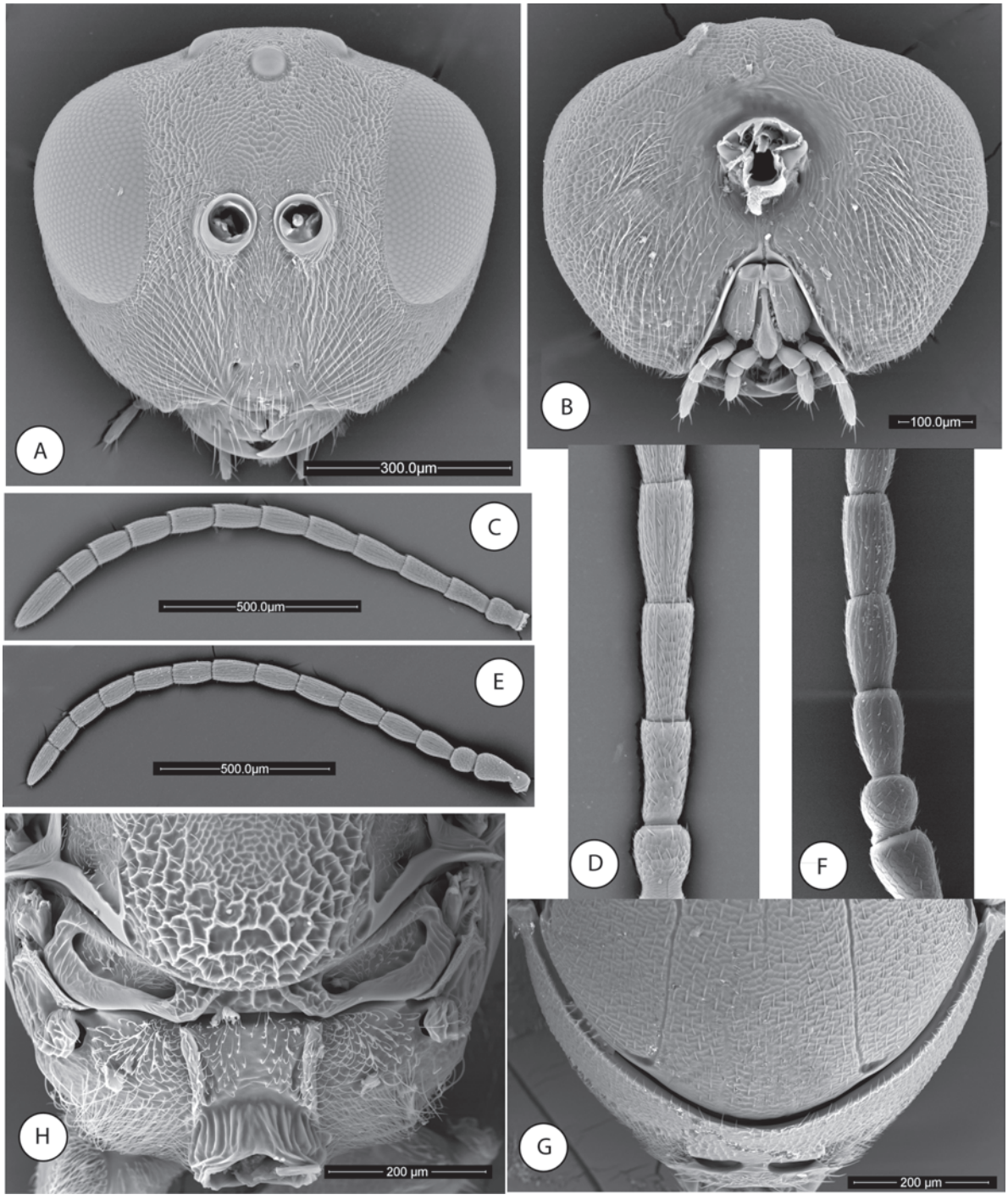


Fig. 3.– *Aulacidea pilarae* n. sp., adult (SEM). (A) Head anterior view. (B) Head posterior view. (C) Female antenna. (D) Detail of first antennomeres. (E) Male antenna. (F) Detail of the first antennomeres. (G) Pronotum anterior view (H) Propodeum.

Fig. 3.– *Aulacidea pilarae* n. sp. (SEM del adulto). (A) Cabeza en visión anterior. (B) Cabeza en visión posterior. (C) Antena de la hembra. (D) Detalle de los primeros artejos de la antena. (E) Antena del macho. (F) Detalle de los primeros artejos de la antena. (G) Pronoto en visión anterior. (H) Propodeo.

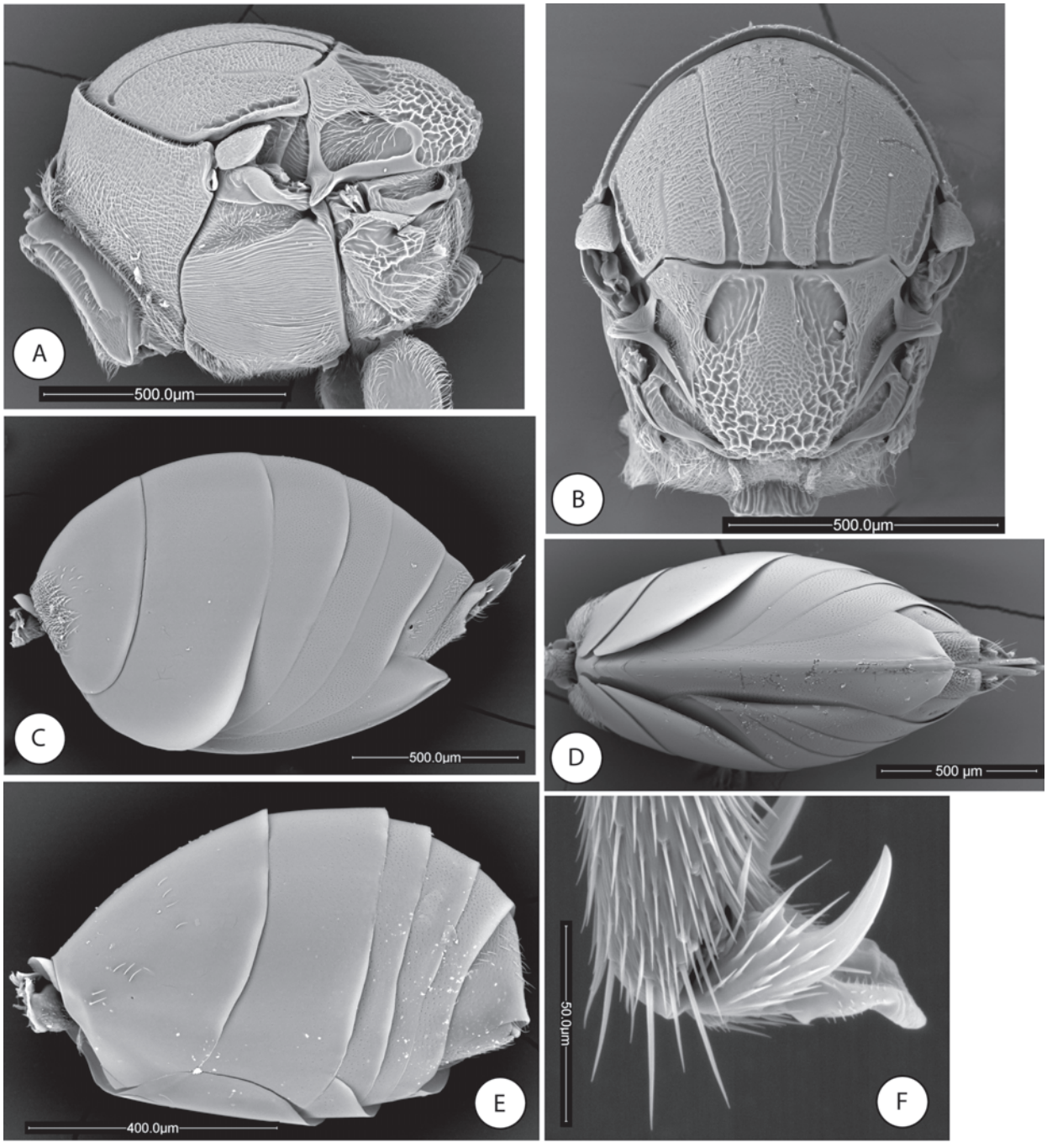


Fig. 4.– *Aulacidea pilarae* n. sp., adult (SEM). (A) Mesonotum lateral view. (B) Mesoscutum dorsal view. (C) Female metasoma lateral view. (D) Female metasoma ventral view. (E) Male metasoma, lateral view. (F) Metatarsal claw.

Fig. 4.– *Aulacidea pilarae* n. sp. (SEM del adulto). (A) Mesonoto en vision lateral. (B) Mesoescudo en visión dorsal. (C) Metasoma de la hembra en visión lateral. (D) Metasoma de la hembra en vision ventral. (E) Metasoma del macho en visión lateral. (F) Uña metatarsal.

times longer than wide, 1.9 times as long as F11. Placodeal sensillae on F3-F11 disposed in one row of 2-4 sensillae in each flagellomere.

Mesosoma. Pronotum weakly pubescent; with coriaceous sculpture. Ratio of length of pronotum medially/laterally = 0.45. Admedian pronotal depressions oval transverse, deep, open laterally, separated medially by a distance almost as broad as half an admedian depression (Fig. 3G). Posterior pronotal plate rectangular, sculptured and hairy as other parts of pronotum; ventral and lateral margins weakly marked. Spiracular incision of pronotum distinct. Mesoscutum (Fig. 4B) with weak alutaceous sculpture and weakly pubescent. Median mesoscutal impression strongly impressed, in posterior half of mesoscutum. Notauli complete, narrow anteriorly but broadly impressed in posterior half of mesoscutum. Anteroadmedian signa very shallowly impressed, almost indistinct. Mesoscutum and scutellum separated by a distinct transscutal fissure. Scutellar foveae smooth and shallow, large, ovate elongated posteriorly, measuring more than one third the lenght of scutellum; separated anteriorly by a broad septum; their inner posterior margins not strongly diverging posteriorly (Fig. 4B). Mesoscutellum in dorsal view about 0.8 times as long as mesoscutum; in lateral view, extending posteriorly slightly past dorsellum. Dorsal surface of scutellum, coriaceous reticulate medially; posteriorly and laterally the sculpture is strongly reticulate rugose. Axillula smooth and pubescent. Posterodorsal and posterior margins of axillula distinct.

Mesopleuron (Fig. 4A) thoroughly longitudinally costulate, almost glabrous. Mesopleural triangle distinctly impressed and pubescent; its dorsal and ventral margins clearly marked.

Metanotum (Fig. 3H). Metascutellum conspicuously constricted medially. Bar ventral to metanotal trough almost smooth. Metanotal trough narrow and densely pubescent.

Metapectal-propodeal complex. Metapleural sulcus meeting anterior margin of metapectal-propodeal complex at about mid-height of latter. Lateral propodeal carinae parallel (Fig. 3H). Lateral and median propodeal area smooth and densely pubescent. Nucha dorsally with strong irregular longitudinal costulae.

Legs. Tarsal claw (Fig. 4F) virtually simple, but with base produced into a secondary very small acute tooth, measuring less than 1/8 of length of apical tooth.

Forewing (Fig. 6C). 0.9 as long as body. Radial cell 2.6 times longer than wide; closed along anterior margin, but R1 sometimes narrower and slightly depigmented along marginal cell making it difficult to decide if the radial cell is closed or not (Fig. 6C); areolet present, small; vein Rs+M weakly pigmented, but visible, directed towards lower half of median vein. Apical margin of wing with a very short fringe of setae.

Metasoma (Figs 6C, 6D). 1.2 times as long as head plus mesosoma. Third abdominal tergum covering about one fourth of metasoma, about 0.8 times as long as fourth; antero-medial area of third abdominal tergum with a hair patch. Fourth to seventh terga smooth and bare, with micropunctures well visible. Projecting part of hypopygial spine very short, shorter than basal height of spine; ventrally with one row of short hairs.

Male.

Similar to female except as follows: Antenna 14-segmented (Figs. 3E, 3F); pedicel as long as wide; F1 slightly curved and excavated in the middle. Placodeal sensillae present on all flagellomeres. Relative length of antennomeres: 17:10:15:18:19:20:18:18:17:16:15.14:12:20. Metasoma (Fig. 4E) smaller than that of female; T2 0.4 times as long as metasoma.

Gall (Figs. 7A-H). Similarly to *Isocolus serratulae*, adult insects emerge from galls formed inside the flower heads of *Serratula nudicaulis* (Asteraceae) (Figs. 7C-E). The achenes are transformed into unilocular oval galls with tough walls and then fused to form a solid mass. The galled mass remains enclosed by the flower head's involucral bracts during the winter.

Life cycle. The life cycle is typically univoltine, as in most Aylacini. Reproduction appears to be bisexual as both males and females are observed. Adult gall wasps emerge in the spring when the host plant begins flowering. Galls develop and mature in June, and fully-grown larvae are found inside them in the summer. Insects overwinter as larvae inside the galls and pupate during the next spring.

Distribution. The new species is only known to exist in the Lozoya Valley (Madrid, Central Spain). However, it is possible that a greater sampling effort could locate the species in other parts of the

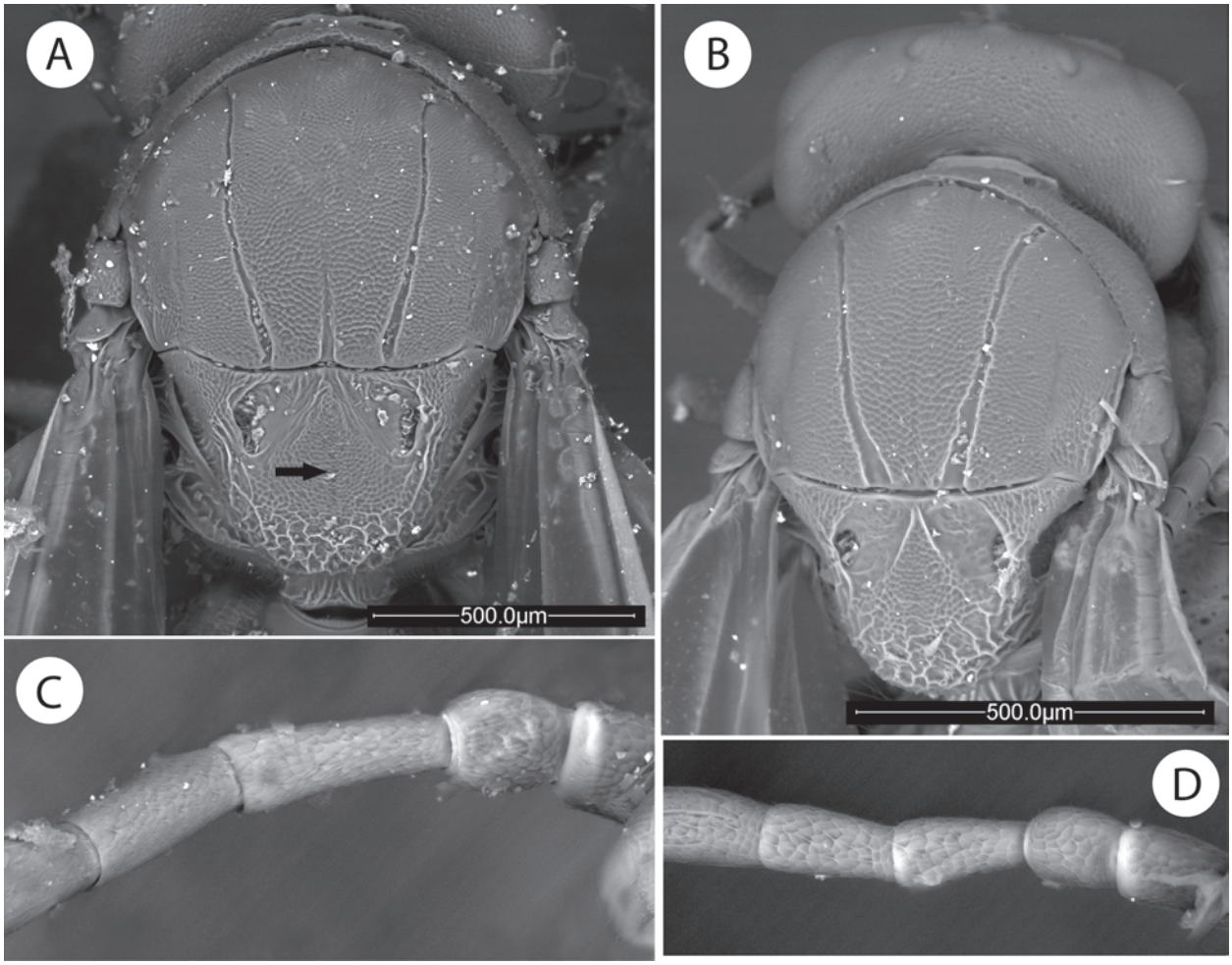


Fig. 5.– (A, C) *Aulacidea serratulae*, female (SEM): (A) Mesoscutum dorsal view; the arrow point to the septum separating the scutellar foveae. (C) First antennomeres. (B, D) *Aulacidea ascanica*, female. (B) Mesoscutum dorsal view. (D) First antennomeres.

Fig. 5.– (A, C) *Aulacidea serratulae*, hembra (SEM): (A) Mesoescudo en vision dorsal; la flecha señala el septum que separa las fosetas escutelares. (C) Primeros artejos de la antena. (B, D) *Aulacidea ascanica*, hembra. (B) Mesoescudo en visión dorsal. (D) Primeros artejos de la antena.

area of distribution of its host plant. The host plant, *Serratula nudicaulis*, is an herbaceous plant of submediterranean distribution and has been observed in Spain, France, Switzerland and Italy (Cantó, 1984). It has primarily been recorded in large areas of central, northern, and northeast Spain. In the Community of Madrid, it is not common, being recorded in montane areas on calcareous soils, such as the Lozoya valley.

ETYMOLOGY. Named after my beloved Pilar Rodríguez, a botanist with whom I share a love for plants and nature.

DIAGNOSIS AND IDENTIFICATION. The new species is closely similar to *Aulacidea serratulae*, which was recorded in the Ukraine, Far East of Russia and Kyrgyzstan, on *Serratula bracteifolia*; *Serratula coronata* L. and *Serratula tianshanica* L. (Diakont-schuk, 1984; Melika, 2006). The new

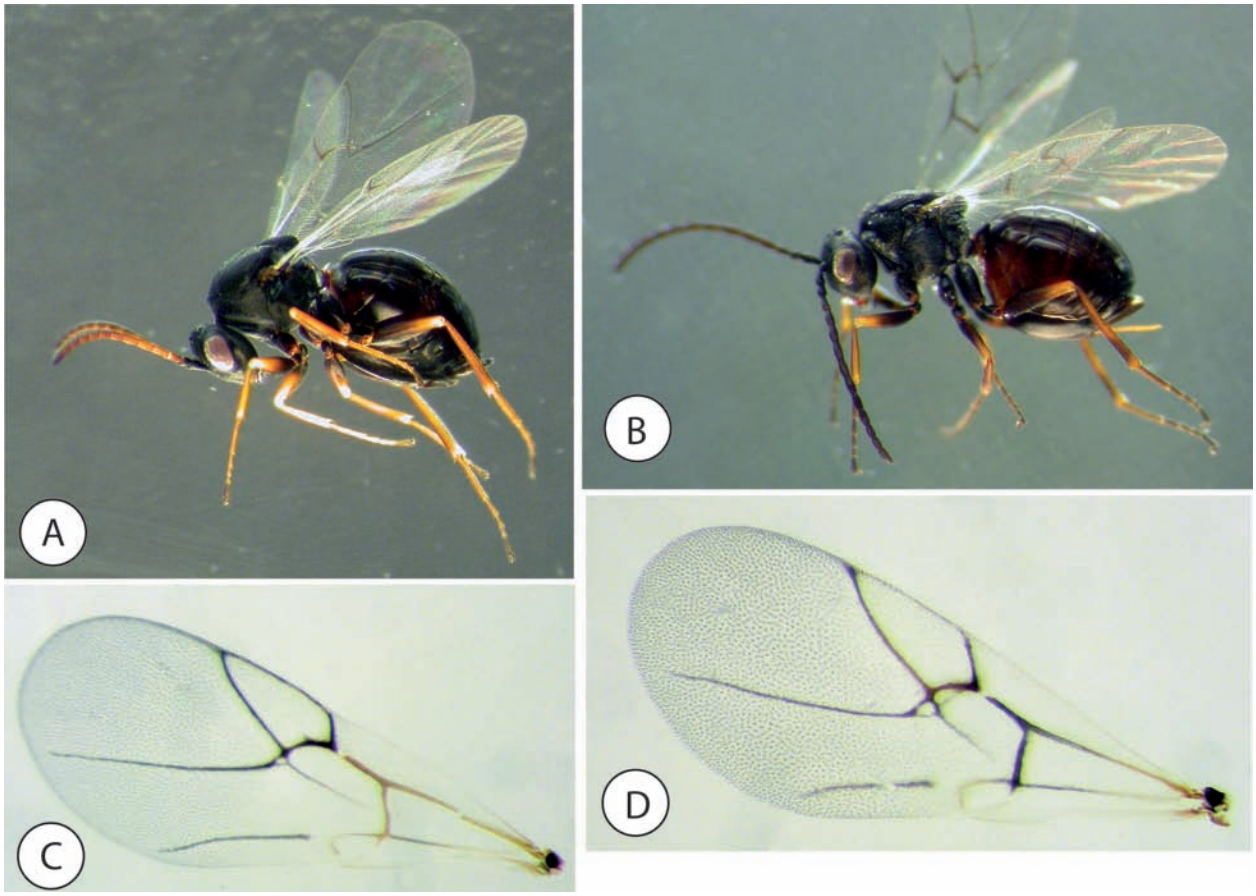


Fig. 6.– (A, C) *Aulacidea pilarae,* female. (A) habitus. (C) forewing. (B, D) *Isocolus serratulae*, female (B) habitus (D) forewing.

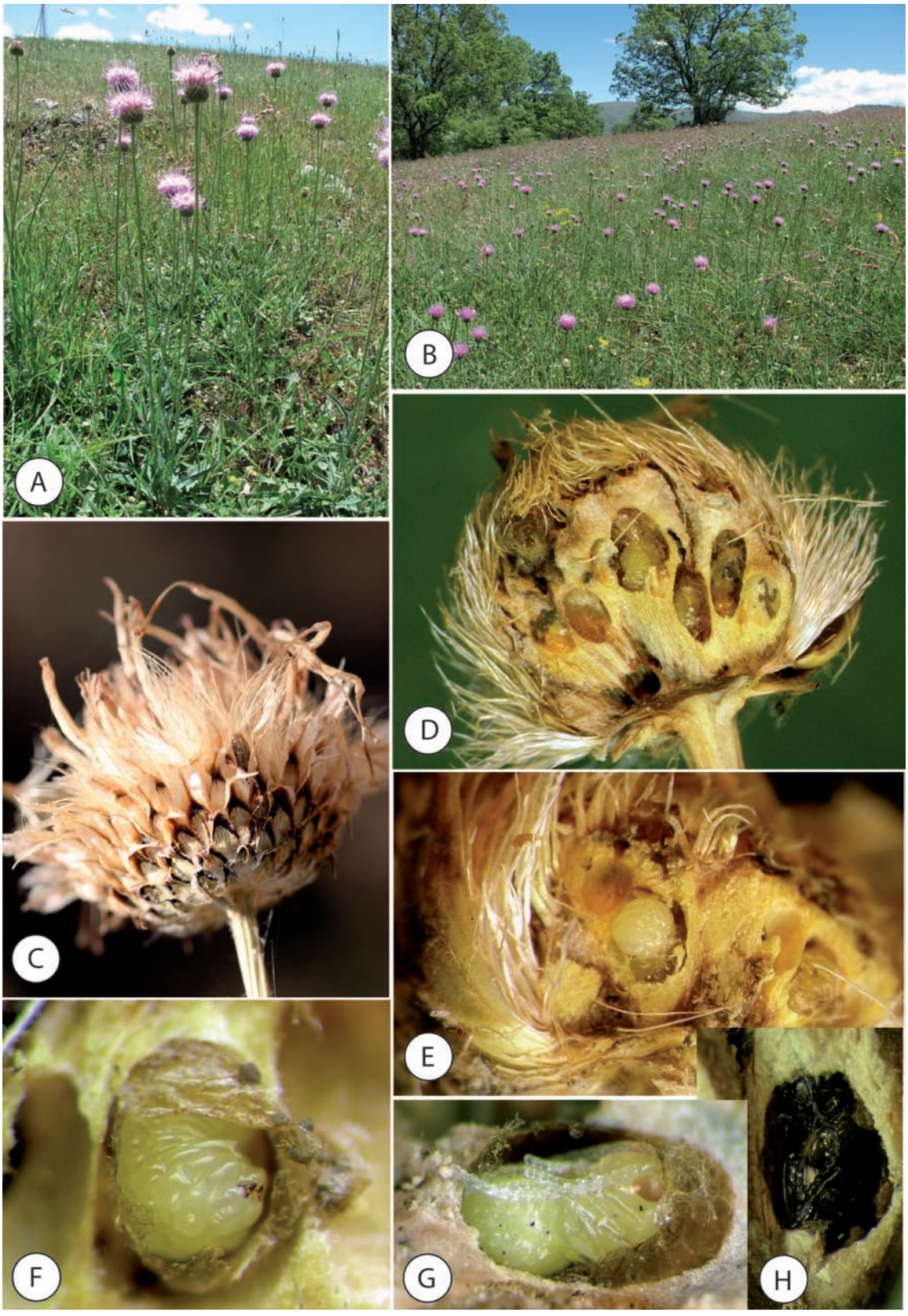
Fig. 6.– (A, C) *Aulacidea pilarae*, hembra. (A) Habitus. (C) Ala anterior. (B, D) *Isocolus serratulae*, hembra (B) Habitus (D) Ala anterior.

species is readily distinguishable from *A. serratulae* as follows:

F2 is 1.15 times longer than F1 in *A. pilarae* (about two times longer in *A. serratulae* according to the description and the figure illustrated in Melika (2006)). It should be noted, however, that according to the comparison with the type material, F2 is only slightly longer than F1 (Fig. 5C). The notauli and the median mesoscutal impression are much broader in the new species (Fig. 4B). The scutellum is medially convex, and the scutellar foveae are separated by a broader septum, whereas, in *A. serratulae,* the scutellum is concavous and with a visible medial impression, and the scutellar foveae are only slightly separated by a septum (Fig. 5A). Additionally, the tarsal claws have a small

Fig. 7.– Collecting site, host plant and galls of *Aulacidea pilarae* and *Isocolus serratulae.* (A-B) Hill with *Serratula nudicaulis* in Alameda del Valle (Lozoya Valley, Madrid). (C-D) Flower head and section showing galls and larvae (E-F); details of larvae of *Aulacidea pilarae* (G-H); details of initial and final pupae of *Aulacidea pilarae*.

Fig. 7.– Localidad de colecta, planta hospedadora y agallas de *Aulacidea pilarae* and *Isocolus serratulae*. (A-B) Colina con *Serratula nudicaulis* en Alameda del Valle (Valle del Lozoya, Madrid). (C-D) Cabezuelas florales y sección de una de ellas mostrando agallas y larvas. (E-F) Detalles de la larva de *Aulacidea pilarae*. (G-H) Detalles de las pupas iniciales y finales de *Aulacidea pilarae*.


A
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basal tooth in the Spanish species, and the relative length of the metasomal tergites is also different in the new species.

Another *Aulacidea* species associated with *Serratula* species from Ukraine has been described: *Aulacidea ascanica*, which induces galls not in flower heads but in the slightly deformed stems of *Serratula bracteifolia*. I have examined one female paratype of this species. Their diagnostic characteristics are as follows (Figs. 5B, 5D): F1 is as long as F2 (Fig. 5D); scutellar foveae rounded, and their anterior margins are in close contact; notauli are strongly convergent posteriorly and weakly separated at the transcutal fissure; the mesoscutal median impression is short and weakly visible; the lateral carina of the propodeum is long; the T3 of females is not micropunctate. The scutellar foveae in contact anteriorly, and the weakly indicated median mesoscutal impression, together with the different galls, readily distinguish *Aulacidea ascanica* from the new species described herein.

The adults of the new species differ from those of other related *Aulacidea* species recorded in the Iberian Peninsula, as follows (to be added to the identification keys in Nieves-Aldrey (2001)).

The long and narrow scutellar foveae, with inner margins widely divergent, the notauli faint or more weakly impressed anteriorly and F1 shorter than F2 show the similarity of *A. pilarae* with the Iberian species *A. laurae* and *A. martae*. However, the new species can be readily distinguished from these Iberian species by the much wider septum anteriorly separating the scutellar foveae and by the different host association (A. *laurae* galling achenes of *Podospermum laciniatum* while *A. martae* induces cryptic galls in stems of *Launaea arborescens*). Additionally, the new species is distinguished from *A. laurae* by the shape of the head. The head is not as narrow and high as *A. laurae,* and the clypeus is rectangular (it is subquadrate in *A. laurae*), while the long median mesoscutal impression, the black colouration (metasoma red in *A. martae*) and host plant data distinguish *A. pilarae* from *A. martae*.

Concluding remarks

Completing the list of 33 species of the tribe Aylacini that were recorded in the monograph of the Iberian Cynipidae (Nieves-Aldrey, 2001), new collecting trips and efforts to sample herb gall wasps in Spain have resulted in 7 new species added to the Iberian list, including the discovery of 4 new species (Nieves-Aldrey, 2002, 2003a, 2003b, 2004, 2005, 2008; Nieves-Aldrey & Parra, 2003; Nieves-Aldrey *et al*., 2004, 2008). With the two species added here to the list of Aylacini of the Iberian peninsula, the total number of species is 42, representing 32% of the world diversity of this group and 39% of the recorded Palaearctic species. There is, however, the potential for new discoveries of herb gall wasp species in Iberia because large areas of Spain and Portugal remain unexplored with regard to this cynipid group, and if sampling efforts on potential host plants are increased, it is likely that new species will be found. Potentially rewarding areas are the arid and steppe zones of Northeastern and Southeastern Spain, where the floristic composition is similar to that of Eastern Europe and Central Asia, Ukraine, Russia, Turkmenistan, Kazakhstan, Uzbekistan, and the Middle East, where the primary lineages of Aylacini are present in their greatest diversity. Biogeographical links between steppe insects in the Monegros region (NE Spain), the eastern Mediterranean, and central Asia have been demonstrated for many families and species of insects (Ribera & Blasco-Zumeta, 1988), which could also be the case for herb gall wasps.

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References

Ashmead, W. H., 1897. Descriptions of some new genera in the family Cynipidae. *Psyche*, 8: 67-69.

Cantó, P., 1984. Revisión del género *Serratula* (L) (Asteraceae) en la Península Ibérica. *Lazaroa*, 6: 7-80.

Diakontschuk, L. A., 1984. New species of Cynipidae (Cynipidae, Hymenoptera) from Georgia. *Vestnik Zoologii*, 3: 74-77.

Karimpour, Y., Takavoli, M. & Melika, G., 2008. New species of herb gallwasps from the Middle East (Hymenoptera, Cynipidae, Aylacini). *Zootaxa*, 1854: 16-32.

Liljeblad, J., 2002. *Phylogeny and Evolution of Gall Wasps (Hymenoptera: Cynipidae)*. Doctoral dissertation. Department of Zoology, Stockholm University. 36 pp

Liljeblad, J. & Ronquist, F., 1998. A phylogenetic analysis of higher-level gall wasp relationships (Hymenoptera: Cynipidae). *Systematic Entomology*, 23: 229-252.

Liljeblad, J., Ronquist, F., Nieves-Aldrey, J. L., Fontal-Cazalla, F. M., Ros-Farré, P. & Pujade-Villar, J., 2008. A fully web-illustrated morphological phylogenetic study of relationships among oak gall wasps and their closest relatives (Hymenoptera: Cynipidae). *Zootaxa,* 1796: 1-73.

Melika, G., 2006. *Gall wasps of Ukraine. Cynipidae*, vol. 1. Schmalhausen Institute of Zoology. Nacional Academy of Sciences of Ukraine. 300 pp

Melika, G. & Gharaei, B., 2006. New species of herb galling cynipids (Hymenoptera, Cynipidae: Aylacini) from Iran. *Acta Zoologica Academiae Scientiarum Hungaricae,* 52(4): 385-399.

Nieves-Aldrey, J. L., 1994. Revision of West-European Genera of the Tribe Aylacini Ashmead (Hymenoptera, Cynipidae). *Journal of Hymenoptera Research,* 3: 175-206.

Nieves-Aldrey, J. L., 2001. Hymenoptera, Cynipidae. En: *Fauna Ibérica*, vol. XVI. Ramos, M.A. *et al.* (eds). Museo Nacional de Ciencias Naturales. CSIC. Madrid. 636 pp.

Nieves-Aldrey, J. L., 2002. Anotaciones sobre la morfología y Biología de *Neaylax salviae* (Giraud), nuevo cinípido para la fauna ibérica, incluyendo la descripción de la larva (Hymenoptera, Cynipidae). *Boletín de la Sociedad entomológica Aragonesa,* 31: 61-65.

Nieves-Aldrey, J. L., 2003a. Descubrimiento de la agalla y ciclo biológico de *Neaylax versicolor* (Nieves-Aldrey) (Hymenoptera, Cynipidae): primer registro de un cinípido asociado a plantas papaveráceas del género *Fumaria. Boletín de la Sociedad entomológica Aragonesa,* 32: 111-114.

Nieves-Aldrey, J. L., 2003b. Primera cita para España de *Timaspis urospermi* (Kieffer), con notas taxonómicas y biológicas, incluyendo la descripción de la larva (Hymenoptera, Cynipidae, Aylacini). *Boletín de de la Sociedad entomológica Aragonesa,* 33: 79-83.

Nieves-Aldrey, J. L., 2004. A new *Aulacidea* species (Hymenoptera, Cynipidae) from Cabo de Gata Nature park (Spain) inducing galls on *Launaea arborescens*, including description of its terminal instar larva. *Graellsia*, 60(2): 175-184.

Nieves-Aldrey, J. L., 2005. A new species of *Iraella* Nieves-Aldrey (Hymenoptera: Cynipidae) from northeastern Spain, inducing galls on *Papaver* (Papaveraceae). *Annals of the Entomological Society of America*, 98(6): 853-860.

Nieves-Aldrey, J. L., 2008. Rediscovery of *Aulacidea kiefferi* (Hymenoptera, Cynipidae), with re-description of the adult and terminal larva. *Graellsia*, 64(2): 295-305.

Nieves-Aldrey, J. L., Gómez, J. F. & Hernández Nieves, M., 2004. Nuevos datos sobre *Aulacidea freesei* y *Phanacis zwoelferi* (Hymenoptera, Cynipidae, Aylacini), inductores de agallas en *Silybum marianum* (Asteraceae), en la Península ibérica, incluyendo la descripción y comparación de sus larvas terminales y sus agallas. *Boletín de la Sociedad entomológica Aragonesa*, 34: 85-93.

Nieves-Aldrey, J. L. & Parra, L.A. 2003. A new species of *Isocolus* (Hymenoptera, Cynipidae) from Spain, inducing galls in flower heads of *Leuzea conifera* (Asteraceae). *Annales de la Societé Entomologique de France*, 39(1): 49-54.

Nieves-Aldrey, J. L., Sánchez, I., Massa, B. & Gómez, J. F., 2008. Cynipid wasps that induce galls on plants of the genus *Picris* (Asteraceae) in Europe, with a description of a new species of *Phanacis* Foerster (Hymenoptera, Cynipidae) from the Iberian Peninsula. *Annales de la Societé Entomologique de France*, 44(3): 257-269.

Nylander, J. A., Ronquist, F., Huelsenbeck, J. P. & Nieves-Aldrey, J. L., 2004. Bayesian Phylogenetic Analysis of Combined Data. *Systematic Biology*, 53(1): 47-67

Ribera, I. & Blasco-Zumeta, J., 1998. Biogeographical links between steppe insects in the Monegros región (Aragón NE Spain), the eastern Mediterranean, and central Asia. *Journal of Biogeography*, 25: 969-986.

Ronquist, F., 1995. Phylogeny and early evolution of the Cynipoidea (Hymenoptera). *Systematic Entomology*, 20: 309-335.

Ronquist, F. & Nordlander, G., 1989. Skeletal morphology of an archaic cynipoid, *Ibalia rufipes* (Hymenoptera: Ibaliidae). *Entomologica Scandinavica*. *Supplementum*, 33: 1-60.

Tavakoli, M. & Melika, G., 2006. Two new species of *Timaspis* Mayr, 1881 – aylacine gall wasps from Iran (Hymenoptera: Cynipidae: Aylacini). *Folia Entomologica Hungarica*, 67: 75-87.

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