Acta Zoologica Academiae Scientiarum Hungaricae 52 (4), pp. 385–399, 2006

NEW SPECIES OF HERB GALLING CYNIPIDS (HYMENOPTERA: CYNIPIDAE: AYLACINI) FROM IRAN

MELIKA, G.[1] and GHARAEI, B.[2]

[1]*Systematic Parasitoid Laboratory, Plant Protection and Soil Conservation Service of County Vas Kelcz-Adelffy str. 6, Kőszeg, 9730 Hungary; E-mail: melikageorge@freemail.hu*
[2]*Department of Plant Pests and Diseases Research, Agricultural Research Center P.O.Box 386, Ilam, Iran; e-mail: bgharaei@yahoo.com*

New species of aylacine gall wasps, *Isocolus tinctorius* and *Aulacidea irani* (Hymenoptera: Cynipidae: Aylacini) from Iran are described. Data on the diagnosis, distribution and biology of new species are given. In fact, these are the first herb galling cynipids known from Iran.

Key words: *Isocolus*, *Aulacidea*, taxonomy, description, morphology, dsitribution

INTRODUCTION

The Cynipinae (Hymenoptera: Cynipidae) are divided into two main trophic groups: the gall-inducers, and the gall-associated inquilines, which together make up six tribes. The gall-inducers are divided into five tribes, one of which is Aylacini, known to induce galls on different herbaceous plants. Recent phylogenetic studies have shown this group to represent a basal paraphyletic assemblage within the Cynipinae, in contrast to other tribes which are thought to represent true, monophyletic groups (LILJEBLAD 2002, LILJEBLAD & RONQUIST 1998, RONQUIST & LILJEBLAD 2001). Nevertheless, the Aylacini share a number of biological characters that make it useful to treat them as a group. The Aylacini have been revised by WELD (1952) and EADY and QUINLAN (1963), with a recent generic revision by NIEVES-ALDREY (1994). The Aylacini comprise a group of primitive genera of gall-inducers that induce structurally simple galls, predominantly in the stems, fruits and seeds of herbaceous plants.

The aylacine gall wasp fauna (Hymenoptera: Cynipidae: Aylacini) of Iran is nearly unknown. No aylacine species were mentioned in the literature for Iran. Even in DALLA TORRE and KIEFFER (1910) Cynipidae world fauna catalogue no aylacine species are mentioned for Iran. In fact, these are the first two species of aylacine wasps listed for Iran.

In this paper we describe two new species, *Isocolus tinctorius* and *Aulacidea irani*, both sexual forms, and give some data on the distribution and biology of these species.

We follow the current terminology of morphological structures (GIBSON 1985, RONQUIST & NORDLANDER 1989, FERGUSSON 1995). Abbreviations for forewing venation follow RONQUIST and NORDLANDER (1989). Measurements and abbreviations used here include: F1–F12, 1st and subsequent flagellomeres; POD (post-ocellar distance) is the distance between the inner margins of the posterior ocelli; OOD (ocellar-ocular distance) is the distance from the outer edge of a posterior ocellus to the inner margin of the compound eye; LOD, the distance between lateral and frontal ocellus. Width of radial cell measured along 2r.

Pictures of some structures of adult wasps were made by digital camera, after that were worked up in AdobePhotoshop 6.0, printout and then linear drawings were made from them.

Isocolus tinctorius MELIKA et GHARAEI, sp. n.
(Figs 1–10)

Description – Female. Head and mesosoma black or dark brown, in some specimens pronotum, mesopleuron much lighter, metasoma light brown to reddish; antenna light brown; legs brown to light brown, except dark brown to black coxae. Head black, with dark brown clypeus and mandibles, with few short white setae frontally and laterally, with more densely pubescent postgena and postocciput. Head 1.9 times as broad as long from above, 1.3 times as broad as high in front view (Fig. 1), slightly broader than mesosoma. POD only 1.1 times as long as OOD; LOD 0.5 times as long as POD, 0.5 times as long as OOD and 2.7 times as long as diameter of frontal ocellus; frons with small depressed area under frontal ocellus (Fig. 2). Vertex, interocellar area, frons and occiput delicately coriaceous, vertex rounded, without occipital carina; transfacial distance 1.2 times as long as height of eye, 1.5 times as long as height of lower face (distance between antennal socket and ventral margin of clypeus); distance between antennal rims 0.4 times as long as distance between antennal rim and inner margin of eye and 0.3 times as long as diameter of antennal socket (Fig. 1). Gena finely uniformly coriaceous, not broadened behind eye, nearly 2.0 times as short as diameter of eye, measuring along transfacial line; malar space without sulcus, 0.6 times as long as height of eye; anterior tentorial pit shallow, epistomal sulcus slightly impressed, distinct; central part of lower face slightly elevated, coriaceous. Malar space and lower face, except median elevated area, with strong striae radiating from clypeus and reaching inner margins of eyes and extending into the area between eye and antennal socket (Fig. 1). Postgena finely coriaceous; postocciput impressed, finely coriaceous; posterior tentorial pits deep. Antenna light brown, except dark brown do black scapus, 13-segmented, F4 the longest flagellomere, ratio of scape, pedicel and subsequent flagellomeres follows: 1.0:0.73:1.0:1.13:1.26:1.33:1.0:1.0:1.0:0.86:0.8:0.8:1.7 (Fig. 3). Mesosoma 1.2 times as long as high. Pronotum dark brown, uniformly delicately coriaceous, very densely pubescent laterally along anterior edge, less pubescent laterally and dorsally, dorso-medially long, 2.5 times as short as greatest length on outer lateral margin. Submedian pronotal pit narrow, transverse, separated by a slightly impressed median carina; pronotal plate dark brown to black, with very few short white setae, well-delimited in anterior half, as broad as long (Fig. 5). Propleuron black to dark brown, coriaceous, with transverse delicate striae. Scutum 1.2 times as broad as long in dorsal view; notauli complete, reaching pronotum, smooth and shining, broadened posteriorly; anterior parallel lines distinct, smooth, shining, extending to 1/3 of scutum length; parapsidal lines indistinct, smooth, shining and narrow, extending to half length of scutum; median mesoscutal line absent (Fig. 6); internotauli area and area between parapsidal line and notaulus transversely minutely sculptured, area lateral to parapsidal line longitudinally very finely striate; entire scutum with uniform short white setae (Fig. 6). Scutellum with parallel sides, nearly as broad as long in dorsal view, slightly overhanging metanotum; dark

brown disk of scutellum in anteromedian narrowed part, coriaceous, with mainly transverse striae; posteromedially and laterally dull rugose, with few short white setae; slightly impressed posteromedially. Scutellar foveae black, large, smooth and mat, separated by central carina (Fig. 6). Dorso-axillar area with longitudinal parallel fine striae (Fig. 6). Mesopleuron dark brown, turn black ventrally, uniformly finely transversely striate; acetabular carina anteroventrally delimiting a broad area on mesopeluron. Forewing margin with short cilia, veins light brown; areolet small, triangular, well-delimited by veins, Rs and R1 not reaching wing margin; radial cell 2.5 times as long as broad, Cu1b curved strongly outwards wing margin (Fig. 7). Legs light brown, except dark brown or partially black coxae, tarsi lighter, tarsal claws simple, without basal lobe. Propodeum dark brown, finely coriaceous, with uniform dense white setae laterally from black, narrow central propodeal area, delimited by subparallel lateral propodeal carinae which in anterior half 3.0 times thicker and higher than in posterior half, central propodeal area without setae, with irregular wrinkles; propodeal spiracle transverse, with strong raised carina along anterior border. Dorsellum dull rugose, impressed, merged with ventral impressed area; metanotal trough coriaceous, with sparse short white setae (Fig. 8); metapleural sulcus reaching mesopleuron in upper 1/3 of its height; axillula finely coriaceous, with dense white setae hidding the sculpture; nucha black with strong longitudinal paralell ridges (Fig. 8). Metasoma light brown to reddish, metasomal tergite 2 with small antero-lateral patch of white short setae, smooth, with indistinct punctures in posterior 1/3; subsequent tergites and hypopygium uniformly finely densely punctate; prominent part of ventral spine of hypopygium very short with very few short white setae (Fig. 9). Body length 3.0–3.5 mm.

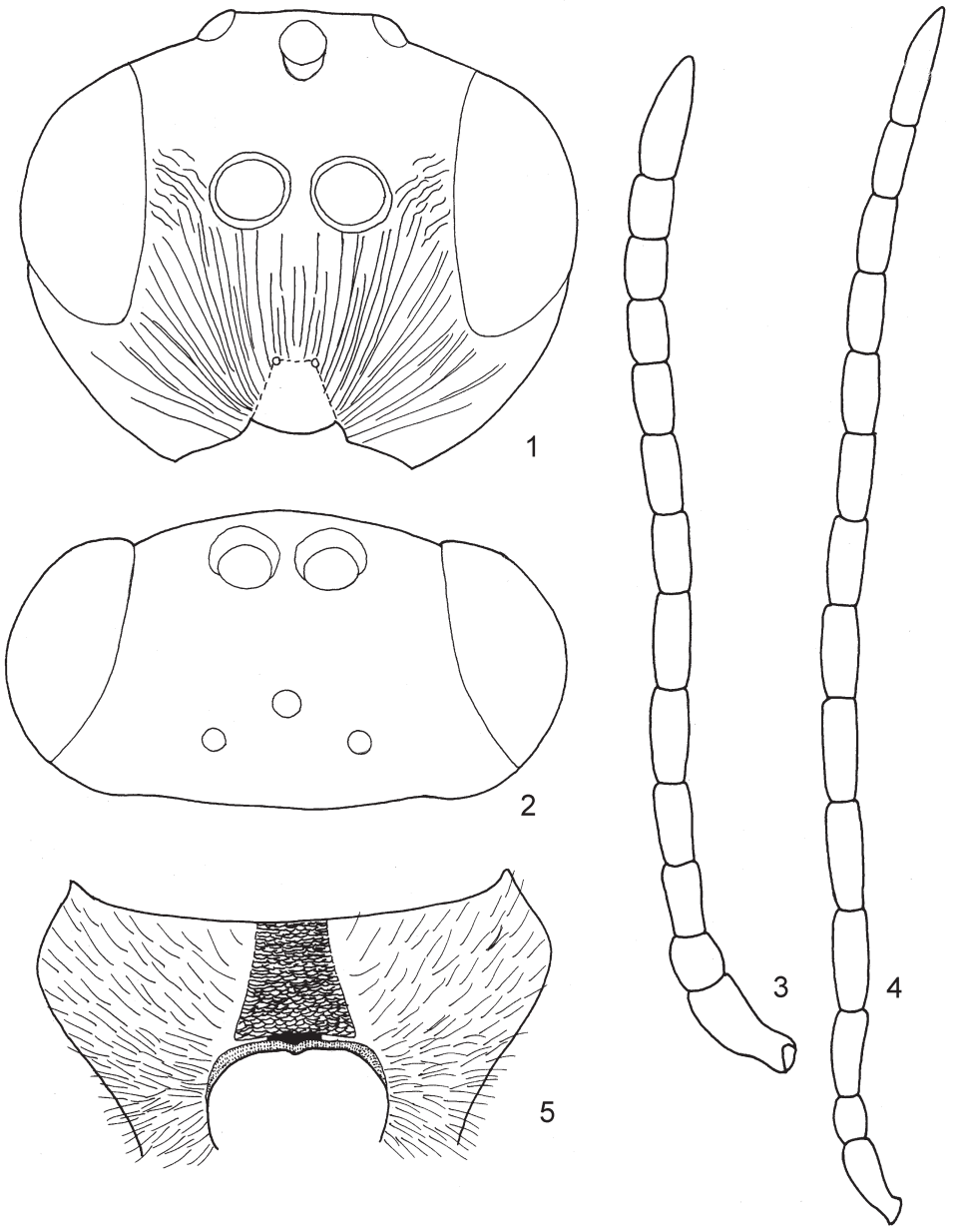
Male differs in 14-segmented antenna, with F1 very slightly curved, ratio of scapus, pedicel and subsequent 12 flagellomeres follows: 1.0:0.47:1.0:1.2:1.29:1.23:1.11:1.0:1.0:0.94:0.94:0.88:0.88:1.53 (Fig. 4).

Type material — Holotype female: “Iran, Ilam Province, Shirvan Chardavol city. 2003.V.31. Leg. Babak Gharaei”, “ex gall in flowerhead of *Carthamus tinctorius*”, 8 female and 8 male paratypes with the same label as the holotype.

Holotype, 1 female and 1 male paratypes in the Hungarian Natural History Museum (HNHM), Budapest, Hungary, 5 female and 5 male paratypes in the cynipid collection of Systematic Parasitoid Laboratory, Plant Protection and Soil Conservation Service of County Vas (SPL), Kőszeg, Hungary; 2 female and 2 male paratypes in the Museo Nacional de Ciencias Naturales, Madrid, Spain.

Etymology — The species is named after the scientific name of the host plant, *Carthamus tinctorius* L. (Asteraceae), which on the species induces flowerhead galls.

Diagnosis — *Isocolus tinctorius*, sp. n. belongs to the group of species with the mesoscutum finely transversely sculptured (usually transverse striae are delicate, thin and dense). Most closely related to *Isocolus carthami* DIAKONTSCHUK, 2003 described from Ukraine, Crimea, from flower heads of *Carthamus lanatus* L. (DIAKONTSCHUK 2003). In *I. carthami* the lower face with dense, white, very short piliferous setae (points), which hide the very minute radiating striae; the pronotum and scutellum are black; the median mesoscutal line visible in the posterior 1/3; scutellar foveae are distinctly delimited all around, deep and narrower, smooth and shining; the disk of the scutellum behind the scutellar foveae finely coriaceous as the entire disk; metasomal tergite 2 without antero-lateral patch of white setae, smooth, without punctures in posterior 1/3. In *I. tinctorius*, sp. n. the lower face

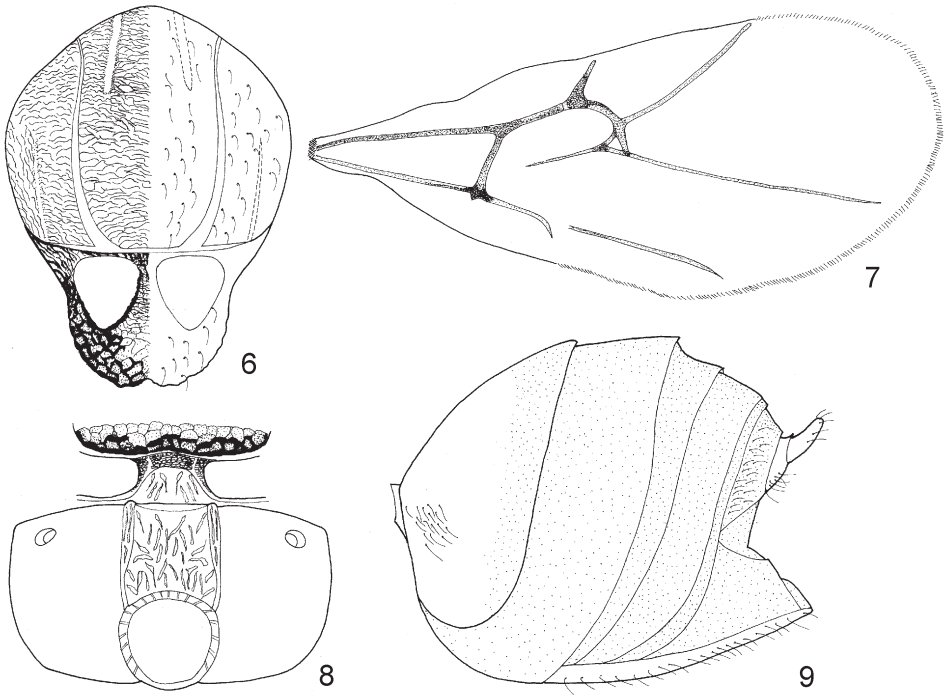


Figs 1–5. *Isocolus tinctorius*, sp. n. – 1–2 = head: 1 = front view, 2 = dorsal view. 3–4 = antenna: 3 = female, 4 = male. 5 = pronotum, dorsal view.

with much less dense piliferous white setae (points), radiating striae are stronger, distinct, not hidden by white piliferous points; the pronotum and scutellum are dark brown; the median mesoscutal line absent; scutellar foveae indistinctly delimited posteriorly, deep and large, longer than broad, smooth, mat; the disk of the scutellum between scutellar foveae finely coriaceous, while behind foveae is dull rugose; metasomal tergite 2 with small antero-lateral patch of white sparse short setae, smooth, with indistinct punctures in posterior 1/3.

Isocolus tinctorius, sp. n. also closely resembles three other species: *Isocolus centaureae*, *I. scabiosae*, and *I. serratulae*.

In *Isocolus scabiosae* (GIRAUD, 1859) metasomal tergite 3 with punctures in the posterior 1/3; the transfacial distance 1.6 times as long as height of the eye; the mesoscutum with strong transverse striae posteriorly, the median mesoscutal line distinct in posterior half; the radial cell of the forewing is about 3.0 times as long as broad; induces stem and flowerhead galls on *Centaurea* species. In *I. tinctorius,* sp. n. metasomal tergite 3 entirely uniformly densely punctate (Fig. 9); the transfacial distance only 1.2 times as long as height of the compound eye (Fig. 1); the meso-



Figs 6–9. *Isocolus tinctorius*, sp. n.: 6 = scutum and scutellum, dorsal view. 7 = forewing. 8 = propodeum and metanotum, dorsal view. 9 = metasoma of female, lateral view

scutum is uniformly delicately transversely striate, the median mesoscutal line absent (Fig. 6); the radial cell of the forewing only 2.5 times as long as broad (Fig. 7).

In *Isocolus serratulae* (MAYR, 1882) the median mesoscutal line extending at most to 1/5 of the mesoscutum length; the scutellum reticulate-coriaceous; metasomal tergite 3 with punctures only in the posterior 1/3; the transfacial distance around 1.5 times as long as the height of the compound eye; F1 of the female antenna is clearly shorter than F2; cilia on the forewing margin is very indistinct; induces galls on *Serratula* species. In *I. tinctorius*, sp. n. the median mesoscutal line absent; the scutellum dull rugose (Fig. 6); the transfacial distance only 1.2 times as long as height of the compound eye; F1 nearly equal F2 (Fig. 3); cilia on the forewing margin is short but distinct (Fig. 7).

Isocolus centaureae DIAKONTSCHUK, 1982 resembles *I. tinctorius*, sp. n. in its entire habitus, minutely transversely sculptured mesoscutum, absence of the median mesoscutal line, metasomal tergite 2 smooth, without punctures, while subsequent tergites are uniformly and densely micropunctate. However, differs in 12-segmented antennae in the female, submedian pronotal pits are separated by a distinct elevated broad carina; the head is rounded in front view, the lower face with very delicate radiating striae, the acetabular carina on the mesopleuron delimiting a very narrow area; scutellar foveae are smaller, with transverse rugae on the bottom; lateral propodeal carinae subparallel, uniformly broad; induces flowerhead galls in *Centaurea diffusa* Lam. and *C. squarrosa* (Boiss.) (DIAKONTSCHUK 1982). In *I. tinctorius*, sp. n. the female antenna 13-segmented; submedian pronotal pits are indistinctly separated by an impressed very narrow area; the lower face with strong radiating striae, partially present on the median elevated area (Fig. 1); scutellar foveae are larger, with smooth mat bottom (Fig. 6); lateral propodeal carinae narrow in posterior half and around 3.0 times broader in the anterior half (Fig. 8).

Gall structure and location – Galls are scattered at the base of the flower head of *Carthamus tinctorius* (Fig. 10a, arrowed). Two types of galls' location were found. Few galls are forming in the ovary, which is deformatted, after the larva hatched from the egg and gradually modifying it into a cylindrical whitish gall, with thick wall and rounded tip and afterwards the growing of the ovary is stopped. As the larva growth, the width of the gall increasing and becaming nearly similar to a healthy seed. The gall, when mature becoming dark brown to blackish (Fig. 10b). This type of the gall is very rare. Majority of galls are on brackts (Figs 10c-d). Each flower head contain only one gall, very rarely two. Each brackt has only one gall. The location of galls on brackts vary – from the base to the tip, but more frequently they are forming on the upper part of brackts. Galls at the base of brackts are elongated, elliptical, green when young, with very hard and smooth wall, 3.0–6.0 mm

in length and 1.2–1.9 mm in diameter. After maturing, similarly to the flower head, they are becoming yellow. Galls on free parts of brackts are rounded, spherical, 1.0–2.0 mm in diameter, or somewhat elongated (2.1–3.5 mm long and 1.5–2.0 mm in diameter), green, with smooth, very hard and thick wall.

Biology – The sexual generation is known to induce galls in the flowerheads of *Carthamus tinctorius* L. (Asteraceae). Adult wasps emerge in late May–June.

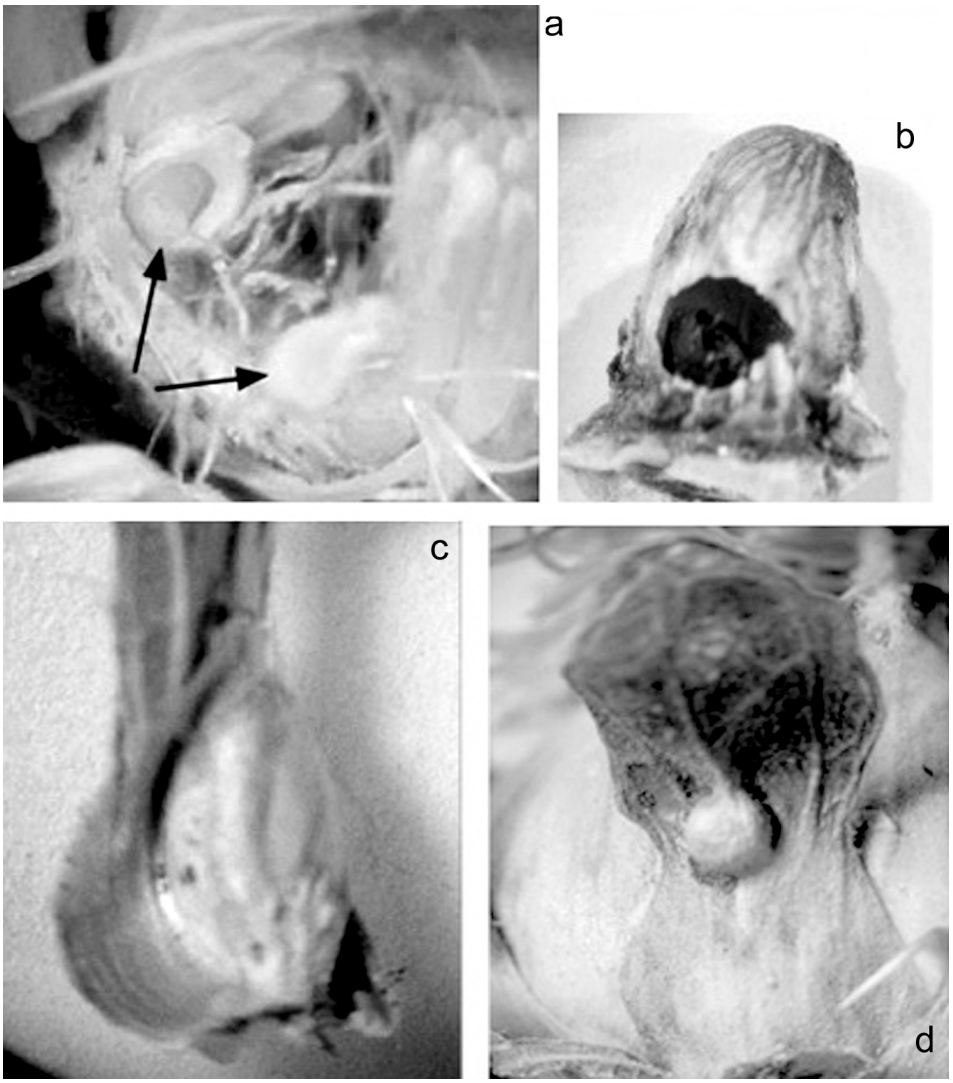


Fig. 10. *Isocolus tinctorius*, sp. n., gall: a = galls (arrowed) in the flower head of *Carthamus tinctorius*, b = mature gall cell, c,d = galls on bracts

Comments – BELIZIN (1959) redescribed an aylacine wasp, *Phanacis carthami* GUSSAKOVSKY, 1933, collected in Uzbekistan and known to induce root galls on *Carthamus tinctorius*. On the basis of the redescription, given by BELIZIN (1959), it is a good *Phanacis* species. Recently, this species was found in Ukraine, Crimea and was reared from stem galls on *Carthamus lanatus* L. (DIAKONTSCHUK 2003). So, taken into account the recently described *I. carthami*, *Isocolus tinctorius*, sp. n. is the third known cynipid gallwasp species associated with *Carthamus* spp.

Distribution – Currently known from Iran, Ilam Province. Probably, distributed in Iraq as well ABDUL-RASSOUL (1980).

Natural enemies – *Isocolus tinctorius*, sp. n. is a minor pest of *Carthamus tinctorius* and have no economic importance in Ilam province in the present time. Three species of parasitoids were reared from the galls: *Sycophila submutica* (THOMSON, 1876) (Eurytomidae), O*rmyrus gratiosus* (FÖRSTER, 1860) (Ormyridae), and *Adontomerus crassipes* (BOUČEK, 1982) (Torymidae). *Ormyrus gratiosus* has been distributed in all parts of the province and appeared to be a more frequent parasitoid than two others. *Sycophila submutica* and *A. crassipes*, were found only in the southern part of Ilam province and nearly 1% of gall wasp larvae were parasitized by them.

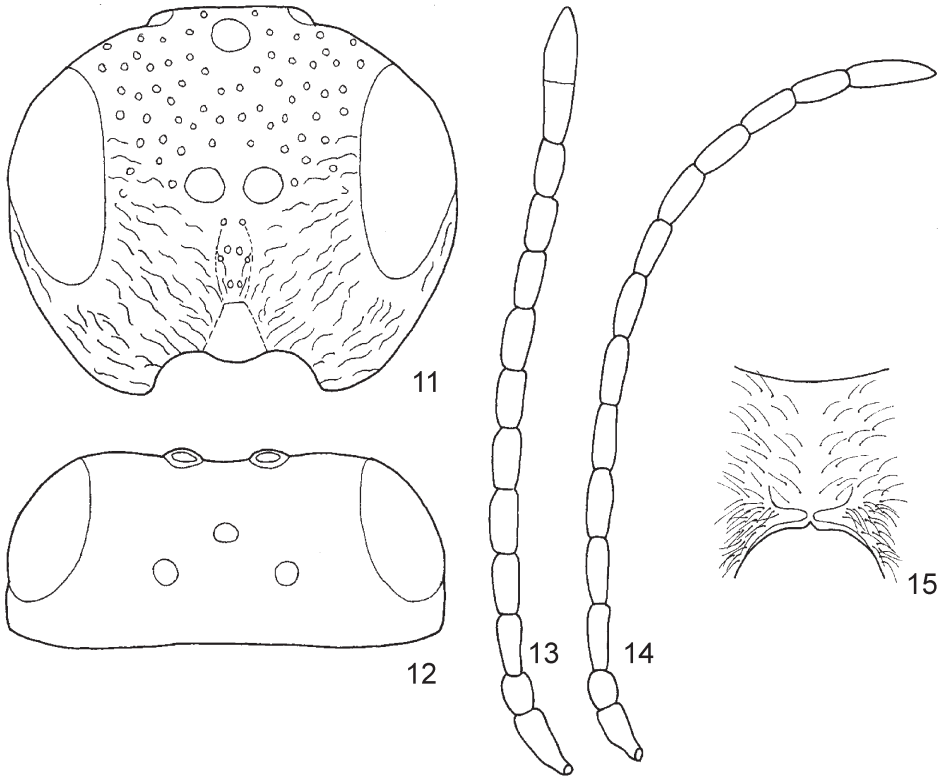
Sycophila submutica is a widespread Western Palaearctic species, known as a parasitoid in galls of aylacine wasps. MAYR (1905) and CLARIDGE (1959) mentioned that this *Sycophila* species trophically associated with those aylacine wasps, which induce galls on Asteraceae only, what is supported by NIEVES-ALDREY (2001), who reared this species only from *Aulacidea hieracii* (BOUCHÉ, 1834), *Isocolus lichtensteini* (MAYR, 1882), *I. scabiosae* (GIRAUD, 1859), and *Phanacis centaureae* FÖRSTER, 1860. ZEROVA (1995) mentioned also *Liposthenes glechomae* (LINNAEUS, 1758) (galls on *Glechoma hederaceae* L., Lamiaceae) and *Aulacidea ascanica* DIAKONTSCHUK, 1984 (galls on *Serratula xeranthemoides* M. B., Asteraceae) in between *S. submutica* hosts.

ABDUL-RASSOUL (1980) described a new eurytomid parasitoid species, *Sycophila emarginata*, reared from galls of an undescribed species of *Isocolus* in the flower heads of *Carthamus oxyacanthus* M. Bieb. collected in Iraq in 1977–1979.

Ormyrus gratiosus earlier was cited as a parasitoid of *Isocolus scabiosae* only (NOYES 1998), while *Adontomerus crassipes* was reared from galls of *I. lichtensteini* and was known from Algeria and Spain only (NOYES 1998, NIEVES-ALDREY 2001).

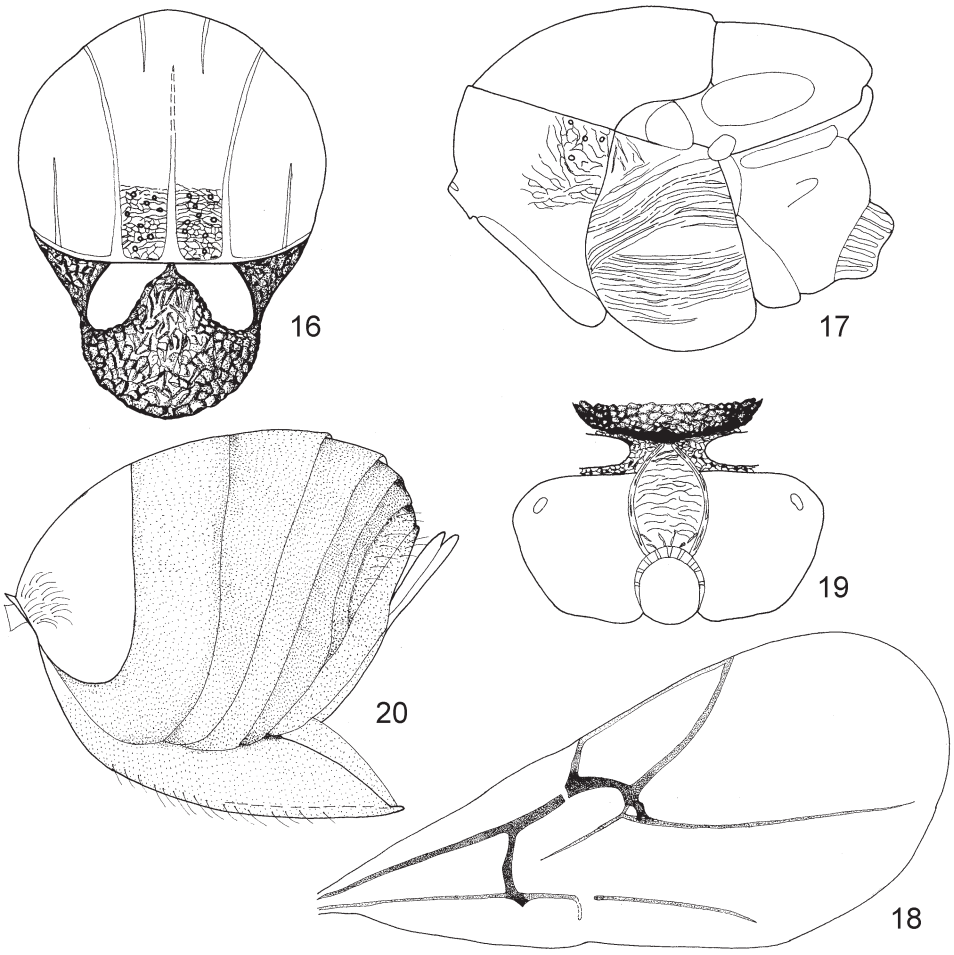
Aulacidea irani MELIKA et GHARAEI, sp. n.
(Figs 11–20)

Description – Female. Body black, except light brown legs and grey compound eyes. Head black, except brown mandibles; with very few short white setae on vertex and frons; lower face, gena, malar space, occiput, postocciput and postgena more densely pubescent. Head 2.5 times as broad as long from above, only 1.1 times as broad as high in front view (Fig. 11); slightly broader than mesosoma. POD 1.35 times as long as OOD; LOD 0.5 times as long as POD, 0.65 times as long as OOD and 1.8 times as long as diameter of lateral ocellus; frons with small depressed area under frontal ocellus (Fig. 12). Vertex, interocellar area, frons and occiput delicately coriaceous, vertex rounded, without occipital carina; frons and interocellar area with very distinct punctures; transfacial distance 1.2 times as long as height of eye, 2.0 times as long as height of lower face (distance between antennal socket and ventral margin of clypeus); distance between antennal rims 0.2 times as long as distance between antennal rim and inner margin of eye and 0.4 times as long as diameter of antennal socket (Fig. 11). Gena uniformly finely coriaceous, very slightly broadened behind eye, malar space without sulcus, 0.6 times as long as height of eye; anterior tentorial pit indistinct, epistomal sulcus



Figs 11–15. *Aulacidea irani*, sp. n.: 11–12 = head: 11 = front view, 12 = dorsal view. 13–14 = antenna: 13 = female = 14 = male. 15 = pronotum, dorso-median part, dorsal view

only slightly impressed, distinct; median elevated area of lower face coriaceous, with few distinct punctures. Gena, malar space and lower face, except median elevated area, with very delicate, hardly traceable radiating striae (Fig. 11). Postgena finely coriaceous, postocciput impressed, finely coriaceous, posterior tentorial pits deep. Antenna uniformly black, with very short white setae on flagellomeres, 13-segmented, scape longer than F1, pedicel 1.5 times as short as F1; F1-F5 nearly equal in length, F6-F10 nearly equal in length, very slightly shorter than F1-F5, F11 1.5 times as long as F10 (Fig. 13). In some specimens suture between F10 and F11 indistinct and giving a false view of 12-segmented antenna. Mesosoma black, 1.3 times as long as high in lateral view (Fig. 17). Pronotum measuring prolong dorsomedian line 1.8 times as short as greatest length on outer lateral margin; uniformly delicately coriaceous, with some distinct punctures and parallel striae laterally (Fig. 17); very



Figs 16–20. *Aulacidea irani*, sp. n.: 16 = scutum and scutellum, dorsal view. 17 = mesosoma, lateral view. 18 = forewing. 19 = propodeum and metanotum, dorsal view. 20 = metasoma, female, lateral view

densely pubescent laterally along anterior edge, less pubescent dorsolaterally and with few short setae dorsomedially on pronotal plate, which is indistinctly delimited; submedian pronotal pits transverse, distinct, separated by narrow carina (Fig. 15). Propleuron black, finely coriaceous, with transverse wrinkles, postero-lateral quarter bulging out. Scutum 1.24 times as long as broad, finely coriaceous, with scattered distinct punctures, with very minutely transverse sculpturing, especially in internotauli area. Notauli narrow, complete, reaching pronotum, finely broadened in posterior 1/3, shining smooth; median mesoscutal line deep, extending at least to 2/3 of scutum length; anterior paralellel lines reaching to 1/3 of scutum length; parapsidal line indistinct, very narrow, reaching to half of scutum length (Fig. 16). Scutellum black, with nearly parallel sides, nearly as long as broad, slightly overhanging metanotum, dull rugose, with more minute sculpture in between large, ovate, smooth and shining scutellar foveae, which separated by very narrow carina (Fig. 16). Dorso-axillar area finely coriaceous (Fig. 16). Mesopleuron black, with strong anterodorsal longitudinal impression under tegula, finely transversely striated, except coriaceous and densely pubescent lower ventral part, acetabular carina delimiting a very narrow area antero-ventrally (Fig. 17). Forewing margin with very indistinct cilia, veins distinct, dark brown, except marginal vein prolong radial cell; radial cell distinctly or obsoletely closed (in some specimens the marginal vein very indistinct, without pigmentation) or partially closed, 2.8 times as long as broad; areolet distinct, very small, rounded; Rs slightly curved; Cu1b curved strongly outwards wing margin (Fig. 18). All coxae, basal half of femurs black, rest of leg light brown, tarsal claws simple, without basal lobe. Propodeum black, laterally coriaceous, with dense white long setae; lateral propodeal carinae distinct, uniformly broad; central propodeal area with transverse parallel fine striae, uniformly densely pubescent; metanotal trough with dense white setae (Fig. 19). Dorsellum in posterior 2/3 impressed with transverse very delicate striae, in anterior 1/3 behind scutellum finely coriaceous; propodeal spiracle transverse, with strong raised carina along anterior border; metapleural sulcus reaching mesopleuron in upper 1/3 of its height; axillula finely coriaceous with dense white setae hidding the sculpture; nucha black with strong longitudinal parallel ridges (Fig. 19). Metasoma black to dark brown, metasomal tergite 2 smooth, without punctures, with antero-lateral patch of white setae; subsequent tergites uniformly and densely punctated; prominent part of ventral spine of hypopygium very short, with sparse short white setae (Fig. 20). Body length 2.8–3.2 mm.

Male similar to female but antenna 14-segmented, F1-F6 equal in length, F7-F11 also equal in length and very slightly shorter than F1-F6; F12 longest flagellomere, 1.5 times as long as F11; pedicel 1.8 times as short as F1; scape nearly equal to F1 (Fig. 14).

Type material – Holotype female: “Iran, Ilam Province, Ilam, 2003.V.08. Leg. Babak Gharaei”, “sweeping on *Echinops robostus* (Asteraceae)”, 9 female and 1 male paratypes with the same labels as the holotype.

Holotype and 2 female paratypes in the Hungarian Natural History Museum (HNHM), Budapest, Hungary, 2 female paratypes in the Natural History Museum (British Museum), London (NHML), 4 female and 1 male paratypes in the cynipid collection of Systematic Parasitoid Laboratory, Plant Protection and Soil Conservation Service of County Vas (SPL), Kőszeg, Hungary; 1 female paratype in the collection of the Schmalhausen Institute of Zoology, National Academy of Sciences of Ukraine, Kiev, Ukraine.

Etymology – The species is named after the country, Iran, where it was collected.

Diagnosis – Most closely resembles *Aulacidea hieracii* (LINNAEUS, 1758) and *A. subterminalis* NIBLETT, 1946, known to induce stem galls on *Hieracium* spp.(Asteraceae).

In *A. hieracii* the female antenna is much lighter, F1 equal F2; the frons and interocellar area are uniformly finely coriaceous, without punctures, the lower face and gena with distinct radiating striae; the radial cell only 2.5 times as long as broad, Rs straight; the pronotum measuring prolong the dorsomedian line is longer, 2.0 times as short as the greatest length on the outer lateral margin; the scutum without piliferous punctures. In *A. irani*, sp. n. the female antenna is black, F1 very slightly longer than F2; the frons and interocellar area are uniformly finely coriaceous, with distinct piliferous punctures, the lower face and gena with indistinct very minute radiating striae; the radial cell 2.8 times as long as broad, Rs slightly curved; the pronotum measuring prolong the dorsomedian line is shorter, only 1.8 times as short as the greatest length on the outer lateral margin; the scutum with piliferous punctures, the median mesoscutal line usually longer and deeper.

Aulacidea subterminalis is very closely related to *A. hieracii*, differs mainly in lighter colouration, stronger radiating striae on the lower face (NIEVES-ALDREY 2001). *Aulacidea irani*, sp. n. differs from *A. subterminalis* by the same characters, mentioned for *A. hieracii* above. *Aulacidea pilosellae* (KIEFFER, 1901), known to induce galls on *Hieracium* sp., also very closely related or even conspecific with *A. subterminalis* (NIEVES-ALDREY 1994, 2001) and differs from *A. irani*, sp. n. by the same main characters as the two previous species.

Aulacidea serratulae DIAKONTSCHUK, 1984 is also somehow similar to *A. irani*, sp. n. in its entire habitus, colouration, sculpture of the scutum, the same length of the median mesoscutal line, the shape and size of scutellar foveae, the central propodeal area and lateral propodeal carinae. However, in *A. serratulae* the head is more transverse in front view (Fig. 21), and longer from above (Fig. 22), the frons, interocellar area and pronotum laterally without distinct piliferous punctures; scutellar foveae are shallower, the radial cell of the forewing only 2.5 times as long as broad (Fig. 23), and punctures are on metasomal tergite 4 and further, while in *I. irani*, sp. n. punctures present on metasomal tergite 3 also.

Aulacidea irani, sp. n. differs from typical *Aulacidea* in that the frons, interocellar area with very distinct piliferous punctures, the lower face, malar space and gena are finely coriaceous and radiating striae on the lower face are very delicate; cilia on the forewing margin are very short, indistinct. Also the radial cell of the forewing in some female paratypes obsoletely closed or only partially obsoletely closed, the marginal vein of the radial cell sometimes very indistinct, only very slightly pigmented.

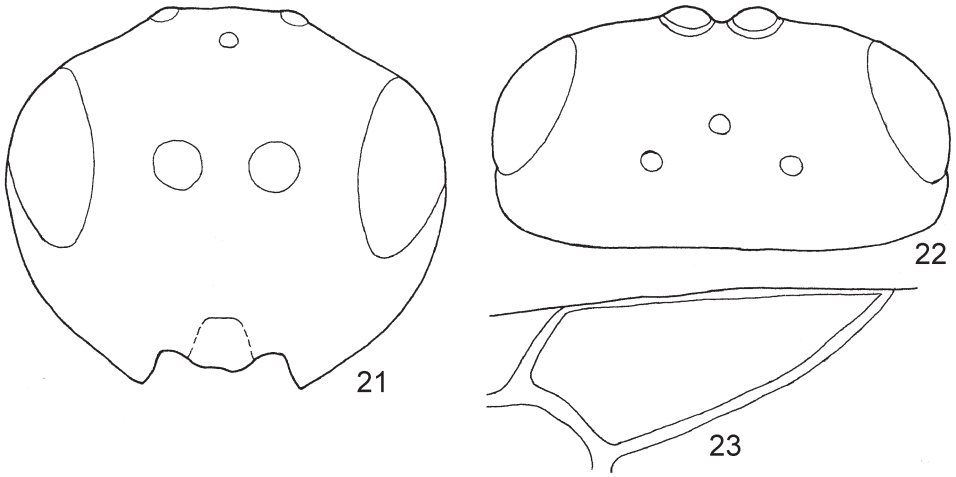
Gall – unknown.

Biology – The sexual generation is known. Adult wasps were swept in mid-May on *Echinops robostus* (BUNGE) (Asteraceae).

Comments – The adult wasps were swept on *Echinops robostus*, and supposedly induce stem galls on this plant, like some other *Aulacidea* species. DIAKONTSCHUK (1984, 1988) described two species, *Aulacidea discolor* and *A. parvula*, both of which induce stem galls on *Echinops ritro* L.

Aulacidea discolor DIAKONTSCHUK, 1988 was described from Turkmenistan and Tadzhikistan, reared from stem galls on *Echinops ritro* L. (holotype female), *Centaurea radians* BGE., *Centaurea* sp. and *Cousinia polycephala* RUPR. (paratypes) (DIAKONTSCHUK 1988). This species strongly differs from *A. irani*, sp. n. by much lighter colouration, especially light brown to yellow head and pronotum; the absence of punctures on the frons and interocellar area; antennae attached to the head much lower; the scutum with strong transverse striae, the median mesoscutal line in a form of a triangle; scutellar foveae much smaller, narrower and transverse; lateral propodel carinae nearly straight, the central propodeal area smooth, without wrinkles; the forewing without cilia on margin, veins are very light, the form of the radial cell is different also; metasomal tergite 2 of the metasoma with a ring of strong pubescence at the base.

Aulacidea parvula DIAKONTSCHUK, 1984 originally was described on the basis of females only, known to induce stem galls on *Eryngium* sp. (Brassicaceae) in Georgia (DIAKONTSCHUK 1984). Later, DIAKONTSCHUK (1988) described also males and found this species to induce stem galls on *Cousinia polycephala* Rupr.,



Figs 21–23. *Aulacidea serratulae*, female: 21–22 = head: 21 = front view, 22 = dorsal view. 23 = radial cell of the forewing

C. bipinnata Boiss., *C. tenella* FISCH. et MEY, *C. onopordoides* LDB., *C. radians* BGE., *C. refracta* JUZ., *Centaurea iberica* TREV., *Rhaponticum integrifolium*, and *Echinops ritro* L. (Asteraceae) collected in Turkmenistan and Tadzhikistan. This species also strongly differs from *A. irani*, sp. n. by the different shape of the head, which is much higher in front view; the absence of punctures on the frons and interocellar area; the pronotum dorsomedially is much longer; submedian pronotal pits are smaller; the scutum very minutely coriaceous, notauli are very indistinct and incomplete in the anterior 1/3, do not reaching the pronotum; the median mesoscutal line is short, visible in the posterior 1/3 of the scutum only; the mesopleuron more delicately striate; scutellar foveae are very shallow, indistinctly delimited posteriorly; forewing veins are much lighter, the radial cell is shorter; the metasoma is light brown to reddish.

Distribution – Known from Iran, Ilam Province only. Although further sampling in similar habitats is required to establish its true distribution.

*

Acknowledgments – We thank Dr. Prof. M. D. ZEROVA (Department of Entomophags Systematics, Schmalhausen Institute of Zoology, Kiev, Ukraine) for identification of parasitoids, Dr. J. L. NIEVES-ALDREY (Museo Nacional de Ciencias Naturales, CSIC, Madrid, Spain) for many comments concerning the taxonomy of Aylacini and particularly new species, here described and Ms. MARIA BECHTOLD (Systematic Parasitoid Laboratory, Kőszeg, Hungary) for making drawings from digital photographs and microscopic preparation and for mounting and labeling the type material.

REFERENCES

ABDUL-RASSOUL, M. S. (1980) New species of Sycophila Walker from Iraq (Hymenoptera, Eurytomidae). *Annales Historico-Naturales Musei Nationalis Hungarici* **72**: 281–284.

BELIZIN, V. I. (1959) Gall wasps of the tribe Aylacini (Hym., Cyn.), new for the fauna of the USSR. *Entomologicheskoye Obozrenije* **38**(3): 662–674. [In Russian]

CLARIDGE, M. F. (1959) A contribution to the biology and taxonomy of the British species of the genus Eudecatoma Ashmead (=Decatoma auctt. nec Spinola) (Hym., Eurytomidae). *Transactions of the Society for British Entomology* **13**(9): 149–168.

DALLA TORRE, K. W. & KIEFFER, J. J. (1910) Cynipidae. – In: SCHULZE, F. E. (ed.): *Das Tierreich.* Berlin. 24. 891 pp.

DIAKONTSCHUK, L. A. (1982) New species of the Cynipid genus Isocolus Förster (Hymenoptera, Cynipidae). *Entomologicheskoye Obozrenije* **61**(2): 382–391 [In Russian].

DIAKONTSCHUK, L. A. (1984) New species of Cynipidae (Cynipidae, Hymenoptera) from the Georgian Soviet Socialist Republic. *Vestnik Zoologii* **3**: 74–77. [In Russian]

DIAKONTSCHUK, L. A. (1988) New and little known gall wasps of the subfamily Cynipinae (Hymenoptera, Cynipidae) from Central Asia. *Entomologicheskoye Obozrenije* **67**(1): 166–181. [In Russian]

DIAKONTSCHUK, L. A. (2003) New and little known species of cynipids (Hymenoptera, Cynipidae) from Ukraine. *Vestnik Zoologii* **37**(2): 9–16.

EADY, R. D. & QUINLAN, J. (1963) Hymenoptera, Cynipoidea. Key to the families and subfamilies and Cynipinae (including galls). *Handbooks for the Identification of British Insects*. London. Royal Entomological Society VIII, **1**(a): 1–81.

FERGUSSON, N. D. M. (1995) The cynipoid families. Pp. 247–265. *In*: HANSON, P. E. & GAULD, I. D. (eds): *The Hymenoptera of Costa Rica*. Oxford, New York, Tokyo, Oxford University Press. xx+893 pp.

GIBSON, G. A. P. (1985) Some pro- and mesothoracic structures important for phylogenetic analysis of Hymenoptera, with a review of terms used for the structures. *The Canadian Entomologist* **117**: 1395–1443.

LILJEBLAD, J. (2002) *Phylogeny and Evolution of Gall Wasps* (*Hymenoptera*: *Cynipidae*). Ph. D. Thesis, Department of Zoology, Univ. Stockholm, Stockholm, 90 pp.

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

MAYR, G. (1905) Hymenopterologische Miscellen IV. Die europäischen Arten der Gattung Decatoma Spin., durch Zucht erhalten. *Verhandlungen des Zoologisch-Botanischen Vereins in Wien* **55**: 529–575.

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) *Fauna Iberica*. *Hymenoptera. Cynipidae*. Vol. 16. Madrid, Museo Nacional de Ciencias Naturales. 636 pp.

NOYES, J. S. (1998) *Catalogue of the Chalcidoidea of the World*. Biodiversity Catalogue. CD-ROM.

RONQUIST, F. & LILJEBLAD, J. (2001) Evolution of the gall wasp-host plant association. *Evolution* **55**(12): 2503–2522.

RONQUIST, F. & NORDLANDER, G. (1989) Skeletal morphology of an archaic cynipoid, Ibalia rufipes (Hymenoptera: Ibaliidae). *Entomologica Scandinavica*, *Supplement* **33**: 1–60.

WELD, L. H. (1952) *Cynipoidea (Hym.) 1905–1950*. Ann Arbor, Michigan. Privately printed, 351 pp.

ZEROVA, M. D. (1995) *The parasitic Hymenoptera – subfamilies Eurytominae and Eudecatominae (Chalcidoidea, Eurytomidae) of the Palaearctics*. Naukova Dumka, Kiev. 457 pp. [in Russian]

Revised version received December 14, 2005, accepted September 15, 2006, published December 29, 2006