

A REVISION OF THE GENUS  
*MICROGASTER* LATREILLE  
(HYMENOPTERA: BRACONIDAE)

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## SYNOPSIS

The genus *Microgaster*, as defined by Nixon in 1965, is revised and all species falling within the new definition, as far as they have been recognized, are taken into account. Forty-six species are keyed and discussed and fourteen of these are brought forward as new. Five species are put in synonymy.

## ACKNOWLEDGMENTS

In preparing this revision I have been much helped by a very fine collection of *Microgaster* from Ireland, received on loan from Mr. A. W. Stelfox of Newcastle, Co. Down, N. Ireland and now the property of the U.S. National Museum. I am much indebted to Mr. Stelfox. I am also grateful to the following gentlemen for the loan of useful material: Dr. Max Fischer of the Naturhistorisches Museum, Vienna, Dr. Wolter Hellén of the Helsinki Museum, Helsinki, Dr. C. F. W. Muesebeck of the U.S. National Museum, Dr. Jenö Papp of the Hungarian Natural History Museum, Budapest, and Dr. V. I. Tobias of the Zoological Institute, Leningrad.

## THE GENUS *MICROGASTER* LATREILLE

In my revision of the Microgasterini I redefined this genus (1965 : 267 and in key, : 13) restricting the use of the name to the group of species showing an obvious and natural relationship with the type-species, *deprimator* Fab. (Muesebeck & Walkley, 1951 : 135). Many of the better known of the remaining European species were transferred by me to the genus *Protomicroplitis*.

*Microgaster* of authors now consists virtually of two genera—*Microgaster*, as used here, essentially N. Temperate, and *Protomicroplitis* Ashmead with a world-wide distribution and best represented in tropical regions.

In 1965 I divided *Protomicroplitis* into many species-groups, some of which were established for species that were traditionally included in European *Microgaster*, such as *marginatus* Nees, *abdominalis* Nees and *scotica* Marshall.

The species of *Microgaster* s. str. are remarkably alike in general facies and quite

impossible to recognize on the characters that have been used in the past. Species with red hind femora have usually been called *globata* L. Indeed, this is the name that appears most frequently in the literature on European *Microgaster*. I do not know to what species it should be applied. The Linnean type no longer exists and the little that Linné said about it indicates that it is a gregarious parasite living in stalks (? reeds) "in Culmis, intra folliculum communem, bombycinum, subrotundum, album". *Microgaster globata* auctt. is a solitary parasite. The name "globata" is not used in this paper.

*Microgaster* s. str. was recognized as a distinct segregate within the older concept of the genus by earlier workers. Its species have always presented a tough taxonomic problem, baffling taxonomists by what was thought to be their extreme variability. Only Thomson, always a pioneer in the taxonomy of difficult groups of insects, succeeded in defining the limits of some of the species. Marshall, who lacked neither carefulness nor good judgement, was handicapped by the practice, fashionable in his time, of gumming insects on pieces of card, thus obscuring important areas of their anatomy. Much more recently Fahringer (1936), Telenga (1955) and Papp (1959, 1960) have tried to define what they consider to be species of *Microgaster* but none, unhappily, has discovered any new characters that permit even a partial break-down of the genus.

Having studied *Microgaster* intermittently for several years, I have been able to find a few structural characters that narrow considerably the margin of error in naming species. These characters are: the presence of teeth, or even a lobe (*deductor*), on the claws, the relative proportions of the abscissae of the basal vein of the fore wing and the degree of sclerotization of the hypopygium. But even with the help of these characters, I cannot claim to have cleared away all the difficulties of species-differentiation in *Microgaster*. The correlation of the North American and European species is specially in need of investigation.

When I defined the limits of *Microgaster* in 1965, I stated that the first abscissa of the discoideus is fully equal to the second. This is true of all the species included below with the exception of *consors* sp. n. from England. In all other respects, this species is typical of the genus.

As stated earlier, *Microgaster* is mainly confined to north temperate regions. It does, nevertheless, extend as far as the Oriental region, *tjibodas* from Java, *kuchingensis* from Borneo and *magnifica* from Queensland. I include also one species from Mexico, *nerione*.

In conclusion, it is important to state that this revision is based only on material that I have personally examined. For this reason, published host records are excluded, since no reliance can be placed on the identification of the parasites.

#### KEY TO SPECIES

##### FEMALES

- 1 Notaulic courses widened behind and here tending to coalesce (at most separated by a weak keel) so that the posterior half of the mesoscutum shows a large, more or less sunken area of coarse rugose-punctation or rugose-reticulation.

- Gaster always in part red; tergite 2 extremely coarsely rugose and considerably longer than 3; apical tarsal segment of all legs enlarged; claws very large hypopygium heavily sclerotized all over and hence without trace of lateral creasing; *russatus*-group . . . . . 2
- Notaulic courses, if indicated at all, never reaching beyond the middle of the disc; posterior part of mesoscutum thus never with an area of sunken rugosity; *deprimator*-group . . . . . 4
- 2 Hind coxa red; tergite 2 hardly more than twice as wide as long; hind tarsal segment 3 fully one and a half times longer than wide; ovipositor sheath distinctly longer than the hind basitarsus . . . . . 3
- Hind coxa blackish; tergite 2 fully two and a half times wider than long; hind tarsal segment 3 hardly longer than wide; ovipositor sheath distinctly shorter than the hind basitarsus
- Gaster short, broad (Text-fig. 31); tergites 1-3 black; rest of gaster red; inner spur of the hind tibia not reaching middle of hind basitarsus.
- 3 Tergites 1 and 2 and most of 3 red, the rest black; head behind the ocelli shiny and with only weak traces of punctation; preapical segment of the antenna not more than twice as long as wide; flagellum yellow. Europe. Japan *rugulosus* Nees (p. 68)
- Tergites 1 and 2 black, the rest broadly banded with black or more or less entirely black; head behind the ocelli dull, densely rugose-punctate; preapical segment of the antenna fully two and a half times longer than wide; flagellum brownish but paler beneath. North America . . . . . *melligaster* Provancher (p. 68)
- 4 Tergite 2 entirely smooth; costad abscissa of the basalis about one fifth as long as the mediad abscissa
- Hind coxa and hind femur black. Europe . . . . . *politus* Marshall (p. 48)
- Tergite 2 never as smooth as this; almost always very strongly, coarsely sculptured; if almost smooth (*tjibodas*) then the hind coxa in part, and the hind femur entirely, yellow; costad abscissa of the basalis at least one quarter as long as the mediad abscissa . . . . . 5
- 5 Thorax entirely bright reddish fulvous; hypopygium without lateral, membranous creases and, seen from the side, with its apex produced to form a long, strongly sclerotized spine (Text-fig. 15)
- Preapical segment of the antenna tapered distally and about two and a half times longer than its basal width; wings strongly, evenly, smoky yellow. Queensland. . . . . *magnificus* Wilkinson (p. 66)
- Thorax black or blackish; hypopygium not thus produced at apex, though sometimes it may be without lateral creases (*grandis*-subgroup) . . . . . 6
- 6 Face either virtually impunctate or more often with an even punctation, there being no indication of transverse or almost transverse vermiculate rugosities towards sides.
- Vertex around the ocelli smooth, shining; claws simple . . . . . 7
- Face much less shining and with a predominantly rugose sculpture and almost always with a clear indication of vermiculate rugosities towards sides; rarely the sculpture reduced to a vague, confused aciculation (*tjibodas*) or obsolescent (*nerione*) . . . . . 14
- 7 Face smooth, except for minute setiferous punctures.
- Basal half of ventral surface of gaster bright yellow; flagellum long, thin, with somewhat outstanding pubescence; its preapical segment hardly less than twice as long as wide. Europe . . . . . *procerus* Ruthe (p. 45)
- Face with distinct punctation . . . . . 8
- 8 Face, anterior part of mesopleurum, mesosternum, with a heavy discrete punctation; preapical segment of antenna about two and a half times longer than wide;

hypopygium, except at extreme tip, heavily sclerotized all over, without trace of a fold along the middle line

Very large species, *c.* 6 mm., with the whole of the hind leg blackish. E. Siberia . . . . . ***reticulatus*** Shestakov (p.65)

- Face and more especially the anterior part of the mesopleurum and mesosternum with a much finer, sparser punctation, the surface at first sight sometimes appearing polished and almost impunctate; preapical segment of the antenna at most hardly twice as long as wide; hypopygium, except in one species which has the hind femur almost entirely red, tightly folded along the middle line in death and with more or less distinct lateral creases . . . . . 9

- 9 Hairy part of ovipositor sheath very distinctly less than half as long as the hind tibia; hind femur red, blackened at tip; inner spur of the hind tibia not extending beyond basal two thirds of hind basitarsus.

Very small species, *c.* 2.5 mm. without ovipositor. Europe ***opheltes*** sp. n. (p. 48)

- Hairy part of ovipositor sheath at least about two thirds as long as the hind tibia; if somewhat shorter, then the hind femur entirely dark; inner spur of the hind tibia longer . . . . . 10

- 10 Hind femur entirely red.

Antennal segments 15-17 somewhat barrel-shaped so that the apical antennal segments appear loosely articulated (Text-fig. 5). Europe

***fulvicrus*** Thomson (p. 45)

- Hind femur at least with a darkened tip . . . . . 11

- 11 Hind femur entirely black . . . . . 12

- Hind femur red with a darkened tip . . . . . 13

- 12 Hairy part of ovipositor sheath not more than two thirds as long as the hind tibia; posterior tangent to the anterior ocellus not, or hardly, cutting the posterior pair.

Very dark species with heavily infumated wings; antennal segments 15-17 cylindrical, with 17 varying from one and a half to one and two thirds times longer than wide. Europe . . . . . ***curvicrus*** Thomson (p. 46)

- Hairy part of ovipositor sheath about three quarters as long as the hind tibia; posterior tangent to the anterior ocellus distinctly cutting the posterior pair (Text-fig. 14). Europe . . . . . ***erro*** sp. n. (p. 46)

- 13 Tergites with very narrow, pale, apical margin; tergite 3 with a yellowish spot on each side; first abscissa of the discoideus not longer than the second; setae of the median cell as dark towards base of cell as at apex. Europe ***obsepiens*** sp. n. (p. 47)

- Tergites entirely black; no yellow spot on each side of tergite 3; first abscissa of the discoideus more or less distinctly longer than the second; setae of the median cell dark only within about apical quarter; elsewhere colourless and almost absent. Ireland . . . . . ***fulvicrus*** Thomson, var. A (p. 46)

- 14 Hind coxa entirely, or in large part, yellow; (if the yellow colour is not sharply discrete, then the apical tergites are marked with yellow) . . . . . 15

- Hind coxa black or dark brown; at most somewhat paler beneath or at apex (*epagoges, brittoni*) . . . . . 19

- 15 Hind coxa entirely yellow.

Gaster conspicuously pale-marked or banded with yellow on apical segments . . . . . 16

- Hind coxa darkened at base . . . . . 17

- 16 Claws long, thin, evenly curved (Text-fig. 12); inner spur of the middle tibia not reaching apex of basal segment of tarsus; tergites 4-6 with weakly indicated, pale, longitudinal, median band. Europe . . . . . ***auriculatus*** Fab. (p. 55)

- Claws of ordinary form; inner spur of the middle tibia reaching apex of basal segment of tarsus; tergites 4-6 with dark, longitudinal, median band, sometimes so narrow that segments appear virtually yellow.

Hind tarsus and apex of hind tibia deeply infusate. North America

***leechi*** Walley (p. 65)

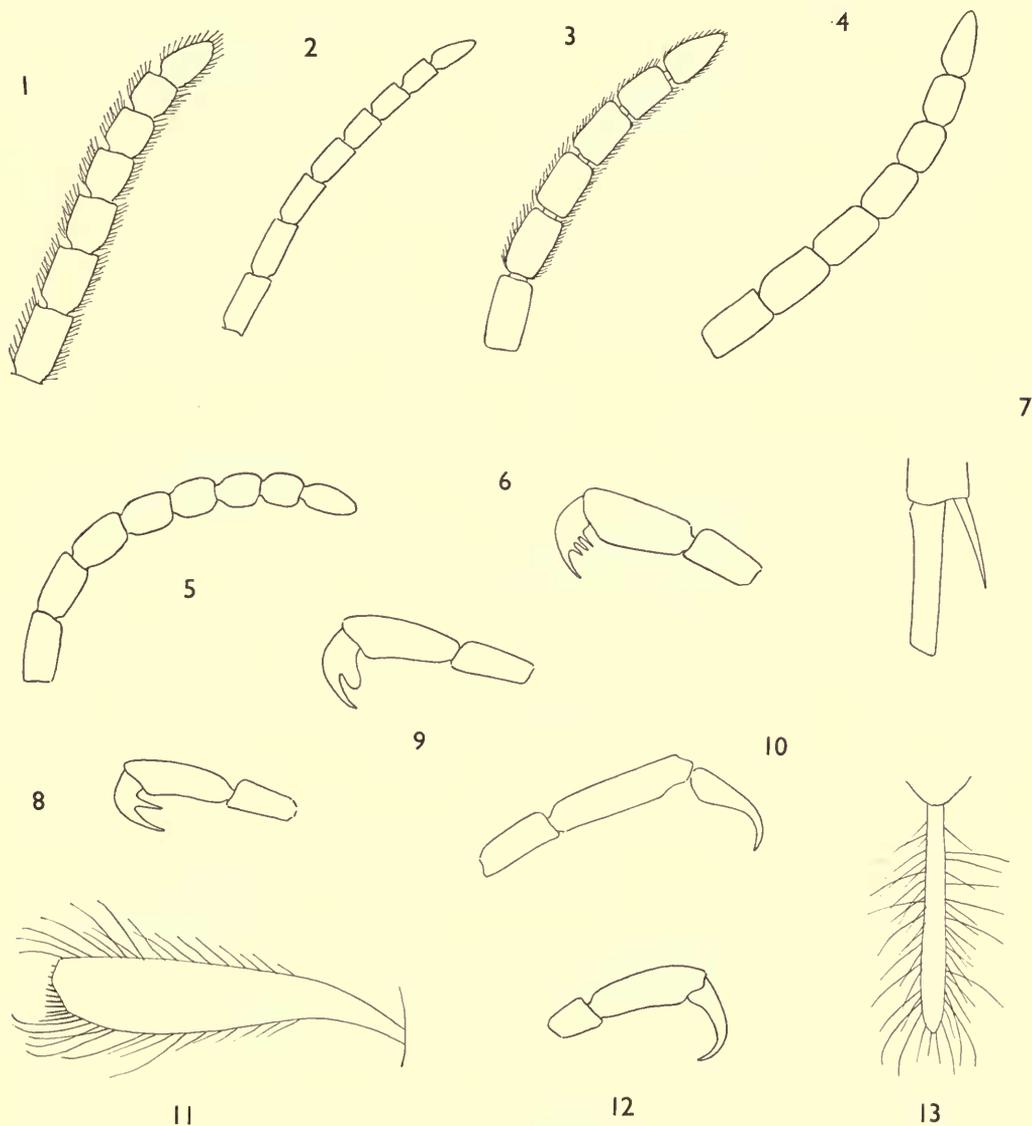
- 17 Apical tergites conspicuously banded with yellow.  
 Ventral surface of gaster entirely yellow; hind leg distal to coxa entirely reddish yellow; anterior half of mesoscutum with fine, shrivelled rugosity, stronger along the imaginary course of the notaulices; radius leaving stigma far distal to middle.  
 North America . . . . . *gelechia* Riley (p. 65)
- Apical tergites entirely dark . . . . . 18
- 18 Gaster largely dull reddish; tergite 2 almost smooth; mesoscutum, except for its anterior declivity, polished, smooth-looking; hind femur entirely yellow; claws with minute, basal spine. Java . . . . . *tjibodas* Wilkinson (p. 67)
- Gaster virtually black; tergite 2 very coarsely rugose-reticulate; mesoscutum markedly dull, rugose almost all over; hind femur weakly infusate at apex; claws with 2-3 teeth. North America. England *pantographae* Muesebeck (p. 62)
- 19 Claws with a conspicuous, basal lobe (Text-fig. 9); head from in front markedly triangular (Text-fig. 29).  
 Mesoscutum densely, heavily punctate all over and, at the origin of the notaule courses, rugose-punctate. Europe . . . . . *deductor* sp. n. (p. 49)
- Claws never lobed, but sometimes toothed or pectinate; head from in front not triangular . . . . . 20
- 20 Hind claw with one to two long teeth or two to four fine, close, black spines (Text-figs. 8, 6) . . . . . 21
- Hind claw at most with a single, fine, black spine at base . . . . . 30
- 21 Hind claw bent almost at right angles near base and with one to two strong teeth (Text-fig. 8); the distal tooth almost as pale and as long as that part of the claw distal to it.  
 Preapical segment of the antenna more or less square in outline; hairy part of the ovipositor sheath fully three quarters as long as the hind tibia . . . . . 22
- Hind claw less bent and with two to four spine-like teeth that are somewhat darkened and do not reach the level of the claw-tip; the claw, hence, simply pectinate (Text-fig. 6) . . . . . 24
- 22 Metacarp short, only about one and one third times longer than its distance from the apex of the radial cell; stigma rather short and broad (Text-fig. 25); at least the anterior half of the mesoscutum with much fine, shrivelled rugosity, the lines of the notaulices more strongly rugose; tergite 2 very coarsely rugose-reticulate, without obvious longitudinal elements in the sculpture; slightly longer than 3, the dividing suture deep, somewhat rugose; tergite 3 with distinct traces of rugosity (vague rugose-punctuation); inner spur of the hind tibia longer. North America  
*congregatifformis* Viereck
- Metacarp longer, at least twice as long as its distance from the apex of the radial cell; stigma longer, narrower; anterior half of the mesoscutum more shiny and smoother; tergite 2 with weaker rugosity, in which there are obvious longitudinal elements; not longer than 3, the dividing suture smooth; tergite 3 virtually smooth; inner spur of the hind tibia shorter, only about three fifths as long as the hind basitarsus . . . . . 23
- 23 Flagellum bristly, the pubescence of segment 17 being equal to about one third the width of the segment (Text-fig. 1); hind femur entirely red or with faint, dark patch above at base; no trace of short, longitudinal keel between the posterior ocelli. Europe . . . . . *crassicornis* Ruthe (p. 49)
- Flagellum less bristly, the pubescence of segment 17 not more than one quarter the width of the segment; hind femur blackened at base and along upper margin; nearly always a very short, longitudinal keel between the posterior ocelli. Europe.  
*areolaris* Thomson (p. 49)
- 24 Hypopygium heavily sclerotized all over and without a trace of lateral creases.  
 Hind femur black; hind tibia deeply infusate but slightly paler along dorsal surface; ovipositor sheath about half as long as the hind tibia; ovipositor thick, evenly curved. Mexico . . . . . *nerione* sp. n. (p. 68)

- Hypopygium more feebly sclerotized laterally than long the middle line and always with some lateral creasing in the dead insect . . . . . 25
- 25 First abscissa of the discoideus distinctly shorter than the second (Text-fig. 23); costad abscissa of the basalis hardly more than one quarter as long as the mediad abscissa; hind claw with two pale spines; ovipositor sheath about three quarters as long as the hind tibia. England . . . . . **consors** sp. n. (p. 50)
- First abscissa of the discoideus as long as, or longer than, the second; costad abscissa of the basalis fully one third as long as the mediad abscissa; hind claw with two to four thickened spines . . . . . 26
- 26 Hind coxa somewhat brownish beneath; middle coxa yellowish brown.  
Flagellum fulvous beneath; hind tibia reddish fuscous, becoming faintly darker towards apex and with yellowish, basal ring. North America **epagoges** Gahan (p. 52)
- Hind and middle coxa black . . . . . 27
- 27 Metacarp more sharply defined, short, only a little longer than its distance from the apex of the radial cell; hind femur black; hairy part of the ovipositor sheath distinctly less than half as long as the hind tibia.  
Mesoscutum conspicuously punctate over anterior half. Europe **tibialis** Nees (p. 50)
- Metacarp less sharply defined, at least about one and a half times longer than its distance from the apex of the radial cell and then, *canadensis*, mesoscutum not obviously punctate in front; hind femur red, with at most the apex darkened; hairy part of ovipositor sheath fully two thirds as long as the hind tibia . . . . . 28
- 28 Metacarp about one and a half times longer than its distance from the apex of the radial cell; first abscissa of the radius virtually straight; hind tibia with weak, but distinct apical infuscation; hairy part of ovipositor sheath hardly two thirds as long as the hind tibia. North America . . . . . **canadensis** Muesebeck (p. 64)
- Metacarp about twice as long as its distance from the apex of the radial cell; first abscissa of the radius markedly convex on its distal side (Text-fig. 24); hind tibia with conspicuous, apical infuscation; hairy part of the ovipositor sheath distinctly more than two thirds as long as the hind tibia . . . . . 29
- 29 Scutellum coarsely punctate; the punctures large and separated by one to two diameters, except posteriorly; mesopleurum towards front with clearly defined, dull surface sculpture between its large, round punctures. Europe **eupolis** sp. n. (p. 51)
- Scutellum with at most scattered punctures along sides; mesopleurum smooth and shining between its punctures  
Species with deeply blackened hind tarsus and black tip to hind tibia, contrasting with deep red hind femur. Europe. Mediterranean Region  
**deprimator** Fab. (p. 51)
- 30 Costad abscissa of the basalis hardly one quarter as long as the mediad abscissa.  
Gaster yellow on basal half beneath; antenna thin, with segment r6 fully twice as long as wide; flagellum bristly; hairy part of ovipositor sheath about one third as long as the hind tibia. Europe. North America . . . . . **novicius** Marshall (p. 53)
- Costad abscissa of the basalis one third to one half as long as the mediad abscissa . . . . . 31
- 31 Hind tibia black with white basal ring; fore wing hyaline, sharply infuscate distal to middle of radial cell and with dark band enveloping first abscissa of radius  
Hind spurs white and hind tarsus as black as its tibia; scape somewhat reddish; costad abscissa of the basalis at most about one third as long as the mediad abscissa (Philippines); much shorter than this (type series, Borneo). Indo-Australian Region . . . . . **kuchingensis** Wilkinson (p. 66)
- Hind tibia never black with white, basal ring; hyaline and infuscate areas of fore wing never as sharply discrete as this . . . . . 32
- 32 Eyes strongly convergent below (Text-fig. 32).  
Small species, c. 2.3 mm., with the mesoscutum confusedly rugose-punctate almost all over and the hind femur bright reddish yellow with darkened apex. Macedonia . . . . . **phryne** sp. n. (p. 63)

- Eyes never as strongly convergent below as this . . . . . 33
- 33 Hypopygium very short, heavily sclerotized all over, not tightly folded along the middle line and without trace of lateral creases.  
 Antenna very long, the preapical segment fully twice as long as wide; surface between and around the ocelli with some sort of sculpture; hairy part of ovipositor sheath at most nearly half as long as the hind tibia, its apical edge with a row of stiff bristles that contrast with the longer hairs below them (Text-fig. 11); this tuft poorly defined in the North American *brittoni* but this species has the dorsum of the gaster conspicuously yellow-marked . . . . . 34
- Hypopygium usually considerably longer and not thus evenly and heavily sclerotized so that, in the dead insect, it tends to be tightly folded along the middle line and usually shows one or more lateral creases; (creases hardly evident in *fischeri* but this species is less than 2.5 mm.) . . . . . 36
- 34 At least tergite (2 + 3) heavily marked with yellow; hairy part of ovipositor sheath almost half as long as the hind tibia. North America . . . . . *brittoni* Viereck (p. 54)
- Dorsum of gaster entirely black; hairy part of ovipositor sheath only about one third as long as the hind tibia . . . . . 35
- 35 Mesoscutum, at least over anterior two thirds, with large, well separated punctures; hairs of the head and mesoscutum unusually long and conspicuous; hind tibia infusate at apex. Europe . . . . . *grandis* Thomson (p. 53)
- Mesoscutum without distinct punctation, but strongly rugulose in front; hairs of the head and mesoscutum short, inconspicuous; hind tibia uniformly red throughout. Europe . . . . . *acilius* sp. n. (p. 53)
- 36 Claws unusually large and conspicuous (Text-fig. 10); mesoscutum dull, densely rugose-punctate almost everywhere; apart from the medial, polished area, the mesopleurum in front and below is densely rugose-punctate; posterior tangent to the anterior ocellus not touching the posterior pair; the rugosity of the mesopleurum extends over the area posterior to the sternaucic pit. Europe . . . . . *deceptor* sp. n. (p. 55)
- Claws normal; mesoscutum never as dull or as extensively sculptured as this, though there may be conspicuous, shrivelled rugosity along the imaginary course of the notaulices; mesopleurum shiny and with at least a somewhat superficial, less close punctation; ocelli in a lower triangle, the posterior tangent to the anterior ocellus at least touching the posterior pair; if the mesopleurum shows coarse rugosity, then this does not extend over the area posterior to the sternaucic pit . . . . . 37
- 37 First abscissa of the discoideus very distinctly longer than the second (Text-fig. 22)  
 Mesoscutum rugulose almost all over; hind femur infusate at tip; hind tibia deeply infuscated on about apical third; basal half of ventral surface of gaster bright yellow. Austria . . . . . *caris* sp. n. (p. 61)
- First abscissa of the discoideus never distinctly longer than the second . . . . . 38
- 38 Ovipositor sheath very long, its hairy part as long as the hind tibia.  
 Both hind femur and hind tibia with blackened tip; flagellum very slender, with bristly pubescence and the preapical segment at least one and a half times longer than wide. Europe . . . . . *subcompletus* Nees (p. 56)
- Ovipositor sheath at most three quarters as long as the hind tibia and then the hind femur is not tipped with black . . . . . 39
- 39 Distance between the anterior ocellus and a posterior ocellus about equal to the diameter of the anterior ocellus.  
 Surface between and around the ocelli almost smooth; hind femur entirely red; hind tarsus almost as red as its tibia; hairy part of ovipositor sheath about two thirds as long as the hind tibia. Europe . . . . . *laeviscuta* Thomson (p. 56)
- This distance usually markedly less than the diameter of the anterior ocellus; if not, then the surface around the ocelli shows some striation radiating outwards from the ocellar triangle or the hind femur is blackened at least at apex . . . . . 40

- 40 Tergite 1 tending to become smooth and polished over the greater part of its horizontal surface; hind tibia tricoloured, deeply infusate over distal half, red at middle and whitish on about basal fifth  
Mesoscutum smooth, shining, even in front; scape bright reddish. S. Europe  
*asramenes* sp. n. (p. 62)
- Tergite 1 strongly sculptured everywhere; hind tibia not tricoloured . . . . . 41
- 41 Hypopygium very strongly developed, long, acute, extending well beyond the apex of the gaster (Text-fig. 18).  
Hind femur blackish; hind tibia becoming progressively more strongly infusate from base to apex; flagellum very bristly, with the preapical segment about one and one third times longer than wide; metacarp nearly three times as long as its distance from the apex of the radial cell. Finland . . . . . *ductilis* sp. n. (p. 58)
- Hypopygium rarely approaching this length and then the hind femur is entirely or predominantly reddish or yellowish and the flagellum is not noticeably bristly . . . . . 42
- 42 Hind femur varying from entirely black to red with usually at least a dark streak above at base; if entirely red, then wings virtually hyaline.  
Small species, at most about 3 mm., without ovipositor . . . . . 43
- Hind femur rarely blackened and then the species are considerably larger . . . . . 44
- 43 Larger, about 3 mm. without ovipositor; hind tibia pale reddish, without trace of apical infuscation  
Wings virtually hyaline; antenna short with segments 16-17 and often 15 not or only very slightly longer than wide; ovipositor evenly curved throughout (Text-fig. 17), thinner than in *laeviscuta*. Europe. North America.  
*hospes* Marshall (p. 57)
- Smaller, about 2.3 mm. without ovipositor; hind tibia becoming infusate in about apical third  
Hind femur infusate almost throughout or entirely; ovipositor sheath very short, hardly more than half as long as the hind tibia; propodeum having a somewhat flattened appearance. Europe . . . . . *fischeri* Papp (p. 64)
- 44 Anterior half of mesoscutum very distinctly punctate, though the punctures tend to become crowded and form rugose-punctuation at the origin of the imaginary notaulic courses; anterior part of the mesopleurum somewhat coarsely rugose.  
Wings strongly infumated; at least the apex of the hind femur strongly infuscated; surface around the ocelli polished, smooth; ovipositor sheath with numerous, outstanding bristles. Austria . . . . . *famulus* sp. n. (p. 59)
- Anterior half of mesoscutum without such distinct punctuation though there may be considerably rugosity along the course of the notaulices; with punctuation feebly indicated at front of middle lobe; anterior part of mesopleurum with a prevailing sculpture of discrete punctuation that may be very weak or superficial; if the sculpture here is somewhat coarse and not resolvable as punctuation, then the wings are virtually hyaline . . . . . 45
- 45 Tergite 2 at most about two and a half times wider than long (Text-fig. 33) and distinctly longer than 3.  
Hairy part of the ovipositor sheath a little less than half as long as the hind tibia; hind tarsus almost as red as its tibia; head considerably sculptured around and between the ocelli; flagellum long, tapering, the preapical segment fully one and a half times longer than wide; front part of mesoscutum strongly rugose or rugose-punctate. Europe . . . . . *sticticus* Ruthe (p. 59)
- Tergite 2 about three times wider than long and not distinctly longer than 3; hairy part of ovipositor sheath distinctly more than half the length of the hind tibia . . . . . 46
- 46 Femora predominantly yellowish; smaller, *c.* 3 mm. without ovipositor. North America . . . . . *peroneae* Walley (p. 58)
- Femora predominantly reddish; larger, *c.* 4.2 mm. without ovipositor . . . . . 47

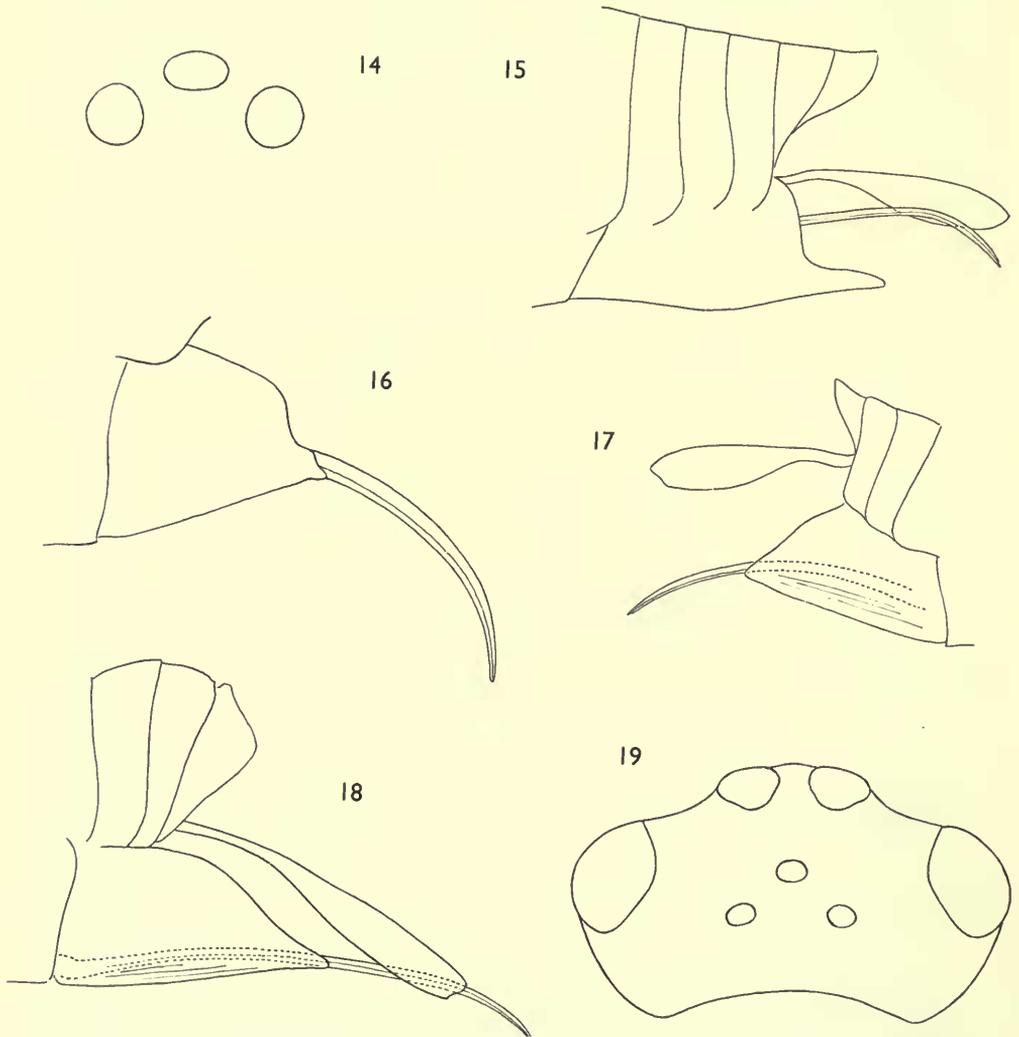
- 47 Ovipositor abruptly downcurved in about apical third; no transverse striation to the side of the ocelli; spines of the outer side of the hind tibia rather short and sparse, especially at about middle; sculpture at the origin of the notaulic courses fine, weak. Europe . . . . . *parvistriga* Thomson (p. 61)



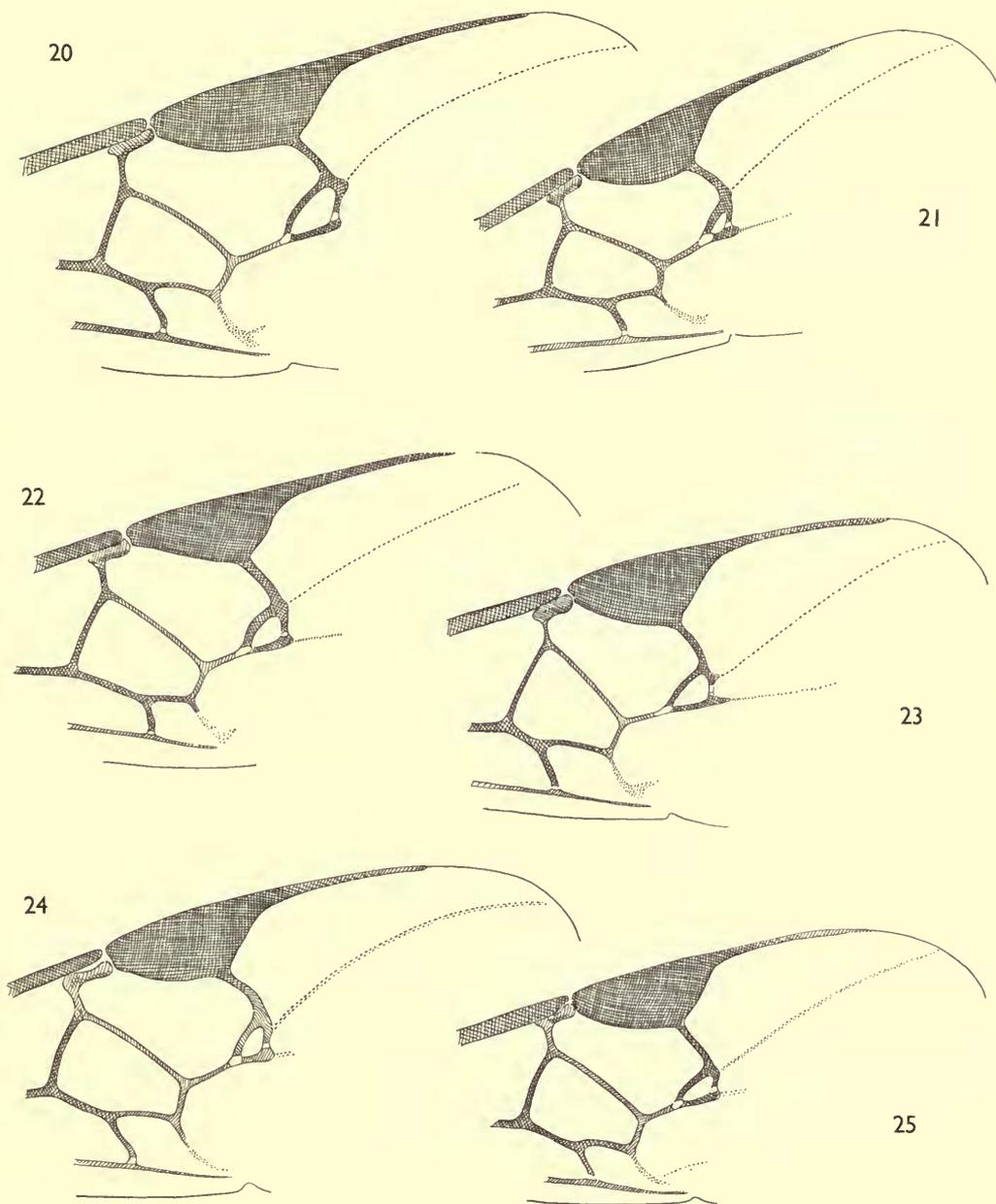
FIGS. 1-13. *Microgaster*, ♀: Apical flagellar segments of 1, *crassicornis* Ruthe. 2, *sticticus* Ruthe. 3, *erro* sp. n. 4, *curvicrus* Thomson. 5, *fulvicrus* Thomson. 6, *deprimator* Fab., hind claw. 7, *laeviscuta* Thomson, inner spur of left hind leg. 8, *crassicornis* Ruthe, hind claw. 9, *deductor* sp. n., hind claw. 10, *deceptor* sp. n., hind claw. 11, *grandis* Thomson, ovipositor sheath (lateral). 12, *auriculatus* Fab., middle claw. 13, *procerus* Ruthe, ovipositor sheaths (dorsal).

- Ovipositor weakly but evenly curved throughout; considerable striation to the side of the ocelli; spines of the outer side of the hind tibia longer, more numerous; sculpture at the origin of the notaulic courses very coarse, the sculpture extending much further onto the disc than in *parvistriga*.

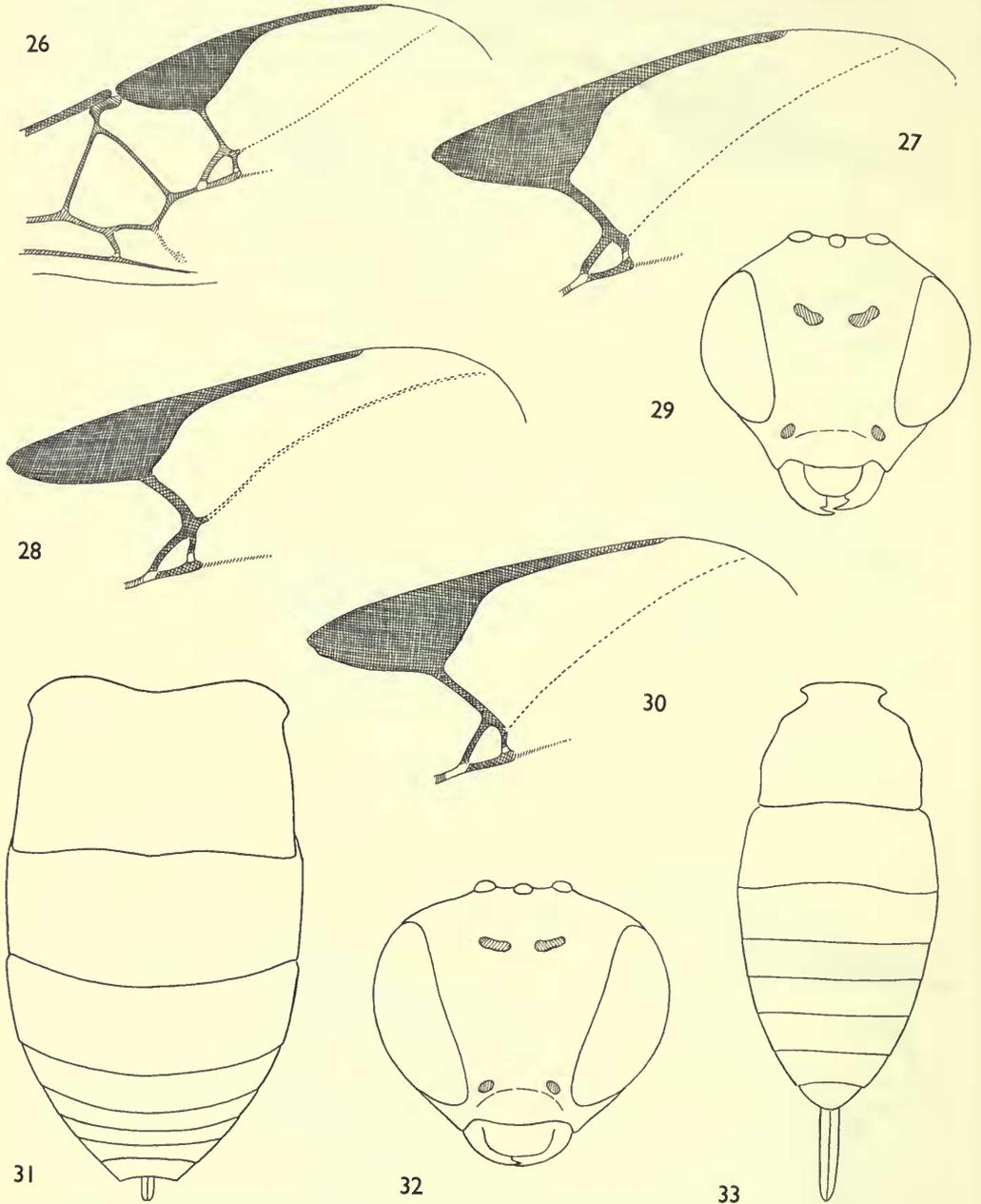
Hind femur red with at most the faintest trace of apical infuscation. Europe  
*alebion* sp. n. (p. 60)



FIGS. 14-19. *Microgaster* ♀: 14, *erro* sp. n., ocellar triangle. 15, *magnificus* Wilkinson, apex of gaster (lateral). 16, *nerione* sp. n., hypopygium and ovipositor (lateral). 17, *hospes* Marshall, apex of gaster (lateral). 18, *ductilis* sp. n., apex of gaster (lateral). 19, *deceptor* sp. n., head from above.



FIGS. 20-25. *Microgaster*, ♀: Distal half of fore wing of 20, *deceptor*, sp. n. 21, *tibialis* Nees. 22, *caris*, sp. n. 23, *consors* sp. n. 24, *deprimator* Fab. 25, *congregatiformis*, Viereck.



FIGS. 26-33. *Microgaster*, ♀: Distal part of fore wing of 26, *politus* Marshall. 27, *fulvicrus* Thomson. 28, *grandis* Thomson. 29, *deductor* sp. n.; head (from in front). 30, *laeviscuta* Thomson, distal part of fore wing. 31, *rugulosus* Nees, gaster (dorsal). 32, *phryne* sp. n., head (from in front). 33, *sticticus* Ruthe, gaster (dorsal).

*Microgaster procerus* Ruthe

(Text-fig. 13)

*Microgaster procerus* Ruthe, 1860 : 115.

♀. Basal half of ventral surface of gaster yellow. Maxillary palpi pale yellow. Hind femur red with darkened tip; hind tibia at apex and hind tarsus, infuscated. Fore wing faintly smoky; metacarp paler than the stigma.

Head above smooth, polished. Flagellum thin, somewhat pale beneath, distinctly bristly; the preapical segment almost twice as long as wide.

Mesoscutum having a highly polished appearance, even in front, where there are traces of very superficial punctation; no rugosity at the origin of the notaulic courses. Costad abscissa of the basalis fully two-fifths as long as the mediad abscissa; first abscissa of the discoideus distinctly a little longer than the second. Inner spur of the hind tibia fully three quarters as long as the hind basitarsus.

Tergite 1 somewhat narrowly triangular, its sculpture towards sides tending to be predominantly longitudinal. Hairy part of ovipositor sheath about half as long as the hind tibia; seen from above, the hairs of the sheaths are particularly long and outstanding (Text-fig. 13).

♂. Like the female in colour and sculpture.

Length: ♂ ♀, *c.* 5 mm. without ovipositor of female.

Material examined: FINLAND. GERMANY. IRELAND. 3 ♂, 4 ♀.

Distinct among those species with non-rugose face on general reduction of sculpture together with colour, especially that of the ventral surface of the gaster.

The single Irish male I have seen differs from two Finnish males in that the middle femur is streaked with black above and the base of the gaster is not bright yellow; this may be due to discoloration.

*Microgaster fulvicrus* Thomson

(Text-figs. 5, 27)

*Microgaster fulvicrus* Thomson, 1895 : 2240.

♀. Maxillary palpi brownish, the basal segments almost black. Hind femur entirely red; hind tibia with darkened tip, sometimes hardly noticeable; hind tarsus deeply infuscated. Fore wing somewhat darkened; the radial cell contrastingly paler than the large third cubital cell adjacent to it.

Head above smooth, polished. Apical flagellar segments (Text-fig. 5).

Front part of mesoscutum with faint to rather sharp, fine punctation. Scutellum virtually impunctate. Costad abscissa of the basalis about one third as long as the mediad abscissa; stigma rather broad, emitting the radius virtually at middle (Text-fig. 27).

Tergite 2 as coarsely rugose as tergite 1. Hairy part of the ovipositor sheath slightly more than half as long as the hind tibia; outstanding hairs fewer than in *procerus* (cf. Text-fig. 13).

♂. Like the female in colour and associated with it on the evidence of the short series bred from *D. ocellana*. Unless careful attention is paid to the sculpture of the face, the male is virtually indistinguishable from the males of several other species.

Distribution: ENGLAND. FINLAND. IRELAND. SWEDEN.

Host: *Depressaria ocellana* Fab. (Oecophoridae), in England, Westmorland, Witherslack. Parasites emerge in May from hosts collected previous June.

Type in the Entomological Institute, Lund, Sweden. Examined.

*Microgaster fulvicrus*, var. A. Seven females from counties Wicklow and Dublin in Ireland. These differ from typical *fulvicrus* as follows: the apex of the hind femur is conspicuously blackened; the two preapical segments of the antenna are slightly more elongate; the anterior part of the mesoscutum is more densely and more sharply punctate; the first abscissa of the discoideus is usually distinctly longer than the second; the hairs of the median cell are darkened only in about apical quarter of cell; elsewhere the cell appears bare, the scattered setae being sparse and colourless, whereas in typical *fulvicrus*, the setae are dark wherever they occur.

***Microgaster curvicrus* Thomson**

(Text-fig. 4)

*Microgaster curvicrus* Thomson, 1895 : 2242.

♀. Middle and hind femur entirely black; front femur yellow on about distal half; hind tibia dusky red, darkened at tip but the infuscation not sharply discrete and more extensive on inner side. Radial cell more or less as dark as the third cubital cell adjacent to it.

Flagellum differs from that of *fulvicrus* in that the two preapical segments are more elongate and evenly cylindrical (Text-fig. 4).

Anterior half of mesoscutum very shiny, tending to be sharply and distinctly punctate. Costal abscissa of the basalis a little longer than in *fulvicrus* so that the discoidal cell is slightly more elongate; abscissa 1 of the radius slightly more obliquely placed than in *fulvicrus* and slightly more curved.

Ovipositor sheath as in *fulvicrus*.

♂. I associate with the female numerous males, caught in certain localities, with females, in England (Kent: Wye and Dartford Heath) and showing the same colouration.

Distribution: ENGLAND. FINLAND. SWEDEN. A common species; some seventy-five specimens examined.

Host: *Depressaria pallorella* Zeller (Oecophoridae). Host collected July; parasites emerge following May. In southern England, Mr. R. L. E. Ford has swept the species commonly from broom (*Cytisus*) in June.

Type in the Entomological Institute, Lund, Sweden. Examined.

*Microgaster curvicrus*, var. A. Three females from SWITZERLAND: Valais, Les Haudères and Ferpeclé, vi and CZECHOSLOVAKIA: Tatra Mts., v. These females have the hind tibia blackened throughout; the apical segments of the flagellum are slightly more slender than in typical examples and slightly more bristly; the hairy part of the ovipositor sheath is slightly less than half as long as the hind tibia.

Superficially, *curvicrus* s.l. is much like *tibialis* but differs strikingly in the sculpture of the face.

***Microgaster erro* sp. n.**

(Text-figs. 3, 14)

♀. Extremely like *curvicrus* and differing from it by little more than the characters given in the key. The most obvious difference is the longer ovipositor of *erro* but the difference in the shape of the ocellar triangle may have equal importance.

Whereas in *curvicrus*, the apical infuscation of the hind tibia tends to spread over almost a third of the tibia, in *erro* it is restricted to the extreme apex but tends to be faint and in one of the three females from Semsjärvi is absent.

Flagellum not at all tapered apically. (Text-fig. 3). First abscissa of the radius slightly more curved than in *curvicrus*.

Length: larger than *curvicrus*, c. 6 mm. without ovipositor.

Type ♀. FINLAND: Lemland (*Hellén*), Helsinki Museum.

FINLAND: Bergö, 1 ♀, 17-28.vi.1946 (*Hellén*); Carelia, Semsjärvi, 3 ♀, 6.vi.1943 (*Hellén*); Helsingfors, 3 ♀ (*W. Nylander*). SWITZERLAND: Valais, Les Haudères, 4,000-8,000 ft., 3 ♀, vi.1935 (*J. E. & R. B. Benson*). The seven Finnish females are paratypes.

The three females from Switzerland are somewhat doubtful; they do not have the flagellar segments so bristly as in the type series. In one of them, the hind tibia is infuscate almost throughout; and in colour is thus exactly like var. A of *curvicrus*.

In *curvicrus* the ovipositor itself is strongly curved, rather thick and distinctly shorter than the hind tibia; in *erro*, it is longer than the hind tibia, less thick and less curved.

I have examined a female of what I believe to be this species from Cyprus; it differs from the Finnish specimens as follows: hind tibia without a trace of apical infuscation. Flagellum somewhat tapered apically, with the two preapical segments slightly longer, though this appearance may be deceptive for the segments are somewhat collapsed. Ocelli in a higher triangle, the posterior tangent to the anterior ocellus not cutting the posterior pair. Anterior part of the mesoscutum more shining and having altogether a much more polished appearance, the punctuation being almost absent.

The combination of the above differences may constitute specific validity but needs to be seen in further specimens before a decision on this point can be reached.

### *Microgaster obsepiens* sp. n.

♀. Wings strongly darkened; stigma suffused with reddish on about basal third. All the femora red, except that the hind femur is faintly tipped with black; hind tibia also faintly darkened at tip and yellowish on about basal fifth. Basal half of ventral surface of gaster reddish yellow; a reddish yellow spot on each side of tergite 3.

Flagellum as in *curvicrus*, the apical segments tightly articulated and having an evenly cylindrical appearance; its pubescence so short as to be virtually not outstanding.

Front part of mesoscutum sharply and quite strongly punctate. Front femur slightly less thick and slightly longer than in both *curvicrus* and *fulvicrus*; inner spur of the hind tibia relatively a little shorter than in both *curvicrus* and *fulvicrus*, not more than two thirds as long as the hind basitarsus. Radius leaving stigma more obviously distal to middle than in both *fulvicrus* and *curvicrus*; first discoidal cell exactly as in *curvicrus*.

Ovipositor sheath slightly more than half as long as the hind tibia. Tergites with thin, pale apical margin.

Length: 5 mm. without ovipositor.

Type ♀. GERMANY: Berlin, Finkenburg (*Hellén*), Helsinki Museum.

In colour, this species approaches *procerus* more closely than it does either *fulvicrus* or *curvicrus* but differs from Ruthe's species in having very distinct punctation on both face and mesoscutum; the flagellum is also considerably shorter than in *procerus*.

***Microgaster opheltes* sp. n.**

♀. Hind femur red with dark tip; hind tibia also red with dark tip; middle femur with faint dark streak above.

Flagellum without bristly pubescence; preapical segment about one and one third times longer than wide.

Mesoscutum very shiny, even in front, and here with only a weak trace of punctation; much weaker than in both *curvicrus* and *fulvicrus*. Costal abscissa of the basalis between one third and one half as long as the mediad abscissa; first discoidal cell elongate, as in *curvicrus*; first abscissa of the radius virtually straight and leaving the rather broad stigma only very slightly beyond middle. Hind spurs whitish, the inner one not extending beyond basal two thirds of hind basitarsus.

Tergite 2 weakly sculptured (compared with most species of the genus), distinctly shorter than 3. Ovipositor sheath (hairy part) distinctly less than half as long as the hind tibia, *ca.* 3 : 7.

Length: *c.* 2.5 mm., without ovipositor; a small species.

Type ♀. Europe, YUGOSLAVIA: Macedonia, Lake Ochrid, 16.vi.1958 (*R. L. Coe*), B.M. (N.H.).

Paratype ♀. NORTHERN IRELAND: Co. Down, Cranfield Pt., 1.vii.1957 (*A. W. Stelfox*).

Size, colour and short ovipositor are the main features of this species. The usefulness of the other characters mentioned must be accepted with caution since they are based only on two specimens.

***Microgaster politus* Marshall**

(Text-fig. 26)

*Microgaster politus* Marshall, 1885 : 260.

♀. Legs predominantly brownish, the hind femur almost black. Wings more or less hyaline. Face smooth-looking, almost polished and with only the merest trace of punctation. Pre-apical segment of flagellum about one and one third times longer than wide.

Mesoscutum highly polished. Suture between scutellum and mesoscutum reduced to a very narrow, foveolate groove. Hind spurs whitish, the inner one reaching only a little beyond the middle of the hind basitarsus. Fore wing (Text-fig. 26).

Ovipositor sheath nearly three quarters as long as the hind tibia.

♂. Like the female in colour and sculpture.

Length: ♂ ♀, *c.* 3 mm. without ovipositor of female.

Distribution: ENGLAND. IRELAND. SWEDEN. Not common.

Type in the B.M. (N.H.).

An easily recognized species. Apart from the polished second tergite, the short costad abscissa of the basalis is very characteristic.

***Microgaster deductor* sp. n.**

(Text-figs. 9, 29)

A highly aberrant species on account of its lobed claws (Text-fig. 9).

♀. Hind femur entirely red; middle femur dark beneath; hind tibia red throughout. Wings almost hyaline.

Head from in front rather narrowly triangular (Text-fig. 29). Pubescence of flagellum hardly noticeable; preapical segment about one and a quarter times longer than wide.

Mesoscutum densely punctate almost all over and coarsely rugose-punctate at the origin of the notaulic courses. Scutellum closely punctate along each side. Mesopleurum with large, conspicuous punctures almost everywhere.

Tergite 2 fully as long as 3. Tergites beyond 2 unusually densely and extensively hairy. Ovipositor sheath about three quarters as long as the hind tibia.

♂. Like the female but the palpi almost black and the middle femur more extensively blackened at base. The lobe of the claws is less well developed than in the female but will nevertheless distinguish this male from all others available for consideration in this synopsis.

Length: ♂ ♀, *c.* 5.2 mm. without ovipositor of female.

Type ♀. FINLAND, Ivalo (*Hellén*), Helsinki Museum.

Paratypes. Same data: 1 ♂, 1 ♀. LAPLAND: Tornekrask, 1 ♀.

In the Lapland female, the hind femur is darkened at base above and the middle and front femora are more extensively blackened at base than in the two Finnish females. The colour of the legs is likely to be variable.

An unmistakable species on account of the structure of the claws.

***Microgaster crassicornis* Ruthe**

(Text-figs. 1, 8)

*Microgaster crassicornis* Ruthe, 1860 : 124.

This species has been confused in the literature with some of the other species with equally red legs but because of its toothed claws *crassicornis* could actually be confused only with *areolaris*. The essential differences between the two species have been given in the key.

♀. The flagellum is more bristly than in any other species known to me and this, combined with the shortness of the apical segments, provides one of the most useful features for recognizing the species (Text-fig. 1).

Mesoscutum in front without punctation but there is considerable rugosity at the origin of the notaulic courses. Inner spur of the hind tibia hardly equal to two thirds the length of the hind basitarsus. Ovipositor sheath fully three quarters as long as the hind tibia.

Distribution: ENGLAND. FINLAND. SWEDEN. GERMANY 4 ♀.

Host: *Eupithecia denotata* Guenée (now *pimpinellata* Hübnagel) (Geometridae), England, Lyle Coll. in B.M. Bred from same host in Germany, Hinz Coll.

***Microgaster areolaris* Thomson**

*Microgaster areolaris* Thomson, 1895 : 2240.

♀. The legs are altogether darker than in *crassicornis*, the basal and apical infuscation of the hind femur being a conspicuous feature of all the specimens I have examined.

Flagellum considerably longer than in *crassicornis*. Face somewhat gabled along the middle; towards the antennal sockets, the keel is more prominent than in *crassicornis*.

Sculpture of tergite 2 very variable and on the whole very weak; in one of two Scottish examples, the surface is almost smooth; when clearly present, the sculpture is predominantly longitudinal.

Metacarp almost three times as long as its distance from the apex of the radial cell, a little longer than in *crassicornis*. Claws slightly weaker than in *crassicornis*.

♂. Ten males that I associate with this species (Poland, 8), (Switzerland, 2) have the claws toothed like the female; in all of them the middle femur is blackened and in the two specimens from Switzerland (Valais) the hind femur is almost entirely black.

Material examined: N. ENGLAND. FINLAND. SCOTLAND. SWEDEN. SWITZERLAND.

This is perhaps a Northern species.

### *Microgaster consors* sp. n.

(Text-fig. 23)

♀. Hind femur red with infuscation at base beneath (type) or entirely blackish; hind tibia without apical infuscation. Wings only faintly tinted, almost hyaline.

Flagellum not bristly; preapical segment almost square in outline.

Mesoscutum on the whole smooth-looking but finely rugose at the origin of the notaulic courses. Propodeum unusually finely and evenly rugose and with only a very weak, medial keel. Costad abscissa of the basalis short, not much more than one quarter as long as the mediad abscissa; stigma somewhat broad; metacarp fully three times as long as its distance from the apex of the radial cell (Text-fig. 23).

Hairy part of the ovipositor sheath fully three quarters as long as the hind tibia; apex of the ovipositor with two to three very small serrations, as seen from above.

Length: *c.* 3.8 mm. without ovipositor.

Type ♀. ENGLAND: S. Devon, Kingsteignton, Stark's Pond, 24.v.1942 (*J. F. Perkins*), B.M. (N.H.).

Paratypes. ENGLAND: Surrey, Byfleet, 1 ♀, 9-11.v.1947 (*R. B. Benson*); Herts., Brickett Wood, 1 ♀, 20.v.1936 (*R.B.B.*).

I associate with the females seven males, on the strength of wing and claw characters. These were all captured in May (England, Herts., Brickett Wood; Bucks., Farnham Common; Surrey, Wimbledon Common). With one exception (Brickett Wood) all have the hind femur infuscate throughout, that is, very dark brown.

This species is largely characterized by the shortness of the first abscissa of the discoideus, and long ovipositor sheath.

### *Microgaster tibialis* Nees

(Text-fig. 21)

*Microgaster tibialis* Nees, 1834 : 168.

*Microgaster pluto* Morley, 1936 : 211, **syn. n.**

♀. Rather small, very dark species with dusky reddish hind tibia, infuscated on about apical third; both middle and hind femur entirely black or blackish. Wings strongly smoky.

Antenna rather short, not bristly; preapical segment at most about one and a quarter times longer than wide.

Mesoscutum conspicuously punctate, the punctures tending to fade out at about posterior third. Scutellum with a few scattered punctures. Costad abscissa of the basalis between one third and one half as long as the mediad abscissa; first abscissa of the discoideus fully as long as the second; first abscissa of the radius leaving the stigma considerably distal to middle and very obliquely placed (Text-fig. 21).

N. W. EUROPE. Common.

Host: *Gracillaria tringipennella* Zeller (Gracillariidae); *Peronea aspersana* (Hübner) (Tortricidae).

In size and colour this species is much like *curvicrus* but easily separated by the sculpture of the face, among several other characters.

### *Microgaster deprimator* Fab.

(Text-figs. 6, 24)

*Ichneumon deprimator* Fab., 1798 : 227.

*Microgaster australis* Thomson, 1895 : 2240, **syn. n.**

♀. This large species is almost recognizable to the naked eye by its deeply infumated wings and strongly blackened hind tarsus, contrasting sharply with the intensely red hind femur. In one female (Switzerland, Münstertal, 1,400 m.) the hind femur is weakly infuscated at base; it is possible that more extensive darkening may occur in specimens taken at high altitudes.

Whole of median part of face with simple, though rather coarse punctation. Flagellum thick, markedly tapered apically; its pubescence so short as to be almost imperceptible; preapical segment from one and one third to one and a half times longer than wide.

Mesoscutum much less noticeably punctate than in *tibialis*. Mesopleurum, except for a small posterior area, closely punctate. Lateral keel of the propodeum very strongly raised behind so that the surface between it and the medial keel is almost concave.

♂. Claws pectinate like the female (Text-fig. 6). Colour usually similar but the hind tarsus often not contrastingly darkened. Propodeum equally characteristic.

Length: ♂ ♀, *c.* 5.5 mm. without ovipositor of female.

Distribution: CENTRAL EUROPE as far as SPAIN and TURKEY. CYPRUS. PERSIA. N. MONGOLIA (1 ♂). Thomson records *australis* from N. Italy, not N. Europe, as given by Fahringer (1937 : 334).

### *Microgaster eupolis* sp. n.

♀. Apart from the essential differences given in the key, this species may be compared with *deprimator* as follows:

Wings much less smoky. Distribution of light and dark leg-colouration much as in *deprimator*, except that the hind tarsus, especially in the type, is considerably reddened.

Surface immediately surrounding the ocelli considerably rugose; temples coarsely rugose in comparison with *deprimator*. Apical segment of antenna less narrowly conical but since only two females are available, this may have no significance.

Mesoscutum coarsely punctate; course of notaulices marked by a band of coarse rugose-punctation. Propodeum exactly as in *deprimator*. Hind coxa on lower half very closely, strongly punctate.

Length: *c.* 5.2 mm. without ovipositor.

Type ♀. AUSTRIA: Tyrol, Seiseralpe, 1893, Naturhistorisches Museum, Vienna. Paratype. AUSTRIA: Innsbruck, Höttinger Berg, 1,700 m., 1 ♀, 20.viii.1950 (*Pechlauer*).

I associate with the above two females a single male from ITALY (Dolomiti, Passo Campolongo, 6.ix.1954 (*G. J. Kerrich*)). This has the characteristic mesoscutal sculpture of the females and the densely punctate hind coxa, but the punctures of the scutellum are smaller and hence more widely spaced; the punctation of the mesopleurum is equally strong and conspicuous but the interspaces show hardly a trace of surface sculpture.

### *Microgaster epagoges* Gahan

*Microgaster epagoges* Gahan, 1917 : 197.

♀. Flagellum fulvous throughout but darker above. Hind femur red with faint apical infuscation. Basal half of ventral surface of gaster yellowish.

Flagellum not bristly; preapical segment about one and one third times longer than wide.

Mesoscutum not punctate in front but considerably roughened, the sculpture still stronger at the origin of the notaulic courses. Hind claw with three to four spine-like teeth.

Sculpture of tergites 1 and 2 particularly coarse; 3 also considerably sculptured. Hypopygium thin, membranous, yellowish and with numerous lateral creases.

Length: c. 3.5 mm. without ovipositor.

Material examined: U.S.A., Tennessee, Nashville, 1 ♀ paratype, in B.M. (N.H.).

Host: *Epagoge sulfureana* Clemens (Tortricidae).

I cannot be sure that this species, represented by the single paratype in the British Museum, is really distinct from *Microgaster phthorimaeae*, as represented by a single female in the B.M.(N.H.), determined by Muesebeck and evidently one of three specimens recorded by him (1922 : 41) from California, Pasadena but not part of the type series. These three examples of *phthorimaeae* were bred from *Phthorimaea operculella* Zeller.

Apart from slight differences in colour—the broken flagellum of *phthorimaeae* is pale only beneath—I can find no differences of particular significance. Certainly there is a short keel beneath the antennal insertions in *epagoges*, as specially mentioned by Muesebeck and only the merest trace of one in the single specimen of *phthorimaeae* but in my opinion this is a feature of only doubtful specific value.

### *Microgaster phthorimaeae* Muesebeck

*Microgaster phthorimaeae* Muesebeck, 1922 : 40.

See discussion under *epagoges*. Not included in key because not sufficiently differentiated from *epagoges* on the material available to me in the B.M. (N.H.).

Distribution: U.S.A., California, Oxnard (type locality); Pasadena, 1 ♀ paratype, in B.M. (N.H.).

Host: *Phlyctaenia ferrugalis* Hübner (Pylalidae), host of type series; *Phthorimaea operculella* Zeller (Gelechiidae).

***Microgaster novicius* Marshall**

*Microgaster novicius* Marshall, 1885 : 252.

*Microgaster swammerdamiae* Muesebeck, 1922 : 37, **syn. n.**

♀. This is a small species, characterized essentially by three features: long, thin antenna with bristly flagellum; very short costad abscissa of the basalis and very short ovipositor.

The pale parts of the legs are yellow rather than red; hind spurs whitish; hind femur faintly darkened at tip above.

Metacarp almost four times as long as its distance from the apex of the radial cell.

Ovipositor sheath only about one third as long as the hind tibia. Hypopygium rather heavily sclerotized but still tightly folded along the middle line in death and without lateral creases.

Length: *c.* 3 mm. without ovipositor.

Distribution: SCOTLAND (Lanark, Cadder) (type in B.M.(N.H.)). FINLAND, Kempele, 1 ♀, Flütis, 1 ♀ (hind femur of this female entirely infuscate and fine rugosity of the notaulic courses extending further backwards than in other females). NORTH AMERICA (♀, paratype of *swammerdamiae*, in B.M.(N.H.)).

Host: *Swammerdamia castanea* Busk (Hyponomeutidae), host of type series of *swammerdamiae* in North America.

***Microgaster grandis* Thomson**

(Text-figs. 11, 28)

*Microgaster grandis* Thomson, 1895 : 2242.

♀. Hind femur varying from entirely red to entirely black.

Flagellum long, markedly tapering to apex; preapical segment fully twice as long as wide.

Hairs of the median cell sparse, becoming still sparser to widely absent along the medius side of the cell; radius leaving stigma very obviously beyond middle; stigma rather narrow (Text-fig. 28); costad abscissa of the basalis fully half as long as the mediad abscissa.

Hairy part of the ovipositor sheath about one third as long as the hind tibia.

♂. Like the female in hairiness and punctation of mesoscutum. The median cell shows the same sparseness of hairs.

Length: ♂ ♀, 4.5 mm. without ovipositor of female.

Distribution: ENGLAND. FINLAND. IRELAND. SWEDEN.

Host: *Cnephasia chrysanthemana* Duponchel (Tortricidae), 1 ♀, England, Kent, Bexley, collected May, emerged June same year (*R. L. E. Ford*). *Aphelia viburniana* Fab. (Tortricidae), 1 ♀, England, Yorks., Ling Hill, emerged 2.vii.1965 (*J. Bradley*); the hind femur of this female is entirely black.

This is one of the more distinct species, characterized largely by the long hairs and very characteristic punctation of the mesoscutum.

***Microgaster acilius* sp. n.**

♀. Has a hypopygium similar to that of *grandis*, with which, in addition to the characters given in the key, it may be compared as follows:

Hind femur red, except for faint infuscation at extreme tip.

Upper surface of the head with more rugosity.

The coarse rugosity at the origin of the notaulic courses extends almost to middle of disc; similar rugosity occurs along the middle line in front so that the mesoscutum anteriorly has a strongly rugose appearance but along the middle of the lateral lobes the surface tends to be much smoother. Costad abscissa of the basalis slightly shorter; first discoidal cell slightly less elongate; metacarp very slightly shorter, about one and two thirds times longer than its distance from the apex of the radial cell; median cell showing an even distribution of setae. Inner spur of the hind tibia slightly shorter, not more than two thirds as long as the hind basitarsus.

Gaster slightly narrower. Tergite 2 a little longer than 3. Seen in profile, the postero-dorsal edge of the hypopygium is deeply sinuate; this is more obvious than in *grandis*.

Length: *c.* 3.5 mm. without ovipositor.

Type ♀. ENGLAND: Kent, Wye Downs, 2.vi.1949 (*R. L. E. Ford*), B.M. (N.H.).

Paratypes. Same data: 1 ♀, 8.vii.1946 (*G. E. J. Nixon*). Kent, Dartford Heath, 2 ♀, 16.ix.1960 (*R. L. E. Ford*); Dulwich, 2 ♀, 24.viii.1885 (*Billups*).

Mr. Ford has taken a series of nine males with the two females from Dartford Heath that I think may well belong to this species; they show the same strong rugosity of the anterior part of the mesoscutum a similarly short metacarp and similarly coloured legs. The association, however, must be regarded as circumstantial for I am unable to define the male clearly in relation to the males of other species.

In general facies, the female bears a striking resemblance to *sticticus*, differing from it by hardly more than the degree of sclerotization of the hypopygium, the arrangement of bristles at the apex of the ovipositor sheath and the longer flagellar segments.

### *Microgaster brittoni* Viereck

*Microgaster (Microgaster) brittoni* Viereck, 1916 : 202.

*Microgaster brittoni* Viereck; Muesebeck, 1922 : 36.

Through the courtesy of Dr. Muesebeck, I have been able to examine a male and two females of this species, all determined by him.

♀. Apart from differing from *acilius* in its extensively yellow-marked gaster, *brittoni* is extremely like that species.

The front part of the mesoscutum is more evenly and more evidently rugose than in *acilius*. First discoidal cell more elongate, as in *grandis*. Hind femur narrow and very evenly widened towards apex. Tergite 1 appears shorter than in *acilius* and is more abruptly and strongly widened towards apex. Ovipositor sheath distinctly longer.

♂. In colour and in sculpture of mesoscutum like the female. Beyond this there is nothing useful I can say about this specimen. Dr. Muesebeck assures me that it is an excellent match of Viereck's type.

Material examined: U.S.A., Mass., Holliston, 1 ♀. Michigan, Tuscola, 1 ♂. CANADA: Toronto, 1 ♀.

This species, together with *grandis* and *acilius* form a small species-group within the larger aggregate, characterized by the long, somewhat tapering flagellum, with its very elongate preapical segment, the evenly sclerotized hypopygium and the

differentiated tuft of bristles at the apex of the ovipositor sheath. This tuft is not too readily seen in the two females of *brittoni* but is more distinct in the specimen from Holliston.

***Microgaster deceptor* sp. n.**

(Text-figs. 10, 19, 20)

An aberrant species on account of large claws and heavily sculptured thorax.

♀. All femora and all tibiae entirely reddish yellow. Basal half of gaster beneath yellowish; gaster otherwise, except for the black first and second segments, dark brown.

Head from above strongly narrowed behind the eyes (Text-fig. 19). Temples almost coarsely rugose; traces of rugose-punctation immediately behind the ocelli. Flagellum thin, the pre-apical segment about one and a half times longer than wide. Ocelli in a higher triangle than in the other species in this synopsis except *auriculatus*.

Costad abscissa of the basalis fully two thirds as long as the mediad abscissa; areolet somewhat characteristic in shape (Text-fig. 20). Apical tarsal segments of all legs somewhat enlarged (Text-fig. 10). Propodeum with a longer, more clearly differentiated, dorsal surface than in the other species of the genus, somewhat dull looking, densely intricately rugose; the posterior corners rather strongly produced backwards.

Tergite 2 three times as wide as long and markedly longer than 3; tergite 3 with a group of large punctures towards sides. Widened, hairy part of ovipositor sheath a little less than half as long as the hind tibia. Hypopygium in type shows no lateral creasing but is tightly folded along the middle line; in paratype distinct creasing is visible.

Length: 4 mm. without ovipositor.

Type ♀. FINLAND: Juuga (*Woldstedt*), Helsinki Museum.

Paratype. Same data: 1 ♀.

Apart from its long claws, this species has the mesoscutum more heavily sculptured than in any other species, excepting the *russatus*-group (but cf. *auriculatus*). On structure of propodeum, enlargement of apical tarsal segment and lengthening of tergite 2, this species and *auriculatus* are transitional towards *russatus* and *rugulosus*, the two species that formerly constituted the genus *Hygroplitis*, now treated as a synonym of *Microgaster* (Muesebeck & Walkley, 1951 : 135, Nixon, 1965 : 267).

***Microgaster auriculatus* Fab.**

(Text-fig. 12)

*Ichneumon auriculatus* Fab., 1804 : 69.

*Microgaster auriculatus* Fab.; Spinola, 1808 : 147.

A most distinctive species, characterized by the pale-marked gaster, short ovipositor and especially by the long claws. On claw-length different from typical species of *Microgaster* with the exception of *deceptor* to which it appears to be closely related and with which it may be compared as follows:

♀. Hind coxa entirely reddish yellow; (hind tibia missing); Scape reddish yellow on basal half; flagellum pale. Tergite 1 suffused with reddish; 2 still paler; 3 reddish yellow; a wedge-shaped mark of the same colour extending along the middle of the following three tergites.

Head from above less exaggerated in appearance, less narrowed behind the eyes (cf. Text-fig. 19). Ocelli in a high triangle as in *deceptor*. Flagellum thin as in *deceptor* but broken in the single specimen available; twelve antennal segments present on left side.

Mesoscutum less rugose. Front part of mesopleurum without the dense punctation characteristic of *deceptor* but nevertheless with coarse rugosity within the prepectal area. Claws thinner, slightly longer and more evenly curved; apical tarsal segment of all legs less obviously enlarged. Areolet of the fore wing not characteristic in shape.

The pale honey-yellow hypopygium is more evenly sclerotized than in *deceptor* and is without a trace of lateral creasing. Ovipositor sheath as in *deceptor*.

Material examined: GERMANY: 1 ♀, labelled "Fürstenberg i.M. Konow", "auriculatus F. Coll. Marshall" and "Microgaster auriculatus F. det Szepligeti". This specimen received on loan from the Hungarian Natural History Museum.

*M. auriculatus* and *M. deceptor* clearly represent a small species-group within *Microgaster*, characterized essentially by the long claws.

### *Microgaster subcompletus* Nees

*Microgaster subcompletus* Nees, 1934 : 165.

*Microgaster carinata* Packard, 1880 : 25, Muesebeck, 1922 : 38, **syn. n.**

♀. Scape and flagellum pale beneath. Pale parts of the legs somewhat yellowish; front and middle femora entirely pale. Basal half of ventral surface of gaster yellowish.

Mesoscutum without punctation in front but rugose at the origin of the notaulic courses; the rugosity sometimes extending almost to middle of disc. Mesopleurum in front strongly shining and with only minute setiferous punctures.

Ovipositor evenly but weakly curved and rather thick.

N.W. EUROPE. NORTH AMERICA, ? Mass. (*carinata*). According to Muesebeck, in litt., *carinata* may not be native to North America.

Host: *Pyramis atalanta* Linn., (Nymphalidae), in Europe and North America. *Notarcha ruralis* Scopoli (Pyrilidae), Europe in B.M. (N.H.). Both hosts live concealed in folded or rolled leaves of nettle (*Urtica*).

This, the only gregarious species of *Microgaster* known to me, is easily recognized by its long, thick ovipositor, thin, bristly antenna and black-tipped hind femur and hind tibia.

Dr. Muesebeck has confirmed that *carinata* falls as a synonym of *subcompletus*.

### *Microgaster laeviscuta* Thomson

(Text-figs. 7, 30)

*Microgaster laeviscuta* Thomson, 1895 : 2239.

This is one of a small group of species previously confused by older writers under the name "*globatus* Nees".

♀. All the femora and tibiae red; hind tarsus almost as red as its tibia; hind spurs as red as their tibia.

Flagellum somewhat thick, not bristly, usually pale beneath and with the two preapical segments obviously longer than wide. The two apical segments of the maxillary palpi rather short.

Mesoscutum considerably roughened in front but without obvious punctation. Front part of the mesopleurum shiny, at most finely rugose. Spines of the outer side of the hind tibia pale and short, the thicker ones along upper edge of tibia clearly a little shorter than the finer spines on the lower side; inner spur of the hind tibia rather short in relation to the outer one and not reaching beyond basal two thirds of the hind basitarsus (Text-fig 7). First abscissa of the radius very obliquely placed on the stigma (Text-fig. 30).

Ovipositor thick, forming an even curve; the straight line joining its extremities equal to the length of the hind tibia.

Length: *c.* 4 mm. without ovipositor.

CZECHOSLOVAKIA. ENGLAND. FINLAND. SWEDEN.

Type in the University Museum, Lund, Sweden. Examined.

Host: *Argyroplote dimidiana* Sodoffsky (Eucosmidae) (in England); *Acrobasis tumidana* Schiffermüller (Crambidae) (in Czechoslovakia); *Tortrix viridana* L. (Tortricidae) (in Czechoslovakia).

Very important for the recognition of this species is the shortness of the inner spur of the hind tibia (not an easy feature to appreciate!), and the thick, evenly curved ovipositor.

### *Microgaster hospes* Marshall

(Text-fig. 17)

*Microgaster hospes* Marshall, 1885 : 257.

*Microgaster comptanae* Viereck, 1911 : 403, **syn. n.**

♀. Very close to *laeviscuta* but smaller and differing from it only in a few details; these are mainly concerned with colour.

All the femora clouded with infuscation at least basally; sometimes the hind femur entirely blackish; in palest specimens the middle femur always shows a dark streak above.

Flagellum rather short, a little shorter than in *laeviscuta* but the preapical segment at least very slightly longer than wide.

Inner spur of the hind tibia slightly longer in relation to the length of the outer one and to the length of the hind basitarsus. First abscissa of the radius very slightly less curved than in *laeviscuta* (cf. Text-fig. 30).

Hairy part of the ovipositor sheath shorter than in *laeviscuta*, not more than half as long as the hind tibia.

Length: 3-3.2 mm. without ovipositor.

Distribution: N.W. EUROPE. NORTH AMERICA (*comptanae*).

Type in the B.M.(N.H.).

Host: *Peronea hastiana* L., *Depressaria aspersana* Hübner (Tortricidae). Bred from both these hosts in England by R. L. E. Ford. Parasite overwinters in cocoon and emerges in May and June. *Ancylis comptana* Fröhlich (Tortricidae) in North America, host of *comptanae*.

I sent specimens of *hospes* to Dr. Muesebeck for comparison with Viereck's type of *comptanae* and he has confirmed that they are the same species.

The hind tibia of *hospes* has the same subtly distinctive appearance as that of *laeviscuta*, all the spines being just as short and pale golden in colour.

I am not satisfied that I have clearly recognized the specific limits of *hospes*; it is a species needing further study.

### *Microgaster peroneae* Walley

*Microgaster peroneae* Walley, 1935 : 56.

This is a species with only a minute black spine at the base of the claws.

♀. Flagellum a little pale beneath. Hind femur bright yellowish rather than reddish with only a faint touch of infuscation at tip; hind tibia with weak infuscation at extreme apex; hind tarsus about as dark as the apex of the hind tibia but the hind basitarsus whitish at base.

Maxillary palpi somewhat short, in comparison with, say, *leechi*, bright yellow. Temples considerably rugose. Antenna rather thin; flagellum slightly bristly, the preapical segment fully one and one third times longer than wide; the segment proximal to this still longer. Face evenly dull, confusedly rugulose.

Anterior part of the mesoscutum considerably roughened, the lines of the notaulices markedly rugose as far as about middle. Anterior part of mesopleurum shiny and with large, but very ill defined punctures. Inner spur of the hind tibia three fifths as long as the hind basitarsus; hind coxa on outer side more evenly and more closely punctate than in *hospes*. Medial groove of mesosternum wide enough to show its costae; this groove is narrower in *hospes*.

In one female, a paratype, tergite 3 is as rugose as 2; in the other two females, this tergite, though still markedly rugose, is much less so than tergite 2. Hypopygium large, tightly folded along the middle line in the dead insect and with numerous lateral creases. Hairy part of the ovipositor sheath almost two thirds as long as the hind tibia.

Material examined: CANADA: N.S., Grand River, 1 ♀ paratype, received for B.M. (N.H.) through the courtesy of W. M. Mason. Ontario, Biscotasing, 1 ♀, ex *P. variana*. British Columbia, Creston, 1 ♀, ex *Acleris variana* on Cranberry.

Host: *Peronea variana* Fernald (now *Acleris v.*) (Tortricidae).

There is very little of substance to separate this species from *hospes*, beyond colour and the slightly longer ovipositor of *peroneae*. It is possible that the hypopygium of *peroneae* is larger than that of *hospes* but the difference is difficult to assess with only two females of *peroneae* available.

### *Microgaster ductilis* sp. n.

(Text-fig. 18)

♀. Dark species; hind femur blackish; hind tibia showing a dark reddish infuscation that deepens distal to middle; hind tarsus infuscate, as dark as the apical part of the hind tibia; hind spurs contrasting pale yellow. Wings strongly infumated.

Flagellum thin, bristly; preapical segment only very slightly longer than wide.

Anterior part of the mesopleurum very shiny, with very shallow but more or less discrete punctation. Metacarp fully three times as long as its distance from the apex of the radial cell; costad abscissa of the basalis fully one third as long as the mediad abscissa. Inner spur of the hind tibia three quarters as long as the hind basitarsus.

Ovipositor sheath with unusually long, thin, basal stalk; hairy part of sheath about two thirds as long as the hind tibia; ovipositor slightly but evenly curved throughout.

Length: 4 mm. without ovipositor.

Type ♀. FINLAND: Siikajoki (*Wuorentaus*), Helsinki Museum.

Paratypes. FINLAND: Aitlohti, 1 ♀, vii.; Kyolimaj, 1 ♀; Kangasala, 1 ♀, vii.

This dark-legged species is essentially characterized by the bristly flagellum and the long hypopygium.

### *Microgaster famulus* sp. n.

♀. This species is superficially extremely like *tibialis*, differing from it as follows:

In four out of six females, the hind femur is predominantly red with considerable apical infuscation. Wings as dark as in *tibialis*.

Flagellum slightly longer and slightly bristly.

Front part of the mesoscutum less clearly punctate. Front part of mesopleurum rather coarsely rugose; the same area in *tibialis* shows well defined, discrete punctures. Metacarp longer, about twice as long as its distance from the apex of the radial cell. Claws less bent and without spines.

Ovipositor sheath, seen from above, with many more outstanding bristles.

Type ♀. AUSTRIA: Loitsch-Krain, vii-viii (*Graeffe Coll.*). Naturhistorisches Museum, Vienna.

Paratypes. AUSTRIA: Steiermark, Tratten b. Murau, 2 ♀, ix.; Feistritz i.d. Wochein, 1 ♀.

The face of this species is very shiny and has rather ill defined pits along the middle line. This is an observable difference, compared with *tibialis*, but it may have little significance. In spite of the differences given above, the specific validity of *famulus* should be accepted with some caution.

### *Microgaster sticticus* Ruthe

(Text-figs. 2, 33)

*Microgaster sticticus* Ruthe, 1858 : 5.

This species closely resembles *acilius* in general facies but there is a fundamental difference between the two species in the sclerotization of the hypopygium; that of *sticticus*, though short, is tightly folded along the middle line and laterally usually shows one or more creases in death.

♀. Legs, excluding the coxae, red; rarely the middle femur with a short, dark streak above at base. Wings faintly, and virtually evenly, brownish.

Head rather deeply emarginate behind. Space between the eye-margin and the ocelli transversely striate. Flagellum not bristly (Text-fig. 2).

Mesoscutum conspicuously rugose in front, the sculpture coarser along the course of the notaulices. Front part of the mesopleurum strongly shining, very superficially punctate. Propodeum rather evenly rounded from back to front; its sculpture fine and close for the genus; medial keel, and lateral keel behind, weak. As in *acilius*, the radius leaves the stigma markedly distal to middle. Inner spur of the hind tibia about three quarters as long as the hind basitarsus.

Gaster decidedly elongate (Text-fig. 33).

Length: c. 3.8 mm. without ovipositor. A medium sized species of slender build.

N.W. EUROPE. Common.

This species could be confused with the similarly coloured *laeviscuta*; the latter,

however, has the head more transverse, the second segment of the gaster more transverse, the inner spur of the hind tibia relatively shorter and the ovipositor sheaths longer.

***Microgaster alebion* sp. n.**

I regard this species, provisionally, as being composed of two generations—a spring form emerging from larvae of *Platyptilia* and a summer one parasitizing various lepidoptera feeding on nettle (*Urtica*). These two generations are separable on a small difference in the length of the ovipositor but by no other criteria that I believe to have specific validity. It is the spring generation from *Platyptilia* to which I give the name “alebion”.

♀. The two basal sternites usually extensively yellow; in such individuals, the femora are entirely red; in one out of two bred females from Boxhill, the middle femur shows faint darkening at base above; hind tibia without apical infuscation; hind tarsal segments becoming infuscated towards apex, but generally as reddish as tibia. Fore wing almost hyaline.

Head above with a considerable amount of rugosity; between the ocelli and the eye-margin there is always at least a trace of striation. Distance between a posterior ocellus and the front ocellus distinctly less than the diameter of the anterior ocellus. Flagellum not bristly, the preapical segment hardly one and one third times longer than wide.

Mesoscutum very strongly rugose in front, the coarse, wrinkly rugosity extending backwards along the course of the notaulices almost to middle; the sculpture much stronger than in the very similar *laeviscuta*. Front part of the mesopleurum quite strongly rugose-punctate. Hind tibia slightly less thick than in *laeviscuta*, the spines of its outer surface having a very prickly appearance, being long, sharply pointed and more upstanding than in *laeviscuta*; inner spur of the hind tibia about three quarters as long as the hind basitarsus, much longer in proportion to the outer spur than in *laeviscuta*. Costad abscissa of the basalis rather short, hardly more than one third as long as the mediad abscissa.

Ovipositor sheath about three quarters as long as the hind tibia.

Length: ca. 4 mm. without ovipositor.

Type ♀. ENGLAND: Kent, Gravesend, collected 1.vi.1950, emerged 16.vi.1950, ex *Platyptilia gonodactyla* (R. L. E. Ford), B.M. (N.H.).

Paratypes (females only). Same data as type, 3 ♀, 4 ♂; 1 ♀, 1 ♂, 10.vi.1951. England: Kent, Polhill, 3 ♀, 1 ♂, 12.vi.1952; Surrey, Boxhill, 2 ♀, 3 ♂, v.1951; 3 ♀, 2 ♂, 1.vi.1959. All the foregoing bred by R. L. E. Ford from *P. gonodactyla*. Surrey, Redhill, 1 ♀, 9.vi.1934, ex *P. gonodactyla* (W. Rait-Smith). Herts., Gade Valley, 1 ♀, 23.vi.1936 (R. B. Benson).

Host: *Platyptilia gonodactyla* Schiffermüller (Pterophoridae) on *Tussilago farfara* L., (Coltsfoot).

***Microgaster alebion*, var. A**

♀. Differs from the nominate form only in the length of the ovipositor, the sheaths being two thirds as long as the hind tibia.

ENGLAND: Hants, Stockbridge, 1 ♀, 1 ♂, vii. ex *Vanessa atalanta*. Kent, Bexley, 1 ♀, 1 ♂, collected 6.vii.1938, emerged 1.viii.1938, ex *Vanessa atalanta* (R. L. E. Ford); 8 ♀, 3 ♂, vii.1943, ex *Choreutis myllerana* (R.L.E.F.). Surrey, Esher, 2 ♀, 1 ♂, collected 12.vi.1947, emerged 30.vi.1947, ex *Notarcha ruralis* (G. E. J. Nixon);

Wimbledon Common, 1 ♀, 20.v.1947, ex *N. ruralis*; Redhill, 1 ♀, 14.viii.1947, ex *Simaethis fabriciana*. Sussex, Hailsham, 1 ♀, vii, ex *N. ruralis*.

Host: *Choreutis myllerana* Fabr., *Notarcha ruralis* Scopoli, *Simaethis fabriciana* L. These three hosts, like *Platyptilia gonodactyla*, the host of the nominate form, are all Pyralidae. *Vanessa atalanta* L. (Nymphalidae). Since this host, like the others of var. A., lives in a rolled or folded leaf of *Urtica* (Nettle), the possibility of misidentification of host cannot be ruled out here.

*Platyptilia gonodactyla* lays its eggs in September on *Tussilago* so that the early stages are available for *alebion*, var. A. after its cycle on the *Urtica*-feeding hosts.

I have examined a series of seven females from various localities in Finland, that resemble var. A. in the shortness of the ovipositor sheaths but show considerable leg darkening. In all these specimens both hind femur and hind tibia show well defined apical infuscation and in some individuals, the hind femur shows also a patch of basal infuscation.

### *Microgaster parvistriga* Thomson

*Microgaster parvistriga* Thomson, 1895 : 2241.

♀. All the femora reddish yellow. Wings almost hyaline.

Face rather finely rugulose-aciculate, lacking the somewhat coarse punctate element seen in the facial sculpture of *hospes*. Vertex between the ocelli and the eye-margin without transverse striation; immediately behind and between the ocelli, the surface virtually smooth and highly polished. Flagellum rather short, not bristly; the two preapical segments about one and a quarter times longer than wide.

Mesoscutum with a polished, smooth appearance in English specimens, the weak sculpture at the origin of the notaulic courses hardly spreading backwards onto the disc; in a large individual from Germany, Berlin (Ruthe Coll. in B.M. (N.H.)), the front part of the mesoscutum shows more rugosity than in the English material. Costad abscissa of the basalis not more than one third as long as the mediad abscissa, that is, relatively shorter than in *hospes*.

Tergites 1 and 2 rather weakly sculptured compared with *hospes* and *laeviscuta*, the surface having a smoothed-out appearance.

ENGLAND. GERMANY. SWEDEN.

Host: A series in the B.M. (N.H.) was bred in August, 1945, from catkins of *Betula* found in March of the same year.

The determinative feature for recognizing this species is the shape of the ovipositor. When this is concealed within its sheaths, the species could easily be confused with palest forms of *hospes* and smallish examples of *laeviscuta*. From the latter, *parvistriga* differs in having the first abscissa of the radius much less obliquely placed (cf. Text-fig. 30) and from *hospes* in having tergites 1 and 2 more finely sculptured.

### *Microgaster caris* sp. n.

(Text-fig. 22)

♀. A brightly coloured species. The pale parts of the legs are more yellowish than reddish; the hind spurs are whitish and contrast strongly with the deeply infuscated apex of the hind tibia and the equally infuscated hind tarsus.

Maxillary palpus pale yellow. Wings only faintly and evenly darkened.

Head considerably roughened above; traces of transverse striation between the eye-margin and the ocelli and at temples. Flagellum thin, bristly, with the underside markedly paler; antennal segment 16 fully one and a half times longer than wide.

Mesoscutum densely sculptured at least to middle, the sculpture having a somewhat shrivelled appearance.

Tergites 1 and 2 as densely sculptured as in the majority of the species. Tergite 2 distinctly longer than 3; tergite 3 with pale apical margin. Ovipositor sheaths about three fifths as long as the hind tibia.

Length: *c.* 3.5 mm. without ovipositor.

Type ♀. AUSTRIA: N. Tyrol, Salvenburg (*Kohl*), Naturhistorisches Museum, Vienna.

Same data: 1 ♂. AUSTRIA: Jitter, 1 ♀ (*Kohl*).

The single male that I associate with the female has the underside of the flagellum almost yellow. The sculpture of the mesoscutum is a little less extensive but the venational details and the colour of the legs are the same.

### *Microgaster asramenes* sp. n.

♀. This species has been largely characterized by the details given in the key; there is little to add.

Wings faintly darkened, the colour deeper apically; a dark band envelopes the first abscissa of the radius and this contrasts with a large, pale area occupying almost proximal half of radial cell. Scape almost entirely reddish; flagellum brown, paler beneath. Basal half of gaster beneath, yellowish.

Sculpture of face decidedly fine. Flagellum somewhat bristly, tapering apically; the pre-apical segment fully one and a half times longer than wide. Distance between a posterior ocellus and the anterior ocellus equal to about half the diameter of the anterior ocellus; posterior ocellus separated from eye-margin by about one and two thirds its diameter. Vertex between and around the ocelli highly polished.

Inner spur of the hind tibia fully four fifths as long as the hind basitarsus. Submediellan cell of the hind wing entirely free from hairs.

Tergite 2 as long as 3. Hairy part of the ovipositor sheath fully two thirds as long as the hind tibia.

Length: *c.* 4.5 mm. without ovipositor.

♂. Flagellum strongly tapered, the thick, basal segments somewhat flattened; the entire flagellum almost yellow beneath. Tergites 1 and 2 more extensively smooth and polished medially than in the female.

Type ♀. TURKEY: Cayeli, 50 ft., 22.viii.1959 (*K. M. Guichard*), B.M. (N.H.). Taken in *Alnus* plantation near stream.

Paratypes. ITALY: Napoli, 2 ♂, 15.viii.1953.

### *Microgaster pantographae* Muesebeck

*Microgaster pantographae* Muesebeck, 1922 : 34.

♀. Front and middle coxae, except at base, pale yellow; trochanters of all legs and front and middle tibiae pale yellow; hind femur yellowish, faintly infuscate at extreme apex; the blackened hind tarsal segments are faintly annulated with white at base. Scape and flagellum brown, both paler beneath. Wings faintly and more less evenly darkened (England); virtually hyaline in paratype from U.S.A.

Antenna somewhat tapering to apex; with segment 16 fully one and a half times longer than wide; flagellum somewhat bristly. Distance between a posterior ocellus and the anterior ocellus about half the diameter of the anterior ocellus; posterior ocellus separated from the eye-margin by about one and two thirds its own diameter.

Submedian cell of the hind wing with scattered, colourless hairs.

Tergite 2 very distinctly longer than 3, very coarsely reticulate-rugose; tergite 3 almost as strongly rugose over at least basal half. Hairy part of the ovipositor sheath about two thirds as long as the hind tibia; ovipositor itself evenly curved throughout.

Length: *c.* 4.5 mm. without ovipositor.

Distribution: U.S.A., Maine, Bangor (type locality). Various other localities recorded by Muesebeck. ENGLAND: Surrey, Horsley, 12.vi.1957, 1 ♀ (*J. F. Perkins*), in B.M. (N.H.).

Host: According to Muesebeck, *pantographae* described from the linden-leaf roller, *Pantographa lineata* Grote and Robinson (Pyralidae). Same author also gives *Gelechia cercerisella* Chambers (Gelechiidae) as another host.

In the English female the hind tibia is strongly infuscated on about apical third; the middle part of the tibia is almost reddish and the basal fifth is yellowish; in the American examples (paratype and one other female examined), this contrast in colour is much less well marked, the apex of the hind tibia being only weakly infuscate.

This species is readily distinguished from all other N.W. European species by its predominantly yellow-marked hind coxa.

### *Microgaster phryne* sp. n.

(Text-fig. 32)

♀. Front and middle legs distal to coxae entirely pale reddish yellow; hind tibia with darkened tip and hind tarsus infuscate more or less throughout. Wings almost hyaline.

Face finely rugose and with no obvious punctate element (Text-fig. 32). Temples considerably roughened. Flagellum thin; preapical segment about one and a third times longer than wide.

Mesoscutum somewhat dull and rugulose almost all over though the sculpture fades out and the surface becomes more shiny towards back. Costad abscissa of the basalis from one third to nearly one half as long as the mediad abscissa; stigma short, somewhat broad. Claws simple.

Tergite 2 weakly sculptured, sometimes almost smooth. Hypopygium more or less evenly sclerotized, without lateral creases. Ovipositor sheaths very short, narrow, about as wide as the hind basitarsus; hairy part of sheath about two fifths as long as the hind tibia. Ovipositor rather thin, weakly downcurved at apex.

♂. Like the female in colour and sculpture but the eyes slightly less convergent.

Length: ♂ ♀, *c.* 2.3 mm. without ovipositor of female.

Type ♀. EUROPE: Yugoslavia, Macedonia, Prespa Geul, 22.vi.1958, verge of oak-wood (*R. L. Coe*), B.M. (N.H.).

Paratypes. Same data: 4 ♀, 2 ♂.

This unusually small species is a typical *Microgaster*. It differs from all other species in having convergent eyes. This character will separate it from *opheltes*, to which it otherwise bears a very close resemblance.

*Microgaster fischeri* Papp

*Microgaster fischeri* Papp, 1960 : 120

My knowledge of this little species is based on two male paratypes kindly lent to me by Dr. Max Fischer of the Naturhistorisches Museum, Vienna.

The species was described from the neighbourhood of Vienna and, being based unfortunately on the male sex only, is difficult to interpret. Nevertheless, there are, in the B.M. (N.H.), two females and one male, from England, all of which agree with the paratypes in size, colour and sculpture. It is on the characters of the two females that I am interpreting the species and finding a place for it in the synopsis.

♂♀. Wings considerably, evenly, darkened. Middle and hind femur entirely blackish in the three English examples; in one of the paratypes, the middle femur is flushed with reddish along outer side in apical half; hind tibia brownish red, gradually becoming darker in about apical third.

♀. Face finely rugose, without a punctate element, much as in *phryne*. Flagellum somewhat thin, with the preapical segment about one and a third times longer than wide, exactly as in *phryne*. Eyes not at all convergent.

Mesoscutum considerably rugulose in front half in the two paratypes; less so in the English examples; the sculpture virtually not distinguishable from that of *phryne*. Propodeum with hardly an indication of a medial keel; it is sharply defined in *phryne*.

In the paratypes, tergite 3 is sculptured over basal half; in the English examples, this segment is smooth, though not as polished as in *phryne*. Ovipositor sheath as short as in *phryne* but wider; ovipositor slightly thicker, evenly curved throughout.

Length: ♂ ♀, *c.* 2.3 mm. without ovipositor of female.

AUSTRIA: Vienna (type locality). ENGLAND: Bucks., Princes Risborough, 1 ♀, 21.vi-4.vii.1942; Aston Clinton, 1 ♂, 6.vi.1953; Wendover, 1 ♀, 28.vi.1955. All *R. B. Benson*.

Small size and very short ovipositor are important features of this species.

*Microgaster canadensis* Muesebeck

*Microgaster canadensis* Muesebeck, 1922 : 38.

♀. Anterior part of mesoscutum without punctation but markedly rugose at the origin of the notaulic courses. Preapical segment of the flagellum almost square in outline (♀ from Canada); flagellum not in the least bristly.

♂. Flagellum very long, heavy-looking; the basal segments decidedly flattened; the whole flagellum markedly pale beneath. Hind claw pectinate like that of female.

Material examined: CANADA (type locality). Ontario, 1 ♀, 1 ♂, ex *Compsolechia niveopulvella*; these two specimens in B.M. (N.H.) as well as female paratype.

Host: *Compsolechia niveopulvella* Chambers (Gelechiidae). No host known for the type series.

Rather close to *crassicornis* from which it differs in not having bristly antennae and differently armed claws.

*Microgaster reticulatus* Shestakov

*Microgaster reticulatus* Shestakov, 1940 : 11.

I have seen a female of this species from the Riksmuseum, Stockholm, labelled " *Microgaster reticulatus*, sp. n., det Shestakov, Vladivostok, Suchan (*Malaise*) "

♀. Flagellum very long, much tapered towards apex, bristly. Costad abscissa of the basalis short, only about one quarter as long as the mediad abscissa. Outer side of the hind tibia unusually densely beset with short, thick, fire-red spines. Propodeal rugosity coarser than in other species known to me; the propodeum itself, especially towards sides, is clothed with long, silvery white hairs.

Gaster somewhat short, tergite (2 + 3) being longer than following tergites together; the suture between tergites 2 and 3 is much deeper, broader and more distinctly costate than in any other species in this revision.

Length: ♀, 6 mm. without ovipositor.

E. SIBERIA: Vladivostok.

This is a most distinctive species, aberrant among those species with simple claws and probably representing a distinct species-group.

*Microgaster leechi* Walley

*Microgaster leechi* Walley, 1935 : 57.

♀. This species is richly marked with yellow. Scape predominantly pale; flagellum pale almost throughout but the 2-3 basal segments darkened above. Hind coxa yellow throughout; hind femur reddish yellow; hind tibia almost dull reddish, with conspicuous apical infuscation; hind tarsus deeply infuscate throughout. The rather long maxillary palpi pale yellow.

Eyes, in a facial view, markedly convergent and the face with well marked keel on upper half; in one of the two specimens available (Ottawa), this keel is distinct as far as the clypeus. Flagellum somewhat thin, markedly bristly; penultimate segment one and a half times, and antipenultimate segment almost twice, as long as wide.

Costad abscissa of the basalis fully two fifths as long as the mediad abscissa. Claws simple (cf. *gelechia*); outer side of hind tibia having a prickly appearance, its spines numerous and rather long.

Gaster beyond tergite 2 almost entirely reddish yellow (Clement) or with broad, medial, blackish band (Ottawa). Ovipositor sheath fully two thirds as long as the hind tibia; ovipositor evenly curved throughout.

♂. The flagellum is strikingly yellowish throughout, except that the two to three basal segments are darkened above; this contrast is more striking than in the female. Apex of hind femur faintly darkened above.

Material examined: CANADA: Quebec, Clement, 1 ♀, det. Mason. Ontario, Ottawa, 1 ♂, 1 ♀, vii and viii. 1947 (*W. R. M. Mason*). U.S.A.: Maine, Dryden, 3 ♂, 26. vii. 1959 (*G. H. Heinrich*); all in B.M. (N.H.).

*Microgaster gelechia* Riley

*Microgaster gelechia* Riley, 1869 : 178.

Superficially very like *leechi* with which it may be compared as follows:

♀. Entire hind leg distal to the coxa reddish yellow, the hind tarsus being as brightly coloured as its tibia; the hind coxa becomes darkened on about basal half.

Face broader than in *leechi*, the eyes less convergent and the sculpture more evenly rugose, finer. Hairs of the eyes slightly shorter. Flagellum not in the least bristly; the two preapical segments about one and one third times longer than wide. Hind claw with three pale spines. Ovipositor sheath almost three quarters as long as the hind tibia. Mesosternum with fine, transverse striation.

♂. Flagellum blackish above, faintly paler beneath.

Material examined: U.S.A., Virginia, Great Falls, 1 ♀, 1 ♂, det. Gahan, ex *Gnorimoschema gallae-solidaginis*, in B.M. (N.H.).

Host: *Gnorimoschema gallae-solidaginis* Riley.

There is in the B.M. (N.H.) a single female from CANADA (Toronto, Ottawa, 22.v.1956, R. B. Benson) that I believe to be this species. The yellow markings of the dorsal surface of the gaster are reduced to a yellow spot at each lateral corner of tergite 3; these spots are united by the faintly yellow, apical margin of the tergite.

### *Microgaster kuchingensis* Wilkinson

*Microgaster kuchingensis* Wilkinson, 1927 : 176, 1929 : 120.

A species largely characterized by the heavily blackened hind tibia with its white basal ring.

♀. Front and middle tarsi whitish yellow.

Submedian cell of the hind wing without hairs. Hairy part of ovipositor sheath about half as long as the hind tibia; ovipositor thick, evenly downcurved. Hypopygium short, evenly sclerotized and without lateral creases.

BORNEO: Kuching (type locality). PHILIPPINES: Mt. Macolod, 1 ♀, 24.x.1953 (*H. M. & D. Townes*); Mindanao, Surigao, 1 ♀ (*Baker*).

Type in the B.M. (N.H.).

I am puzzled by a single female from INDIA: United Provinces, Dehra Dun, ex *Pyrausta codesalis* Walker, defoliating bamboo, (Wilkinson, 1929 : 120). The darkened areas of the fore wing are less contrasted than in typical material, the hind tibia is not so deeply infuscated and the pale basal ring is less sharply discrete and covers almost basal quarter of tibia. The striate element in the striate-punctate sculpture of the basal tergites of the far eastern material is absent in this single specimen and most of the surface of tergites 1 and 2 is describable as predominantly punctate and shiny.

### *Microgaster magnificus* Wilkinson

(Text-fig. 15)

*Microgaster magnifica* Wilkinson, 1929 : 120.

♀. With its entirely fulvous red thorax, darkened gaster and dark, smoky yellow wings, this is a very striking species. The curiously prolonged apex of the hypopygium is distinctive and unique among the species dealt with in this paper.

Hind tibia deeply infuscate but paler at extreme base; hind coxa infuscate but with a yellowish streak above and below.

Costad abscissa of the basalis fully one third as long as the mediad abscissa. Outer side of the hind tibia very densely spinose (cf. *tjibodas*).

Tergite 2 almost as smooth and as shining as 3, but with some vague punctation along anterior margin. Hairy part of the ovipositor sheath about one third as long as the hind tibia; ovipositor thin, straight basally but sharply downcurved at apex (Text-fig. 15).

♂. There are two paratypes in the B.M. (N.H.). One has the gaster considerably reddened medially. Both have the antenna brown but considerably paler beneath.

AUSTRALIA: Queensland, 2 ♀, (type and paratype); 2 ♂, (paratypes).

Type in the B.M. (N.H.).

In general heaviness of build this species is closer to *kuchingensis* than to *tjibodas* but for all that the two species are widely different. Whereas *kuchingensis* is striking on colour only and structurally is close to the European species with rugose face and simple claws, *magnificus* is aberrant on the shape of the hypopygium. This, of course, may turn out to be only a species-group character.

### *Microgaster tjibodas* Wilkinson

*Microgaster tjibodas* Wilkinson, 1927 : 177.

♀. A brightly coloured species with the legs almost entirely yellow. The thin hind tibia is reddish yellow with faint apical darkening; the hind tarsus is weakly infuscated and is much the same colour as the darkened apex of the hind tibia.

Sculpture of the face very fine, feebly rugose and very shiny. Flagellum thin, bristly, with the preapical segment fully one and a half times longer than wide.

First abscissa of the discoideus a little shorter than the second; costad abscissa of the basalis slightly more than one quarter as long as the mediad abscissa. Spines of the outer side of the hind tibia very fine and very sparse.

Horizontal part of tergite 1 smooth-looking, very shiny and with scattered irregular pits and punctures. Tergite 2 almost smooth. Hairy part of the ovipositor sheath about three fifths as long as the hind tibia. Hypopygium thin, membranous and with several lateral creases.

JAVA: Tjibodas (type locality).

Type in the B.M. (N.H.).

I know this species only from the type.

### *Microgaster russatus* Haliday

*Microgaster russatus* Haliday, 1834 : 237.

♀. Flagellum pale at least beneath. Stigma usually markedly bicoloured but in one specimen in the B.M. (N.H.) entirely yellow. The hind tarsus varies from black to dull reddish with the apical segment the darkest.

Japanese specimens (♀) have the pale parts of the body and legs yellowish rather than red and the apical infuscation of the hind tibia more extensive.

EUROPE. JAPAN.

Host: *Orthotelia sparganella* Thunberg (Plutellidae) (in the literature). *Chilo suppressalis* Walker; *Chilo simplex* Butler. Both in Japan. Specimens in B.M. (N.H.) *Crambus paludellus* Hübnagel (Crambidae) (in England, bred by R. L. E. Ford).

I do not think there has ever been any confusion about the identity of this very distinctive species.

*Microgaster rugulosus* Nees

(Text-fig. 31)

*Microgaster rugulosus* Nees, 1834 : 163.

This species departs from the typical *Microgaster* pattern in that the apical, polished band of the scutellum becomes very narrow at middle owing to the considerable amount of punctation at the apex of the scutellar triangle.

The general surface of the gaster is much duller and more sculptured than *russatus* and tergite (2 + 3) occupies a much larger area beyond the first tergite (Text-fig. 31).

Hind coxa densely punctate all over. Hind tibia without apical infuscation; its inner spur unusually short, not quite reaching the middle of the hind basitarsus.

EUROPE.

*Microgaster melligaster* Provancher*Microgaster melligaster* Provancher, 1886 : 143.*Microgaster rubricoxus* Provancher, 1888 : 386.

This species is much more closely related to *russatus* than to *rugulosus* and in fact is very like the former species from which it differs as follows:

♀. Two basal segments of gaster entirely dark; remaining segments either entirely darkened (1 ♀, in B.M., Canada, Ontario) or reddened along sides (2 ♀, U.S.A., Maine).

Disc of scutellum more narrowed behind, even slightly constricted. Segments of the hind tarsus considerably shorter. Areolet in six out of seven specimens triangular; in *russatus*, it is distinctly four-sided.

Two basal segments of gaster less transverse; tergite 3 (i.e. tergite (2 + 3) beyond the suture) smooth, unsculptured; in *russatus*, this segment shows considerable coarse, rugose punctation.

U.S.A.: Maine, 2 ♀, 2 ♂. CANADA: Ontario, 2 ♂, 1 ♀. All in the B.M. (N.H.).

Other characters for this species are given in the key.

*Microgaster nerione* sp. n.

(Text-fig. 16)

♀. Middle femur infuscate throughout; front femur somewhat darkened. Fore wing hyaline proximal to the areolet and also within the radial cell; otherwise faintly darkened. Gaster blackish but becoming dark brown beneath.

Face strongly shining, its sculpture very weak, obsolescent. Ocelli in a low triangle, the posterior tangent to the anterior ocellus cutting the posterior pair. Flagellum long, rather thin, slightly bristly; antennal segment sixteen fully twice as long as wide (two apical segments missing).

Mesoscutum very smooth-looking, virtually without a trace of punctation in front and with only very weak rugosity at the origin of the notaulic courses. First abscissa of the discoideus distinctly shorter than the second; costad abscissa of the basalis hardly one third as long as the mediad abscissa so that the first discoidal cell is somewhat high. Inner spur of the hind tibia unusually short, only just reaching beyond middle of hind basitarsus; spines of the outer side of the hind tibia somewhat sparse; those along upper edge golden; those below, whitish; hind claw with three, close, blackish spines. Anterior part of the mesopleurum strongly shining, virtually impunctate.

Tergite 1 rather strongly narrowed basally and hence markedly triangular. Tergite 2 about three times as wide as long, showing the usual type of rugosity but this tending to fade out

medially; tergite 3 as long as 2. Ovipositor thick, strongly curved. Posterior edge of hypopygium markedly sinuate (Text-fig. 16).

Length: 4.3 mm., without ovipositor.

Type ♀. MEXICO: Guerrero, Omilteme, 8,000 ft., viii (*H. H. Smith*), B.M. (N.H.).

A rather slender species, distinguished from all others with toothed claws by the evenly sclerotized hypopygium. This feature, however, does not relate the species, in my opinion, to the European *grandis*-group.

#### SPECIES INQUIRENDAE

1. *Microgaster campestris* Tobias, 1964 : 210.  
KASAKHSTAN. Tobias states that this species is close to *curvicrus* Thomson.
2. *Microgaster claritibia* Papp, 1959 : 405.  
HUNGARY. Almost certainly a species of *Protomicroplitis*.
3. *Microgaster fusca* Papp, 1959 : 407.  
HUNGARY. Papp states that this species is related to *Microgaster postica* Nees. Probably a species of *Protomicroplitis*.
4. *Microgaster procris* Fischer, 1964 : 42.  
AUSTRIA. Bred from *Procris notata* Zeller (Zygaenidae). Probably a species of *Protomicroplitis*.
5. *Microgaster rugosicoxa* Papp, 1959 : 408.  
HUNGARY. Papp states that this species is related to *Microgaster scotica* Marshall (now *Protomicroplitis scotica* (Marshall) Nixon, 1965 : 252). Evidently a species of *Protomicroplitis*.
6. *Microgaster tegularius* Papp, 1959 : 407.  
HUNGARY. Papp says this species comes close to *Microgaster circumvectus* Lyle (now *Protomicroplitis circumvectus* (Lyle) Nixon, 1965 : 256). Evidently a species of *Protomicroplitis*.
7. *Microgaster dudichi* Papp, 1961 : 154.  
GERMANY. This species certainly belongs to *Microgaster* s. str. Papp places it near *tibialis* Nees but this does not necessarily relate it to the species for which I use the name "*tibialis*" in this paper.
8. *Protomicroplitis kasachstanica* (Tobias) **comb. n.**  
*Hygroplitis kasachstanica* Tobias, 1964 : 208. KASAKHSTAN. One female paratype in the B.M. (N.H.), presented by Dr. Tobias. Tobias states that this species is related to *Hygroplitis abdominalis* Nees (now *Protomicroplitis abdominalis* (Nees) Nixon, 1965 : 254); it is certainly closely related to this species and may not really be distinct from it. Nevertheless, without examining further specimens I hesitate to sink Tobias' species.
9. *Protomicroplitis stepposa* (Tobias) **comb. n.**  
*Hygroplitis stepposa* Tobias, 1964 : 209.  
This species seems to be closely related to *Protomicroplitis meges* Nixon, 1965 : 251, a species transitional between the *abdominalis*- and *scotica*-groups

of *Protomicroplitis* (Nixon, 1965); *stepposa* is a much more brightly coloured species than *meges*, with the hind tibia entirely reddish yellow and the meso-scutum with larger punctures and their interspaces much more polished.

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