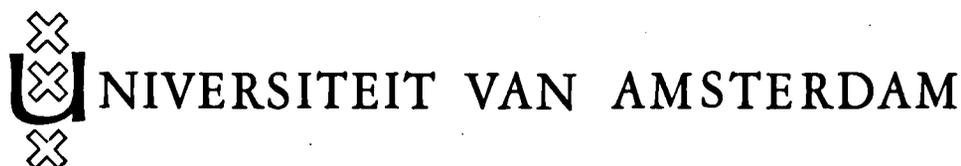


BULLETIN ZOOLOGISCH MUSEUM



Vol. 5 No. 10 28-V-1976

NOTES ON BIOLOGY AND DISTRIBUTION OF THE GENUS *OMPHALE* HALIDAY, 1833, WITH DESCRIPTIONS OF TWO NEW SPECIES (INSECTA, HYMENOPTERA, EULOPHIDAE)

M.J. GIJSWIJT

ABSTRACT

An account is given of 22 species of the eulophid genus *Omphale* Haliday, 1833, from the Netherlands and other European countries, that came to the author's attention. Many new distributional records are provided. The male of *O. brevis* Graham, 1963, is described, as well as *O. acuminata* n. sp. from Greece (Lesbos), and *O. grahami* n. sp. from the Netherlands. Moreover, new host relationships are established.

INTRODUCTION

The genus *Omphale*, erected by Haliday in 1833 and based on one species, *salicis* Haliday, 1833, remained in obscurity until 1959. Before that year, the only relevant contribution was that of Thomson, 1878, who redefined the genus and added some species.

The first review, though limited to the British species, of the genus, was that of Graham in 1959,

based on a study of the type specimens. In 1963 the same author discussed nearly all European species belonging to the genus described up to that time. Many Walker species, as well as some more recently discovered ones have been recognized since.

The genus is presumed to be a large one: Walker alone already described 13 species that belong in it and Graham added 6 new species to the list of British *Omphale*. In 1968 Bouček & Askew listed 29 species occurring in the palaearctic region. Our knowledge of the genus is poor. The taxonomy is based on females only. Up to now the males of only 7 species could be correlated with certainty with the opposite sex. Though I can increase this number by 3, it is not possible to complete the provisional key, given by Graham in 1963: the males of the species-groups *aetius* and *salicis* are not distinguishable so far.

According to Bouček & Askew's 1968 list, hosts are ascertained for no more than 4 species. I can add 8 new associations. All known hosts belong to the dipterous family Cecidomyiidae.

The following is an account of my results, and should be used along with Graham's publication of 1963. The arrangement of species is made according to the species-groups as proposed by Graham.

Much of the fresh information concerning the host relationship is due to Messrs. W. Nijveldt and H.J. Vlugg, who very kindly presented me with hundreds of Chalcidoidea.

Unless otherwise stated, the material is in the author's collection. Holotypes and some paratypes are in the collection of the Zoölogisch Museum, Amsterdam (ZMA). Material was collected by the author if not stated otherwise.

O. SALICIS-GROUP

Omphale salicis Haliday, 1833

The Netherlands: Haamstede and Oostkapelle, September in several years (leg. B. van Aartsen); Epen (Zuid Limburg) 10/13-VII-1975 (leg. H.J. Vlugg); Naardermeer 5-VI-1971.
France: (Ain) Mont Rond 15-VII-1971; (Alpes-Mar.) Beuil-les-Launes, 1600 m, 21-VII-1975.
Germany: (Nordrh.-Westf.) Höxter 30-VII-1969; (Rheinl.-Pfalz) Gerolstein, July in several years; (Baden-Württ.) Stetten am Kalten Mark, July 1972.
Austria: (Tirol) Ötztal, 1850-2000 m, August 1967 (ZMA).

This species is widespread throughout Europe. Vlugg was the first to rear the species from the host: galls of *Contarinia loti* (De Geer) on *Vicia cracca* L. The galls were collected in July, 1974, the parasites emerged in July 1975.

Omphale theana (Walker, 1839)

The Netherlands: Naardermeer 24-VI-1924 (ZMA); 's-Graveland 7-VII-1962.
France: (Htes.-Pyr.) Gavarnie, 1250-1300 m, 21-VII-1975 (leg. A.C. & W.N. Ellis).
Germany: (Niedersachsen) Gildehaus 19-VII-1969.

This species was known from Britain only.

Omphale radialis Thomson, 1878

The Netherlands: in dunes near Bloemendaal 18-VIII-1965.
France: (Aisne) Oeilley 7-VII-1971.
Germany: (Nordrh.-Westf.) Höxter 30-VII-1969; (Rheinl.-Pfalz) Gerolstein 29-VII-1967.

Omphale chryseis Graham, 1963

Germany: (Niedersachsen) Brochterbeck 19-VII-1969.

Parasite of *Contarinia medicaginis* Kieffer in various places in Europe.

O. LUGENS-GROUP

Omphale lugens (Nees, 1834)

The Netherlands: Nieuwersluis (leg. G. Barendrecht); Naardermeer (leg. S. van Heynsbergen); Winterswijk; (Zuid Limburg) Epen; 's-Graveland; Hilversum; Bergen op Zoom, reared from galls of *Contarinia tiliarum* (Kieffer) (leg. H.J. Vlugg); Langbroek, reared from galls of *Dasyneura alni* (F. Löw) (leg. H. J. Vlugg). The specimens were found in the field between May 14th and June 19th in several years.

Bouček & Askew (1968) synonymized *Eulophus lugens* Nees, 1834, with *Entedon navius* Walker, 1839, *Entedon coactus* Ratzeburg, 1848, and *Asecodes fagi* Förster, 1856.

The species has two forms: a larger one (1.8-2.0 mm), parasite of *Mikiola fagi* (Hartig) and a smaller (1.6-1.8 mm), of which the biology was unknown until now. *Ent. coactus* and *A. fagi* belong to the former, *Eul. lugens* and *Ent. navius* to the latter. Graham (1963) states that *navius* "may be found upon birch and beech, especially the former".

Indeed, upon birch the species is rather common; the specimens being of the smaller type as well as the specimens reared from galls of *Contarinia tiliarum* and *Dasyneura alni* recently. This is in good agreement with the fact that the host *Mikiola fagi* most probably did not occur in Britain in Walker's lifetime. As I am not able to find morphological differences between the two forms, it would be of interest to check the possibility of sibling species with other parameters such as mating behaviour or host preferences.

Omphale phruron (Walker, 1839)

The Netherlands: dunes near Bloemendaal 18-VIII-1965; Zaltbommel (dike along river Rhine) 27-VII-1968; (Zuid Limburg) Epen 15-IX-1961; Wessum July 1972 (leg. H.J. Vlugg).
France: (Htes.-Pyr.) Gavarnie, 1250-1300 m, 21-VII-1975 (leg. A.C. & W.N. Ellis).
Germany: (Rheinl.-Pfalz) Nassau 30-V-1963; (Nordrh.-Westf.) Höxter 30-VII-1969; (Baden-Württ.) Stetten am Kalten Mark, Fridingen and Irrendorfer Hardt 18/21-VII-1972; Westerheim 11-VII-1970; (Bayern) Bärnstein 12-XI-1965 (leg. W. Nijveldt).

The species was known from Britain only.

Biology: reared from galls of *Geocrypta galii* (H. Loew) on *Galium pumilum* Murr. by Nijveldt, who collected them in Germany, in August 1965. One female emerged from galls of *Dasyneura pyri* (Bouché)

collected in the Netherlands, Wessum in July 1971 by Vlug.

All specimens I saw are brown. The colour of the legs varies from testaceous to dark brown. Only the faces have green reflections in some cases.

I collected in the North of France viz. (Aisne) near Cerny-en-Laonnois: Mont de Fer 2-VII-1971, two females, which are so brilliantly green, that they seem to belong to another species. However, this colour is the only difference that I can find. Such variation in colour within a species has not been recorded in the genus up to now. Nevertheless the decision, whether or not the green form belongs to a new species must be delayed, till we have more evidence.

Omphale acuminata n. sp.

Greece: Lésvos, 12 km S.S.W. from Ayía Paraskeví, in bed of river Milopótamos. Swept in a wood of *Pinus halepensis* Miller, with *Poterium*, *Cistus* and *Erica* 11-XI-1973, 8 ♀ (leg. A.C. & W.N. Ellis).

Holotype (♀) and 2 paratypes (♀) in ZMA, 5 paratypes (♀) in my collection.

Description of female.

Coloration.- Head below frontal fork bright green with golden reflections, very shiny; clypeus sometimes more bluish-green; vertex and frons above fork coppery; antennae dark brown, scape ventrally and at base yellow. Parts behind malar groove and eyes brown or bronzy, shiny; mandibles light brown; sutures between posterior ocelli and eyes yellow.

Thorax dark brown with, sometimes strong, green reflections; tegulae testaceous with brown spot; postspiracular sclerite testaceous or brown; upper angle of mesopleuron, sutures between meso- and metapleuron, legs, except base of hind coxae, and petiole yellow. Wing veins grey.

Gaster brown with a lighter transverse stripe on each segment, penultimate segment testaceous.

Morphology.- Length 1.3-1.6 mm.

Head: space between clypeus and eyes strigose-reticulate, weaker towards the eyes. Clypeus more irregularly reticulate. Frons alutaceous, shiny; vertex alutaceous, more dull in appearance. Occiput not margined. Antenna (fig. 1a): length of flagellum + pedicellus as long as combined length of pronotum, mesoscutum and scutellum or a little shorter and as long as marginal vein + parastigma.

First funicle segment ventrally only with a few short bristles, 2.3-2.6 times as long as broad and 1.2 times as long as pedicellus; seen ventrally, the second to fifth segments have long bristles, arising from their bases and reaching beyond their apices. A few shorter bristles arise from the apical half; their lengths equal the apical width of the corresponding segment. The longer bristles of the fifth segment may be broken off sometimes.

Thorax: 1.5-1.7 times as long as broad; as a whole very faintly alutaceous, sidelobes of mesoscutum more coarsely than midlobe; apex of scutellum nearly smooth. Propodeum smooth. Sidelobes of mesoscutum with two bristles; scutellum 1.3 times as long as broad, bristles behind the middle. Pleurae smooth, except for the metapleurae which are faintly alutaceous.

Wings (fig. 1b): marginal vein + parastigma 5.5-6.0 times as long as stigmal vein. Postmarginal vein a little shorter than stigmal, the latter distinctly petiolate. Radial cell and a broad strip along marginal vein bare. Four to six admarginal bristles arising from marginal vein. One or two bristles in apical part of basal cell.

Legs: tarsi of middle legs only a little shorter than tibiae. First segment of tarsi $\frac{1}{3}$ - $\frac{1}{4}$ of corresponding tibia.

Gaster (fig. 1c): acuminate, 2.0-2.5 times as long as broad, 1.4-1.6 times longer than thorax. Last segment as long as broad.

Male unknown.

This species, together with *O. phurron*, *brevis* and *lugens*, has a few very long setae on the ventral sides of the third and fourth funicle segments. The four species can be distinguished from each other by means of the characters, indicated in the modification of Graham's (1963) key, provided at the end of this paper.

Omphale brevis Graham, 1963

The Netherlands: Heerlen 26-VII-1933 (leg. G. Baarendrecht); Wageningen 13/22-X-1970 (leg. H.J. Vlug).
Germany: (Baden-Württ.) Westerheim 11-VII-1970.

Biology: males and females were reared from galls of *Cystiphora taraxaci* (Kieffer) (collected 10-IX-1970 near Wageningen) by H.J. Vlug. The male is like the female except for the following characters: length 0.9 mm. Face bright green, greenish reflections on mesoscutum more extended, especial-

ly on midlobe. Legs darker, testaceous are only the coxae apically, and the front and middle femora apically. Antennae as shown in fig. 2. Sides of gaster nearly parallel; apically rounded. Length of gaster shorter than that of thorax. The species can be inserted in couplet 10 of Graham's (1963) key to the males, which should be altered as follows:

- 10 [as in Graham's key]
 - [as in Graham's key], but instead of "*phruron* (Walker)" read: 10a
 10a Length 1 mm or less. Body squat. Thorax 1.5-1.6 times longer than broad; gibbous: propodeum sloping at an angle of at least 45°. Midlobe of mesoscutum violet-black, sidelobes bronze with green reflections.
 *brevis* Graham
 - Length 1.2-1.3 mm. Thorax about 1.8 times longer than broad, flattened: propodeum sloping at an angle of 30° or less. Midlobes with green reflections as sidelobes.
 *phruron* (Walker)

Omphale rubigus (Walker, 1839)

The Netherlands: Naarden 21-VI-1965 (leg. S. van Heynsbergen); Lobith 11-VI-1973, 6 ♀ from the rich vegetation of a dyke along the river Rhine (now being a nature reserve).
 France: (Jura) Vaux les St. Claude 11-VII-1967; (Htes.-Pyr.) Gavarnie 1250-1300 m, 21-VII-1975 (leg. A.C. & W.N. Ellis); (Alpes-Mar.) Beuil-les-Launes, 1600 m, 21-VII-1975.
 Germany: (Rheinl.-Pfalz) Gerolstein 22-VII-1967.

The species is known from a few localities throughout Europe, and is associated with a gall midge on *Vicia cracca* L. (Bouček & Askew, 1969).

Omphale clymene (Walker, 1839)

The Netherlands: Ankeveen 27-VI-1965, 1 ♀ taken along a small path between lakes.

The species was known from Britain, Germany and Czechoslovakia.

Omphale matrana Erdős, 1954

Germany: (Nordrh.-Westf.) Beverungen 29-VII-1967, 1 ♀.

The species was known from Hungary and Czechoslovakia.

O. ADMIRABILIS-GROUP

Omphale telephe (Walker, 1839)

The Netherlands: dunes near Bloemendaal 19-VI-1963.

The species was known from Britain.

O. AETIUS-GROUP

Omphale coilus (Walker, 1839)

The Netherlands: Driel 7-VI-1965 and Holten 29-VIII-1963 (leg. S. van Heynsbergen).
 France: (Ain) Mont Rond, 1200-1500 m, 19-VII-1971.
 Germany: (Rheinl.-Pfalz) Nassau 28-V-1963; Gerolstein 8-VII-1970; (Baden-Württ.) Westerheim 19-VII-1970.

The species was known from Britain, Czechoslovakia and Hungary.

Omphale ?coilus (Walker, 1839)
 var. (Graham, 1963: 247)

Germany: (Baden-Württ.) Irrendorfer Hardt 18/22-VII-1972.

I believe it is a good species, associated with *Picea*, but we need more material for a description.

Omphale aetius (Walker, 1839)

The Netherlands: Vogelenzang 24-VI-1933 (leg. G. Barendrecht); 's-Graveland 28-VI-1961 and 15-X-1962; Bloemendaal 9/10-VI-1963; Stokhem 1-VI-1971; Oosterbeek (see below).

The species was known from Britain, Norway and Czechoslovakia.

Biology: The specimens from Oosterbeek were reared from galls of *Dasyneura dioica* (Rübsaamen) on *Urtica dioica* L. by W. Nijveldt. He collected the galls on 9-X-1968. Fourteen females emerged between 11-XII-1968 and 14-II-1969. No males were observed.

Omphale aethiops Graham, 1963

The Netherlands: 's-Graveland between June 28 and July 20 in several years; Leersum 30-VI-1972.
 Germany: (Niedersachsen) Gildehaus 16/19-VII-1969.

The species was known from Britain only.

Biology: The specimens from Leersum were reared from galls of *Dasyneura epilobii* (F. Löw) by H.J. Vluc, collected on July 17, 1971. The species can frequently be observed ovipositing in the forementioned galls on *Chamaenerion angustifolium* (L.) Scopoli.

The specimens from the galls have 2 bristles on the sidelobes of the mesoscutum instead of the 3, indicated in Graham's description. In France I found 2 females with three bristles on the sidelobes, but they have their gasters and last gasteral segments relatively short.

I agree with Mr. Graham, that these characters may be variable ones. We need more evidence, before we can conclude whether or not there are two species involved.

Omphale epaphus (Walker, 1839)

The Netherlands: Bennekom.

The species was known from Britain and Ireland. Biology: H.J. Vlugg reared 28 females and 5 males from galls of *Macrolabis aquilegiae* Kieffer, collected in June 1970. The parasites emerged in May and the beginning of June 1971.

As in many *Omphale* species, there seems to be only one generation a year.

Omphale grahami n. sp.

The Netherlands: Wageningen 24-VIII/2-IX-1971, 5 ♀ (one the holotype) and 7 ♂; 30-VII/2-VIII-1971, 1 ♀ and 1 ♂; De Weerribben 30-VII-1971, 2 ♀ and 2 ♂; Leersum 30-VII-1971, 1 ♀ (all these specimens: leg. W. Nijveldt & H.J. Vlugg).

Germany: (Baden-Württ.) Schopfloch 12-VII-1970.

Holotype in ZMA; paratypes in collection Graham, Oxford, Britain, and in my collection.

Description of female.

Coloration.- Bronze-black, sometimes with faint greenish reflections. Clypeus, propodeum and first gastral tergite more or less green in a few cases. Antennae brown, scapus and pedicellus light brown. Fore coxae fuscous along hind margin, nearly testaceous in front, middle coxae fuscous, hind coxae fuscous on proximal part, light yellow on apex. Legs otherwise testaceous, femora, and tibiae to some extent, darkened. Wings clear, faintly infumate around stigmal vein; venation fuscotestaceous.

Morphology.- Length 1.2-1.4 mm.

Head: clypeus and space between clypeus and eyes alutaceous. Face and frons faintly alutaceous, smooth between toruli, vertex smooth. Antennae (fig. 3a): flagellum plus pedicellus 1.1-1.2 times longer than marginal vein plus parastigma and 1.6-1.9 times longer than breadth of mesoscutum. Pedicellus 1.7-2.0 times longer than broad; first funicular segment 2.7-3.0 times longer than broad and 1.3-1.7 times longer than pedicellus. Fourth funicular segment 2.0-2.4 times longer than broad, closely united to fifth segment.

Thorax: 1.5-1.6 times as long as broad, scutellum 1.1-1.3 times longer than broad. Two bristles on each sidelobe of mesoscutum. Sculpture

alutaceous and well visible. Metascutellum and propodeum smooth. Fore tarsi about as long as, mid and hind tarsi 0.8 times shorter than their corresponding tibiae. Mid tibia 4.4-5.2 times longer than first segment of mid tarsus, the latter as long as or up to 1.2 times longer than spur of mid tibia.

Wings (fig. 3b): marginal vein plus parastigma 6.7-8.4 times longer than stigmal vein. Postmarginal vein from as long as to nearly twice as long as stigmal vein; speculum closed below. Most admarginal bristles on underside of wing arise from membrane.

Gaster: 1.3-1.5 times longer than thorax and as long as thorax plus head or a little longer, 2.2-2.4 times as long as broad, in some specimens it may be deformed by drying. Last tergite 0.9-1.3 times longer than broad.

Male: differs from the female by the characters enumerated hereafter.

Length: 1.0-1.4 mm.

Colour: dark brown, often with bright green sheen, clypeus and face blue-green, frons above fork with golden reflections. Antennae (fig. 3c): flagellum plus pedicellus about 1.7 times longer than breadth of thorax, each segment with two whorls of bristles, one at the proximal end, one in the middle. Length of the bristles about as long as corresponding segment.

Biology.- Reared from galls of *Dasyneura trifolii* (F. Löw), collected in June and July in Wageningen and De Weerribben. Imagines emerged in the same year.

The female from Leersum was reared from *Dasyneura glechomae* (Kieffer). These galls were collected in the end of May, imagines appeared in the same year.

The species is mentioned by Graham (1963: 249) as sp. indet. and well separated from the other species.

I feel happy to have an opportunity to name this species after Dr. M.W.R. de Vere Graham who has made the West-European Chalcidoidea accessible for study.

ISOLATED SPECIES

Omphale connectens Graham, 1963

The Netherlands: Gulpen-Slenaken 31-VII-1933 (leg. G. Barendrecht); Zaltbommel 27-VII-1968. (swept from *Galium* sp.).

France: (Jura) Viry 12-VII-1971.

Germany: (Nordrh.-Westf.) Beverungen 27/31-VII-1969; (Bayern) Bärnstein (see below).

The species was known from Britain only.

Biology: reared from galls of *Geocrypta galii* (H. Loew) on *Galium pumilum* Murr., collected by W. Nijveldt in Bärnstein on 6-VIII-1965. Imagines emerged 27-XII-1965.

Omphale breviventris Graham, 1970

The Netherlands: Winterswijk 20-V-1972. Swept, like the original material, on a sunny roadside in a wood of deciduous trees.

The species was known from Germany and Britain.

Omphale clypealis (Thomson, 1878)

The Netherlands: Naarden 20-VII-1958.

Germany: (Schleswig-Holstein) Kitzeberg, from *Dasyneura brassicae* (Winnertz) (leg. W. Nijveldt).

Known as a parasite of *Dasyneura brassicae*, widely distributed in Europe.

ADDITIONS TO THE KEY TO THE FEMALES OF *OMPHALE*

(GRAHAM, 1963: 245-246), WHICH IS NOW

A KEY TO MOST EUROPEAN SPECIES

- 11 [As in Graham's key]
 - [As in Graham's key], for 12 read: 11a
 11a Funicular segments ventrally with long bristles arising from near their bases and reaching beyond the corresponding segment. (First funicular segment at most twice as long as broad, except in *acuminata* n. sp.) 12

- Funicular segments ventrally with two sets of bristles on segments 1-3, the subbasal bristles reach at most to apices of corresponding segments; first funicle segment 2.5-4.5 times as long as broad 15
 12 [As in Graham's key]; for *navius* (Walker) read: *O. lugens* (Nees)
 - [As in Graham's key] 13
 13 [As in Graham's key] *O. brevis* Graham
 - [As in Graham's key] 14
 14 Femora darkened, scutellum dark. First funicle segment less than twice as long as broad *O. phururon* (Walker)
 - Femora light yellowish, scutellum more or less yellow marked, especially near front margin. First funicle segment 2.3-2.6 times as long as broad *O. acuminata* n. sp.
 15 [As in Graham's key]
 16 (I cite Graham 1970): Gaster (see Graham, 1970, fig. 1) obovate, broadest beyond the middle, thence abruptly narrowed to a blunt point, at most as long as the thorax, only 1.50-1.75 times as long as broad. Legs, including all the coxae except sometimes the base of the hind pair, clear citron-yellow. Body wholly metallic, bright green with some golden parts. Postmarginal vein 1.3-1.5 times as long as the stigmal vein; speculum closed below. Face between lower corners of eyes and the clypeus mainly strigose-reticulate *O. breviventris* Graham
 - Gaster ovate to lanceolate, broadest at or in front of the middle, acute or acuminate apically, at least slightly (often much) longer than thorax, 1.8-4.0 times as long as broad. If the legs are almost entirely clear lemon-yellow and the body is bright green with golden parts, then either the prosternum at least is yellow, and the postmarginal vein is virtually twice as long as the stigmal vein; or the speculum is open below; or the face between the lower corners of the eyes and the clypeus has only very weak sculpture or none 16a
 16a 16 of old key
 p. 249:
 26sp. indet. should be
 *O. grahami* n. sp.

NEW HOST-PARASITE ASSOCIATIONS, ARRANGED ACCORDING TO THE HOST

HOST	PARASITE
<i>Contarinia loti</i> (De Geer)	<i>O. salicis</i> Haliday
- <i>medicaginis</i> Kieffer	<i>O. chryseis</i> Graham
- <i>tiliarum</i> (Kieffer)	<i>O. lugens</i> (Nees)
<i>Cystiphora taraxaci</i> (Kieffer)	<i>O. brevis</i> Graham
<i>Dasyneura alni</i> (F. Löw)	<i>O. lugens</i> (Nees)
- <i>dioicae</i> (Rübsaamen)	<i>O. aetius</i> (Walker)
- <i>epilobii</i> (F. Löw)	<i>O. aethiops</i> Graham
- <i>pyri</i> (Bouché)	<i>O. phururon</i> (Walker)
- <i>trifolii</i> (F. Löw)	<i>O. grahami</i> n. sp.
<i>Geocrypta galii</i> (H. Loew)	<i>O. phururon</i> and <i>O. connectens</i> Graham
<i>Macrolabis aquilegine</i> Kieffer	<i>O. epaphus</i> (Walker)

ACKNOWLEDGEMENTS

I acknowledge with thanks the help of Dr. Z. Bouček, London, who enabled me the study of some types of the British Museum (Natural History), of Drs. W.N. Ellis, Zoölogisch Museum, University of Amsterdam, who critically read the manuscript, and of Dr. M.W.R. de Vere Graham, Hope Department of Entomology, University Museum, Oxford, who checked the identity of some species and who gave much valuable advice.

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Received: 5 March 1976

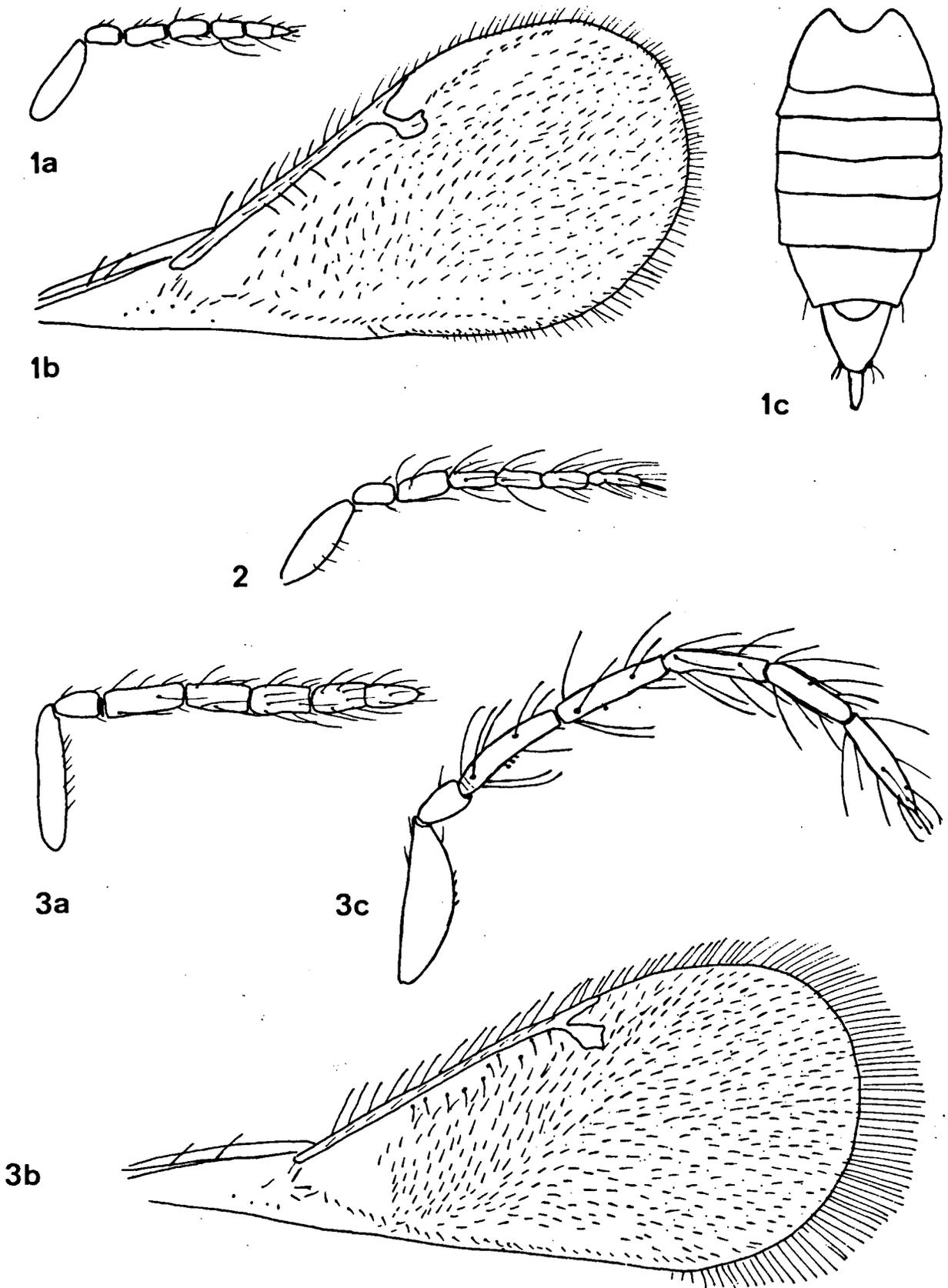


Fig. 1. *Omphale acuminata* n. sp. a, antenna ♀; b, forewing ♀; c, gaster ♀.

Fig. 2. *Omphale brevis* Graham. Antenna ♂.

Fig. 3. *Omphale grahami* n. sp. a, antenna ♀; b, forewing ♀; c, antenna ♂.