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## NEW SPECIES OF EULOPHIDAE (HYMENOPTERA, CHALCIDOIDEA) FROM MADEIRA, WITH SOME OBSERVATIONS ON THE FAUNA

By R. R. Askew \*

With 7 figures

**RESUMO.** — Duas espécies novas para a ciência da família dos eulofídídeos são descritas. Outras três espécies são dadas como novas para a Madeira, e fornece-se dados sobre algumas espécies.

The Chalcidoidea of Madeira are of considerable interest, the fauna comprising a mixture of European, endemic and introduced species. Vernon Wollaston was the first to collect chalcids on the island; his material, much of which was described by Francis Walker, has been revised by Marcus Graham who has himself recently collected on Madeira. Graham has described several new taxa and compiled a list of Madeiran chalcids (Graham 1979) which was later supplemented (Graham 1981).

In 1981 an opportunity arose to study Madeiran insects and Chalcidoidea in particular. With Graham's papers providing a comprehensive foundation, some contribution to our knowledge of the Madeiran fauna was immediately possible. In this paper attention is restricted to the family Eulophidae; two new species are described, three others are added to the species list, and notes on some other species are provided.

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\* Department of Zoology, University of Manchester, Manchester M13 9PL, England.

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Eulophinae Elachertini

*Elachertus tumidiscapus* sp. n.

Resembles closely *E. olivaceus* (Thomson), a well known European species, but differs as follows:

♂ and ♀. Dorsum of thorax black with weak bluish to purple reflections. Thorax in profile (fig. 1) narrow and only slightly convex

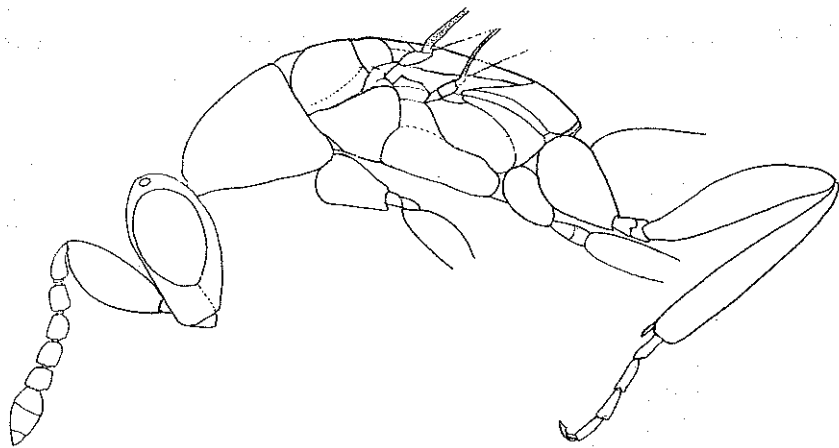


Fig. 1. — *Elachertus tumidiscapus* sp. n., ♂, head and thorax from the side.

dorsally, the scutellum virtually flat, maximum depth of thorax only 0.34 to 0.39 times length of thorax plus propodeum. Marginal vein of forewing 1.8 to 2.0 times as long as stigmal vein.

♂. Antennal scape (fig. 1) strongly expanded, excluding radicle about 2.2 times as long as broad; legs with femora and tibiae somewhat expanded, the hind tibia about 1.7 times as long as hind tarsus and about six times as long as broad, its breadth slightly greater than the length of the basitarsus.

♀. Gaster distinctly longer (about 1.2 times) than thorax plus propodeum, about twice as long as broad.

In *E. olivaceus* the thoracic reflections are weakly greenish to bronze, the thorax including scutellum is dorsally distinctly convex and deeper in profile, its greatest depth 0.5 times the length of thorax plus propodeum. Marginal vein of forewing relatively longer, 2.2 to 3.0 times as long as stigmal vein. In male *olivaceus* the antennal scape is only slightly expanded, about 3.3 times as long as broad, but legs similar to those of *tumidiscapus*. The female gaster is only very slightly longer than thorax plus propodeum and 1.2 to 1.5 times as long as broad.

Holotype ♂, Madeira: São Lourenço, Prainha, 14.iv.1981 (R. R. Askew). In the British Museum (Natural History).

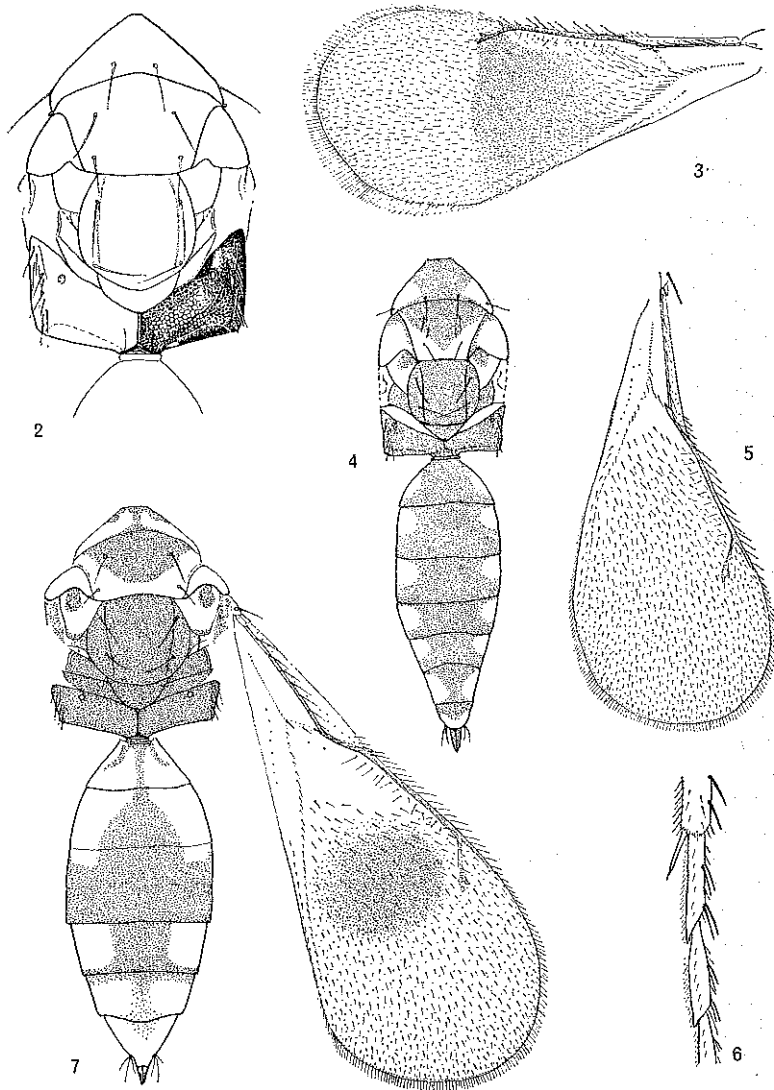
Paratypes 5 ♂ 12 ♀, same locality as holotype, 14 and 21.iv.1981 (R. R. Askew). in BMNH, Manchester Museum and the author's collection. All swept from grazed slopes above the beach near clumps of *Juncus* infested by *Coleophora* sp. (Lep., Coleophoridae), the probable host. I have designated a male the holotype since additional specific characters are evident in this sex.

*E. tumidiscapus* is a bisexual species, unlike its near ally *E. olivaceus* in which males are very scarce. Host relations of the two species are probably similar; *E. olivaceus* is a parasite of the larvae of *Coleophora* on *Juncus*. Graham (1979) records one male *E. olivaceus* taken in 1972 at Prainha; this record must refer to the present species and *E. olivaceus* should be deleted from the list.

#### **Cirrospilus setipes** sp. n.

♀. Head and thorax metallic bluish-green with yellow on face below toruli, on inner and dorsal margins of eyes, and on thorax as follows: pronotum laterally, on mesoscutal mid-lobe surrounding a dark triangular area, mesoscutal side-lobes except margins of parapsidal furrows, axillae except for dark spot anteriorly, metanotum except dorsellum (fig. 4). Scutellum and propodeum entirely metallic. Setae on head and thorax fuscous. Gaster brown with small, yellow, lateral spots on each segment and a yellow band across posterior half of last tergite. Antenna with scape fuscous, pedicel with yellowish apical spot, flagellum testaceous. Legs with coxae metallic, the front pair broadly yellow apically; trochanters yellow; femora brown (weakly metallic) in basal third to a half, pale yellow apically; tibiae yellowish testaceous, the front pair broadly and the middle pair narrowly striped brown on the flexor surfaces. Wings almost hyaline, venation pale testaceous.

Head (partially collapsed) with short temples; eyes almost bare; vertex and occiput with raised reticulation. Antennae inserted near lower level of eyes; pedicel 2.5 times as long as broad and 1.7 times as long as first funicle segment; funicle segments broader than pedicel, both subquadrate and with setae not strongly outstanding, about equal



Figs. 2-7.—The Madeiran species of *Cirrospilus*. Fig. 2.—*C. nehelodes* Graham, ♀, thorax plus propodeum. Fig. 3.—*C. nehelodes*, ♀, forewing. Fig. 4.—*C. setipes* sp. n., ♀, thorax and abdomen. Fig. 5.—*C. setipes*, ♀, forewing. Fig. 6.—*C. setipes*, ♀ apex of hind tibia and base of hind tarsus. Fig. 7.—*C. pictus* (Nees) form *atlanticus* n., ♀, thorax, abdomen and forewing.

in length to a segment; clava longer than funicle (8.5 : 7.0) with a terminal stylus.

Thorax with raised reticulation of moderately large areoles over most of dorsum but becoming indefinite on axillae and posterior of scutellum, thorax plus propodeum 1.56 times as long as broad. Pronotum twice as broad as long, with two pairs of short setae and two pairs of long setae near caudal margin, the inner pair of long setae separated by about the length of a seta, and with ten short setae further forwards. Mesoscutum slightly more than twice as broad as long; mid-lobe with six setae, each of the long posterior pair almost as long as distance between their bases; side lobes each with five setae, one on each side long and directed almost vertically; parapsidal furrows intercepting axillae almost at their inner angles. Axillae strongly advanced. Scutellum as broad as long, slightly longer than mesoscutum (6 : 5), with two pairs of strong setae just laterad of submedian grooves which are complete and distinct. Dorsellum hemispherical, smooth. Propodeum medially shorter than dorsellum (6 : 7); median carina complete; plicae absent; median area with faint indications of reticulation, shining; spiracles small and round, each separated from metanotum by rather more than a diameter; callus with an irregular row of six setae; posterior margin of supracoxal flange at right angles to long axis of body. Legs rather long and slender; hind tibia about eleven times as long as maximum breadth with a rather sparse row of stout, brown setae on dorsal edge, each about equal in length to breadth of tibia; hind basitarsus (fig. 6) with two pairs of strong fuscous setae dorsally, contrasting in shape and colour from other setae.

Forewing (fig. 5) extending beyond apex of gaster, 2.4 times as long as broad; trichiation of disc quite dense; relative lengths of veins, submarginal 24, marginal 18, stigmal 7, postmarginal 7; speculum of medium size, completely closed below by cubital hairline; cubital vein only slightly angled at interception of basal vein; basal cell bare with two or three hairs below distally on cubital vein; costal cell with a single, complete row of hairs on undersurface and with five or six hairs on upper surface near apex. Setae on marginal vein about 0.6 times as long as stigmal vein. Hind wing broadly rounded at apex.

Gaster acuminate, much longer than rest of body (51 : 40); last tergite broader than long (11 : 8); ovipositor sheaths from above project about 0.8 times length of last tergite and extend far beyond apices of pygidial setae; hypopygium extending only about one third the length of the gaster.

Body length 1.6 mm.

♂. Unknown.

Holotype ♀, Madeira: Fajã da Nogueira, 17.iv.1981 (R. R. Askew). Collected by sweeping in the Lauraceae forest above the power station, at an altitude of about 800 m.

Belongs to the subgenus *Atoposomoidea* Howard but is easily distinguished from European species by its distinctive colour pattern, rather elongated body and dimorphic hind tarsal setae. The metallic colouration, short funicle segments and quite well-developed speculum of *C. setipes* suggest an affinity with *C. pictus* (Nees), although the posterior termination of the parapsidal furrows very close to the inner angles of the axillae and the elongated form are features of *C. lynceus* (Walker) and allied species.

*Elachertus sobrius* (Walker). João do Prado, 1 km. east of summit, altitude about 1000 m., 13.iv.1981, 4 ♀ (R.R.A.) ; Fajã da Nogueira, 10.iv.1981, 2 ♀ (R.R.A.).

Not recorded since the original description (Walker 1872). The specimens from João do Prado were attracted to the white roof of our hired car, parked at the edge of a *Pinus* plantation adjacent to an area dominated by *Erica arborea*; those from Fajã da Nogueira were swept in native forest at an altitude of some 800 m. above the power station. *E. sobrius* is distinct from *E. gallicus* Erdős and will be dealt with by Dr. Z. Boucek in a forthcoming paper.

*Miotropis unipuncta* (Nees). Recorded by Graham (1979). Taken at Fajã da Nogueira, 10 and 17.iv.1981, 1 ♂, 5 ♀ (R.R.A.), all by sweeping in a clearing of laurel forest. Very variable in colour pattern.

*Cirrospilus pictus* (Nees). New to Madeira. São Jorge, 11.iv.1981, 1 ♀ (R.R.A.).

This specimen differs in colour from typical *pictus*: axillae yellow with a dark dorsal spot, gaster dorsally yellow with a central brown area, forewing with a round, fuscous, discal spot (fig. 7). Three other females, reared in May 1973 by Mr S. N. A. Jacobs from mines of *Chrysopora boseae* Walsingham collected from *Bosea* at Puerto de la Cruz, Tenerife, are similar to but smaller than the Madeiran specimen and their wing marks are weaker. In all four specimens there are only four setae on the mid-lobe of the mesoscutum (usually six in *pictus*), the forewing speculum is larger and the gaster relatively longer (1.3 to 1.4 times as long as combined length of thorax and propodeum) and narrower (twice as long as broad) than in typical *pictus*. I consider the material conspecific with *pictus* but a distinct form (*atlanticus* forma n.) of that species. *C. pictus bifasciatus* Walker is another form of *pictus* (Boucek & Askew 1968) with an extensively yellow body. The brown area on the dorsum of the gaster of *atlanticus* is partially divided, thus approaching the pattern of *bifasciatus* which has two transverse fasciae, but the scutellum of *atlanticus* is entirely dark (yellow anteriorly in *bifasciatus*) and there is no indication of wing markings in *bifasciatus*.

*C. pictus* has previously been recorded from the Canary Islands (Otten 1940).

*Cirrospilus nephelodes* Graham. Described (Graham 1981) from one female collected at Rabaçal in 1980. Fajã do Cedro Gordo, 10.iv.1981, 1♀; Balcões, 13.iv.1981, 2♂ (R.R.A.).

*C. nephelodes* is allied to *C. pictus* from which it may be distinguished by its strongly sculptured propodeum (fig. 2), much-reduced forewing speculum, relatively longer marginal vein which is 3.6 to 3.8 times as long as stigmal vein, wing infuscation (fig. 3), relatively long funicle segments and presence of only four setae on mesoscutal mid-lobe.

The male, not previously found, has metallic areas of head and thorax darker and more extensive than in the female, the thorax dorsally with dark bluish green to purple reflections and the yellow marks on mesoscutum obliterated; legs and wings marked as in female; antenna with funicle segments relatively shorter; sculpturation on body less strong than in female but propodeum still distinctly reticulate and dull; body length 1.2-1.4 mm.

#### Eulophinae Eulophini

Species found in 1981 were *Hemiptarsenus unguicellus* (Zetterstedt), *H. dropion* (Walker), *Dicladocerus westwoodii* Westwood, *Prigalio soemius* (Walker), *Necremnus artynes* (Walker), *Diglyphus isaea* (Walker) and *D. eleanorae* Graham, all previously known from Madeira.

The two species of *Diglyphus* are closely allied and details of their Madeiran distributions may be of interest. Captures in April 1981 were as follows:

Locality (altitude)	<i>D. isaea</i>	<i>D. eleanorae</i>
Prainha (25 m.)	5	3
Boca do Risco (425 m.)	1	2
Fajã do Cedro Gordo (425 m.)	0	50
Portela (575 m.)	0	2
Santo da Serra (675 m.)	1	8
Fajã da Nogueira (800 m.)	2	11
Casa das Queimadas (875 m.)	0	4
Poiso (1350 m.)	0	1

*D. eleanorae* is the commoner and more widespread of the two species, and *D. isaea* was nowhere found in the absence of *D. eleanorae*. Only at Prainha on the São Lourenço promontory was *isaea* found in greater numbers than *eleanorae* which might suggest that *isaea* is more

associated with grazed or cultivated regions at lower altitudes. The occurrence of *isaea* at Fajã da Nogueira, however, is at variance with this suggestion.

#### E n t e d o n t i n a e

Species previously recorded from Madeira and found in 1981 were *Chrysocharis entedonides* (Walker) (Balcões, Fajã da Nogueira), *C. discalis* Graham (Fajã da Nogueira), *C. centralis* (Walker) (São Jorge, Balcões, Fajã da Nogueira, Queimadas), *C. chilo* (Walker) (Fajã da Nogueira, Santo da Serra) and *Pediobius acantha* (Walker) (Fajã da Nogueira, Boca do Risco).

*Chrysocharis gemma* (Walker). New to Madeira. Santo da Serra, 13.iv.1981, 1♂ (R.R.A.).

*Pediobius* sp. nr *acantha* (Walker). São Jorge, 11.iv.1981, 1♀ (R.R.A.). This probably represents an undescribed species but I prefer to see further specimens before preparing a description.

*Ionympha carne* (Walker). New to Madeira. Queimadas, 20.iv.1981, 1♀ (R.R.A.).

A striking feature of the Madeiran chalcid fauna is the high proportion of species that have dark wing markings. This is especially evident among Eulophidae. Two of the three species of *Cirrospilus* known from Madeira have distinct wing pigmentation, but all European species have clear wings. In *Chrysocharis* similarly, two of the three known Madeiran endemic species have dark wing spots whereas of the species found in Britain only one, *C. gemma* (which also occurs on Madeira), has darkly spotted wings.

Graham (1981) draws attention to the generally darker pigmentation of Madeiran representatives of European species, mentioning that other writers have observed a similar phenomenon in birds and butterflies, and quotes the suggestion by Baker (1891) that high humidity may be a causative factor. I propose an alternative hypothesis. Wing marks are not necessarily correlated with increased general dark pigmentation of the body. The body of *C. pictus* form *atlanticus* is less darkened than that of the typical form but its wings are dark-spotted whilst those of typical *pictus* are hyaline. At rest, the folded wings of a chalcid lie over the abdomen and dark discal forewing spots provide a double screen over the centre of the abdomen. This screen might serve to reduce the amount of harmful solar radiation penetrating the abdomen and thus afford protection to the internal organs, perhaps especially the gonads.



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