

A new species of *Isocolus* from Spain (Hymenoptera, Cynipidae) inducing galls in flower heads of *Leuzea conifera* (Asteraceae)

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Résumé – Une nouvelle espèce d'*Isocolus* d'Espagne (Hymenoptera, Cynipidae) produisant des galles dans les akènes de *Leuzea conifera* (Asteraceae). – *Isocolus leuzeae* n. sp. (Cynipidae « Aylacini ») décrite d'Espagne produit des galles dans les akènes de *Leuzea conifera* (Asteraceae); c'est la première fois que l'on trouve un Aylacini sur cette plante. La nouvelle espèce est très proche d'*Isocolus lichtensteini* (Mayr) qui produit des galles dans les tiges de *Centaurea aspera*.

Abstract – A new species of *Isocolus* Förster (Hymenoptera, Cynipidae "Aylacini") is described from Spain: *Isocolus leuzeae* n. sp. The new species induces galls in flower heads of *Leuzea conifera* (Asteraceae) and represents the first known aylacin species associated with this plant. The species is closely related to *Isocolus lichtensteini* (Mayr) that induces galls on stems of *Centaurea aspera*. Biological data on its life cycle, larva and gall are provided.

Cynipid gall-wasps species inducing galls on herbaceous plants from several families, mostly Asteraceae, Papaveraceae, Lamiaceae and Rosaceae, are currently classified within the "Aylacini" (Hymenoptera, Cynipidae). Recent phylogenetic studies indicate that that tribe comprises the basal lineages of gall wasps (Liljeblad & Ronquist 1998; Ronquist 1999) but see also Nieves-Aldrey (2001). The "Aylacini" are distributed across the Holarctic region but are more species rich in the Palearctic, specially in Europe. The tribe is specially well represented in the Mediterranean Region and in the East and South-East of Europe where most species have been recorded, many of them described as new in recent years by Zerova *et al.* (1988). However some of them are still badly or incompletely known and need further taxonomic revision (Nieves-Aldrey, personal observation). The genera of "Aylacini" from western Europe were revised for Nieves-Aldrey (1994) as well as the species from the Iberian Peninsula (Nieves-Aldrey 2001).

Isocolus Förster, 1869 is one of the better characterized aylacin genera. According to Liljeblad & Ronquist (1998) it belongs to one of the most primitive phyloge-

netic lineages of cynipids, the *Isocolus-Neaylax* lineage. *Isocolus* can be distinguished from other Aylacini genera by the following combination of characters: female antenna usually with 13-14 antennomeres, first flagellar segment shorter than second; mesopleuron longitudinally striated; marginal cell open on anterior margin; R₁ and R_s stopping near anterior margin of wing; hair fringe on distal margin of wing very short or absent; fourth to seventh abdominal terga densely micropunctate.

The distribution of *Isocolus* is Palearctic. About 15 species have been described from West Palearctic, reared from galls on plants of the Asteraceae family, mainly *Centaurea* species but also on *Cirsium*, *Serratula* and *Inula* species (Baumann & Brandl 1992; Nieves-Aldrey 2001). One species was described from Eastern Palearctic (from Turkmenistan), *I. cousinia* Diakontshuk, 1988, reared from *Cousinia bipinnata* Boiss (Diakontshuk 1988). However, the status of many species need to be revised. The centre of diversity seems to be in Eastern Mediterranean and around the Black Sea from where most species have been described and recorded. From Western Europe six species are known, three of them plus a doubtful one have been recorded from the Iberian Peninsula (Nieves-Aldrey 2001). The Iberian species are all associated to species of *Centaurea*, mainly *Centaurea scabiosa* and *C. aspera*.

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Cynipid galls collected in the Centre of Spain associated with plants of the tribes Lactuceae and Cardueae (Asteraceae), particularly flower heads of *Centaurea* and related species, included an unknown species of *Isocolus* Ashmead which is described in this paper. All the insects were reared from galls collected in summer, and then kept indoors and forced to overwinter two months in a fridge at 5 °C.

***Isocolus leuzeae* n. sp.**
(figs. 1-4)

Type material – Holotype female (in Museo Nacional de Ciencias Naturales, Madrid, card mounted, SPAIN, Burgos, Aranda de Duero, Monte de La Calabaza, 850 m UTM: 30TVM4914; ex gall in flower heads of *Leuzea confifera* (L.) (Asteraceae) gall collected on 6/VIII/1998, insect emerged VI/1999, L.A. Parra leg. – **Paratypes:** 1 ♂, 3 ♀, same data as holotype, in Museo Nacional de Ciencias Naturales, Madrid (catalogue number 9025); 5 ♂, 13 ♀, La Rioja, Enciso, ex galls on *Leuzea confifera* collected 9/VIII/1998, emerged VI, 1999.

Additional material: Guadalajara, Chiloeches, 31/VII/2001, Madrid, Valgallego, 4/VIII/2002, galls collected on *Leuzea confifera* (Nieves-Aldrey leg.).

Description – Adult. Body length, measured from anterior margin of head to posterior margin of metasoma, 2.5-2.8 mm (n = 4) for females; 2 mm (n = 1) for male. Coloration black; basal half of metasoma, mouthparts, antennal flagellum and legs, excepting coxae and basal half of femora, reddish brown.

Head. Dorsal view slightly more than two times as broad as long. POL about 1,4 times OOL, posterior ocellus separated from inner orbit of eye by about 2,5 times its diameter. In anterior view (fig. 1A) 1,2 times as broad as high; lower face not keeled medially; with facial striae radiating from clypeus, scarcely reaching compound eyes and lower margin of antennal sockets. Upper face and vertex coriarius; median frontal carina and lateral frontal carinae absent. Ocellar plate distinctly raised. Lateral margin of gena bowed, height of malar space about 0.5 times the height of compound eye. Clypeus subquadrate. Ventral margin of clypeus slightly projecting. Anterior tentorial pits small but clearly indicated. Epistomal sulcus and clypeo-pleurostomal lines weakly marked. Antennal sockets situated at mid-height of compound eye; distance between antennal rim and compound eye 1.2 times as long as width of antennal socket including rim.

Occiput with alutaceous sculpture (fig. 1B). Without occipital carina; only some weak transverse rugae present above occipital foramen. Gular sulci free, well separated at hypostomata. Oral foramen more than about 1,5 times as long as occipital foramen; distance between oral and occipital foramina slightly shorter than height of occipital foramen.

Mouthparts. Mandibles moderately large, right mandible with three teeth; left with two teeth. Maxillary stipes about three

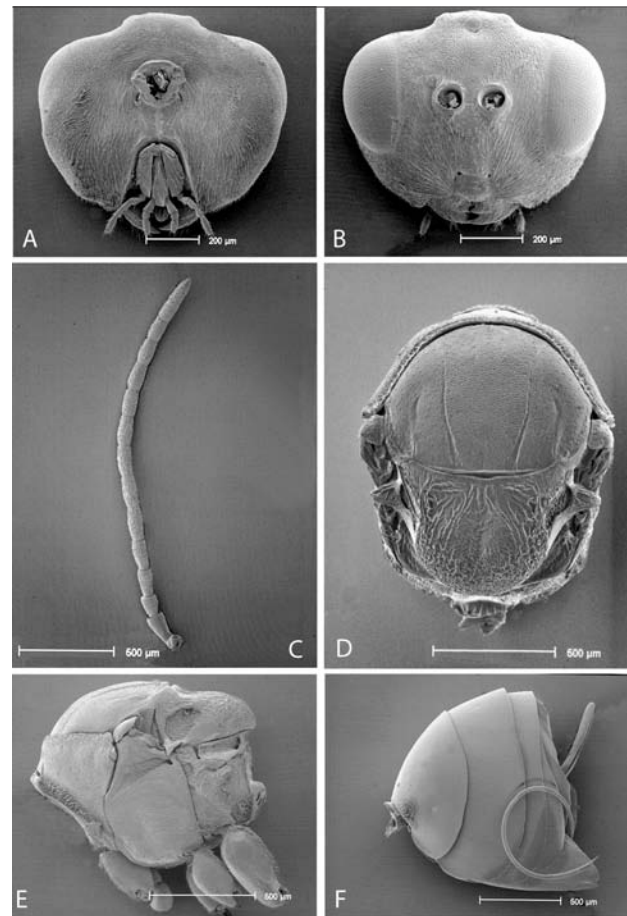


Figure 1
Isocolus leuzeae n. sp., female (SEM). – A, head anterior view. – B, head posterior view. – C, antenna. – D, mesosoma dorsal view. – E, mesosoma lateral view. – F, metasoma lateral view.

times as long as broad. Maxillary palp five-segmented: first segment very short, as broad as long; second to fourth segments about 1,5 times as long as broad; fifth segment long, two times as long as fourth. Labial palp three-segmented: first and third segments subequal, second segment about 0,5 times as long as first and third.

Female antenna (fig. 1C) 0.7 times as long as body, with 13 antennomeres. Elongate placodeal sensilla present on all flagellomeres excepting first. Scape 1.4 times as long as pedicel, pedicel almost 0.7 times as long as F1. Length of F1 0,8 times length of F2. F3 2.1 times as long as broad. Ultimate flagellomere 2.2 times as long as penultimate. Male antenna. 14 antennomeres. F1 slightly curved. Length of F1 0.8 times length of F2.

Mesosoma. Pronotum medially long (high), in anterior view ratio of median distance between anterior and posterior margins to lateral distance between these margins about 0.5. Submedian pronotal depressions oval transverse, deep, open laterally, broadly separated. Posterior pronotal plate without sculpture. Lateral surface of pronotum coriarius.

Mesonotum (fig. 1D). Scutum shining, minutely alutaceous. Median mesoscutal impression weakly impressed in posterior one sixth of mesoscutum. Notauli narrow and shallow, broader and convergent in posterior one third of mesoscutum, slightly

faint anteriorly. Scutellar foveae with irregular sculpture, separated by a broad septum; their inner posterior margins indistinct. Dorsal surface of scutellum rugose, medially with a shallow longitudinal furrow. Posterodorsal and posterior margins of

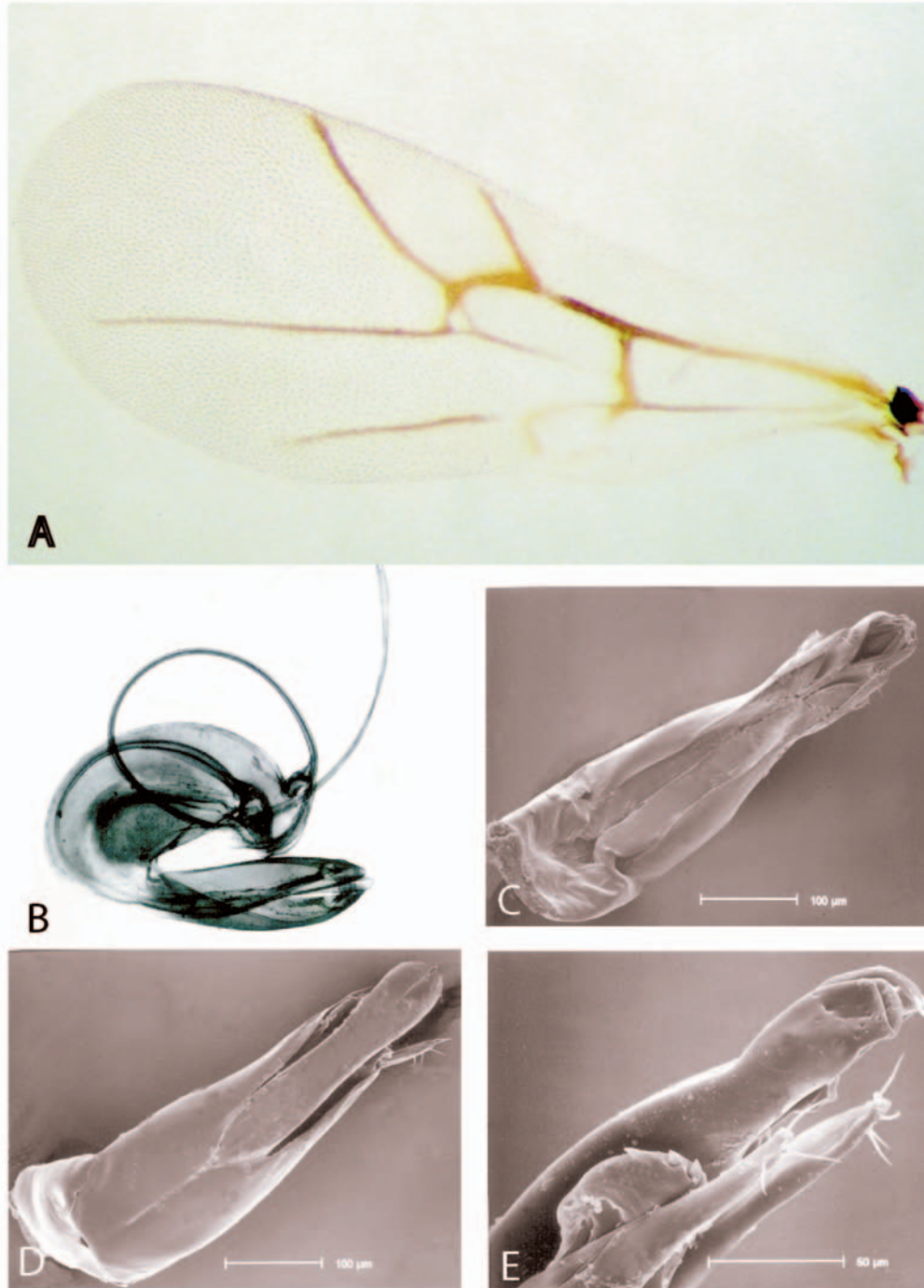


Figure 2
Isocolus leuzeae n. sp., female. – A, left forewing (LM). – B, ovipositor, lateral view from the left side (LM). – C, phallus ventral view (SEM). – D, phallus dorsal view (SEM). – E, phallus lateral view (SEM).

axillula distinct. Lateral shining strip extended dorsoposteriorly. Mesopleuron beneath mesopleural triangle longitudinally costulate and shining (Fig. 1E). Mesopleural triangle distinctly impressed, ventral margin clearly marked.

Metanotum. Metascutellum conspicuously constricted medially. Bar ventral to metanotal trough almost smooth. Metanotal trough narrow.

Metapectal-propodeal complex. Metapleural sulcus meeting anterior margin of metapectal-propodeal complex slightly above mid-height of latter. Lateral propodeal carinae relatively broad and flattened above, slightly divergent. Lateral and median propodeal area smooth and sparsely pubescent. Nucha moderately long dorsally, longitudinally rugose.

Legs. Claws without a basal lobe or tooth.

Forewing (fig. 2A). As long as body, hyaline and pubescent. Marginal cell open along anterior margin. R_1 ending near anterior margin of wing; first abscissa of radius ($2r$) curved and radius (R_s) slightly bowed. Areolet present, closed by nebulous to tubular veins. Hair fringe along apical very short to almost absent.

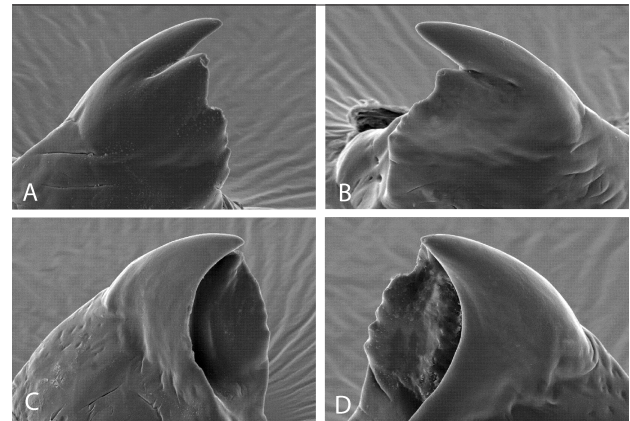


Figure 3
Isocolus leuzeae n. sp., mandibles of the larva (SEM). – A, left, dorsal view. – B, right, dorsal view. – C, left, ventral view. – D, right, ventral view.

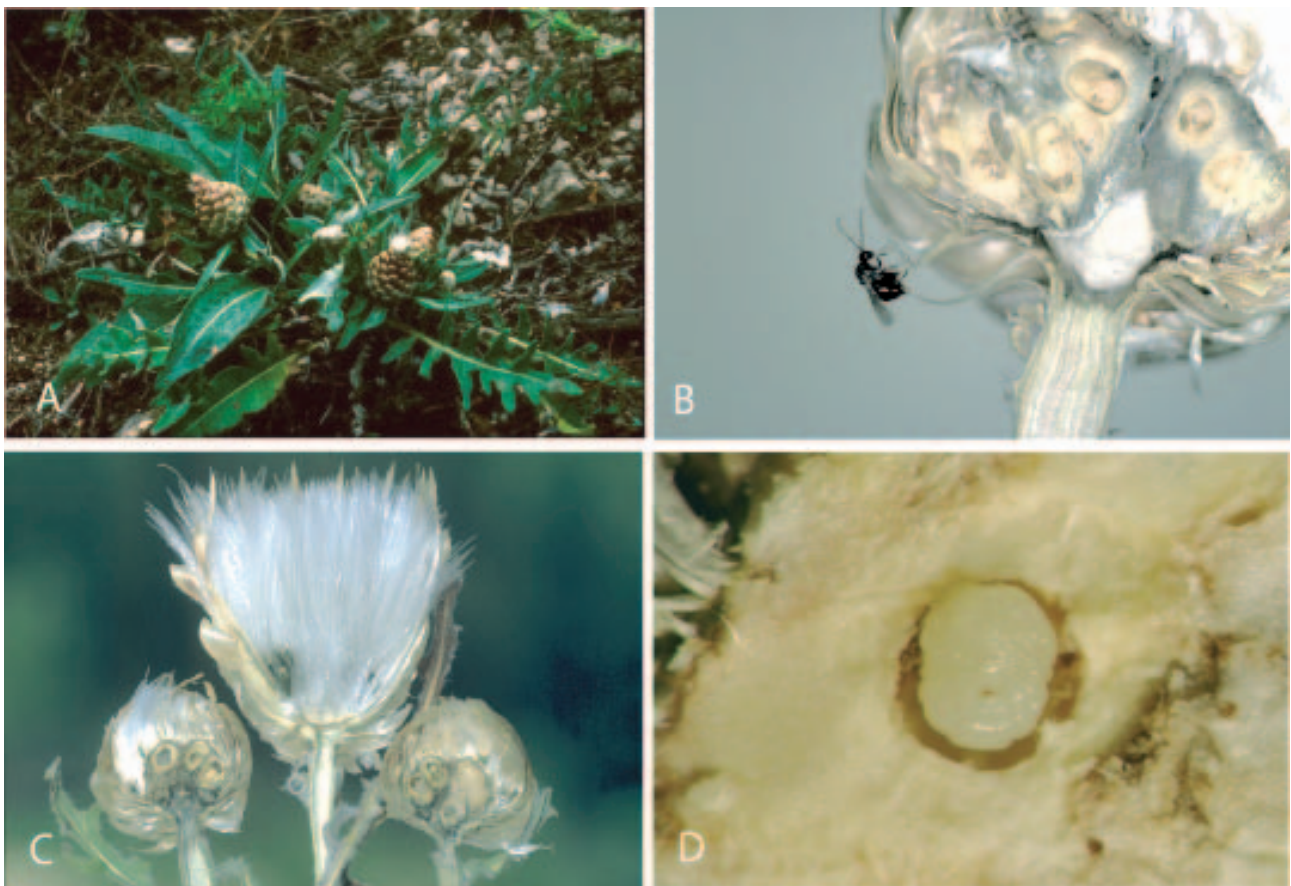


Figure 4
Isocolus leuzeae n. sp., host plant and gall. – A, host plant, *Leuzea conifera*. – B, longitudinal section of a galled head flower and an adult female. – C, normal mature head flower (centre) and galled ones (lateral). – D, detail of a dissected larval chamber with a larva.

Metasoma. Female metasoma (fig. 1F). Third abdominal tergum covering about one third of metasoma, with a small hair patch antero-medially, about 1,5 times as long as fourth tergum along dorsal curvature of metasoma. Fourth to seventh terga, sometimes posterior part of third tergum as well, very minutely but distinctly and densely micropunctate, nude. Ventral spine of hypopygium not projecting, united almost to apex with the lateral flaps. Ovipositor (fig. 2B). Basal part of ovipositor curved spirally almost 360 degrees. Terebra apically serrate.

Male metasoma. Similar to female metasoma excepting as follows: Third tergum slightly more than twice as long as fourth tergum; without lateral pubescent patch; micropunctures present at posterior part of tergum.

Phallus (fig. 2C-E). Apical part of aedeagus only slightly expanded subapically. Length of paramere relatively long, reaching beyond digitus. Basidorsal margin of parameral plates almost straight.

Larva. The larva is a typical white U shaped, apodous, 13-segmented cynipid larva (fig. 4D). Mandibles have two teeth of different size, the external longer and stronger. Basal tooth of right mandible is smaller than basal tooth of left mandible (Fig. 3A-D).

Gall (fig. 8). Galls are formed in flower heads of *Leuzea conifera* (fig. 4A). The achenes are transformed into unilocular oval galls with tough walls (fig. 4B, D). Galled achenes are fused forming a mass. Galled flower-heads are distinguished from normal ones by their smaller size, the galled mass remaining almost entirely enclosed by the head flower involucre bracts (fig. 4C).

Diagnosis and identification – Closely related to *Isocolus lichtensteini* (Mayr) that induces galls on stems of *Centaurea aspera* and *C. melitensis* in the Mediterranean region. In the key to species of *Isocolus* included in the monography of Iberian Cynipidae (Nieves-Aldrey 2001), the new species differs from *I. lichtensteini* as follows:

- Scutellum without longitudinal depression; scutellar foveae smooth and shining and with their anterior margins closer. Forewing with first abscissa of radius weakly angled and radius almost straight. Punctures on metasomal tergites weak and faint. Galls in stems of *Centaurea aspera* and *C. melitensis* . . . ***Isocolus lichtensteini***
- Scutellum with a weakly longitudinal depression; scutellar foveae with their anterior margins more broadly separated, with rugulose sculpture (fig. 3A). First abscissa of radius curved and radius slightly bowed (fig. 4). Punctures on metasomal tergites more clearly impressed. Galls in achenes of *Leuzea conifera* ***Isocolus leuzeae*** n. sp.

Etymology – Named after its host plant.

Biological data – The species induces galls inside flower heads of *Leuzea conifera* (Asteraceae). The life cycle is typically univoltine as in most Aylacini. Baumann & Brandl (1992) observed that in most *Isocolus* species from Europe, galling flower heads of *Centaurea* species, males were absent indicating parthenogenetic reproduction. However it is not the case for the new species where males are not rare and the reproduction appears to be bisexual. Adult gall-wasps emerge in late spring or early summer when the host plant are available in the field. Galls develop and mature in summer and fully-grown larva are found inside in September. Insects overwinter as larvae inside the galls and pupate next spring.

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