

# The Palaearctic species of *Ascogaster* (Hymenoptera: Braconidae)

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## Synopsis

The cosmopolitan genus *Ascogaster*, which is parasitic on Microlepidoptera, is revised for the Palaearctic zoogeographical region. A key to species is given. Thirty species are recognized; four of them are described as new. Twenty-two synonyms are newly established; one species (*nigrator*) is transferred to *Ascogaster* from *Chelonus* and one (*maculata*) from *Ascogaster* to *Phaneroitoma*.

## Introduction

It is imperative that biological studies are founded on a basis of sound taxonomy; the results of such studies are otherwise vitiated. The taxonomy of the Braconidae has been composed piecemeal over the last 200 years or so and relatively few taxa have received comprehensive up-to-date attention. Many taxa therefore need to be completely revised, at least within a single zoogeographical region. This revision is concerned with the Palaearctic species of *Ascogaster*, a chelonine braconid genus.

*Ascogaster* is a cosmopolitan genus parasitic upon Microlepidoptera, principally Tortricidae. *A. quadridentata* has frequently been recorded as a parasite of the codling moth (*Cydia pomonella*) and other pests of fruit trees (see Evenhuis & Vlug, 1983). This species and probably several others merit consideration for use in biological control programmes.

## Biology

Very little work has been done on the biology of *Ascogaster* and, as far as is known, the species are solitary endoparasites of Microlepidoptera, principally Tortricidae. They lay their eggs into the egg of the host and, as van Achterberg (1976: 47) has pointed out, this is clearly an adaptation to the use of hosts whose larvae live in concealment, thereby deriving some protection against the attacks of parasites and predators. In his studies of *Ascogaster quadridentata*, Rosenberg (1934) found that the development of the parasite is slow and its larva is in its first instar when the host larva has completed its development. If the host larva then goes into hibernation the parasite remains within as a first-stage larva, otherwise it passes rapidly through two further instars and emerges from the host to pupate. Rosenberg's work and that of Cox (1932), Boyce (1936) and Allen (1962) are fairly full accounts of the biology of *A. quadridentata* and they also give much information on the larval morphology of the parasite. The larval characteristics of chelonines are discussed in more general terms by Short (1952) and Capek (1970). Host-searching and egg-laying behaviour has recently been studied in *reticulata* parasitic on the smaller tea tortrix (*Adoxophyes* sp.), an important pest of tea in Japan (Kainoh & Tamaki, 1982; Kainoh, Hiyori & Tamaki, 1982).

There are many host records in the literature on *Ascogaster*, collated by Shenefelt (1973). Much of this information, however, is of little value because of doubt about the accuracy of identification of the parasite species involved; undoubtedly host species are also sometimes misidentified. Host data cited here are therefore only from the specimens examined for this revision except for the hosts from which the type-specimens of *reticulata* were reared (as given by Watanabe, 1967: 43). These records are listed below.

## List of host records

Hosts	SPECIES OF <i>Ascogaster</i>
<b>LEPIDOPTERA</b>	
<b>TINEIDAE</b>	
<i>Infurcitinea argentimaculella</i> (Stainton)	<i>grahami</i>
<b>YPONOMEUTIDAE</b>	
<i>Yponomeuta padella</i> (L.)	<i>rufidens, quadridentata</i>
<b>COLEOPHORIDAE</b>	
<i>Coleophora hornigi</i> Toll	<i>armata</i>
<b>OECOPHORIDAE</b>	
<i>Tubuliferola subochreella</i> (Doubleday)	<i>klugii</i>
<b>GELECHIIDAE</b>	
<i>Recurvaria leucatella</i> (Clerck)	<i>annularis</i>
<b>MOMPHIDAE</b>	
<i>Sorhagenia lophyrella</i> (Douglas)	<i>grahami</i>
<b>TORTRICIDAE</b>	
<i>Cydia pomonella</i> (L.)	<i>quadridentata</i>
<i>Cydia funebrana</i> (Treitschke)	<i>quadridentata</i>
<i>Cydia pallifrontana</i> (Lienig & Zeller)	<i>quadridentata</i>
<i>Spilota ocellana</i> (Denis & Schiffermüller)	<i>quadridentata</i>
<i>Epiblema uddmanniana</i> (L.)	<i>quadridentata</i>
<i>Epiblema roborana</i> (Denis & Schiffermüller)	<i>bidentula</i>
<i>Epinotia cruciana</i> (L.)	<i>bidentula</i>
<i>Endothenia gentianaeanana</i> (Hübner)	<i>dispar</i>
<i>Endothenia quadrimaculana</i> (Haworth)	<i>canifrons</i>
<i>Pandemis corylana</i> (Fabricius)	<i>rufidens</i>
<i>Pandemis cerasana</i> (Hübner)	<i>rufidens</i>
<i>Pandemis heparana</i> (Denis & Schiffermüller)	<i>rufidens, annularis</i>
<i>Pandemis</i> sp.	<i>bidentula</i>
<i>Archips oporana</i> (L.)	<i>reticulata</i>
<i>Archips issikii</i> Kodama	<i>reticulata</i>
<i>Adoxophyes orana</i> (Fischer von Röslerstamm)	<i>reticulata</i>

<i>Archips pulchra</i> (Butler)	<i>reticulata</i>
<i>Croesia bergmanniana</i> (L.)	<i>rufidens</i>
GEOMETRIDAE	
<i>Eupithecia venosata</i> (Fabricius)	<i>bidentula</i>

### Taxonomic history

*Ascogaster* was erected by Wesmael (1835: 226) for 10 species which he described as new. Wesmael also correctly recognized that several of Nees von Esenbeck's species of '*Chelonus*' came within the definition of the new genus but he also included *Chelonus dentata* [= *Phanerotoma dentata*]. This obviously anomalous placement was based upon the examination of only a single specimen and was corrected by Wesmael's (1838: 165) erection of the genus *Phanerotoma* for *dentata*. Wesmael possessed outstanding taxonomic skill and his discrimination of species was always sound even though he worked with few specimens of each species. This was the general practice in the nineteenth century and the results are generally considered to be more or less inadequate when judged by modern standards.

Latreille (1809) was the first to describe (as *Sigalphus*) a species which can be unequivocally assigned to *Ascogaster*. The description would no doubt be adequate to differentiate the species if one had only Latreille's material of the genus available for study. Unfortunately I have been unable to locate Latreille's specimen and the description alone is insufficient for the certain identification of the species. Its interpretation must therefore rest upon inference; this question is discussed in the text upon *rufipes* (Latreille).

Nees von Esenbeck (1816) described (as *Sigalphus*) four species which were subsequently transferred by him (1834) to *Chelonus* and by Wesmael to *Ascogaster*. Three of Nees von Esenbeck's species are certainly identifiable from his descriptions but the other, *similis*, is not.

Curtis (1837) described four species of *Ascogaster*. Fortunately his collection is still available for study and his inadequate descriptions can therefore be interpreted with confidence. One of his species is here considered valid.

Herrich-Schäffer (1838) described (as *Chelonus*) 10 species of *Ascogaster*; his original material appears to be lost and his descriptions are generally difficult to interpret, but Reinhard's paper (see below) is of considerable help in this matter. Two of Herrich-Schäffer's species are here considered valid.

In his revision of *Ascogaster*, Reinhard (1867) described three new species, one of which I consider to be valid. Despite Thomson's (1892: 1715) dismissal of Reinhard's revision as 'unfit for use', it includes much useful information. Reinhard's most significant contribution lies in his redescrptions and placements of species more or less inadequately described by Herrich-Schäffer and Ratzeburg. Reinhard's descriptions are much superior to those of the original authors and were often based on syntypic material which no longer exists. Without Reinhard's paper the placement of many of those species would be difficult, perhaps impossible.

Thomson (1874; 1892) revised the Swedish species of *Ascogaster*, describing nine species as new. However, Thomson appears not to have fully understood Wesmael's species and all his names are here placed in synonymy, except for *lapponicus* which could not be identified.

There have been only two previous attempts to monograph the Palaearctic species of *Ascogaster*. Marshall (*in* André, 1888) and Fahringer (1934) included the genus in their reviews of the Palaearctic braconid fauna. The admirably ambitious scope of these works severely limited their usefulness; neither author was able to give sufficiently rigorous attention to the large number of species involved. Their interpretation of the species was in general based on the descriptions rather than on a critical re-examination of original material. Marshall at least realised that some descriptions were inadequate and this left him unable, for instance, to include Thomson's species of *Ascogaster* in his key. Both Marshall and Fahringer exhibited a too facile acceptance of the significance of any character proposed as a taxonomic discriminant by original authors and made little attempt to search for worthwhile characters. Moreover, Marshall and probably Fahringer worked with small numbers of specimens and this made it impossible for them to assess intraspecific variation. Thus the contribution of these major works to the understanding of the species of *Ascogaster* has been insignificant.

Telenga (1941) revised the *Ascogaster* species of the U.S.S.R.; his taxonomy was much superior to that of Marshall and Fahringer and his work is still useful. Hellén (1953) reviewed the Finnish *Ascogaster* fauna and established two new synonymies.

Graham (1955), in an unpublished doctoral thesis on the European species of *Ascogaster* (and *Chelonus*), was the first worker to approach the subject systematically. His arrangement of the species was based on the examination of a large amount of material, including the critical reappraisal of the available type-specimens. Graham's thesis was considerably superior to previous work on the genus and only Tobias (1976) has produced anything of comparable quality on *Ascogaster* (mainly of the eastern Palaearctic region). However, because Graham's work was never published, his nomenclatorial decisions were never validated. I carried out my revision of the Palaearctic species of *Ascogaster* without first examining his manuscript so as to avoid being influenced when solving taxonomic difficulties. Many of the conclusions at which I have thus independently arrived agree with those reached by Graham. I have, however, ascribed to some species wider limits of variation than did Graham and I have therefore placed in synonymy some names which he regarded as representing valid species, albeit sometimes tentatively.

Isolated descriptions by various authors are scattered throughout the literature (Dahlbom, 1833; Lucas, 1849; Ratzeburg, 1844; 1848; 1852; Ruthe, 1855; Wollaston, 1858; Marshall, 1897; Szépligeti, 1896; 1908; Ashmead, 1906). Many of these authors appear to have had but little understanding of the species.

### Synonymic list of species

#### *semenovi*-group

- excavata* Telenga
- kasachstanicus* Tobias syn. n.
- semenovi* Telenga
- kyushuensis* Yoneda syn. n.

#### *caucasica*-group

- bicarinata* (Herrich-Schäffer)
- mlokossewitchi* Kokujev
- caucasica* Kokujev
- rostrata* Szépligeti
- excisa* (Herrich-Schäffer)
- longiventris* Tobias syn. n.
- kasparyani* Tobias

#### *abdominator*-group

- abdominator* (Dahlbom)
- instabilis* Wesmael
- fulviventris* Curtis
- femoralis* (Herrich-Schäffer)
- rufiventris* (Herrich-Schäffer)
- pallida* Ruthe
- dentifer* Tobias
- punctulator* Kirchner
- nachtshevanica* Abdinbekova

#### *annularis*-group

- annularis* (Nees von Esenbeck)
- exigua* sp. n.
- gonocephala* Wesmael
- grahami* sp. n.
- klugii* (Nees von Esenbeck)
- ruficeps* Wesmael
- neesii* Reinhard syn. n.

#### *bidentula*-group

- albitarsus* Reinhard
- leptopus* Thomson

#### *arisanica* Sonan

- bidentula* Wesmael
- multiarticulatus* Ratzeburg
- gibbiscuta* Thomson syn. n.
- fuscipennis* Thomson syn. n.
- atamiensis* Ashmead syn. n.

#### *consobrina* Curtis

- longicornis* sp. n.
- perkinsi* sp. n.
- rufidens* Wesmael
- rufipes* (Herrich-Schäffer)
- laevigator* (Ratzeburg)

#### *varipes* Wesmael

- cavifrons* Thomson syn. n.
- sternalis* Thomson
- jaroslawensis* Kokujev syn. n.

#### *quadridentata*-group

- armata* Wesmael
- pulchellus* (Curtis)
- esenbeckii* Curtis syn. n.
- luteicornis* (Herrich-Schäffer)
- brevicornis* Wesmael
- monilicornis* (Herrich-Schäffer)
- canifrons* Wesmael
- graniger* Thomson syn. n.
- dispar* Fahringer
- spinifer* Tobias syn. n.
- koslovi* Tobias syn. n.
- quadridentata* Wesmael
- impressus* (Herrich-Schäffer)
- nigricornis* Thomson syn. n.
- cynipum* Thomson syn. n.
- egregius* Kokujev syn. n.
- nigrator* (Szépligeti) syn. n.
- epinotiae* Watanabe syn. n.

*reticulata* Watanabe  
*rufipes* Latreille  
*elegans* (Nees von Esenbeck)  
*fasciatus* (Dahlbom)  
*ratzeburgii* Marshall syn. n.  
*soror* Telenga syn. n.  
*scabricula* (Dahlbom)  
*limitatus* Wesmael syn. n.  
*clypealis* Thomson syn. n.

*contracta* (Ratzeburg)  
*dentiventris* Telenga  
*erythrothorax* Marshall  
*kabystanica* Tobias  
*lapponica* Thomson  
*pallidicornis* Curtis  
*quadridens* (Herrich-Schäffer)  
*rubripes* (Lucas)  
*similis* (Nees von Esenbeck)  
*tersa* Reinhard

SPECIES INQUIRENDAE  
*atriceps* (Ratzeburg)

### Taxonomic characters

*Sexual dimorphism.* A few species of *Ascogaster* show little sexual dimorphism; most, however, exhibit some generally rather subtle differences between the sexes. Female antenna often shorter and broader than that of male, generally with areas of felt-like pubescence on underside of medial flagellar segments. Male antenna generally more copiously covered with hairs and more richly supplied with tyloids than in female. Carapace of female often shorter, broader and more rounded than that of male, with posteroventral rim often closer to apex and therefore less rounded posteroventrally. In several species in which the female has large genitalia the posteroventral rim of the carapace is modified in various ways in order, presumably, to facilitate the extrusion of the ovipositor (e.g. flanged in *excavata*, *semenovi*; emarginate in *annularis*; produced in *kaspanyani*); these characteristics are not present in the males of these species. In many species facial hair of male longer and much denser than in female.

*Ocelli.* Size of ocelli varies little and therefore of limited use in discrimination of species; however, relative positions of ocelli are characteristic at species-group level. Two character-states of the ocellar triangle are defined as follows: where a straight line drawn between the anterior borders of posterior ocelli also touches anterior ocellus, the ocelli are referred to as being 'on line'; where a line between posterior ocelli passes behind anterior ocellus without touching it, the ocelli are referred to as being 'not on line'. Variations in size and protuberance of the eyes are sometimes useful characteristics for differentiation of species; in none, however, do the eyes exhibit a significant degree of convergence.

*Clypeus.* Shape, sculpture and apical armature of clypeus generally of great significance. Apical border of clypeus often bears one or more tubercles which, in some species, are tooth-like. There is little variation within a species in the clypeal tubercles which are therefore of considerable value as a taxonomic character. The dentate clypeal armature is extremely rare in *Chelonus* although a characteristic feature of many species of *Ascogaster*. It appears to be largely confined to the Palaearctic species of the latter genus and is commoner in those of the eastern part of the region.

*Facial hair.* Hair on face generally pointing downwards except for a patch between bases of antennae; in some species, however, the hair points upwards, at least on upper part of face. This characteristic varies little within a species and is of considerable use for differentiation of species-groups. It is more easily seen in males because their facial hair is generally denser than that of females, but it always requires oblique lighting to be properly examined.

*Gaster.* Shape of carapace sometimes varies within a species but nonetheless furnishes useful characters for species differentiation if the possibility of variation is constantly borne in mind. Specimens with a deformed carapace are of not infrequent occurrence. Hypopygium generally small, not projecting beyond apex of carapace, at least in dead specimens. In some species (e.g. *excisa*, *semenovi*) hypopygium large, projecting beyond apex of carapace. Ovipositor in these species generally long and often exerted.

**Genitalia.** In chelonines, the genitalia are often retracted beneath the carapace and are thus difficult to see, particularly in dried specimens. It is difficult to determine the sex of such specimens, especially in those species which exhibit little secondary sexual dimorphism. If a view can be obtained into the carapace, however, the female can be distinguished as such because the hypopygium has a convex apical border whereas the corresponding male sternite is strongly emarginate. Also, the hypopygium often has a medial longitudinal fold revealing the course of the ovipositor beneath. When the latter projects beyond the hypopygium it is usually possible to recognise it because the ovipositor sheaths are nearly always close together and apically rounded, whereas the corresponding structures in the male genitalia are generally widely separated, strongly tapered and curved.

**Colour.** In *Ascogaster*, as in most groups of Braconidae, undue importance has been given to colour-characteristics by many authors. In my opinion differences in colour are not sufficient to differentiate species of *Ascogaster*. Shu-Sheng & Carver (1982) have provided experimental confirmation of the lability of colour in one species of Aphidiinae and have briefly reviewed previous studies of this phenomenon in Parasitica. In some species (e.g. *varipes*, *canifrons*) the carapace of some females is black, in others distinctly banded with yellow at the base. There are no intermediate stages between the two colour-patterns nor any associated morphological discriminants. In *abdominator*, on the other hand, all intermediates between extreme colour-variants occur. Presence or absence of strongly contrasted light-coloured bands on the legs appears to vary but little within a species, though the colour itself is subject to variation; this is therefore a useful characteristic for differentiation of species. Two species in the Palaearctic fauna have predominantly light-coloured heads (*klugii*, *gonocephala*); although there is considerable variation in head-colour within these species it is a useful ancillary character for their identification.

**Wing venation.** In much previous work on *Ascogaster* significance has been ascribed to relatively minor differences in venation. Wharton (1980), writing about Alysiinae, has shown the probability of error inherent in the use of small differences in venation as taxonomic discriminants, and his conclusion is probably equally valid when applied to the chelonines. Yoneda (1978) has analysed and illustrated variation in forewing venation in *semenovi* (= *kyushuensis*).

**Sculpture.** In chelonines, sculpture is more strongly developed than that of other groups of Braconidae. At first sight the taxonomic significance of the sculpture of Cheloninae is obscured by its richness. Differences in sculpture in *Ascogaster*, however, are of considerable significance, particularly at species-group level. Thus sculptural characteristics of face, vertex, mesonotum and mesopleuron are of first importance. Sculpture of the carapace is sometimes useful in the discrimination of species but the differences are generally rather too subtle to be useful taxonomic characters. Presence or absence of rugosity on the hind coxa is sometimes a useful specific character.

The morphological terms used are defined in Richards (1977).

## Depositaries

AS	Academy of Sciences, Leningrad.
BMNH	British Museum (Natural History), London.
CC	Capek collection, Prague.
EH	Haeselbarth collection, Munich.
ELKU	Entomological Laboratory, Kyushu University, Fukuoka.
HNHM	Hungarian Natural History Museum, Budapest.
IP	Institut für Pflanzenschutzforschung, Eberswalde.
IPO	Instituut voor Plantenziektenkundig Onderzoek, Wageningen.
IRSNB	Institut Royal des Sciences Naturelles de Belgique, Brussels.
LC	Lukas collection, Trencin.
MC	Maeto collection, Ibaraki.
MNHN	Museum National d'Histoire Naturelle, Paris.

NCM	Norwich Castle Museum, Norwich.
NMV	National Museum of Victoria, Melbourne.
NM	Naturhistorisches Museum, Vienna.
NR	Naturhistoriska Riksmuseet, Stockholm.
RNH	Rijksmuseum van Natuurlijke Historie, Leiden.
RSM	Royal Scottish Museum, Edinburgh.
SC	Stelfox collection <i>in</i> USNM, Washington.
TC	Townes collection, American Entomological Institute, Ann Arbor.
UEI	Entomological Institute, Hokkaido University, Sapporo.
USNM	[U.S. National Museum] National Museum of Natural History, Washington D.C.
ZC	Zaykov collection, Plovdiv.
ZI	Zoological Institute, The University, Lund.
ZMB	Zoologisches Museum, Humboldt Universität, Berlin.
ZMC	Zoologisk Museum, Copenhagen.

### Characteristics of subfamily Cheloninae

More than 10,000 species of Braconidae have been described and it is probable that there are at least 40,000 species in nature; it is therefore one of the largest families in the Hymenoptera. The Cheloninae, with at least 800 described species, is one of the larger subfamilies of the 22 into which the Braconidae is at present divided (*see* van Achterberg, 1976).

The Cheloninae are distinguished from all other subfamilies of Braconidae by the possession of a complete posterior mesopleural carina. This structure is generally absent in other Braconidae and, when present, is broadly interrupted in front of the mid coxae. All Cheloninae have a heavily sculptured gastral carapace formed by the fusion of tergites 1–3, the remaining parts of the gaster being normally concealed beneath the carapace. This feature occurs in a number of genera in other subfamilies, most of them not closely related to the Cheloninae; these taxa therefore bear a superficial resemblance to the Cheloninae, undoubtedly as a result of convergence. This matter has been dealt with in great detail in an excellent review by Dudarenko (1974). In the Palaearctic region the genera most likely thus to be confused with Cheloninae are *Symphya* (Alysiinae), easily distinguished by its exodont mandibles, *Triaspis* and *Schizoprymnus* (Helconinae *sensu* van Achterberg, 1976), which have only two submarginal cells in the forewing whereas chelonines have three. In other zoogeographical regions there are genera possessing a gastral carapace also in, for example, Braconinae (*Physaria*), Rogadinae (*Spinaria*), Hormiinae (*Cedria*), Microgasterinae (*Fornicia*, *Buluka*), Opiinae (*Coleopius*), Meteoridiinae (*Urosigalphus*). The gastral carapace is nonetheless a valuable characteristic for the differentiation of Cheloninae if the possible exceptions are borne in mind. Chelonines also always have three submarginal cells in the forewing and the ovipositor is generally not exerted or, if it is, it is most often short and always has a slender needle-like apex. In the majority of species the ovipositor is thick at the base, abruptly narrowed shortly before the apex, short and rarely exerted. In a few species the ovipositor is slender throughout its length and requires but little reduction in breadth to attain a fine point; this type of ovipositor is often exerted. In some species of *Chelonus* the ovipositor is thick at the base, evenly tapered to the apex and often strongly upcurved.

Two groups of genera of the Cheloninae are represented in the Palaearctic region; the *Phanerotoma*-group, in which the carapace is divided by crenulate sutures into three tergites and the body colour is predominantly testaceous, and the *Chelonus*-group, in which the carapace is entire with no trace of sutures (except in occasional deformed specimens) and the body colour is predominantly black. The latter group is represented in the Palaearctic region by two genera, *Ascogaster* and *Chelonus*, which can be distinguished as follows.

- 1 First submarginal cell always divided from first discal cell by vein *Rs+M* (Fig. 2); eyes never conspicuously hairy ..... **ASCOGASTER** Wesmael
- First submarginal cell and first discal cell confluent, vein *Rs+M* never present (Fig. 1); eyes always conspicuously hairy ..... **CHELONUS** Panzer

There are several ancillary characters which are useful in placing some species in the two genera. The clypeus often has apical tubercles in *Ascogaster* but rarely in *Chelonus*. The face is generally strongly rugose in *Chelonus*, sometimes punctate in *Ascogaster*. The hair on the face generally points downwards in *Ascogaster*. upwards in *Chelonus*. The males of some species of *Chelonus* have a supragenital aperture at the apex of the carapace; this characteristic is never present in *Ascogaster*.

### ASCOGASTER Wesmael

*Ascogaster* Wesmael, 1835: 226. Type-species: *Ascogaster instabilis* Wesmael (= *abdominator* (Dahlbom)), by subsequent designation (Foerster, 1862: 244).

*Cascogaster* Baker, 1926: 482. Type-species: *Cascogaster fullawayi* Baker, by original designation. [Synonymized by Watanabe, 1937: 75.]

### The species-groups

The 30 Palaearctic species of *Ascogaster* are here divided into six informal groups based on the sculpture and vestiture of the face and the armature of the clypeus. I have made use of the species-group concept because it has the advantage of being flexible – its limits can be extended or restricted without nomenclatural disturbance. It therefore seems to me to be ideally suited for use in the Braconidae in which the fragmentary knowledge of the species in most genera precludes their sensible division into formal subgeneric units.

The *semenovi*- and *caucasica*-groups have in common a rather slender habitus with long legs and long slender gasters and concomitantly elongate female genitalia. The female carapace is often modified posteroventrally either by the development of bizarre flanges or by the strong depression of this part of the carapace. Two species in the *caucasica*-group do not have such modification of the carapace, but in these species the hypopygium is grossly elongated in *caucasica* and the ovipositor is elongate in *bicarinata*, the least modified species of its group. The males in the two groups have conspicuously more elongate, slender gasters than their females and the male antennae are also considerably more elongate. These species-groups therefore exhibit much stronger sexual dimorphism than is usual. The habitus of the *abdominator*- and *annularis*-groups has certain features in common with the preceding groups. Thus species of the *abdominator*-group are rather slender with elongate legs, though the female carapace is not modified and the ovipositor and hypopygium are short. The degree of sexual dimorphism is therefore less in the *abdominator*-group. All the species of the latter group share the upwardly directed facial vestiture of the *semenovi*- and *caucasica*-groups. The *annularis*-group also consists of species which are rather elongate and slender, but the female carapace is generally but little modified and the hypopygium and ovipositor only moderately elongate. The degree of sexual dimorphism is even less marked in the *annularis*-group than in the *abdominator*-group and only three of the five species of the former group have upwardly directed facial vestiture. The species of the *semenovi*-, *caucasica*-, *abdominator*- and *annularis*-groups are evidently more closely related to each other than to the remaining species of the genus. The *bidentula*- and *quadridentata*-groups of species have in common a generally short, squat habitus with rather short, thick legs, a short, often deep carapace and a short hypopygium and ovipositor. The facial vestiture in these groups is always downwardly directed.

### Key to species

- |   |   |   |
|---|---|---|
| 1 | Ovipositor sheaths broad, flat (Figs 4, 6); ventral opening of carapace strongly narrowed posteriorly and with a strong flange posterolaterally but this not projecting beyond apex of carapace; clypeus with dentate flanges laterally (Fig. 5) or a broad, spatulate medial projection (Fig. 3).....  | 2 |
| – | Ovipositor sheaths not conspicuously broad and flat; if ventral opening of carapace strongly narrowed posteriorly and with a posteroventral flange ( <i>excisa</i> ) then ovipositor sheaths conspicuously slender and flange projecting beyond apex of carapace (Figs 23, 24); clypeus with no dentate flanges laterally or broad spatulate projection medially (except <i>longicornis</i> , cf. Figs 41, 42)..... | 3 |

- 2(1) Clypeus with conspicuous dentate flanges laterally (Fig. 5); carapace more pointed posteriorly (Fig. 6); ovipositor sheaths broader, knife-like (Fig. 6) *semenovi* Telenga (p. 352)
- Clypeus with no dentate flanges laterally but with a broad, spatulate medial projection (Fig. 3); carapace more rounded posteriorly (Fig. 4); ovipositor sheaths less broad, more evenly rounded at apex (Fig. 4)..... *excavata* Telenga (p. 352)
- 3(1) Apical border of clypeus with one or two large dentate tubercles medially (Figs 7–9, 13–15, 17), laterally often strongly reflexed inwards; face always distinctly punctate, never rugose, often reticulate-punctate, sometimes finely reticulate-rugulose; hairs on upper part of face directed upwards ..... 4
- Apical border of clypeus with very small medial tubercles (Figs 37, 51, 54) or with none, or if with a single large, dentate tubercle medially than face strongly irregularly rugose (except *perkinsi*, Fig. 43); hairs on upper part of face directed downwards (except for a small area between bases of antennae), or if occasionally directed upwards, face strongly, transversely rugose (*exigua*, *gonocephala*, *klugii*) ..... 10
- 4(3) Clypeus with a single apical tooth (Figs 7–9); hypopygium short, rarely projecting beyond apex of carapace and then by little (Figs 10–12); hind coxa generally strongly rugose, at least dorsally ..... 5
- Clypeus with two median apical teeth (Figs 13–15, 17): hypopygium generally long, projecting beyond apex of carapace (Figs 20, 22–24) (but generally not in *bicarinata*, Fig. 21); hind coxa generally conspicuously smooth with minute punctures except dorsally reticulate-punctate ..... 7
- 5(4) Apical border of clypeus produced into apical tooth (Fig. 7) strong, dentate tubercle between antennae; face shining, more sparsely punctate; carapace shorter more rounded in lateral view (Fig. 12) ..... *dentifer* Tobias (p. 359)
- Apical border of clypeus truncate (Figs 8, 9); if tubercle present between antennae then it is weak; face matt, reticulate-punctate or rugulose; carapace longer, less rounded in lateral view (Figs 10, 11) ..... 6
- 6(5) Notaulices obsolescent, generally almost indistinguishable from punctures on mesonotum; antenna longer, 33–36 segmented, dilated medially; ovipositor sheaths thicker (Fig. 10) *abdominator* (Dahlbom) (p. 357)
- Notaulices weak but distinct; antenna shorter, 27–30 segmented, not dilated medially; ovipositor sheaths slender (Fig. 11) ..... *nachitshevanica* Abdinbekova (p. 359)
- 7(4) Carapace of ♀ strongly narrowed distally (Fig. 19), strongly flattened dorsoventrally (Fig. 20); finely and regularly reticulate rugose; ♀ hind leg orange-testaceous *kasparyani* Tobias (p. 356)
- Carapace of ♀ not strongly narrowed or dorsoventrally flattened distally, normally rounded (Figs 21–24); more coarsely reticulate rugose, at least anteriorly, the longitudinal element predominant; ♀ hind leg black, only tibia lighter in colour ..... 8
- 8(7) Carapace of ♀ with a bifurcate flange posteroventrally (Figs 23, 24); propodeum broadly impressed medially; hypopygium long, narrow in lateral view (Fig. 23); ovipositor abruptly upcurved distally; labiomaxillary complex not exerted. *excisa* Herrich-Schäffer (p. 355)
- Carapace of ♀ with no bifurcate flange posteroventrally; propodeum not impressed medially; hypopygium shorter, broader (Figs 21, 22); ovipositor evenly and slightly upcurved over its whole length, not abruptly upcurved distally; labiomaxillary complex generally exerted, at least slightly (Figs 15–18) ..... 9
- 9(8) Labiomaxillary complex strongly exerted, labial palps inserted at a point distinctly beyond mandibles (Figs 15, 16); hypopygium generally extruded (Fig. 22), always at least slightly longer than hind basitarsus, often considerably so; genae in face view contracted (Fig. 15), face and clypeus not protuberant, rather straight in profile (Fig. 16) *caucasica* Kokujev (p. 354)
- Labiomaxillary complex weakly exerted, labial palps inserted at a point distinctly behind mandibles (Figs 17, 18), hypopygium generally not extruded, always distinctly shorter than hind basitarsus (Fig. 21); genae in face view more rounded (Fig. 17); face and clypeus protuberant, rounded in profile (Fig. 18) ..... *bicarinata* Herrich-Schäffer (p. 354)
- 10(3) Antenna short, generally less than 30 segments in ♀ (except sometimes in *gonocephala* and in *exigua*); apical border of clypeus rounded, neither produced nor with teeth; carapace rather flat, sometimes with a posteroventral notch (Figs 33, 34); ovipositor slender, long; sheaths slender; radius emitted from distal third of pterostigma (Fig. 25) ..... 11

- Antenna long, generally more than 30 segments in ♀ (except *brevicornis*); apical border of clypeus either produced or with one, two or three teeth (rounded in *varipes*, *reticulata*, *armata*); carapace rounded, generally deep, without posteroventral notch (Figs 60, 61, 69, 70, 74). Ovipositor short, thick, abruptly narrowed shortly before apex; sheaths short, wide; radius generally emitted from about middle of pterostigma (Fig. 2) ..... 15
- 11(10) Face completely irregularly rugose, transverse-striate element often predominating; hairs on upper part of face directed upwards; head generally pale in colour, sometimes completely so except for ocellar triangle, sometimes partly so, rarely completely black ... 12
- Face sometimes punctate, shining, sometimes finely regularly reticulate-rugose; hairs on upper part of face directed downwards (except sometimes between bases of antennae); head always completely black save only occasionally the clypeus ..... 14
- 12(11) Temple straight, strongly contracted, produced posterolaterally into strongly backwardly directed flanges (Fig. 26); vertex rather depressed; strong dentate tubercle between bases of antennae..... *gonocephala* Wesmael (p. 362)
- Temple rounded, not strongly contracted, not produced posterolaterally (Figs 27, 28); vertex convex, not depressed; no tubercle between bases of antennae ..... 13
- 13(12) Carapace in ♀ not conspicuously long and narrow, at most about twice as long as broad, reaching maximum breadth in distal half and roundly tapered to apex (Fig. 35)  
*klugii* (Nees von Esenbeck) (p. 363)
- Carapace in ♀ elongate, narrow, about 2.5 times as long as broad, broadest in proximal third and tapering to apex (Fig. 36)..... *exigua* sp. n. (p. 361)
- 14(11) Carapace of ♀ emarginate posteroventrally (Fig. 34), often tapered and slightly truncate in dorsal view; temple at least equal to eye in dorsal view (Fig. 29); carapace always with two yellow patches at base..... *annularis* (Nees von Esenbeck) (p. 360)
- Carapace of ♀ at most slightly emarginate posteroventrally, rounded in dorsal and lateral view (Figs 31, 32); temple shorter than eye in dorsal view (Fig. 30), strongly contracted; carapace sometimes without yellow patches at base ..... *grahami* sp. n. (p. 362)
- 15(10) Face generally completely smooth, punctate, sculpture of clypeus not contrasting strongly with that of face; face sometimes finely and regularly reticulate-rugose (*varipes*); mesonotum generally predominantly punctate; clypeus rounded apically or produced (Fig. 45) or emarginate (Fig. 42), sometimes with two (Figs 51, 54) or three (Fig. 37) medial teeth, occasionally with one (Fig. 43)..... 16
- Face completely, strongly irregularly rugose, never finely reticulate, sculpture of clypeus often smooth, punctate in contrast to that of face; mesonotum generally coarsely rugose so that notaulices indistinct; clypeus generally produced medially with a single medial tubercle (except in *armata*, *reticulata*), never with more (Figs 62, 72, 79)..... 23
- 16(15) Mandible at base with a deep, semicircular depression (Fig. 38); apical border of clypeus transversely impressed, without medial teeth or excision; hind coxa always strongly, transversely striate, at least in part ..... *varipes* Wesmael (p. 370)
- Mandible at base with a vertical, parallel-sided depression; if apical border of clypeus transversely impressed then medially excised or with teeth or tubercles (Figs 37, 51); hind coxa largely smooth punctate ..... 17
- 17(16) Apical border of clypeus medially with three small but distinct dentate tubercles (Fig. 37); mandible broad, not strongly twisted, ventral border reflexed forward into a distinct flange (Fig. 40); carapace broad, short (Fig. 39)..... *rufidens* Wesmael (p. 369)
- Apical border of clypeus medially with a small excision flanked by two small tubercles (Figs 51, 54), or produced into a blunt point (Fig. 45), or emarginate (Fig. 42); mandible relatively slender, twisted, without a distinct flange on ventral border but often with a carina from between the teeth to the ventral border at base; carapace generally less broad (Figs 44, 53), sometimes longer (Figs 46, 48, 52) ..... 18
- 18(17) Antenna very long, 47–50 segmented; apical border of clypeus broadly shallowly emarginate medially (Fig. 42); mesopleuron dorsally completely coarsely reticulate-rugose, precoxal suture not distinct..... *longicornis* sp. n. (p. 368)
- Antenna shorter, at most 41-segmented; apical border of clypeus medially either excised with two small tubercles or produced (Figs 45, 51, 54); mesopleuron dorsally at least in part smooth, punctate, precoxal suture distinct ..... 19
- 19(18) Carapace elongate, clavate, always broadest in posterior third (Figs 46, 48); apical border of clypeus produced medially, generally without medial excision or tubercles (Fig. 45) ... 20
- Carapace short, broadest at about mid-point (Figs 44, 53), if elongate clavate (Fig. 52) then

- clypeus not produced medially and with a distinct medial excision flanked by two tubercles (Fig. 54) ..... 21
- 20(19) Carapace finely rugose and with a downwardly directed anterior flange (Fig. 47), antenna shorter, 33–34 segmented; hind leg yellow, except coxa at base black, apex of femur and sometimes of tarsus infuscate ..... *consobrina* Curtis (p. 367)
- Carapace more coarsely rugose and with anteroventral flange not directed downwards; antenna longer, 37–39 segmented; hind leg dark with base of tibia and of tarsus ivory or pale yellow ..... *albitarsus* Reinhard (p. 364)
- 21(19) Clypeus with a single medial apical tooth (Fig. 43); clypeus not distinctly divided from face; propodeum and carapace finely regularly reticulate-rugose ..... *perkinsi* sp. n. (p. 368)
- Clypeus with two medial apical teeth, generally with a small excision between them (Figs 51, 54); if excision obsolete than medial clypeal border a narrow, spatulate projection, never a medial tooth; clypeus distinctly divided from face; propodeum and carapace more coarsely reticulate-rugose ..... 22
- 22(21) Head massive, distinctly rounded behind eyes (Fig. 49), broader than mesonotum; carapace long (Fig. 52); propodeum long dorsally ..... *arisanica* Sonan (p. 365)
- Head less massive, contracted behind eyes (Fig. 50), about equal in breadth to mesonotum; carapace short (Fig. 53); propodeum short dorsally ..... *bidentula* Wesmael (p. 366)
- 23(15) Antenna very short, 21–23 segmented in female; apical segments of flagellum distinctly separated (Fig. 67) with copious long erect bristles ..... *brevicornis* Wesmael (p. 373)
- Antenna longer, generally more than 30 segmented in female; flagellar segments not distinctly separated and hairs shorter, adpressed ..... 24
- 24(23) Head behind eyes strongly contracted, temples rather straight (Fig. 59); genae in face view contracted, long (Fig. 58); ♀ antenna long, 39–40 segmented ..... *canifrons* Wesmael (p. 374)
- Head behind eyes not strongly contracted, often at least slightly expanded, always rounded (Figs 56, 63, 66, 68, 78) genae in face view rounded (Figs 62, 76, 79); ♀ antenna shorter, 30–36 segmented ..... 25
- 25(24) Interantennal carina strongly raised into an erect triangular flange between scapes (Fig. 57); apical border of clypeus rounded with at most a weak trace of a medial tubercle; propodeum with a weak medial transverse carina which is never raised into strong medial tubercles ..... *armata* Wesmael (p. 372)
- Interantennal carina present but never strongly raised into a triangular flange between scapes; apical border of clypeus produced medially, generally with a strong medial tubercle (except *reticulata*, *scabricula*); propodeum with strongly raised medial tubercles (except *rufipes*) ..... 26
- 26(25) Temple generally equal in length to eye in dorsal view (Figs 63, 66); carapace short, deep in lateral view, posteroventral rim distinctly in front of apex (Figs 60, 61) ..... 27
- Temple generally conspicuously longer than eye in dorsal view, rounded (Figs 68, 78); carapace longer, posteroventral rim less conspicuously in front of apex (Figs 69, 70, 74) .. 28
- 27(26) Apex of clypeus not impressed, produced, with a distinct medial tubercle (Fig. 62); hind tibia pale at base but never with a distinct pale band medially; hind coxa striate dorsally, generally black ..... *quadridentata* Wesmael (p. 376)
- Apex of clypeus transversely impressed, its edge more or less straight with no medial tubercle (Fig. 65); hind tibia with a medial pale-coloured band; hind coxa smooth, punctate dorsally, generally yellow, sometimes infuscate at base *reticulata* Watanabe (p. 377)
- 28(26) Carapace rather narrow, almost parallel-sided in dorsal view (Fig. 77), slender in lateral view (Fig. 69); carapace of ♀ pale yellow in proximal third; legs pale, all coxae yellow, at least in part ..... *rufipes* (Latreille) (p. 378)
- Carapace more rounded or tapered in dorsal view (Figs 73, 75), stouter in lateral view (Figs 70, 74); carapace of ♀ always black; legs darker, all coxae black ..... 29
- 29(28) Clypeus not distinctly divided from face, apex with a conspicuous dentate tubercle medially (Fig. 72); mandible produced ventrally at base with no flange beneath *dispar* Fahringer (p. 375)
- Clypeus divided from face by a deep groove, apex forming a blunt point medially but with no dentate tubercle (Fig. 76); mandible not produced ventrally at base, with a flange beneath (Fig. 71) ..... *scabricula* (Dahlbom) (p. 379)

The *semenovi*-group

Face punctate, generally reticulate-punctate, hairs on upper part of face pointing upwards. Clypeus with lateral dentate flanges or a broad medial projection, never with dentate tubercles.

The two species of this group are known only from the eastern part of the Palaearctic region, and are uncommon. They both have unusually stout female genitalia and the posteroventral part of the female carapace is strongly excised and laterally flanged, presumably to facilitate the use of these enlarged organs.

*Ascogaster excavata* Telenga

(Figs 3, 4)

*Ascogaster excavatus* Telenga, 1941: 311. Lectotype ♀, U.S.S.R.: Voronezh, Shipovo, 17.vi.1898 (*Silan-t'ev*) (AS) [examined]. [Lectotype selected by Tobias.]

*Ascogaster kasachstanicus* Tobias, 1964: 183. Holotype ♂, U.S.S.R.: Kazakhstan, Tselinogr. oblast, 17 km from mouth of river Shapdara, 21.vi.1957 (*Tobias*) (AS) [examined]. **Syn. n.**

The data of the lectotype agree with those cited for one of Telenga's (1941: 312) syntypes of *excavata*. Tobias selected and labelled the lectotype but I have been unable to discover where or whether the designation was published.

The holotype of *kasachstanica*, a male, of course lacks the extremely modified carapace which makes *excavata* so distinctive. Tobias was evidently misled by this extreme dimorphism and so described *kasachstanica* as distinct. The latter species, however, has most of the characteristics which distinguish *excavata* and I have no doubt that they are conspecific. In the original material of *excavata*, Telenga had specimens of this species from Kazakhstan.

♀. Antennae missing. Head contracted behind eyes but not strongly so. Temple about equal in length to eye in dorsal view, not strongly rounded. Ocelli moderately large, OO = 3.0 OD; ocellar triangle acute. Frons behind antennae not strongly excavate, with a strong medial carina from face almost to anterior ocellus. Eyes not strongly protuberant. Face about twice as broad as high, not strongly protuberant, reticulate-punctate. Hair on upper part of face directed upwards and forwards, sparse. Clypeus about twice as broad as high, not strongly protuberant, reticulate-punctate; apical border produced medially into a broad, blunt projection without tubercles. Mandibles long, slender, strongly twisted. Pronotum projects in front of mesonotum; lateral surface smooth anteroventrally with minute punctures, strongly reticulate-rugose dorsally. Notaulices foveolate, rest of mesonotum reticulate-punctate. Precoxal suture distinct, foveolate; rest of mesopleuron densely punctate, dorsally reticulate-punctate except anterodorsally rugose. Propodeum reticulate-rugose. Carapace long, oval, rather pointed distally in dorsal view; posteroventrally rather truncate, the ventral rim only narrowly separated posteriorly and expanded into a strong flange which is deeply notched medially; smooth, shining punctate in distal half, dorsally and anteriorly reticulate-punctate with some weak rugosity. Hypopygium long, narrow, projecting beyond ventral rim of carapace. Ovipositor thick at base, abruptly narrowed shortly before apex; sheaths broad, flat. Hind coxa smooth, punctate.

Colour black; gaster and legs brown except tibiae yellow.

♂. Same as ♀ except carapace narrower and with posteroventral flange less strongly raised, not emarginate medially.

Hosts. Unknown.

REMARKS. This species is closely related to *semenovi* from which it can be distinguished by the characteristics cited in the key to species. *A. excavata* is conspicuously smooth – no other Palaearctic species of *Ascogaster* has as smooth and punctate a carapace.

*Ascogaster semenovi* Telenga

(Figs 5, 6)

*Ascogaster semenovi* Telenga, 1941: 310. Holotype ♀, MONGOLIA: Alashan, Dyn-juan-in, 23.vi.1908 (*Koslov*) (AS) [examined].

*Ascogaster kyushuensis* Yoneda, 1978: 291. Holotype ♀, JAPAN: Kyushu, Fukuoka Pref., Fukuoka city, Wakozaki, 22.v.1975 (*Yoneda*) (ELKU) [not examined]. **Syn. n.**

Telenga cited data for only one specimen of *semenovi*. I have examined the specimen bearing precisely these data and, agreeing with Telenga's description of *semenovi*, no doubt this specimen is the holotype. It has lost its head but is otherwise well preserved. Yoneda's description and excellent figures of *kyushuensis* are quite sufficient for this species to be identified and the name placed as a synonym of *semenovi*.

♀. Antenna short, 22-segmented. Flagellum dilated medially, strongly tapered to apex, distally serrate beneath; medial segments at least as broad as long, some broader than long, rest of segments distinctly longer than broad but only three basal ones as much as twice as long as broad. Head broad, rounded behind eyes. Temple about equal to eye in dorsal view. Ocelli small, OO = 4OD; ocellar triangle acute. Frons behind antennae moderately depressed, strongly transversely striate-rugose. Eyes moderately protuberant. Genae contracted below. Face slightly protuberant, about twice as broad as high, reticulate-punctate; densely hairy, the hairs on the upper part of face pointing upwards. Clypeus moderately protuberant, densely punctate though slightly less densely than face; apical border rounded medially, without teeth or incision, produced laterally into broad dentate flanges which point forwards and downwards in front of rest of clypeus. Mandible long, twisted, the teeth blunt, broad, not distinctly separated. Pronotum projecting little in front of mesonotum; laterally rugose-foveolate. Notaulices deep, foveolate; rest of mesonotum punctate except where notaulices coalesce in a reticulate-rugose area. Precoxal suture deep foveolate; rest of mesopleuron punctate but with a deep foveolate groove anterodorsally, the anterior end of this groove and middle of precoxal suture joined by a further foveolate groove. Propodeum strongly reticulate-rugose, with a medial transverse carine dividing it into a short dorsal surface and a long posterior surface; the dorsal surface with a medial areola formed by two short medial longitudinal carinae. Carapace long, slender, sharply pointed in dorsal and lateral views, finely reticulate-rugose except posterolaterally polished, punctate; ventral rim strongly converging posteriorly, with a broad flange which is strongly incised medially. Hypopygium very long, projecting beyond ventral rim of carapace. Ovipositor long, broad, abruptly narrowed shortly before apex. Hind coxa smooth, punctate.

Colour black; sternites and legs brown except fore tibia yellow, ovipositor sheaths translucent, pale brown.

♂. Same as ♀ except antenna longer, 27–28 segmented; flagellum less strongly dilated, not distally serrate, all segments longer than broad with copious tyloidae and a conspicuous band of light-coloured hairs at junction of each segment; occipital carina joins genal carina a little way behind mandibles and expanded into a prominent flange beneath base of mandible; ventral rim of carapace not expanded posteriorly into a flange, generally less strongly pointed.

#### MATERIAL EXAMINED

9 ♂, 3 ♀. **Japan:** 7 ♂, Fukuoka city, Hakozaki, 22.v.1978 (*Maetô*) (BMNH; MC); 2 ♂, Fukuoka city, Ohori, 22.v.1976 (*Maetô*) (MC). **Mongolia:** holotype ♀ of *semenovi*; 2 ♀, 'de Cha Tcheou a Kan Tcheou' Nan Chan, north slope, 1000–2000 m, vi.1908 (*Vaillant*) (BMNH; MNHN).

**HOSTS.** Unknown.

**REMARKS.** This remarkable species is easily distinguished by the dentate flanges on its clypeus and by the characteristics of the ovipositor sheaths.

#### The *caucasica*-group

Face punctate, generally reticulate-punctate, hairs on upper part of face pointing upwards. Clypeus medially excised, with two prominent dentate tubercles.

The four species of this group are commoner in the eastern part of the Palearctic region though the range of *excisa* extends as far west as France and that of *bicarinata* to Spain. All species in this group have exceptionally long, slender female genitalia and a large hypopygium. The clypeal teeth are least well developed in *kaspariyani* which also has the most highly modified female carapace of any in the group.

*Ascogaster bicarinata* (Herrich-Schäffer)

(Figs 17, 18, 21)

*Chelonus bicarinatus* Herrich-Schäffer, 1838: 154. Syntypes. GERMANY (lost).*Ascogaster mlukossewitchi* Kokujev, 1895: 78. Holotype ♀, U.S.S.R.: 'Lagodechi' (*Mlukossewitch*) (AS) [examined]. [Synonymised by Szépligeti, 1908: 409.]

Reinhard (1867: 368) redescribed *bicarinata* after having examined Herrich-Schäffer's original material. This detailed redescription is precise and I have based my interpretation of the species upon it. I do not believe that Reinhard could have overlooked the conspicuously exerted labiomaxillary complex of *rostrata* (= *caucasica*) or that he would have failed to mention it had it been present in the syntype of *bicarinata*. I therefore reject Fahringer's (1934: 517) placement of *rostrata* in synonymy with *bicarinata*.

♀. Antenna long, 25–26 segmented. Flagellum generally evenly tapered from base to apex, occasionally slightly dilated medially; all segments considerably longer than broad except terminal three or four which are quadrate. Head broad, distinctly broader than mesonotum, roundly contracted behind eyes. Temple about equal to eye in dorsal view. Occiput deeply concave. Ocelli small, OO = 5.0 OD; ocellar triangle obtuse but ocelli not on line. Frons behind ocelli slightly depressed. Eyes protuberant. Malar space long; genae in face view moderately convex. Face moderately protuberant, slightly less than twice as broad as high, reticulate-punctate, often with some weak rugosity medially; hair on upper part of face points upwards. Clypeus protuberant, slightly less densely punctate than face; apical border folded inwards with two strong dentate tubercles medially. Labiomaxillary complex projecting more or less beneath the head; exerted part never as long as malar space; labial palps inserted behind mandibles. Mandibles long, slender, strongly twisted. Prothorax projecting in front of mesonotum; pronotum dorsolaterally rugose, rest punctate. Notaulices foveolate, coalescing posteriorly in a reticulate-rugose area; rest of mesonotum punctate. Precoxal suture shallow, foveolate; rest of mesopleuron densely punctate except anterodorsally rugose. Propodeum not distinctly divided into dorsal and posterior surfaces; strongly rugose, often the longitudinal rugae predominating; with two weak posterolateral tubercles. Carapace oval, rather flattened; strongly reticulate-rugose, the longitudinal element predominating except distally where the sculpture is weaker and more regular reticulate-rugose. Hypopygium short, not projecting beyond posteroventral rim of carapace; distinctly shorter than basal segment of tarsus. Ovipositor long, thin, gradually tapered, upcurved. Hind coxa smooth, punctate, sometimes with weak rugae dorsally.

Colour black. Carapace sometimes orange-testaceous at base; apex of femur, tibia and tarsus of foreleg, tibia of midleg and medial band of tibia of hindleg testaceous.

♂. Same as ♀ except antenna longer, 30–32 segmented; all flagellar segments distinctly longer than broad, terminal segments not quadrate; carapace more slender in dorsal view, flatter in lateral view; legs darker, generally completely black except for femur at apex and tibia testaceous, occasionally mid and hind tibiae somewhat lighter but never testaceous.

## MATERIAL EXAMINED

32 ♂, 35 ♀. Bulgaria, Greece, Spain, Turkey, U.S.S.R., Yugoslavia.

HOSTS. No reared material examined.

REMARKS. This species is closely similar to *caucasica* with which it has generally been confused. The labiomaxillary complex is often more or less exerted in *bicarinata* but never as strongly as in *caucasica*; the characteristics of the hypopygium, ovipositor and head that are cited in the key serve amply to differentiate the two species. Both *bicarinata* and *caucasica* are generally darker than most other species of *Ascogaster* but the ♀ carapace of *bicarinata* is sometimes tinged with orange-testaceous, that of *caucasica* never is.

*Ascogaster caucasica* Kokujev

(Figs 15, 16, 22)

*Ascogaster causicus* Kokujev, 1895: 82. Holotype ♀, U.S.S.R.: 'Lagodechi', v.1881 (AS) [examined].*Ascogaster rostratus* Szépligeti, 1896: 178. Lectotype ♂, HUNGARY: Budapest, Gellerth, 19.v.1895 (Szépligeti) (HNHM), designated by Papp in Shenefelt, 1973: 817 [examined].

Kokujev stated that he had a single female of *caucasica*; this specimen, bearing the data cited in the description, is now in AS, Leningrad. Fahringer (1934: 517) synonymised *rostrata* with

*bicarinata* Herrich-Schäffer and the two species have often been confused in collections, but the characteristics distinguishing them are given above in the key to species. Telenga (1941: 316) synonymised *caucasica* with *bicarinata*, evidently following Fahringer's misinterpretation of the latter species.

♀. Antenna moderately long, 25–26 segmented. Flagellum not conspicuously dilated medially, slightly tapered apically; basal segment distinctly more than three times as long as broad, each following segment slightly shorter until preapical segment which is about as long as broad. Head contracted behind eyes. Occiput deeply concave. Temple about equal to length of eye in dorsal view. Ocelli minute, OO = 5 OD; widely separated. Eyes small, round, protuberant. Malar space long, about 1.5 times basal breadth of mandible. Genae in face view contracted, not strongly rounded. Face almost twice as broad as high, rather flat, not strongly protuberant, densely reticulate-punctate, often with a distinct rugose element. Hair on upper part of face directed upwards. Clypeus not protuberant, weakly and evenly convex, apical border reflexed backwards at sides, medially produced into two prominent dentate tubercles; polished and densely punctate, sometimes reticulate. Mandible long, strongly twisted, ventrally expanded at base. Labiomaxillary complex elongate, projecting conspicuously beneath head; exerted part distinctly longer than malar space; labial palps inserted at least one third of distance along exerted part, distinctly beyond mandibles. Prothorax projecting in front of mesonotum with a strongly impressed foveolate groove medially. Notaulices shallow, foveolate, coalescing posteriorly in a coarsely rugose area; rest of mesonotum polished, reticulate-punctate. Precoxal suture irregularly rugose; rest of mesopleuron reticulate-punctate. Propodeum rounded, not abruptly divided or posteromedially impressed; coarsely irregularly rugose with no distinct carinae but with small lateral tubercles. Carapace long, slightly acuminate, not rounded posteroventrally, reticulate-rugose, the longitudinal element predominating anteriorly. Hypopygium exceptionally long, sometimes projecting beyond the posteroventral rim of carapace. Ovipositor very long, slender, gradually tapering to apex; generally covered by hypopygium for most of its length but occasionally protruding to a distance at least equal to the length of the hind tibia.

Colour black; wings infumate, legs yellow-marked.

♂. Same as ♀ except that antenna longer, 32–33 segmented; carapace narrower, flatter, slightly rounded posteroventrally.

#### MATERIAL EXAMINED

21 ♂, 15 ♀. **Bulgaria:** 2 ♂, 1 ♀, Rhodopi, Sh. poljana, v.1976 (*Zaykov*) (ZC); 1 ♀, Rhodopi, D. Lukovo, v.1977 (*Zaykov*) (ZC). **Cyprus:** 1 ♀, Yermosoyia, 3.iv.1978 (*Teunissen*) (RNH); 1 ♀, Episcopi Forest, 20–23.iv.1950 (BMNH); 1 ♂, Yerolakko, 25.iv.1948 (*Longfield*) (BMNH); 3 ♂, Limassol, 1–5.v.1934 (*Mavromoustakis*) (BMNH); 1 ♂, Kellaki, 2000 ft, 10.iv.1952 (BMNH); 1 ♀, Nicosia, 20–23.iv.1934 (*Mavromoustakis*) (BMNH); 2 ♂, Yerasa, 24.iii.1947 (*Mavromoustakis*) (BMNH). **Czechoslovakia:** 1 ♂, 1 ♀, Sturovo, 25.v.1959 (*Strejcek*) (CC). **Greece:** 3 ♂, 1 ♀, Prov. Attiki, Marathon, 21.iv.1978 (*Papp*) (HNHM); 3 ♂, 1 ♀, Athens, Mt Pendeli, 25.iv.1980 (*Teunissen*) (RNH); 1 ♂, Delphi, 22–23.iv.1980 (*Teunissen*) (RNH); 1 ♂, Lesbos, Milies, 21.v.1980 (*Teunissen*) (RNH); 1 ♀, Kerkyra, 16–30.v.1971 (*Aartsen & Wolschrijn*) (RNH). **Hungary:** lectotype ♂ of *rostratus*. **Iran:** 1 ♂, 3 ♀, Susa (*Escalera*) (BMNH). **Spain:** 1 ♂, Ventas, St Barbara, 29.iii.1980 (*Teunissen*) (RNH). **Turkey:** 1 ♀, Adana, 7.v. (*Vachal*) (MNHN). **U.S.S.R.:** holotype ♀ of *causicus*. **Yugoslavia:** 1 ♀, Lake Ochrid, 16.vi.1958 (*Coe*) (BMNH).

HOSTS. No reared material examined.

REMARKS. The strongly exerted labiomaxillary complex of this species immediately distinguishes it from any other Palaearctic species of *Ascogaster*. The strongly dentate clypeus, the upwardly pointing facial vestiture and the elongate, slender habitus of *caucasica* show its close relationship with *bicarinata*, *excisa* and *kasparyani*.

#### *Ascogaster excisa* (Herrich-Schäffer)

(Figs 14, 23, 24)

*Chelonus excisus* Herrich-Schäffer, 1834: 154. Syntypes, GERMANY (lost).

*Ascogaster longiventris* Tobias, 1964: 184. Holotype ♂, U.S.S.R.: Kazachstan, Kokshetay, 15.vi.1957 (*Tobias*) (AS) [examined]. **Syn. n.**

The identity of this species is clear from Herrich-Schäffer's description and from his excellent figure. The remarkable posteroventral modification of the female carapace makes *excisa* one of the least liable to misinterpretation of all species of *Ascogaster*.

♀. Antenna long, 28–31 segmented. Flagellum not dilated medially, strongly tapered apically; basal five or six segments at least twice as long as broad, rest distinctly longer than broad except apical seven or eight which are almost quadrate. Head not strongly contracted behind eyes. Temple slightly shorter than eye in dorsal view. Occiput deeply concave. Ocelli minute, OO = 4 OD; not on line. Eyes protuberant. Malar space only slightly greater than basal breadth of mandible. Face moderately protuberant, about twice as broad as high, densely and regularly reticulate-punctate; hairs on upper part of face directed upwards. Clypeus moderately protuberant, reticulate-punctate; apical margin incised medially with two blunt dentate tubercles flanking the incision, laterally weakly reflexed backwards. Mandible large, only slightly twisted, punctate. Pronotum not projecting strongly in front of mesonotum; laterally reticulate-punctate except for a medial longitudinal foveolate groove. Notaulices deep, foveolate, coalescing posteriorly in a rugose-foveolate area; rest of mesonotum reticulate-punctate. Precoxal suture broad, reticulate-foveolate; rest of mesopleuron reticulate-punctate, except dorsally rugose. Propodeum posteromedially impressed; anteriorly with two short longitudinal carinae which terminate in two blunt tubercles one on each side of medial depressed area; reticulate-rugose. Carapace about twice as long as broad, ventral rim produced posteriorly into a broad, bifurcate flange. Hypopygium long and rather narrow in side-view, generally extruded and projecting behind the carapace. Ovipositor very long, slender; abruptly upcurved shortly before apex. Hind coxa generally smooth, polished with only weak puncturation, occasionally reticulate-punctate anterodorsally, sometimes also with obsolescent transverse rugae dorsally.

Colour black; legs brownish-testaceous except all coxae and trochanters black, hind femur and all tarsi infuscate.

♂. Same as ♀ except antenna longer; flagellum not tapered apically, all segments distinctly longer than broad; carapace narrower in dorsal view, posteroventral rim distinctly in front of apex; legs darker, mid and hind femur black, fore femur dark proximally.

#### MATERIAL EXAMINED

23 ♂, 19 ♀. **Bulgaria:** 22 ♂, 2 ♀, Rhodopi, Bojno, 6.vii.1976 (*Zaykov*) (ZC); 5 ♀, same data except 24.vii.1975. **France:** 3 ♀, Drôme, Col de Macuegne, i.viii.1979 (*Graham*) (BMNH); 2 ♀, Lozère, R. Lot, Mende, 3–8.vii.1924 (*Moseley*) (BMNH); 1 ♀, Chateau Arnoux, 10.viii.1972 (*Bouček*) (BMNH); 4 ♀, Dept. Vaucluse, Castellet, 20.vii.1974 (*Gijswijt*) (RNH); 1 ♀, Var, Montauroux, 1.vii.1960 (*Van der Vecht*) (RNH); 1 ♀, Var, Ste Baume, 19.vii.1951 (*Granger*) (MNHN). **U.S.S.R.:** holotype ♂ of *longiventris*.

**HOSTS.** No reared material examined.

**REMARKS.** The rounded carapace with the posteroventral rim distinctly in front of the apex is a useful supplementary character for distinguishing the male of *excisa* from those of *rostrata* and *bicarinata* in which the carapace of the male is not strongly rounded posteriorly and the posteroventral rim is only slightly in front of the apex. In describing *longiventris*, Tobias evidently had not appreciated the considerable sexual dimorphism of this species; nonetheless he correctly pointed out its relationship with *bicarinata*.

#### *Ascogaster kasparyani* Tobias

(Figs 13, 19, 20)

*Ascogaster kasparyani* Tobias, 1976: 233. Holotype ♂, U.S.S.R.: Gruzia, Bogdanovka, 28.vi.1967 (*Kasparyan*) (AS) [examined].

♀. Antenna long, slender, more than 28-segmented. Flagellum slender, not dilated medially, first segment about three times as long as broad, next 10 or so segments at least twice as long as broad, rest at least slightly longer than broad. Head not strongly contracted behind eyes. Temple slightly shorter than eye in dorsal view. Occiput deeply concave. Ocelli small, OO = 3.0 OD; not on line. Eyes small, protuberant. Malar space long, about twice basal breadth of mandible. Face about twice as broad as high, moderately protuberant, coarsely reticulate-punctate; hairs on upper part of face directed upwards. Clypeus protuberant, narrower than face; apical margin incised medially, weakly reflexed laterally. Mandible moderately twisted. Pronotum projecting strongly in front of mesonotum; laterally reticulate-rugose. Notaulices shallow, indistinct reticulate-rugose, coalescing posteriorly in a strongly reticulate-rugose area; rest of mesonotum reticulate-punctate. Precoxal suture indistinct, most of mesopleuron laterally irregularly reticulate-rugose, ventrally reticulate-punctate. Propodeum rounded, completely regularly reticulate-rugose with two weak medial longitudinal carinae at base. Carapace long, slender, about 2.5 times as long as broad, gradually diminished in breadth from about proximal third; narrow and rounded distally in dorsal

view; in lateral view rather flat, the proximal tenth strongly dorsoventrally flattened; completely finely regularly reticulate-rugose. Hypopygium at least slightly exerted. Ovipositor long, slender, strongly upcurved. Hind coxa polished with minute punctures.

Colour black, antenna at base and legs orange-testaceous, carapace more or less light-marked.

♂. Same as female except carapace rounded, not dorsoventrally flattened at apex; colour darker, carapace black, legs black except fore tibia yellow, mid and hind tibiae brown.

#### MATERIAL EXAMINED

1 ♂, 2 ♀. **Greece:** 1 ♀, Rhodes, Kremasti Hills, 24–30.vi.1958 (*Mavromoustakis*) (BMNH); 1 ♀, Empona, 18–19.vi.1968 (*Mavromoustakis*) (BMNH). **U.S.S.R.:** holotype ♂.

**HOSTS.** Unknown.

**REMARKS.** The long, exerted hypopygium, the long, slender, upcurved ovipositor and the upwardly directed hair on the upper part of the face show the relationship of *kasparyani*, *caucasica*, *excisa* and *bicarinata*. The characteristics of the carapace distinguish *kasparyani* from all other Palaearctic species of the genus.

### The *abdominator*-group

Face punctate, often reticulate-punctate, hairs on upper part of face pointing upwards. Clypeus with a single prominent dentate tubercle.

Two of the three species of this group are widely distributed in the more northerly parts of the Palaearctic region, the third, *nachitshevanica*, is known only from the U.S.S.R. and Mongolia. All species in the group have a short ovipositor and a short hypopygium which are generally concealed beneath the carapace. *A. dentifer* is rather different in head and body-shape from the other two species which form a close pair differentiated on small differences in the antennae, the notaulices and the genitalia.

### *Ascogaster abdominator* (Dahlbom)

(Figs 9, 10)

*Chelonus abdominator* Dahlbom, 1833: 165. Holotype ♀, SWEDEN: 'Esperod', Fallén colln (ZI) [examined]. [Synonymised with *instabilis* by Thomson, 1874: 583.]

*Ascogaster instabilis* Wesmael, 1835: 227. Syntypes, BELGIUM: Wesmael colln (IRSNB) [examined]. **Syn.**

*Ascogaster fulviventris* Curtis, 1837: folio 672. Holotype ♂, GREAT BRITAIN: England, Curtis colln (NMV) [examined]. [Synonymised with *instabilis* by Fischer, 1965: 11.]

*Chelonus femoralis* Herrich-Schäffer, 1838: 154. Syntypes, GERMANY (lost). [Synonymised with *instabilis* by Reinhard, 1867: 364.]

*Chelonus rufiventris* Herrich-Schäffer, 1838: 154. Syntypes, GERMANY (lost). [Synonymised with *instabilis* by Reinhard, 1867: 364.]

*Ascogaster pallida* Ruthe, 1855: 293. LECTOTYPE ♀, GERMANY: 'Freienwalde', 16.vii.1854, Ruthe colln (BMNH), here designated [examined]. [Synonymised with *instabilis* by Reinhard, 1867: 364.]

There is a single ♀ in Fallén's collection, labelled 'C. abdominator' in Dahlbom's handwriting. There is no indication that Dahlbom had more than one specimen before him when describing this species and I therefore accept this specimen as holotype of *abdominator*. Dahlbom obviously mistook the sex of his specimen, citing it as male in his description – the holotype bears a label upon which this error is repeated. Thomson (1874: 583) synonymised *abdominator* with *instabilis* despite the fact that the latter species is clearly a junior synonym of *abdominator*. Thomson's placement has been followed by all subsequent workers, but there is no justification for continuing this incorrect usage. Wesmael (1835: 229) stated that he possessed six males and two females of *instabilis*. At present there are six males and five females labelled 'Ascogaster instabilis mihi' in Wesmael's collection; all of these specimens are conspecific and agree with Wesmael's description of *instabilis*. Obviously, however, there are more female specimens labelled as 'instabilis' than Wesmael claimed to possess, thus they cannot all belong to the syntype series. A lectotype has not been selected because the species is so distinctive. There is

one male in Curtis' collection named *fulviventris*. It agrees in every particular with what Curtis wrote about *fulviventris* and I regard this specimen as the holotype of that species. The specimen was labelled as 'type' by Nixon in 1948; it is well within the limits of variation of *abdominator*.

Reinhard placed *femoralis* Herrich-Schäffer and *rufiventris* Herrich-Schäffer in synonymy with *instabilis* without indicating that he had seen the original material of *femoralis*. (Herrich-Schäffer himself stated in his description of *rufiventris*, that his original specimen of this species had been destroyed.) There is nothing in Herrich-Schäffer's descriptions of *femoralis* and *rufiventris* which precludes Reinhard's placement of them.

There are two female specimens from Ruthe's collection in the BMNH which agree with his description of *pallida*. One of them bears a label in Ruthe's handwriting 'Asc. pallidus m. Freienwalde 16.7.54'; these are precisely the data cited by Ruthe in his description of *pallida* except that he gave the date of capture as '18.7.54'. This discrepancy is probably due to an error of transcription, all too easily made when copying figures from a barely legible handwritten label. These specimens are undoubtedly syntypic material and the female bearing Ruthe's handwritten label is here designated lectotype of *pallida*.

♀. Antenna long, 32–36 segmented. Flagellum dilated medially, strongly tapered to apex; all segments at least as long as broad. Head large, roundly contracted behind eyes. Temple about equal to eye in dorsal view. Occiput strongly concave. Ocelli small, OO = 3.0–3.5 OD; not on line. Eyes small, protuberant. Malar space about half height of eye. Face protuberant, about twice as broad as high, reticulate-punctate, sometimes rugose medially and occasionally completely so; pubescence short, fine and directed upwards and outwards on upper part of face. Clypeus protuberant, reticulate-punctate, ventral border reflexed beneath so that in front view clypeus appears truncate; medially with a large dentate tubercle. Mandible strongly twisted with numerous long inwardly-directed hairs at base. Pronotum projecting strongly in front of mesonotum; dorsally with a strong transverse fold which becomes laterally a foveolate groove. Notaulices largely obsolete, visible at the anterior border of the mesonotum as a small reticulate-rugose area, otherwise indistinguishable from the puncturation of the mesonotum. Mesonotum smooth reticulate-punctate. Precoxal suture broad, shallow, foveolate-rugose; mesopleuron laterally reticulate-rugose, ventrally punctate. Prepectal carina strongly raised into a flange behind each fore coxa, deeply notched medially. Propodeum rather flat, reticulate-rugose, carinae inconspicuous; generally with small medial and lateral tubercles. Carapace rounded posteriorly, only slightly rounded posteroventrally. Hypopygium short, truncate, never projecting strongly beyond end of carapace. Ovipositor short, straight, abruptly tapered shortly before apex.

Colour black; antenna at base, forelegs and proximal part of carapace yellow or sometimes the latter ivory, mid and hind legs at least partly light-marked; carapace sometimes completely yellow. Occasionally clypeus, face and pronotum orange-yellow, at least in part.

♂. Same as ♀ except antenna longer, flagellar segments longer, thinner though the number of segments is not greater; pubescence on face longer and white in colour so that it appears much denser than that of ♀; carapace longer, narrower, sometimes almost parallel-sided anteriorly; colour darker, antenna generally black, carapace often completely dark.

#### MATERIAL EXAMINED

267 ♂, 127 ♀. Belgium, Bulgaria, Czechoslovakia, France, Germany, Great Britain, Ireland, Netherlands, Sweden, U.S.S.R., Yugoslavia.

HOSTS. No reared material examined

REMARKS. This species is common and widespread in the region. The characteristics of the clypeus and the face and the virtual absence of notaulices easily differentiate *abdominator* from all other Palaearctic species. Indeed, the latter characteristic alone is almost diagnostic though in some species in the *caucasica*-group the notaulices are rather weak and in those species of the *quadridentata*-group in which the mesonotum is strongly rugose the notaulices are therefore indistinct. This species is extremely labile in colour, varying from almost completely black to almost completely yellow, though the majority of specimens are largely black-bodied except that the carapace is more or less pale-marked.

*Ascogaster dentifer* Tobias

(Figs 7, 12)

*Ascogaster dentifer* Tobias, 1976: 236. Holotype ♂, U.S.S.R.: Armenia, Kefansky region, Tsav. wood, 28.vi.1971 (*Kulitskij*) (AS) [examined].

*Chelonus punctulator* Kirchner, 1867: 119. [Nomen nudum; attributed to Foerster.]

♀. Antenna long, 36–37 segmented, pedicel often protuberant posterolaterally. Flagellum weakly dilated medially, proximal segments distinctly longer than broad, 2.0–3.0 times as long as broad at base of flagellum, rest of segments about as long as broad, those at apex about half breadth of medial ones. Head not strongly contracted behind eyes, rounded. Temple about 1.5 times length of eye in dorsal view. Occiput strongly concave. Ocelli small, OO = 3.5–4.0 OD, not on line but in an obtusely angled triangle. Frons deeply excavate behind antennae, the depressed area smooth, polished. Strong dentate lamella between bases of antennae. Face protuberant, about 1.5 times as broad as high, convex, shining, punctate; hair on upper part of face directed upwards. Clypeus about twice as broad as high, convex, shining, punctate; apical border slightly reflexed inwards laterally, medially produced into a strong dentate tubercle. Mandible strongly twisted. Pronotum projecting distinctly in front of mesonotum; rugose. Propleurae reticulate-punctate. Notaulices distinct, foveolate, coalescing posteriorly in a reticulate-rugose area; rest of mesonotum closely, even reticulately, punctate. Precoxal suture shallow, foveolate-rugose; rest of mesopleuron punctate except anterodorsally rugose. Propodeum rather depressed, finely and regularly reticulate-rugose with two medial longitudinal carinae and one medial transverse carina, the latter raised into blunt crests postero-laterally. Carapace oval, rather broadly rounded posteriorly, posteroventral rim considerably in front of apex. Ovipositor short, straight, stout, abruptly tapered shortly before apex. Sheaths clavate with brush of long hairs at apex. Hypopygium short. Hind coxa transversely rugose.

Colour black; base of antenna testaceous, carapace with two yellow patches anterolaterally; pronotum sometimes more or less yellow-marked; fore trochanter, femur at apex, tibia, mid and hind trochanters and tibiae at base yellow or testaceous; all tarsi infusate.

♂. Same as ♀ except antenna longer, all segments at least as long as broad, most distinctly longer than broad; carapace narrower in dorsal view with no yellow patches anteroventrally; legs often darker, less extensively pale-marked.

## MATERIAL EXAMINED

77 ♂, 11 ♀. Bulgaria, Czechoslovakia, France, Germany, Great Britain, Hungary, Italy, Switzerland, U.S.S.R., Yugoslavia.

HOSTS. Unknown.

REMARKS. This species is superficially similar to *perkinsi*; both have smooth, punctate faces and a well-developed medial tubercle on the clypeus and are similar in stature and colour. The facial hair of *dentifer*, however, always points upwards on the upper part of the face while that of *perkinsi* does not, but the sparseness of the facial vestiture in *dentifer* may result in this characteristic being overlooked. However, in *dentifer* there is a well-developed dentate flange between the antennae which is not present in *perkinsi*, and the latter species has a conspicuous longitudinal flange on the basal segment of the hind tarsus which is lacking in *dentifer*.

I have examined four specimens (1 BMNH; 3 MNHN) of *dentifer* which are labelled 'Chelonus punctulator Foerster' in Foerster's handwriting. No description was published by Foerster but the name *Chelonus punctulator* was listed by Kirchner (1867: 119).

*Ascogaster nachitshevanica* Abdinbekova

(Figs 8, 11)

*Ascogaster nachitshevanicus* Abdinbekova, 1969: 69. Holotype ♀, U.S.S.R.: Azerbaidzhan, Ordubad, 20.v.1967 (*Adamidzh*) (AS) [examined].

♀. Antenna short, 27–30 segmented. Flagellum not dilated medially, strongly narrowed at apex, all segments distinctly longer than broad except terminal segments which are moniliform. Head broad, transverse, roundly contracted behind eyes. Temple 1.0–1.5 times length of eye in dorsal view. Occiput strongly concave. Ocelli small, OO = 4.0 OD, almost on line. Eyes small, protuberant. Face slightly protuberant, about twice as broad as high, reticulate-punctate, sometimes weakly rugulose medially; hair on upper part of face directed upwards. Clypeus transverse, apically impressed and truncate with a strong

dentate tubercle medially; reticulate-punctate. Mandible long, slender, twisted. Pronotum projecting in front of mesonotum; rugose laterally. Notaulices shallow but distinct; rest of mesonotum reticulate-punctate. Precoxal suture broad, reticulate-foveolate; mesopleuron anterodorsally rugose, rest densely punctate. Propodeum completely coarsely reticulate-rugose with a medial transverse carina and two medial longitudinal carinae dorsally but these sometimes indistinct; no distinct propodeal tubercles. Carapace strongly narrowed posteriorly, generally also more or less dorsoventrally flattened in lateral view; posteroventral rim at apex of carapace; coarsely reticulate-rugose at base, more finely rugose towards apex. Hypopygium at most slightly exerted. Ovipositor sheaths conspicuously slender. Hind coxa smooth, punctate except dorsally weakly rugose.

Colour black; antenna at base, tegula, sometimes carapace anterolaterally and legs orange-testaceous except hind coxa dark, at least at base; sometimes mid and hind femora dark medially, hind tibia dark at apex; all tarsi infusate.

♂. Unknown.

#### MATERIAL EXAMINED

4 ♀. **Mongolia:** 3 ♀, Chövsgöl aimak, 8 km N. of Somon Burenchaan, 1450 m, 20.vi.1968 (*Kaszab*) (HNHM). U.S.S.R.: holotype ♀.

Hosts. Unknown.

REMARKS. This species is closely similar to *abdominator*. The characteristics cited in the key to species, together with differences in the shape of the carapace, are sufficient to distinguish the two species, but whether these differences would hold good in a longer series of *nachitshevanica* is open to question.

### The *annularis*-group

Face punctate, hairs on upper part pointing downwards or rugose, hairs on upper part pointing upwards. Clypeus without medial excision or tubercles, apical border more or less convex.

The five species in this group are all more or less small in size, rather flat and have long, slender ovipositors; the emission of the radius from conspicuously beyond the middle of the stigma is a venational feature characteristic of the group. Four of the species of this group are widely distributed, at least in north-western Europe, although *gonocephala* is uncommon. The fifth member of the group, *exigua*, is known only from the holotype from Mongolia. The latter species is the most highly modified of the group, having an exceptionally elongate, slender carapace; it is also the only one with long antennae.

#### *Ascogaster annularis* (Nees von Esenbeck)

(Figs 25, 29, 33, 34)

*Sigalphus annularis* Nees von Esenbeck, 1816: 264. Syntypes, GERMANY (lost).

Nees von Esenbeck's description of *annularis* is clear and detailed enough for the species to be identified with confidence as the one described below.

♀. Antenna short, 21–24 segmented. Flagellum sometimes slightly dilated medially, moderately tapered to apex, all segments distinctly longer than broad except terminal three or four about as long as broad, often more or less moniliform. Head broad, slightly broader than mesonotum, roundly contracted behind eyes. Temple about as long as eye in dorsal view or slightly longer. Occiput moderately concave. Ocelli moderately large, OO = 2.5–3.0 OD; not on line. Frons behind antennae shallowly excavate, polished. A weak medial carina extends from a tubercle on upper part of the face, between antennae. Eyes large, protuberant. Malar space equal to about half height of eye. Face weakly convex, about twice as broad as high, shining, punctate, with sparse, downwardly pointing hairs. Clypeus weakly convex, shining, punctate; apical border slightly reflexed, evenly rounded or occasionally more or less straight medially, never with any trace of tooth or excision. Mandible small, strongly twisted. Pronotum projecting distinctly in front of mesonotum; rugose except ventrolaterally smooth, punctate. Notaulices shallow, foveolate, coalescing posteriorly in a finely rugose area; rest of mesonotum smooth punctate. Precoxal suture reticulate-foveolate; rest of mesopleuron smooth punctate except anterodorsally rugose. Propodeum finely irregularly rugose; divided by a transverse medial carina into dorsal and posterior surfaces, the dorsal

rather flat, with a distinct central areola. Carapace distinctly longer than thorax and propodeum; elongate oval and often truncate posteriorly in dorsal view, rather shallow in lateral view; posteroventrally emarginate. Hypopygium long, often projecting beyond carapace. Ovipositor long, sheaths slender, clavate. Hind coxa finely rugose; hind tibia somewhat swollen. Radius emitted from stigma conspicuously beyond middle.

Colour black; antenna brown, lighter at base; mandibles, foreleg testaceous, midleg testaceous except tibia and tarsus infuscate, tibia with a light medial band; hindleg dark except trochanter and femur yellow or testaceous, at least in part, and tibia with an ivory or pale yellow band medially; carapace always with two yellow patches at base.

♂. Same as ♀ except antenna longer, 22–25 segmented; flagellum not dilated medially, all segments about twice as long as broad; carapace not truncate posteriorly or emarginate posteroventrally.

#### MATERIAL EXAMINED

65 ♂, 74 ♀. Bulgaria, Czechoslovakia, France, Germany, Great Britain, Greece, Hungary, Netherlands, Sweden.

HOSTS. *Pandemis heparana* (Denis & Schiffermüller) (Lepidoptera: Tortricidae), *Recurvaria leucatella* (Clerck) (Lepidoptera: Gelechiidae).

REMARKS. This is one of the smallest Palaearctic species of *Ascogaster*, averaging about 2.5 mm in length. The small size of *annularis* together with its characteristic colour pattern of yellow at the base of the gaster and pale-banded hind tibia make it readily recognisable. The only species which shares these characteristics, though it often lacks the yellow on the carapace, is *grahami* which is very closely related to *annularis* and can be differentiated by the characters cited in the key.

### *Ascogaster exigua* sp. n.

(Figs 28, 36)

♀. Antenna long, 35 segmented. Flagellum weakly dilated medially, strongly tapered to apex, all segments longer than broad, apical ones only slightly longer than broad. Head broader than mesonotum, rounded behind eyes. Temple slightly shorter than length of eye in dorsal view. Ocelli large, OO = 2.5 OD; not on line. Face protuberant, about twice as broad as high, conspicuously transversely striate-rugose; hair on upper part pointing upwards. Clypeus narrow, convex, apical part weakly transversely depressed; smooth, punctate; apical border rounded, with no trace of medial tubercles. Mandibles small, strongly twisted. Pronotum projecting but little in front of mesonotum; laterally densely punctate, ventrally weakly rugose. Notaulices foveolate, coalescing posteriorly in a reticulate-foveolate area; rest of mesonotum shining, punctate, rather flat dorsally. Precoxal suture shallow, foveolate; rest of mesopleuron smooth, punctate. Propodeum flat dorsally, depressed, with medial transverse carina, two weak medial longitudinal carinae and lateral longitudinal carinae; completely finely reticulate-rugose. Carapace elongate, about three times as long as broad, broadest at about a third of its length from base; reticulate-rugose proximally, the longitudinal element predominant, distally smooth shining with minute punctures; posteroventral rim reaching apex. Hypopygium not exerted. Hind coxa largely smooth, punctate.

Colour black; antenna brown except testaceous at base; all legs testaceous except hind tibia, all coxae and all tarsi infuscate.

♂. Unknown.

#### MATERIAL EXAMINED

Holotype ♀, Mongolia: Zavchan aimak, Choit church, 26 km ENE. from See Tehnen nuur, 13.vii.1968 (Kaszab) (HNHM).

HOSTS. Unknown.

REMARKS. The shape of the head, the sculpture and vestiture of the face and the point where the radius joins the pterostigma show the relationship of this species to *klugii*. The shape of the carapace and the strongly depressed body distinguish *exigua* from all other Palaearctic species of the genus.

*Ascogaster gonocephala* Wesmael

(Fig. 26)

*Ascogaster gonocephalus* Wesmael, 1835: 240. Holotype ♂, BELGIUM: Brussels, Wesmael colln (IRSNB) [examined].

Wesmael stated that he had a single male of this species. Two males in Wesmael's collection bear labels in Wesmael's handwriting '*Ascogaster gonocephalus mihi* ♂'; both are conspecific and agree precisely with Wesmael's description except that on the specimen which has complete antennae the segments number 31, not 30 as stated as Wesmael. This latter specimen, however, bears a small label '12 Jn.' and as Wesmael's original specimen was collected in June, I accept this specimen as the holotype of *gonocephala*.

♀. Antenna long, 30 segmented. Flagellar segments at base at least twice as long as broad; apical segments very small, much shorter and narrower than preceding ones. Head broad, strongly contracted behind eyes. Temple straight, about half length of eye in dorsal view; produced backwards on each side into a strong flange; vertex behind ocelli depressed, occipital carina obsolete. Ocelli large, OO = 2.0–2.5 OD. Eyes large, protuberant. Face broad, 2.5–3.0 times as broad as high, not strongly protuberant, rugose, the transverse striae predominant; short medial vertical carina produced into a strong dentate tubercle between bases of antennae; hair on face pointing upwards. Clypeus not strongly protuberant, distinctly divided from face; narrow, about half as broad as face; rugose-punctate; apical border reflexed forwards, rounded, without tubercles. Mandibles strongly twisted. Notaulices deep, foveolate, coalescing posteriorly in a broad reticulate-rugose area. Precoxal suture broad, reticulate-foveolate. Propodeum rugose, dorsally reticulate with strong medial and lateral tubercles. Carapace rather long, slightly tapered posteriorly, not distinctly rounded posteroventrally. Ovipositor thin, slightly upcurved, evenly tapered. Ovipositor sheaths slender.

Colour black; scape ventrally, face (except sometimes medially), genae ventrally, tegula and legs reddish-yellow. Coxae, hind femur distally, hind tibia distally and tarsus black or at least infusate; hind tibia at base whitish yellow.

♂. Same as ♀ except that antenna longer, narrower, the apical segments not conspicuously shorter or narrower than preceding ones; hindleg more extensively infusate.

## MATERIAL EXAMINED

3 ♂, 3 ♀. **Belgium:** 2 ♂ (including holotype), Brussels, colln Wesmael (IRSNB). **France:** 1 ♂, Var, Montauroux, 1.viii.1970 (*Van der Vecht*) (RNH). **Great Britain:** 1 ♀, Hampshire, Totton, 14.viii.1952 (*Vardy*) (BMNH). **Yugoslavia:** 1 ♀, Srbija, Drazevac, nr Belgrade, 27–28.vi.1981 (*Day & Fitton*) (BMNH). ? **Hungary:** 1 ♀, no data (HNHM).

HOSTS. No reared material examined.

REMARKS. Morphologically *gonocephala* is closely similar to *klugii*; it differs from all other species of *Ascogaster* by the curious posterior prolongation of the genae.

*Ascogaster grahami* sp. n.

(Figs 30–32)

♀. Antenna short, 20–24 segmented. Flagellum only slightly dilated, moderately contracted to apex; all segments distinctly longer than broad, apical two or three only slightly longer than broad, almost quadrate. Head slightly broader than mesonotum, contracted behind eyes, strongly contracted ventrally in face view. Temple shorter than eye in dorsal view. Ocelli large, OO = 2.5–3.0 OD; not on line. Eyes large, protuberant. Face about twice as broad as high, moderately protuberant, shining, more or less densely punctate, sometimes with weak rugae laterally; hair pointing downwards except between bases of antennae. Clypeus not protuberant, more or less densely punctate; apical border weakly rounded without teeth or excision. Mandibles slender, strongly twisted. Pronotum projecting but little in front of mesonotum; reticulate-punctate and rugose laterally. Notaulices foveolate, indistinct anteriorly, coalescing posteriorly in a broad, finely reticulate-rugose area; rest of mesonotum densely punctate, shining. Precoxal suture foveolate-rugose; rest of mesopleuron punctate except anterodorsally rugose. Propodeum divided by a medial transverse carina with lateral longitudinal and often medial longitudinal carinae; finely, regularly reticulate-rugose. Carapace oval, rounded posteriorly, at most slightly emarginate postero-

ventrally. Hypopygium long but generally not exerted. Ovipositor long, about half as long as carapace, evenly upcurved, slender; ovipositor sheaths slender. Hind coxa rugose laterally and ventrally.

Colour black except antenna at base testaceous, palps pale yellow or ivory; tegula and legs yellow or testaceous except coxae and tarsi infusate, at least in part; femur of mid leg sometimes infusate dorsally; femur of hindleg infusate in dorsal and ventral longitudinal bands; tibia of midleg sometimes and of hindleg always infusate but with a medial pale band. Carapace generally black but occasionally suffused with yellow at base, rarely with distinct pale areas.

♂. Same as ♀ except antenna longer, 22–26 segmented; all flagellar segments conspicuously longer than broad; carapace more elongate, less rounded; legs often lighter in colour.

#### MATERIAL EXAMINED

58 ♂, 112 ♀. Holotype ♀, **Great Britain**: England, Hampshire, New Forest, Beaulieu Road, 25.vi.1959 (Clark) (BMNH).

Paratypes. **Czechoslovakia**: 1 ♀, Praha, Kosire, 27.vii.1961 (*Strejček*) (CC); 1 ♀, Kamenica, 11.vii.1961 (*Strejček*) (CC); 1 ♀, Banská Stiaavnica, 24.vii.1958 (*Čapek*). **France**: 1 ♀, Brout Vernet (*du Buysson*) (MNHN); 3 ♀, Vien, 1877 (*Giraud*) (MNHN). **Germany (West)**: 1 ♀, Geierlambach, Heidebeere (*Haeselbarth*) (HC); 1 ♀, Ober-Bayern, Wessling, 12.viii.1975 (*Haeselbarth*) (HC); 2 ♀, Ruthe colln (BMNH). **Great Britain**: 4 ♀, same data as holotype (BMNH); 1 ♀, Hampshire, Awbridge, vii.1981 (*Vardy*) (BMNH); 1 ♂, Droxford (ex *Sorhagenia lophyrella*) 20.v.1977 (*Langmaid*) (RSM); 6 ♂, 4 ♀, Kent, Faversham (ex *Infurcitinea argentimaculella*) 9.vii.1977 (*Bradford*) (RSM); 18 ♂, 26 ♀, London, Bedford Park, vii.1929 (*Waterston*) (BMNH); 23 ♂, 3 ♀, same data except 'on leaves of *Tilia*' 7.vi.1925 (BMNH); 3 ♂, same data but no date (BMNH); 3 ♂, 9 ♀, London, Earls Court, 26.vi.1937 (*Nixon*) (BMNH); 1 ♀, Cambridgeshire, Monks Wood NNR, 17–29.vii.1978 (*Fitton & Noyes*) (BMNH); 2 ♀, Northamptonshire, Spratton, vii.1975 (*Gauld*) (BMNH). **Italy**: 4 ♂, 3 ♀, Ancona, ex *Ficus*, 1978 (*Cola & Freude*) (HC). **Netherlands**: 45 ♀, Wijster (Dr.), opposite Biol. Station, various dates, vii–viii (*van Achterberg*) (RNH). **Sweden**: 1 ♀, Skåne, Höö district, 22.vi.1938 (*Perkins*) (BMNH); 1 ♀, Skåne, Loderup, 22.vii.1938 (*Perkins*) (BMNH).

**HOSTS.** *Infurcitinea argentimaculella* (Stainton) (Lepidoptera: Tineidae) [larvae feeding in moss on wall]; *Sorhagenia lophyrella* (Douglas) (Lepidoptera: Momphidae).

**REMARKS.** This species is closely similar to *annularis* with which it has been generally confused in collections. The two species are not easy to distinguish and the only differences between them are summarised in the key. Waterston (1926: 174) misidentified this species as *annularis*.

### *Ascogaster klugii* (Nees von Esenbeck)

(Figs 27, 35)

*Sigalphus klugii* Nees von Esenbeck, 1816: 263. Syntypes, GERMANY (lost).

*Ascogaster ruficeps* Wesmael, 1835: 242. Holotype ♀, BELGIUM: Brussels, Wesmael collection (IRSNB) [examined]. [Synonymised by Hellén, 1953: 86.]

*Ascogaster neesii* Reinhard, 1867: 368. Syntype ♂, GERMANY (ZMB) [examined]. **Syn. n.**

Nees von Esenbeck's description of *klugii* applies equally well to both *ruficeps* and *gonocephala* save only that he makes no mention of the gross modifications of the head characteristic of the latter species. Nees von Esenbeck would certainly have mentioned so striking a feature had it been present in the species he was describing, and I therefore accept Hellén's synonymy of *ruficeps* with *klugii*. Wesmael stated that he had a single female of *ruficeps*. One specimen in Wesmael's collection bears his label 'Ascogaster ruficeps mihi ♀' and agrees precisely with his description of *ruficeps*. I accept it as the holotype, which, although in rather poor condition, is nonetheless clearly identifiable.

Two specimens (♂♀) in Reinhard's collection, named as *neesii*, are conspecific and agree with Reinhard's description. The locality data of the ♀ do not agree with those cited by Reinhard; the specimen is therefore not syntypic. The specimens assignable to *neesii* are all smaller than typical *klugii*, their eyes are relatively larger, temples shorter and more strongly contracted and the thorax flatter and more depressed. I consider these differences to be size-related and *neesii* therefore to be within the limits of variation of *klugii*.

♀. Antenna 27–29 segmented. Flagellum sometimes dilated, the medial segments broader than long, sometimes not dilated, the medial segments then longer than broad; strongly tapered, apical six or so segments much shorter and narrower than rest of flagellum, generally almost moniliform. Head broad, distinctly broader than mesonotum, more or less roundly contracted behind eyes. Temple slightly shorter than eye in dorsal view. Occiput strongly concave. Ocelli small, OO = 3.0–3.5 OD; not on line. Frons not strongly excavate. Face broad, at least twice as broad as high, slightly protuberant, medially distinctly rugose, the transverse element predominating; hair on face fine, inconspicuous, pointing upwards on upper half of face. Clypeus only weakly convex, narrow, about half as broad as face. densely rugose-punctate with a row of foveae just behind thickened apical border. Mandibles small, strongly twisted. Pronotum projecting in front of mesonotum, transverse striate dorsally, laterally largely reticulate-punctate with fine rugosity ventrally. Notaulices anteriorly indistinct foveolate, merging with the reticulate-punctate sculpture of mesonotum; posteriorly coalescing in a broad rugose, foveolate area; mesonotum reticulate-punctate. Precoxal suture narrow, rugose foveolate, rest of mesopleuron punctate. Propodeum rather depressed; strongly, irregularly reticulate-rugose, generally only a medial transverse carina distinct though sometimes weak medial longitudinal carinae visible, at least in part, only weak tubercles present laterally. Carapace elongate, oval, coarsely reticulate-rugose anteriorly, more finely reticulate-rugose posteriorly; rather flat in lateral view; posteroventral rim slightly in front of apex. Ovipositor slender; ovipositor sheaths long, slender. Hypopygium not long, produced medially to an apical point. Hind coxa smooth, punctate.

Colour black; antenna pale at base, generally yellow or testaceous, occasionally basal flagellar segments ivory; head varies from completely pale testaceous or yellow (except stemmaticum black) to completely black, except inner orbits pale-marked; pronotum in part and carapace anterolaterally yellow or testaceous. Legs completely pale yellow or testaceous except sometimes (in darker specimens) apex of hind tibia infusate and occasionally, hind leg completely brown.

♂. Same as ♀ except flagellum not dilated medially, not strongly tapered apically, the six apical segments not conspicuously shorter and narrower than preceding ones; carapace narrower.

#### MATERIAL EXAMINED

93 ♂, 124 ♀. Austria, Belgium, Bulgaria, Czechoslovakia, Finland, France, Germany, Great Britain, Sweden.

HOSTS. *Tubuliferola subochreella* (Doubleday) (Lepidoptera: Oecophoridae).

REMARKS. This species and *gonocephala* are closely similar in structure; the only differences are found in the head and are cited in the key. Extensive pale coloration of the head is found only in *klugii* and *gonocephala* in Palaearctic *Ascogaster*, thus both species are fairly easy to recognise. The colour of the head is very variable, however, and it is not infrequently largely black.

### The *bidentula*-group

Face punctate, hairs on upper part pointing downwards. Clypeus with one, two or three small, dentate tubercles or medially produced or emarginate.

Four of the eight species of this group are common and widespread; *albitarsus* is uncommon, *arisanica* is known from China and Japan and *perkinsi* and *longicornis* only from Japan. This is the most disparate group of species; *varipes*, *perkinsi* and *longicornis* could each be regarded as *species sola*. Indeed, *varipes* could also be regarded as transitional with the *quadridentata*-group.

### *Ascogaster albitarsus* Reinhard

(Fig. 48)

*Ascogaster albitarsus* Reinhard, 1867: 364. LECTOTYPE ♂, POLAND: Gdansk (ZMB), here designated [examined].

*Ascogaster leptopus* Thomson, 1874: 584. LECTOTYPE ♀, SWEDEN: Thomson colln (ZI), here designated [examined]. [Synonymised by Hellén, 1953: 86.]

The single male specimen named *albitarsus* in Reinhard's collection agrees precisely with Reinhard's description and is therefore accepted as a syntype and here designated lectotype.

Four specimens (3 ♂, 1 ♀) are in Thomson's collection above the name *leptopus*; they are conspecific and agree precisely with Thomson's description of that species. I here designate as

lectotype the female which Graham restricted as type – his decision was not validated by publication. I have no doubt that Hellén was correct to synonymise *leptopus* with *albitarsus*.

♀. Antenna long, 39 segmented. Flagellum tapered, medial segments about as long as broad, segments at apex much narrower, slightly longer than broad. Head not strongly contracted behind eyes. Temple slightly longer than eye in dorsal view. Occiput concave. Ocelli almost on line,  $OO = 2.5 OD$ . Frons weakly excavate; strongly striate-rugose. Face about 1.5 times as broad as high; weakly convex; reticulate-punctate with a weak median tubercle dorsally. Clypeus weakly protuberant; apical border produced medially and slightly reflexed forwards, occasionally with a weak indication of two tubercles; smooth, shining, densely punctate but not reticulate. Mandible long, moderately twisted. Pronotum not projecting strongly in front of mesonotum; finely, densely rugose laterally. Notaulices foveolate, coalescing posteriorly in a large reticulate-rugose area; rest of mesonotum densely reticulate-punctate. Precoxal suture broad, strongly reticulate-rugose anteriorly; narrow and rather weak posteriorly. Mesopleuron anterodorsally strongly rugose; rest of mesopleuron densely punctate. Propodeum short, broad, divided by a medial transverse carina into dorsal and posterior areas, dorsal area coarsely reticulate-rugose; posterolaterally with stout, blunt teeth, medially with two rather weak teeth. Carapace long, clavate, reaching its maximum breadth in posterior third; coarsely reticulate-rugose; posteroventral rim somewhat before apex. Hypopygium and ovipositor short. Hind coxa densely punctate.

Colour black; antenna testaceous in basal half; legs dark except apex of femur, tibia and tarsus of foreleg yellow, base of tibia and of tarsus of mid-leg, base of tibia and basal segment of tarsus of hind leg pale yellow or ivory.

♂. Same as ♀ except antenna longer, all flagellar segments distinctly longer than broad; fore and midlegs more or less light in colour, sometimes completely pale yellow.

#### MATERIAL EXAMINED

13 ♂, 3 ♀. **Ireland:** 1 ♂, S. Tipperary, Burnt Woods, 1.x.1947 (*Daltry*) (SC). **Poland:** lectotype ♂ of *albitarsus*. **Sweden:** 3 ♂, 1 ♀ (lectotype of *leptopus*), Thomson colln (ZI); 5 ♂, 1 ♀, Narke, Barsta, 11.ix.1931 (*Roman*) (NR); 1 ♂, Uppland, 23.viii. (*Roman*) (NR); 1 ♀, Varmso (NR); 2 ♂, data indcipherable (NR).

**HOSTS.** Unknown.

**REMARKS.** I have examined 3 ♂, 1 ♀ from Japan which differ from *albitarsus* in that the head is more rounded behind the eyes, the mesopleuron is less strongly and less extensively rugose, the carapace is smooth, punctate posteriorly and the light-coloured basal bands on hind tibia and tarsus are less distinct. These differences, too slight to warrant the description of a new species, are nevertheless enough to exclude these specimens from *albitarsus*, at least at present. The limits of variation given for *albitarsus* have, however, been based on the examination of so little material that they will probably require revision when more specimens are available for study.

### *Ascogaster arisanica* Sonan

(Figs 49, 52, 54)

*Ascogaster arisanicus* Sonan, 1932: 79. Holotype ♂, TAIWAN: Arisan, 2.v.1917 (*Shiraki & Sonan*) [not examined].

Reinhard synonymised *bidentula* with *rufipes* but I have retained them as separate species. Watanabe (1937: 77) synonymised *arisanica* with *rufipes*, following Reinhard's interpretation of the latter species. I have based my interpretation of *arisanica* on specimens named as *rufipes* by Watanabe; they are not, however, conspecific with *bidentula* (= *rufipes* sensu Reinhard) or with *rufipes* as I have interpreted it.

♀. Antenna long, 36–39 segmented. Flagellum dilated medially, moderately contracted at apex; all segments longer than broad but medial ones only slightly so. Head distinctly broader than mesonotum; often slightly expanded behind eyes; strongly rounded. Temple at least 1.5 times length of eye in dorsal view. Occiput strongly concave. Ocelli moderately large,  $OO = 3.0 OD$ ; almost on line. Face about 1.5 times as broad as high, evenly convex, densely punctate, sometimes reticulate-punctate, sometimes with weak rugosity medially. Clypeus evenly convex, about twice as broad as high, not distinctly divided from face; densely punctate, the punctures larger than those on face; apical border produced, with a distinct medial excision flanked by two tubercles. Mandible stout, weakly twisted, strongly striate-punctate at

base. Pronotum projecting strongly in front of mesonotum, with a strongly impressed Y-shaped groove dorsally; rugose laterally. Notaulices broad, shallow, rugose, coalescing posteriorly in a reticulate-rugose area. Mesonotum narrow; densely punctate, generally reticulate-punctate medially. Precoxal suture broad, shallow, reticulate-foveolate; rest of mesopleuron smooth, punctate except dorsally rugose. Propodeum rather long dorsally, divided medially by a weak, transverse carina which is raised into strong medial and lateral flanges; dorsally coarsely reticulate-rugose. Carapace elongate, distinctly longer than thorax and propodeum; generally broadest in distal half; posteroventral rim conspicuously in front of apex. Hypopygium and ovipositor short. Hind coxa smooth, punctate.

Colour black; antenna at base testaceous, palps pale yellow; legs testaceous except mid tibia and tarsus generally infusate apically, hind coxa infusate at base, hind femur, tibia and tarsus infusate at apex, hind tibia generally ivory in basal half, basal segment of hind tarsus ivory or pale yellow except sometimes at apex of segment. Hind coxa and femur sometimes almost completely black; in these darker specimens the legs are brown rather than testaceous and the mid coxa, femur and tibia are extensively black-marked.

♂. Same as ♀ except antenna shorter, 33–37 segmented; flagellum not dilated medially; head not expanded behind eyes; carapace narrower, less rounded, flatter.

#### MATERIAL EXAMINED

29 ♂, 40 ♀. Japan.

HOSTS. No reared material examined.

REMARKS. This species is structurally very close to *bidentula*, but it can be distinguished by the more massive head and the more elongate carapace.

### *Ascogaster bidentula* Wesmael

(Figs 50, 51, 53)

*Ascogaster bidentulus* Wesmael, 1835: 230. Holotype ♀, BELGIUM: 'Charleroy', Wesmael colln (IRSNB) [examined].

*Chelonus multiarticulatus* Ratzeburg, 1852: 25. Syntypes, GERMANY (lost). [Synonymised by Reinhard, 1867: 365.]

*Ascogaster gibbiscuta* Thomson, 1874: 586. LECTOTYPE ♀, SWEDEN: Skåne, 'F' (?) 14.viii., Thomson colln (ZI), here designated [examined]. **Syn. n.**

*Ascogaster fuscipennis* Thomson, 1892: 1718. LECTOTYPE ♀, SWEDEN: 'Hbg.' [= Helsingborg] Thomson colln (ZI), here designated [examined]. **Syn. n.**

*Ascogaster atamiensis* Ashmead, 1906: 191. Holotype ♀. JAPAN: 'Atami' (*Koebele*) (USNM) [examined]. **Syn. n.**

Wesmael (1835: 231) stated that he had only one female specimen when describing *bidentulus*. At present, two specimens in Wesmael's collection bear Wesmael's label '*Ascogaster bidentulus* mihi ♀'. One of these has obviously been misplaced, as it is a female of *rufidens*; the other agrees perfectly with Wesmael's description of *bidentulus* and is here accepted as the holotype.

Reinhard (1867: 365) regards *bidentula* and *rufipes* as conspecific, but this is rejected here (see *rufipes*). Reinhard, however, had correctly identified *bidentula* and placed *multiarticulatus* in synonymy with it after having examined Ratzeburg's original material. This synonymy is accepted here.

Thomson (1874: 586) did not state what material he possessed when describing *gibbiscuta*. In his collection there are six specimens so named (2 ♂, 4 ♀). The four females are conspecific and I designate as lectotype that which bears Thomson's labels 'gibbiscuta' and 'Skan' and a square red label 'type' added by Graham. I can find no structural difference between *gibbiscuta* and *bidentula*; although *gibbiscuta* is more extensively pale-marked than typical *bidentula* I consider this to be infraspecific.

The specimen in Thomson's collection which agrees with his description of *fuscipennis* and which was labelled as lectotype by Graham is here designated lectotype. The only significant structural difference between *fuscipennis* and *bidentula* is the form of the clypeus. In *fuscipennis* the apical border is produced medially but without the paired tubercles or the excision of *bidentula*. However, I have seen specimens in which the structure of the clypeus is intermediate – the tubercles are present but not divided by an excision. I therefore consider this characteristic to be variable in *bidentula* and so regard it and *fuscipennis* as conspecific.

♀. Antenna long, 33–36 segmented. Flagellum slightly dilated medially, contracted in apical third, medial segments about as long as broad, apical ones distinctly longer than broad. Head contracted behind eyes; more or less strongly rounded. Temple slightly longer than eye in dorsal view. Frons strongly rugose except sometimes medially smooth, punctate (particularly in small specimens). Occiput concave. Ocelli moderately large,  $OO = 3.0 OD$ , ocellar triangle obtuse, ocelli almost on line. Face about 1.5 times as broad as high, moderately convex with a small medial tubercle on upper half from which runs a weak carina which extends back to the lower part of frons; reticulate-punctate, pubescence very long, silvery. Tentorial pits minute with small but distinct tubercles dorsally. Clypeus weakly divided from face; not strongly protuberant, smooth, densely punctate; ventral border somewhat retracted but produced medially into two small but distinct dentate tubercles. Mandible moderately twisted. Pronotum projects in front of mesonotum; weakly rugose. Notaulices distinct foveolate, rest of mesonotum densely punctate except posteriorly reticulate-rugose where notaulices coalesce. Precoxal suture coarsely foveolate-rugose, most of mesopleuron dorsally strongly rugose (so that precoxal suture is often rather indistinct), ventrally smooth, punctate. Propodeum strongly rugose, divided by a strong medial transverse carina which is raised medially and laterally into strong dentate flanges. Carapace short, oval, broadest at mid point; coarsely, irregularly reticulate-rugose; posteroventral rim distinctly in front of apex. Hypopygium short. Ovipositor short, straight, thick at base, abruptly narrowed shortly before apex. Ovipositor sheaths short, strongly clavate at apex. Hind coxa smooth, punctate, sometimes reticulate-punctate dorsally but never strongly transversely rugose.

Colour black; proximal half of antenna testaceous, rest brown or brownish-testaceous; legs yellow except all coxae dark, at least in part, fore and mid femur slightly infusate, hind femur dark brown except at base, tibiae at least slightly infusate at apex, tarsi infusate except hind basitarsus pale yellow or ivory at base.

#### MATERIAL EXAMINED

162 ♂, 92 ♀. Belgium, Bulgaria, Finland, France, Germany, Great Britain, Ireland, Japan, Netherlands, Sweden.

HOSTS. *Epiblema roborana* (Denis & Schiffermüller), *Epinotia cruciana* (Linnaeus), *Pandemis* sp. (Lepidoptera: Tortricidae), *Eupithecia venosata* (Fabricius) (Lepidoptera: Geometridae).

REMARKS. I have examined 10 specimens (4 ♂, 6 ♀) in which the female antenna is longer (39–41 segmented), the facial sculpture slightly coarser and the legs more extensively yellow-marked than in typical specimens of *bidentula*. They are also slightly larger and the differences may thus be related to size.

### *Ascogaster consobrina* Curtis

(Figs 45–47)

*Ascogaster consobrina* Curtis, 1837: folio 672. Holotype ♂, GREAT BRITAIN: England (NMV) [examined].

Curtis did not state how many specimens he had before him when describing *consobrina*, but 1 ♂, 2 ♀ are in his collection above this name. The two females are not accepted as syntypes because they differ from Curtis' brief but precise description in several features. The male agrees exactly with Curtis' description and I accept this specimen as the holotype of *consobrina* as there is no indication that Curtis had more than one specimen of the species. The two females are conspecific and belong to *rufidens*; one was labelled 'type' by Nixon in 1948.

♀. Antenna long, 33–34 segmented. Flagellum slightly dilated medially, not strongly narrowed at apex, all segments longer than broad, generally distinctly so but sometimes medial segments only slightly longer than broad. Head not strongly contracted behind eyes. Temple distinctly longer than eye in dorsal view. Occiput deeply concave. Ocelli moderately large,  $OO = 3.0 OD$ ; almost on line. Eyes moderately protuberant. Malar space slightly less than twice basal breadth of mandible. Face about 1.5 times as broad as high, strongly projecting dorsally, rather straight in profile, reticulate-punctate, often with a few vertical rugae medially and with a strong medial carina running from upper part of face between antennal sockets. Clypeus raised medially; apical border not retracted, produced into a broad, blunt point with no impression or tubercle; slightly less densely punctate than face. Mandible twisted distally. Pronotum not projecting in front of mesonotum; finely, densely rugose laterally. Notaulices distinct, foveolate anteriorly, coalescing from about mid-point of mesonotum in a broad, reticulate-rugose area; rest of mesonotum punctate. Precoxal suture distinct, foveolate. Mesopleuron laterally finely rugose-punctate except general-

ly for a polished, largely impunctate area just dorsal to precoxal suture, ventrally always sparsely punctate, shining. Propodeum finely, irregularly rugose, transverse carina strongly raised into medial and lateral tubercles. Carapace rather elongate, clavate, widened in posterior third; anterolateral flange dentate, projecting distinctly beneath the rim of carapace; posteroventral rim only slightly in front of apex; finely reticulate-rugose. Hypopygium short. Ovipositor sheaths clavate. Hind coxa punctate, often weakly rugose dorsally.

Colour black; antenna at base and mandible brown; legs yellow except tarsi infusate, hind coxa black at base, generally hind femur and tibia infusate at apex.

♂. Same as ♀ except antenna 31–33 segmented, flagellum not dilated medially.

#### MATERIAL EXAMINED

63 ♂, 28 ♀. **Belgium, Czechoslovakia, France, Germany, Great Britain, Ireland, Japan, Netherlands, Sweden.**

HOSTS. No reared material examined.

### *Ascogaster longicornis* sp. n.

(Figs 41, 42)

♀. Antenna long, 47–50 segmented. Flagellum weakly dilated medially. Strongly narrowed at apex, medial segments about as long as broad, rest distinctly longer than broad. Head broad, rounded behind eyes, not strongly contracted. Temple slightly longer than eye in dorsal view. Occiput deeply concave. Ocelli in line, moderately large, OO = 3.5 OD. Eyes large, not protuberant. Malar space short, about one-third height of eye. Face about 1.3 times as broad as high, evenly convex, reticulate-punctate. A weak carina extends from a tubercle on the upper part of face to the frons; expanded into a blunt tubercle between antennae. Clypeus almost as broad as face; weakly convex, reticulate-punctate; apical border rounded except in medial quarter a weakly emarginate projection. Mandible large, slightly twisted. Pronotum projecting in front of mesonotum; dorsolaterally reticulate-foveolate. Notaulices foveolate; rest of mesonotum densely punctate except posteromedially reticulate-rugose. Precoxal suture not distinct because upper part of mesopleuron completely coarsely rugose, generally reticulate, ventral part smooth, punctate. Propodeum completely coarsely and evenly reticulate-rugose with prominent medial and lateral tubercles, the medial pair pyriform, the lateral ones blunt, dentate. Carapace oval in dorsal view, clavate in lateral view, posteroventral rim distinctly in front of apex; finely reticulate-rugose. Ovipositor short, straight, abruptly narrowed shortly before apex; ovipositor sheaths clavate. Hind coxa smooth, punctate; hind tibia incassate; hind tarsus slightly laterally compressed.

Colour black; palps ivory, mandibles and antenna brown except antenna at base testaceous; carapace at base yellow; foreleg yellow, tarsus infusate apically; midleg pale except femur sometimes, tibia and tarsus at apex infusate; hindleg dark except coxa (infusate only dorsally) and trochanter yellow. Mid and hind tibia with ivory band near base.

♂. Same as ♀ except that antenna longer but sometimes with slightly fewer segments; not dilated medially; all flagellar segments distinctly longer than broad; legs generally lighter in colour. In two of the males examined apical border of clypeus rufous.

#### MATERIAL EXAMINED

6 ♂, 7 ♀. Holotype ♀, **Japan**: Mt Tachibana, Fukuoka city, 22.ix.1979 (*Maetô*) (ELKU).

Paratypes. **Japan**: 1 ♂, same data as holotype; 1 ♀, same data except 14.vii.1979 (MC); 5 ♂, 3 ♀, Hiroshima Pref., Shobara, 23.viii.1976 (*Maetô*) (2 ♂, 2 ♀, BMNH; rest MC); 2 ♀, Fukuoka city, Minami Park, 19.v.1977 (*Maetô*) (BMNH; MC).

HOSTS. Unknown.

REMARKS. This species is perhaps most closely related to *bidentula*. *A. longicornis* is easily distinguished from all other Palaearctic species by its conspicuously long antennae and by the characteristics of its clypeus. It is a large (up to 7.0 mm) stout species though the males tend to be rather smaller on average.

### *Ascogaster perkinsi* sp. n.

(Figs 43, 44)

♀. Antenna long, 36–38 segmented. Flagellum weakly dilated medially, contracted apically, medial segments about as broad as long, rest distinctly longer than broad. Head contracted behind eyes. Temple

slightly longer than eye in dorsal view. Occiput deeply concave. Ocelli moderately large, OO = 3.0–3.5 OD, ocellar triangle obtuse but ocelli not on line. Frons with two depressed, polished impunctate areas behind antennae. Eyes moderately protuberant. Face about 1.5 times as wide as high, protuberant, evenly convex, reticulate-punctate, shining, with a medial tubercle from which a weak carina runs to anterior ocellus. Clypeus weakly divided from face, narrow, about half as broad as face; protuberant; shining, densely punctate, sometimes reticulate-punctate; apical border strongly impressed laterally, medial area raised and produced forwards into a distinct tooth. Mandible small, moderately twisted. Pronotum projecting in front of mesonotum, laterally reticulate-punctate dorsally with a deep pit medially. Notaulices weak, foveolate; rest of mesonotum reticulate-punctate. Precoxal suture foveolate; mesopleuron above precoxal suture reticulate-foveolate anteriorly, smooth, punctate posteriorly; mesopleuron ventrally densely punctate. Propodeum completely finely reticulate-rugose, divided medially by a transverse carina with medial and lateral tubercles, the medial pair of tubercles broad, stout and not strongly raised particularly in small specimens, the lateral pair more prominent, pyriform. Carapace short, oval in dorsal view, clavate in lateral view; posteroventral rim distinctly in front of apex. Hind coxa smooth, punctate. Hind tibia incrassate. Hind tarsus slightly laterally compressed, basal segment with a conspicuous flange ventrally which has a row of short bristles along its edge and a row of longer bristles at its base on each side.

Colour black; antenna at base, mandible and tegula testaceous; legs yellow except mid tibia dark at apex, hind femur and tibia dark at apex, mid and hind tarsi infusate; carapace yellow at base.

♂. Same as ♀ except antenna shorter, 32–34 segmented; flagellum not dilated medially; carapace less extensively pale-marked.

#### MATERIAL EXAMINED

27 ♂, 9 ♀. Holotype ♀, **Japan**: Mt Tachibana, Fukuoka City, 23.vi.1979 (*Maetō*) (ELKU).

Paratypes. **Japan**: 11 ♂, 2 ♀ same data as holotype (BMNH, MC); 3 ♂, same data except 18.vi.1978 (MC); 2 ♂, 4 ♀, Nagano Pref., Shimashima-dani, 1000–1300 m, 28.vii.1980 (*Takemoto*) (BMNH, MC); 5 ♂, Oiya Pref., Kuju, Bogazuru (*Maetō*) (MC); 2 ♂, 1 ♀, Kamikochi, 22–30.vii.1954 (*Townes*) (TC); 4 ♂, Mt Norikura, 2000 m, 30.vii.1954 (*Townes*) (TC).

HOSTS. Unknown.

REMARKS. This species is morphologically very similar to *dentifer* (q.v.). *A. perkinsi* is not closely related to any species in the *bidentula*-group and in the structure of its clypeus it shows affinities with the *quadridentata*-group. I dedicate this species to the memory of the late Dr J. F. Perkins, a gifted and generous former colleague.

### *Ascogaster rufidens* Wesmael

(Figs 37, 39, 40)

*Ascogaster rufidens* Wesmael, 1835: 231. Holotype ♀, BELGIUM: Charleroy, colln Wesmael (IRSNB) [examined].

*Chelonus rufipes* Herrich-Schäffer, 1838: 154. Syntypes, GERMANY (lost). [Junior secondary homonym of *rufipes* (Latreille, 1809); synonymised by Reinhard, 1867: 366.]

*Chelonus (Ascogaster) laevigator* Ratzeburg, 1852: 25. Syntypes, GERMANY (lost). [Synonymised by Reinhard, 1867: 365.]

Wesmael (1835: 233) stated that he had a single specimen of *rufidens*. One specimen in Wesmael's collection bears his label '*Ascogaster rufidens mihi* ♂' and agrees precisely with the description of that species except that the antennae are now more mutilated than originally stated. It is here accepted as holotype. Wesmael believed this specimen to be a male and so labelled it, but I consider it to be a female though the retraction of the genitalia beneath the carapace makes it difficult to discern the sex, particularly so as *rufidens* exhibits no sexual dimorphism.

Reinhard stated that he had examined Ratzeburg's original specimen of *laevigator* and he cited characters for *rufidens* which show that he had correctly identified that species. The above synonymy is therefore accepted.

Reinhard (1867: 366) placed *rufipes* Herrich-Schäffer in synonymy with *rufidens* although apparently without having seen the original material. Herrich-Schäffer's description and figure are entirely consistent with Reinhard's placement.

♀. Antenna long, 33–35 segmented. Flagellum not distinctly dilated medially, all segments at least as long as broad, generally longer than broad. Head contracted behind eyes but not strongly so. Temple about equal to eye in dorsal view. Occiput strongly concave. Ocelli small OO = 3 OD, ocellar triangle obtuse, ocelli almost on line. Eyes protuberant but not large. Malar space about half height of eye. Face not strongly protuberant, densely punctate, sometimes reticulate-punctate, densely hairy; a weak tubercle medially below antennal bases, generally with a weak carina extending back between the antennae, sometimes almost reaching anterior ocellus. Clypeus not protuberant, sculpture same as face; apical border convex, with medially three small dentate tubercles. Mandibles stout, only slightly twisted, ventral border reflexed, produced into a stout flange extending from mandibular articulation to base of ventral tooth. Pronotum transversely rugose dorsally with a distinct medial pit and a small raised triangular area of fine punctures immediately in front of mesonotum; lateral surface of pronotum punctate dorsally, rugose ventrally with a medial foveolate groove. Propleuron reticulate-punctate. Notaulices deep, foveolate. Mesoscutum broad, reticulate-punctate. Precoxal suture broad, anteriorly rugose-foveolate, posteriorly narrow foveolate; mesopleuron rugose dorsally, rest smooth punctate. Propodeum completely strongly reticulate-rugose, divided into dorsal and posterior surfaces by a medial transverse carina which is produced posterolaterally into two stout blunt crests. Carapace broad, rugose, sometimes with one or two faintly impressed lines in positions suggesting the suturiform articulation (such a condition was noted by Wesmael in his description of *rufidens* and is indeed visible in the holotype). Hypopygium short. Ovipositor sheaths short, widened apically where there is a brush of long hairs. Hind coxa smooth, punctate.

Colour black; antenna at base, mandibles, palps yellow or testaceous. Legs yellow except coxae black, at least in part, all tarsi infusate, hind femur and tibia infusate.

♂. Same as ♀.

#### MATERIAL EXAMINED

81 ♂, 41 ♀. Belgium, Czechoslovakia, France, Germany, Great Britain, Hungary, Ireland, Netherlands, Sweden.

HOSTS. *Croesia bergmanniana* (L.), *Pandemis cerasana* (Hübner), *Pandemis corylana* (Fabricius), *Pandemis heparana* (Denis & Schiffermüller) (Lepidoptera: Tortricidae). *Yponomeuta padella* (L.) (Lepidoptera: Yponomeutidae).

REMARKS. The unique clypeal armature of *rufidens* has ensured that it is one of the least misinterpreted species of *Ascogaster*. The characteristics of the mandibles, which appear to have been overlooked by previous workers, are also invaluable taxonomic discriminants. Evenhuis & Vlug (1983) have pointed out that the principal hosts of *rufidens* belong to the Tortricidae, Tortricinae which lay their eggs in batches. In contrast to this *quadridentata* attacks Tortricidae, Olethreutinae the females of which lay their eggs separately on the host plants.

### *Ascogaster varipes* Wesmael

(Fig. 38)

*Ascogaster varipes* Wesmael, 1835: 234. LECTOTYPE ♀, BELGIUM: Brussels, colln Wesmael (IRSNB), here designated [examined].

*Ascogaster cavifrons* Thomson, 1874: 585. LECTOTYPE ♀, SWEDEN: Skåne, Torekov, vii.1860 (*Thomson*) (ZI), here designated [examined]. **Syn. n.**

*Ascogaster sternalis* Thomson, 1874: 587. LECTOTYPE ♀, SWEDEN: Småland (Thomson) (ZI), here designated [examined]. [Synonymised by Telenga, 1941: 322.]

*Ascogaster jaroslawensis* Kokujev, 1895: 86. Holotype ♀, U.S.S.R.: 'Jaroslaw' (AS) [examined]. **Syn. n.**

Wesmael (1835: 235) stated that he possessed two males and six females of *varipes*. Two males and four females are present above this name in Wesmael's collection, each bearing Wesmael's label '*Ascogaster varipes mihi*'. They are conspecific and agree precisely with Wesmael's description of *varipes*. Wesmael assigned two of his series of six females to a 'var. 2'; these specimens are among the surviving syntypes and there is also a male labelled 'var. 1'. I designate as lectotype of *varipes* the better-preserved of the two females from the main syntypic series.

Thomson did not state how many specimens he had before him when describing *cavifrons*; at present six are in his collection above this name. One of these is a male of *abdominator* and cannot be a syntype of *cavifrons* because it does not agree with the original description;

Thomson's remarks upon *abdominator* show him to have been thoroughly familiar with that species. Of the five remaining specimens (2 ♂, 3 ♀) four are certainly conspecific and agree with Thomson's description of *cavifrons*, the fifth (♂) is in poor condition and is impossible to identify. I designate as lectotype the female bearing Thomson's labels 'Tkov., 7 '60' '♀' *cavifrons* m.' and a square red label 'Type' added by Graham. *A. cavifrons* comes well within the range of variation of *varipes*, agreeing closely with Wesmael's 'var. 2'.

Of the four specimens in Thomson's collection above the name *sternalis*, I designate as lectotype the best preserved specimen that was labelled as 'type' by Graham. The strongly raised acetabular carina used by Thomson to differentiate *sternalis* seems to me to be only of infraspecific value; apart from this characteristic, *sternalis* agrees with *varipes* in every particular and Telenga's synonymy is therefore accepted. The holotype ♀ of *jaroslawensis* has lost its head but I have no doubt that it is conspecific with *varipes*.

♀. Antenna long, 34–35 segmented. Flagellum dilated medially, strongly tapered to apex, most distal segments about as long as broad. Head rounded behind eyes, often expanded, particularly in larger specimens. Temple about 1.0–1.5 times length of eye in dorsal view. Occiput strongly concave. Ocelli in obtuse triangle but not on line, OO = 3.0–3.5 OD. Frons behind antennae excavate, the depressed area smooth with a weak medial carina which runs from between the antennae to just in front of the fore ocellus. Eyes not strongly protuberant. Genae generally convex in face view. Face protuberant, always distinctly and evenly convex, about twice as broad as high, generally reticulate-punctate but sometimes finely and regularly reticulate-rugose. Clypeus transversely convex dorsally, the ventral half transversely depressed, its border slightly reflexed without tooth or impression medially; reticulate-punctate. Mandible large, strongly twisted with a deep semicircular depression at base. Pronotum projecting slightly in front of mesonotum; rugose-punctate. Notaulices distinct, foveolate, rest of mesonotum punctate except posteriorly reticulate-rugose and ventrally punctate; precoxal suture not easily distinguished from rugosity on mesopleuron. Propodeum completely reticulate-rugose, divided by a medial carina which is expanded into prominent dentate flanges laterally and two broad low protuberances medially between which dorsal surface of propodeum weakly depressed, sometimes with a short, medial longitudinal carina. Carapace oval, generally rather deep distally, posteroventral rim distinctly in front of apex; reticulate-rugose at base, rugose-punctate apically. Hypopygium short. Ovipositor short, straight, abruptly narrowed shortly before apex; ovipositor sheaths short, clavate. Hind coxa strongly transversely rugose.

Colour black; carapace sometimes pale yellow at base, legs generally predominantly black, only femora at apex and tibiae yellow; hind tibia infuscate at apex, occasionally legs predominantly yellow with only apex of hind femur and apex of mid and hind tibiae and all tarsi dark.

♂. Same as ♀ except antenna not dilated medially; carapace only rarely pale-marked and then weakly and not in a distinct basal patch; legs often darker.

#### MATERIAL EXAMINED

165 ♂, 127 ♀. Austria, Belgium, Bulgaria, Czechoslovakia, France, Germany, Great Britain, Hungary, Netherlands, Sweden, U.S.S.R., Yugoslavia.

HOSTS. No reared material examined.

REMARKS. This species is readily recognisable by the semicircular depression at the base of the mandible and by the characteristics of its face and clypeus. The mandibular depression is best seen if the head is examined in anterolateral view under oblique illumination; it is often invisible in full anterior view. *A. varipes* is a conspicuously short, stout species with a short, deep, strongly rounded carapace; *reticulata* and *quadridentata* share this characteristic, however, and may thus be confused with *varipes*, particularly those specimens of the latter species which have rather rugose faces. Neither *reticulata* nor *quadridentata*, however, has a semicircular depression at the base of the mandible, *quadridentata* always has a medial tubercle on the clypeus, and *reticulata* has a smooth, punctate hind coxa.

#### The *quadridentata*-group

Face strongly, irregularly rugose, hair on upper part pointing downwards. Clypeus generally with medial dentate tubercle, occasionally with none but never with more than one.

The eight species of this group are all heavily sculptured, having the head and thorax more or less completely rugose. The dentate tubercle on the clypeus is absent in *armata* and *reticulata* and is

often weak in *scabricula*; these species are readily distinguished from all other Palaearctic species by the characteristics of the head and carapace, as cited in the key. The species of this group are generally widely distributed throughout the Palaearctic region – indeed *quadridentata* is known to be Holarctic – but *armata*, *canifrons* and *scabricula* are uncommon and *reticulata* is as yet known only from Japan and Czechoslovakia.

### *Ascogaster armata* Wesmael

(Figs 56, 57)

*Ascogaster armatus* Wesmael, 1835: 233. LECTOTYPE ♀, BELGIUM: Brussels, colln Wesmael (IRSNB), here designated [examined].

*Chelonus pulchellus* Curtis, 1829: 105 [Nomen nudum.]

*Ascogaster esenbeckii* Curtis, 1837: folio 672. LECTOTYPE ♀, GREAT BRITAIN: England, Glanvilles Wootton, vii, grass in meadows (NMV), here designated [examined]. [Replacement name for *pulchellus* Curtis, 1829.] **Syn. n.**

*Chelonus luteicornis* Herrich-Schäffer, 1838: 154. Syntypes, GERMANY (lost). [Synonymised by Reinhard 1867: 263.]

Wesmael (1835: 234) stated that he possessed three females and one male of *armata*. There are three females and two males in Wesmael's collection each bearing his label 'Ascogaster armatus mihi'; they are conspecific and agree precisely with the description of *armata*. I designate the best preserved female as lectotype and the other two females as paralectotypes. No doubt one of the two males is the male syntype referred to by Wesmael but it cannot be differentiated.

I have examined two specimens from Curtis's collection, one labelled 'pulchellus' and the other 'Type of *Ascogaster esenbeckii* Curtis det G. E. J. Nixon 1948'. These specimens are conspecific and agree precisely with Curtis' description; that labelled 'Type' by Nixon bears no data whereas the other specimen has a label with the data published by Curtis. I have therefore designated the latter specimen as lectotype of *esenbeckii*, and it comes well within the limits of variation of *armata*. Marshall (1885: 142) synonymised *esenbeckii* with *instabilis*, giving no reason for his action but probably basing it on Curtis' description. I have no doubt that this placement is incorrect.

It is quite clear from the descriptions of *luteicornis* and *annularis* that Herrich-Schäffer's figures of these two species were transposed. Thus figure 154.7 depicts *luteicornis* and 154.8 *annularis*. Reinhard (1867: 263) synonymised *luteicornis* and *armata* based on an examination of specimens sent to him as *luteicornis* by Herrich-Schäffer. It is clear from Reinhard's description that he had correctly identified *armata* and I therefore accept his synonymy.

♀. Antenna long, 36–39 segmented. Flagellum dilated medially, medial segments distinctly broader than long, apical five or six segments nearly moniliform; densely covered in short, thick adpressed bristles. Head subcubic, not strongly contracted behind eyes. Temple 1.5–2.0 times length of eye in dorsal view. Occiput strongly concave. Ocelli small, OO = 4 OD; ocellar triangle obtuse, ocelli almost on line. Frons behind antennae deeply excavate, generally smooth, shining and delimited laterally by a weak carina. A medial carina extends from upper part of face between antennae to anterior ocellus; grossly expanded between antennae into an erect triangular lamina. Eyes small. Malar space about half height of eye. Face protuberant, about twice as broad as high, strongly rugose, generally striate-rugose but sometimes reticulate medially with a weak tubercle medially at which point arises the interantennal carina. Clypeus protuberant though not strongly so, deeply divided from face; apical border convex, not protruding medially and without distinct tooth or tubercle; largely reticulate-punctate. Mandible stout, not twisted, densely punctate with long hairs. Pronotum projecting slightly in front of mesonotum; with a medial transverse groove dorsally, reticulate-rugose laterally; propleuron reticulate-rugose. Notaulices present but indistinct because mesonotum strongly rugose, posteriorly reticulate; medial lobe of mesoscutum often with a reticulate-punctate area anteriorly. Precoxal suture indistinct; mesopleuron completely reticulate-rugose except sometimes reticulate-punctate ventrally, but mesolcus rugose or reticulate. Propodeum strongly reticulate-rugose, divided into dorsal and posterior surfaces by a weak transverse carina which is produced posterolaterally into stout blunt teeth. Carapace long, rather narrow; finely reticulate-rugose, posteriorly rugulose-punctate. Ovipositor short, straight, abruptly tapered just before apex; ovipositor sheaths with apical brush of long hairs. Hind coxa transversely striate on dorsal and outer surface; hind tibia densely reticulate-punctate. Wings rather short, infumate.

Colour black, basal segments of antenna light in colour; fore tibia completely, mid and hind tibia at least partly and gaster proximally yellow.

♂. Same as ♀ except that flagellum not expanded medially, medial segments about as long as broad, gaster almost always completely black.

#### MATERIAL EXAMINED

13 ♂, 13 ♀. **Belgium:** 2 ♂, 3 ♀ (including lectotype), Wesmael colln (IRSNB). **France:** 2 ♂, St M. Vesubie, 27–29.vii.1950 (*Granger*) (MNHN); 1 ♀, Chavith; 30.vii.1882 (*de Gaulle*) (MNHN). **Great Britain:** 4 ♂, Stephen's colln (BMNH) 2 ♀, Curtis colln (lectotype & paralectotype of *Ascogaster esenbeckii*) (NMV); 1 ♀, Marshall colln (BMNH); 1 ♀, Hampshire, Portdown nr Portchester, 16.vii.1971 (*Else*) (BMNH); 1 ♂, Sussex, Hailsham marshes, 27.vii.1949 (*Ford*) (BMNH); 1 ♀, Surrey, Coulsdon, Happy Valley, 13.viii.1978 (*Noyes*) (BMNH); 1 ♀, Kent, Chattenden, 12.vii.1949 (*Ford*) (BMNH); 1 ♂, Buckinghamshire, Buttlers Hangings nr West Wycombe, 24.vii.1978 (*Shaw*) (RSM); 1 ♀, Leicestershire (*Matthews*) (BMNH); 1 ♂, Cardiganshire, Tresaith coll. vi.1979 [ex *Coleophora paripennella*] (*Simpson*) (RSM). **Hungary:** 1 ♀, Nagyvisnyo, 1–8.viii.1956 (*Mihalyi*) (HNHM); 1 ♂, Nemetbanyo Jager-volgy, 17.vii.1973 (*Papp*) (HNHM). **Italy:** 1 ♂, Campi, Riva s Garda, 550 m, 7.vii.1966 (*Haeselbarth*) (HC). **Netherlands:** 1 ♀, Bemelerberg Exc. St Petersburg, 20.vii.1950 (RNH).

**HOSTS.** *Coleophora hornigi* Toll [= *paripennella* auctt.] (Lepidoptera: Coleophoridae).

**REMARKS.** The massive head of this species together with its strongly excavate frons distinguish it from all other species of *Ascogaster*. The strong, dentate flange between the scapes is also a distinctive characteristic shared only by *dentifer* which is otherwise quite a different insect. *A. armata* has no medial tooth on the clypeus, a characteristic found otherwise only in *reticulata* and *scabricula* in the *quadridentata*-group.

### *Ascogaster brevicornis* Wesmael

(Fig. 67)

*Ascogaster brevicornis* Wesmael, 1835: 239. Syntypes, BELGIUM: Wesmael colln (IRSNB) [examined].

*Chelonus monilicornis* Herrich-Schäffer, 1838: 154. Syntypes, GERMANY (lost). [Synonymised by Reinhard, 1867: 367.]

Wesmael (1835: 240) stated that he had three males and one female of this species. Two males and two females in Wesmael's collection are labelled '*Ascogaster brevicornis mihi*' in Wesmael's handwriting; they are conspecific and agree with the original description. Clearly, however, there is a discrepancy between the sex of his specimens as given by Wesmael and that of the specimens which now stand above *brevicornis* in his collection. Thus there is doubt about the syntype status of the females and, as the characteristics which differentiate *brevicornis* are best exhibited by that sex, I have not designated a lectotype.

Reinhard placed *monilicornis* and *brevicornis* together in synonymy with *similis*. It is clear from Reinhard's description that he had correctly identified *brevicornis* and Herrich-Schäffer's description and figure of *monilicornis* support Reinhard's placement of these species. I do not, however, believe that *similis* and *brevicornis* are conspecific because the thorax and scutellum of *brevicornis* are always coarsely rugose whereas those of *similis* were described as finely and closely punctulate.

♀. Antenna short, 22–23 segmented. Flagellum slightly dilated medially, all segments considerably broader than long, preapical segments slightly broader than long, apical segment longer than broad, pointed, all segments in distal half of flagellum distinctly separated. Head roundly contracted behind eyes. Temple about equal in length to eye in dorsal view. Vertex strongly rugose, in part reticulate. Ocelli small, OO = 4 OD; ocellar triangle obtuse, the ocelli almost on line. Eyes fairly large but not protuberant. Face not strongly protuberant, about twice as broad as high, strongly rugose, generally reticulate-rugose medially with a small tubercle from which a weak carina extends back between antennae and ends at anterior ocellus. Clypeus not protuberant polished, punctate; apical border projecting slightly forwards, produced into a blunt tooth medially. Mandible not twisted, punctate at base. Pronotum dorsally with a deeply impressed foveolate transverse groove; laterally strongly rugose-reticulate. Propleuron reticulate-rugose. Notaulices deep, foveolate. Mesoscutum strongly rugose. Mesopleuron almost completely reticulate-rugose, precoxal suture therefore indistinct. Propodeum completely reticulate-rugose, divided by a

weak, transverse carina produced into medial and postero-lateral pairs of stout dentate crests. Carapace viewed dorsally widest at about mid-point, tapering evenly to apex; laterally angulate posteroventrally, the ventral rim reaching almost to apex; completely strongly reticulate-rugose. Ovipositor short. Ovipositor sheaths wide, polished, with a brush of long hairs apically. Hind coxa rugose on outer surface.

Colour black: antenna at base, fore tibia completely, mid and hind tibia at base yellow.

♂. Same as ♀ except that antennal segments longer, less distinctly separated; ventral rim of carapace not reaching apex.

#### MATERIAL EXAMINED

15 ♂, 29 ♀. **Belgium, Czechoslovakia, France, Germany, Great Britain, Hungary, Ireland, Netherlands, Switzerland.**

HOSTS. No reared material examined.

REMARKS. This species closely resembles *quadridentata*; the female of *brevicornis* is easily distinguished from *quadridentata* by its short, thick apically moniliform antenna. Further, the number of antennal segments (♂, ♀) is different in the two species; 21–23 segments in *brevicornis* and more than 30 in *quadridentata*. The carapace also differs; in *brevicornis* the ventral rim reaches almost to the apex, in *quadridentata* it is always distinctly before the apex. The shape of the carapace viewed dorsally is also generally rather different, that of *brevicornis* being much more distinctly tapered and less rounded than that of *quadridentata*. The shape of the carapace in the latter species, however, is rather variable.

#### *Ascogaster canifrons* Wesmael

(Figs 58, 59)

*Ascogaster canifrons* Wesmael, 1835: 236. LECTOTYPE ♀, BELGIUM: Liège (*Robert*) (IRSNB), here designated [examined].

*Ascogaster graniger* Thomson, 1892: 1791. LECTOTYPE ♀, SWEDEN: Skåne, Pålsjö (ZI), here designated [examined]. **Syn. n.**

Wesmael (1835: 237) stated that he possessed one female and one male of *canifrons*; two such specimens are in his collection above the name *canifrons*, both labelled '*Ascogaster canifrons mihi*'. They are conspecific and agree precisely with Wesmael's description; I consider them syntypes and designate the female as lectotype.

There are five specimens (2 ♂, 3 ♀) in Thomson's collection above the name *graniger*. The three females and one of the males are conspecific and agree with the original description; the second male mounted on the same pin below the first belongs to the *bidentula*-group. The lectotype is from Pålsjö (type-locality) and was selected and labelled as 'type' by Graham; it is well within the limits of variation of *canifrons*. One of the female specimens bears the labels 'L-d' (Lapland) and 'lapponicus' in Thomson's handwriting. At first sight, therefore, this specimen appears to be the holotype of *lapponica* but it disagrees with Thomson's description of that species in several respects. It has been pointed out by Huddleston (1980: 3) and Fitton (1982: 4) that species labels in Thomson's handwriting were not placed on the specimens by him and that the presence of such a label on a pin is not reliable evidence of the identity of the specimen.

♀. Antenna long, 39–40 segmented. Flagellum not dilated medially, strongly contracted distally, proximal and distal segments distinctly longer than broad, medial segments broader than long. Head large, strongly contracted behind eyes. Temple not rounded, slightly longer than eye in dorsal view. Occiput deeply concave. Ocelli small, OO = 3.0–3.5 OD, almost on line. Frons depressed behind antennae, strongly transversely rugose. Eyes not strongly protuberant. Face about 1.5 times as broad as high, moderately protuberant, completely rugose with a strong medial tubercle from which a weak carina extends back between the antennae to the anterior ocellus. Clypeus narrow, about half breadth of face; moderately protuberant, shallowly reticulate-punctate, apical border weakly convex with a distinct sharp tubercle medially. Mandible stout, not strongly twisted. Pronotum projecting slightly in front of mesonotum; rugose. Mesonotum completely densely rugose; notaulices not distinct. Mesopleuron completely coarsely reticulate-rugose; precoxal suture not distinct. Propodeum completely coarsely reticulate-rugose, not distinctly carinate but for a medial transverse carina which is expanded medially into two small blunt teeth and laterally into two larger ones. Carapace long, oval, densely and irregularly reticulate-rugose,

posteroventral rim slightly in front of apex. Hypopygium short. Ovipositor short, straight, abruptly narrowed shortly before apex; ovipositor sheaths short, broad, clavate with a copious tuft of hairs distally. Hind coxa distinctly rugose.

Colour black; mouthparts, antenna at base, foreleg (except coxa and tarsus infusate) and sometimes anterior third of carapace yellow; midleg yellow except coxa, femur at base, tibia at apex and tarsus infusate; hind leg dark except trochanter, trochantellus, base and apex of femur, base of tibia and sometimes tarsus in part yellow.

♂. Same as ♀ except antenna longer, medial flagellar segments as long as broad; carapace completely black, its posteroventral rim distinctly in front of apex.

#### MATERIAL EXAMINED

4 ♂, 11 ♀. **Belgium**: lectotype ♂ of *canifrons*. **Czechoslovakia**: 1 ♀, Trencin, Kostolna, 11.vii.1976 (*Lukas*) (LC); 1 ♂, Bohemia, K. Studenec, 18.vii.1955 (*Sedivy*) (CC). **Great Britain**: 1 ♀, Cambridgeshire, Abbots Ripton, Monks Wood NNR, 17–28.viii.1978 (*Fitton & Noyes*) (BMNH). **Ireland**: 2 ♀, Co. KD., Royal Canal, 3.viii.1949 & 15.vii.1950 (*Stelfox*) (SC); 1 ♂, same data except 30.vi.1950; 1 ♀, Co. KD, Landenstown, 20.viii.1941 (*Stelfox*) (SC); 1 ♀, Co. KD., Landenstown, 20.viii.1941 (*Stelfox*) (SC); 1 ♀ Co. WX., Killurin, 22.vii.1937 (*Stelfox*) (SC). **Mongolia**: 1 ♀, Central aimak, 11 km ESE. from Somon, Bajanzogt 1600–1700 m, 26.viii.1968 (*Kaszab*) (HNHM). **Sweden**: lectotype ♀ of *graniger*; 1 ♂, 2 ♀ (paralectotypes of *graniger*), Thomson coll.

**HOSTS.** *Endothenia quadrimaculana* (Haworth) (Lepidoptera: Tortricidae).

**REMARKS.** Papp (1967; 1971) has previously recorded this species from Mongolia. The long antenna and contracted temples and genae distinguish *canifrons* from all other species in the *quadridentata*-group. The strong transverse rugae on the frons are a striking feature of the species.

### *Ascogaster dispar* Fahringer

(Figs 70, 71, 73)

*Ascogaster dispar* Fahringer, 1934: 524. LECTOTYPE ♀, AUSTRIA: '13.v.12' (NM), here designated [examined].

*Ascogaster spinifer* Tobias, 1964: 185. Holotype ♂, U.S.S.R.: 9.vi.1958 (*Tobias*) (AS) [examined]. **Syn. n.** *Ascogaster koslovi* Tobias, 1972: 601. Holotype ♀, MONGOLIA: 3–4.vii.1968 (*Koslov*) (AS) [examined].

#### Syn. n.

There are four specimens (1 ♂, 3 ♀) above the name *dispar* in the NM collection bearing labels with dates from 13.v.1912 to 25.vi.1912 and the number 7–144; one also has a label bearing the host data cited by Fahringer and another a label '*Ascogaster dipsaris* m.' in Fahringer's handwriting. All these specimens are conspecific and agree precisely with Fahringer's description of *dispar* and I have no doubt that they are syntypes of that species. Fahringer obviously changed the specific epithet before publication.

The holotype of *spinifer* and that of *koslovi* are rather smaller than typical specimens of *dispar* but they are within the limits of variation of that species.

♀. Antenna 33–35 segmented. Flagellum slightly dilated medially, strongly tapered to apex; medial segments about as long as broad, following segments slightly longer than broad. Head broad, often slightly broader than mesonotum; slightly expanded then strongly contracted behind eyes. Temple always distinctly longer than eye in dorsal view. Occiput strongly concave. Frons moderately depressed, reticulate-rugose. Ocelli almost on line, OO = 3.5–4.0 OD. Face about twice as broad as high, weakly convex, completely finely rugose, medially slightly raised and more closely rugose. Clypeus weakly convex, smooth, punctate; apical border retracted except medially produced and with a dentate tubercle. Mandibles moderately twisted, stout, produced ventrally at base so that generally they project beneath the head capsule; strongly rugose-punctate with no flange beneath at the base. Pronotum projects distinctly in front of mesonotum; striate-rugose except laterally often a small central smooth, punctate area. Notaulices indistinct. Most of mesonotum strongly reticulate-rugose, often with small densely punctate areas laterally and anteriorly but sometimes transversely rugose anteriorly. Precoxal suture indistinct; mesopleuron laterally strongly reticulate-rugose, ventrally with smooth, punctate areas. Propodeum completely strongly reticulate-rugose; divided by a medial transverse carina which is strongly raised into a medial pair and a lateral pair of dentate flanges. Carapace elongate oval, generally strongly narrowed posteriorly in dorsal

view; slightly depressed and rounded in lateral view; posteroventral rim slightly in front of apex. Ovipositor short, straight. Ovipositor sheaths clavate. Hind coxa finely transversely striate.

Colour black; apex of femur, and tibia of foreleg, apex of femur of midleg testaceous.

♂. Same as ♀ except antenna longer, 33–36 segmented; flagellum not dilated medially, all segments distinctly longer than broad; propodeum rounded, the flanges generally much weaker; posteroventral rim of carapace distinctly more in front of apex.

#### MATERIAL EXAMINED

25 ♂, 21 ♀. Austria, Bulgaria, Czechoslovakia, France, Great Britain, Greece, Hungary, Iran, Mongolia, Switzerland, Turkey, U.S.S.R., Yugoslavia.

HOSTS. *Endothenia gentianaeanana* (Hübner) (Lepidoptera: Tortricidae).

REMARKS. The shape of the head is rather variable in this species; whereas in most specimens it is rather massive, expanded behind the eyes and strongly rounded, in smaller specimens it is not expanded behind the eyes, less strongly rounded, even weakly contracted. Thus some of the smaller specimens of *dispar* rather resemble *quadridentata*; in *dispar*, however, the mandible is always ventrally expanded at the base and never has a flange beneath, and in *quadridentata* the mandible is not expanded at the base and always has a small flange ventrally. Further, in *dispar* the clypeus is not distinctly differentiated from the face except by a change in sculpture; in *quadridentata* the clypeus is distinguishable from the face by a fold. The medial apical tooth of the clypeus is always long and pointed in *dispar*, less so in *quadridentata*.

### *Ascogaster quadridentata* Wesmael

(Figs 60, 62, 63, 64)

*Ascogaster quadridentata* Wesmael, 1835: 237. Lectotype ♀, BELGIUM: Brussels, colln Wesmael (IRSNB), designated by Shaw, (1984) [examined].

*Chelonus impressus* Herrich-Schäffer, 1838: 153. Syntypes, GERMANY (lost). [Synonymised by Reinhard, 1867: 367.]

*Ascogaster nigricornis* Thomson, 1892: 1719. LECTOTYPE ♀, SWEDEN: Thomson colln (ZI), here designated [examined]. **Syn. n.**

*Ascogaster cynipum* Thomson, 1892: 1720. Holotype ♂, SWEDEN: Thomson colln (ZI) [examined]. **Syn. n.**

*Ascogaster egregius* Kokujev, 1895: 83. Holotype ♂, U.S.S.R. (AS) [examined]. **Syn. n.**

*Chelonus nigrator* Szépligeti, 1896: 303. Holotype ♀, YUGOSLAVIA: Buccari, 16.viii.1889 (*Biró*) (HNHM) [examined]. **Syn. n.**

*Ascogaster epinotiae* Watanabe, 1937: 76. Holotype ♀, JAPAN: Hokkaido, Sapporo, 14.vii.1927 (*Uchida*) (UEI) [examined]. **Syn. n.**

Wesmael (1835: 239) described *quadridentata* from five males and two females. Seven specimens in his collection bear the label '*Ascogaster quadridentata mihi*', agree with the original description and are conspecific.

Reinhard examined Herrich-Schäffer's original material of *Chelonus impressus* and his placement of this species in synonymy with *quadridentata* is therefore accepted.

Three specimens (1 ♂, 2 ♀) are in Thomson's collection above the name *nigricornis*; they are probably conspecific but the male and one of the females are in poor condition and are not readily identifiable. I designate as lectotype the better-preserved female, labelled 'type' by Graham. It agrees precisely with Thomson's description and is within the limits of variation of *quadridentata*.

The holotype of *Chelonus nigrator* Szépligeti bears a label with the data cited in the description and is within the limits of variation of *quadridentata*. The holotype of *epinotiae* Watanabe is smaller than average for *quadridentata* but is within the limits of variation of that species.

One male in the collection of the AS, Leningrad agrees precisely with what Kokujev wrote about *egregius*, is labelled 'Asc. egregius m.' in Kokujev's handwriting and is here accepted as the holotype. It comes within the limits of variation of *quadridentata*.

♀. Antenna long, 29–33 segmented. Flagellum slightly dilated medially, weakly tapered to apex, medial flagellar segments at most slightly longer than broad, generally slightly broader than long. Head rounded

behind eyes. Temple contracted (more strongly so in smaller specimens); about equal in length to eye in dorsal view. Occiput moderately concave. Frons slightly excavate behind eyes, generally strongly rugose. Vertex rugose, sometimes reticulate-rugose. Ocelli on line,  $OO = 3.0-3.5 OD$ . Eyes fairly large, not protuberant. Malar space about half height of eye. Face protuberant, about twice as broad as high; finely irregularly rugose, occasionally almost reticulate, with a small medial tubercle on the upper part of face, a fine carina extending from this to the anterior ocellus. Clypeus about half breadth of face, not strongly protuberant; polished, punctate except sometimes rugose laterally; apical border produced medially to a point and often with a small but distinct dentate tubercle. Mandibles moderately twisted, always with a small dentate flange formed at the junction of hypostomal and genal carinae, projecting beneath the base of the mandible. Pronotum projecting slightly in front of mesonotum; strongly rugose-reticulate laterally. Notaulices rather indistinct, obscured by the strong reticulate-rugose sculpture of mesonotum though deep and easily seen under oblique illumination. Precoxal suture likewise obscured; mesopleuron completely coarsely reticulate-rugose except random small areas smooth, punctate. Propodeum coarsely regularly reticulate-rugose with a medial transverse carina raised into a medial pair and a lateral pair of prominent dentate flanges. Carapace oval, generally laterally compressed posteriorly so that it appears sharply pointed in dorsal view, sometimes the point is produced into a tubercle, particularly in specimens of smaller than average size, in larger specimens the apex is often rounded, not pointed in dorsal view; posteroventral rim distinctly in front of apex. In some specimens, particularly those of smaller than average size, the carapace narrower in dorsal view and flatter. Hind coxa always strongly transversely striate-rugose.

Colour black, antenna at base brown or testaceous, mandibles brown, base of femur and tibia of foreleg, base of tibia of midleg and base of tibia of hind leg testaceous. Sometimes legs more extensively testaceous, in the lightest specimens only hind coxa black and mid and hind legs only lightly infuscate in the areas which are normally dark. Occasional specimens have a small pale mark at base of carapace on its lateral border but it is always diffuse.

♂. Same as ♀ except antenna longer, flagellum not dilated medially, all flagellar segments longer than broad.

#### MATERIAL EXAMINED

130 ♂, 121 ♀. Belgium, Bulgaria, Czechoslovakia, France, Germany, Great Britain, Greece, Hungary, Italy, Japan, Netherlands, Sweden, Turkey, U.S.S.R., Yugoslavia.

HOSTS. *Cydia pomonella* (L.), *Cydia funebrana* (Treitschke), *Cydia pallifrontana* (Lienig & Zeller), *Epiblema uddmanniana* (L.), *Spilonota ocellana* (Denis & Schiffermüller) (Lepidoptera: Tortricidae). *Yponomeuta padella* (L.) (Lepidoptera: Yponomeutidae).

REMARKS. It has been common practice for any specimen of *Ascogaster* with prominent flanges on the propodeum to be identified as *quadridentata*; this characteristic, however, is possessed by many species in the *quadridentata*- and *bidentula*- groups so it is not a reliable means of discriminating *quadridentata*. *A. quadridentata* is a common and widespread Holarctic species, rather variable in colour, size and certain other characteristics, probably because of its many host species. The smaller specimens tend to be darker in colour, more slender-bodied, with a prominent apical tubercle on the carapace, more coarsely sculptured and with shorter temples; Watanabe (1937) described the small form of *quadridentata* as *epinotiae*. I am convinced that these differences are infraspecific, resulting from the small size. The characteristics cited above occur sporadically in otherwise typical *quadridentata* and in small specimens, one or more of the differentiating characteristics is often of the normal *quadridentata* form. There is therefore no combination of characteristics by which the small form can be maintained as a distinct species. Larger specimens are stouter in build, the carapace generally more rounded apically and the head relatively more massive; they bear a close resemblance to *scabricula*. *A. quadridentata* also has a superficial resemblance to *brevicornis* (q.v.).

#### *Ascogaster reticulata* Watanabe

(Figs 61, 65, 66)

*Ascogaster reticulatus* Watanabe, 1967: 41. Holotype ♂ [cited as ♀], JAPAN: Hokkaido, Asahigawa, 15.vi.1966 (*Kamijo*) (UEI), [examined].

Watanabe (1967: 42) confused the sexes of this species, describing the male as female and vice versa. The carapace of *reticulata* is very deep and the ventral opening short and it is therefore

difficult to examine the genitalia. Watanabe reasonably concluded that the specimens with the longer antennae were male, as is usual in Braconidae. In *reticulata*, however, as in several other species of *Ascogaster*, the converse is true.

♀. Antenna long, 35–38 segmented. Flagellum weakly dilated medially, tapered to apex, two or three of medial segments about as long as broad, rest distinctly longer than broad. Head strongly contracted behind eyes. Temple about as long as eye in dorsal view or slightly shorter. Occiput moderately concave. Ocelli large, OO = 2.5 OD; on line. Eyes moderately large. Malar space about half height of eye. Face about 1.5 times as broad as high, protuberant, coarsely irregularly rugose; a strong carina running from upper part of face between antennae to fore ocellus; ventral border of antennal scrobes produced, forming a flange which projects forwards and upwards from face. Clypeus not strongly protuberant, narrower than face; transversely depressed in apical half, strongly punctate, matt, apical border almost flat without any trace of tooth or tubercle. Mandible fairly stout, slightly twisted. Pronotum projecting slightly in front of mesonotum, coarsely irregularly rugose laterally. Notaulices indistinct, foveolate. Rest of mesonotum reticulate-rugose posteriorly and laterally; transversely rugose and foveolate anteromedially. Precoxal suture indistinct among strong reticulate-rugose sculpture of mesopleuron, ventrally mesopleuron generally punctate. Propodeum completely coarsely reticulate-rugose, divided by a medial transverse carina which is raised medially and laterally into prominent dentate flanges. Carapace short, deep; posteroventral rim conspicuously in front of apex so that ventral opening is only slightly more than two-thirds total length of carapace. Hind coxa smooth punctate; basitarsus of hindleg with a ventral longitudinal keel bearing a row of short, stout bristles on its edge and with a row of long, erect bristles on either side.

Colour black; antenna at base, mandible, palps testaceous; foreleg testaceous except tarsus infusate, midleg testaceous except tibia at apex and tarsus infusate, hindleg testaceous except base of coxa, apex of femur, tibia and tarsus more or less heavily infusate but tibia with an ivory or pale yellow medial band.

♂. Same as ♀ except antenna shorter, 32–34 segmented, flagellum barely dilated medially and weakly tapered to apex.

#### MATERIAL EXAMINED

7 ♂, 6 ♀. **Czechoslovakia**: 4 ♂, 4 ♀, Banská Štiavnica (*Čapek*) (CC; BMNH); 1 ♂, Klák, 1959 (*Čapek*) (CC); 1 ♀, Kajlovka, 1962 (*Čapek*) (CC). **Japan**: holotype ♂; 1 ♂, 1 ♀ (paratypes), same data as holotype.

**HOSTS.** *Adoxophyes orana* (Fischer von Röslerstamm), *Archips issikii* Kodama, *Archips oporana* (L.), *Archips pulchra* (Butler) (Lepidoptera: Tortricidae).

**REMARKS.** The exceptionally short, deep carapace of this species is most distinctive and is only likely to be confused with that of *varipes* from which *reticulata* is easily distinguished by its strongly, irregularly rugose face and smooth, punctate hind coxae.

I have examined one specimen from Korea (Yeson (*Paik*) (RNH)), reared from an apple leafroller (probably *Adoxophes orana*), that is probably conspecific with *reticulata* although it has a coarsely reticulate-rugose face, the carapace yellow at the base and the legs lighter in colour.

### *Ascogaster rufipes* (Latreille)

(Figs 69, 77–79)

*Sigalphus rufipes* Latreille, 1809: 14. Syntypes, FRANCE (lost).

*Sigalphus elegans* Nees von Esenbeck, 1816: 264. Type-material, GERMANY (lost). [Synonymised by Thomson, 1892: 1716.]

*Chelonus fasciatus* Dahlbom, 1833: 163. LECTOTYPE ♀, SWEDEN (ZI), here designated [examined]. [Synonymised by Thomson, 1874: 583.]

*Ascogaster ratzeburgii* Marshall, 1885: 146. Holotype ♂, GREAT BRITAIN: Norfolk, Brundall, 3.vii.1881 (*Bridgman*) (NCM) [examined]. **Syn. n.**

*Ascogaster soror* Telenga, 1941: 324. Lectotype ♂, U.S.S.R.: 'Sinelnikovo', vi.1930 (AS) [examined]. [Lectotype selected by Tobias.] **Syn. n.**

I have not been able to locate Latreille's specimens of *rufipes* and the description of the species is insufficient for it to be identified with certainty. Several interpretations of the name have been used and this has led to some confusion. Thomson's (1892: 1716) remarks upon *rufipes* cleared away some of the confusion, showing that Nees von Esenbeck's interpretation of *rufipes* was

incorrect. Thomson put forward his own interpretation of *rufipes* and so tactfully rejected that of Reinhard (1867: 365) who regarded *rufipes* and *bidentula* as conspecific. It is clear from his description that he had identified Wesmael's species correctly, but I cannot accept that *bidentula* fits Latreille's description of *rufipes* and so reject Reinhard's interpretation and follow Thomson's. Nees von Esenbeck's description of *elegans* fits perfectly well with Thomson's interpretation of *rufipes*.

Four specimens are named *fasciatus* in the Fallén collection. Two are conspecific and one bears a label 'C. fasciatus Dbm var a' in Dahlbom's handwriting; I designate this specimen as lectotype. The third specimen bearing a small label 'var b' in Dahlbom's handwriting belongs to *varipes* and the fourth bearing the label 'var c' in Dahlbom's handwriting is a male *abdominator*.

The holotype of *ratzeburgii* comes well within the limits of variation of *rufipes*. The lectotype of *soror* has three labels, one bearing the data published by Telenga, a second in Telenga's handwriting, 'Ascogaster soror sp.n. ♂' and a third bearing Tobias' lectotype designation (though I have not been able to find where, or whether this was published); *soror* comes well within the limits of variation of *rufipes*.

♀. Antenna 34–37 segmented. Flagellum generally slightly broader medially than at base, then tapering to apex, most segments longer than broad, a few medial segments about as long as broad. Head slightly expanded behind eyes, then roundly contracted. Temple about 1.5 times length of eye in dorsal view. Occiput strongly concave. Frons behind antennae excavate. Ocelli small, OO = 3.5 OD; ocellar triangle obtuse, ocelli almost on line. Weak carina extends from upper part of face to fore ocellus. Eyes not protuberant. Genae in face view rounded. Face protuberant, about twice as broad as high, reticulate-rugose. Clypeus weakly protuberant; smooth, punctate; apical border produced medially into a large dentate tubercle. Mandibles short, stout, moderately twisted. Pronotum projecting distinctly in front of mesonotum, laterally completely rugose except for a polished medial area. Mesonotum almost completely strongly reticulate-rugose except sometimes a small punctate area laterally. Notaulices indistinguishable. Precoxal suture indistinguishable, almost all mesopleuron strongly reticulate-foveolate. Propodeum completely regularly reticulate-rugose, divided by a medial transverse carina which is raised into strong flanges laterally and weak ones medially; dorsal surface rather long. Carapace rather long and narrow, coarsely reticulate-rugose, the longitudinal element predominant, especially anteriorly; posteroventral rim not reaching apex of carapace. Hypopygium short. Ovipositor short, straight, abruptly narrowed shortly before apex. Ovipositor sheaths thick. Hind coxa polished, punctate, with fine transverse rugae dorsally.

Colour black, apical border of clypeus often rufous, mandibles at base testaceous; carapace at base yellow for slightly more than a third of its length; legs yellow or testaceous except all tarsi generally infusate, at least in part, hind coxa at base and mid and hind tibiae often also infusate.

♂. Same as ♀ except antenna 32–35 segmented; carapace longer, narrower, always completely dark; legs generally darker.

#### MATERIAL EXAMINED

91 ♂, 39 ♀. Czechoslovakia, France, Great Britain, Hungary, Ireland, Netherlands, Spain, Sweden, U.S.S.R., Yugoslavia.

HOSTS. No reared material examined.

REMARKS. Smaller and more delicate than most other species in the *quadridentata*-group; only *brevicornis* and the smaller specimens of *quadridentata* are of comparable size. *A. rufipes* also exhibits more sexual dimorphism than others in the *quadridentata*-group; it was Marshall's failure to appreciate this which led him to describe the male of *rufipes* as a distinct species even though he collected it with the female (for which he used the name *elegans*).

#### *Ascogaster scabricula* (Dahlbom)

(Figs 68, 71, 74–76)

*Chelonus scabriculus* Dahlbom, 1833: 166. LECTOTYPE ♀, SWEDEN: Fallén colln (ZI), here designated [examined].

*Ascogaster limitatus* Wesmael, 1838: 163. LECTOTYPE ♀, BELGIUM: Wesmael colln (IRSNB), here designated [examined]. **Syn. n.**

*Ascogaster clypealis* Thomson, 1892: 1719. LECTOTYPE ♀, SWEDEN: Öland, Thomson colln (ZI), here designated [examined]. **Syn. n.**

Four specimens in Fallén's collection are named *scabriculus*; I designate as lectotype the specimen labelled 'C. scabriculus Dbm. var. a' in Dahlbom's handwriting. It agrees with Dahlbom's description of 'scabriculus var. a' and is labelled '♂' although I believe it to be ♀. The other three specimens belong each to a different species; the only one which bears a label in Dahlbom's handwriting 'var. c' belongs to *rufidens*. Fahringer (1934: 544) synonymised *scabricula* with *similis* which, from his description he obviously interpreted as being conspecific with *brevicornis*; I reject this placement of *scabricula*. Wesmael (1838: 164) stated that he had examined two specimens of *limitatus*. In Wesmael's collection there is one specimen labelled 'Ascogaster limitatus mihi'; it agrees precisely with Wesmael's description and I accept it as a syntype. Wesmael gave the number of antennal segments as 33; in the material I have examined the number ranges from 30–32.

Three females (one without a head) are above the name *clypealis* in Thomson's collection; they are conspecific and agree with the original description. I designate as lectotype the best-preserved female, which Graham labelled as type despite the presence on the pin of a label '4-dentatus' in Thomson's handwriting; the significance of such labels is discussed under *canifrons*.

♀. Antenna 30–32 segmented. Flagellum dilated medially, tapered to end, most segments in distal half quadrate, in proximal half longer than broad (only three or four at base as much as twice as long as broad). Head rounded, more or less expanded behind eyes. Temple about 1.5 times length of eye in dorsal view. Occiput strongly concave. Ocelli small, OO = 3.5 OD; almost on line. Frons behind antennae slightly excavate, strongly rugose. Eyes small, not protuberant. Face protuberant, about twice as broad as high, completely regularly reticulate-rugose, divided from clypeus by a deep furrow. Anterior tentorial pits deep. Clypeus protuberant, polished, densely punctate, but with some rugae laterally; apical border produced medially with no distinct tubercle. Mandible moderately twisted, densely punctate at base. Genal carina joining hypostomal carina at base of mandible, forming a small flange which projects beneath base of mandible. Pronotum projecting but little in front of mesonotum, completely coarsely rugose. Mesonotum broad, almost completely rugose, the notaulices more or less indistinguishable. Mesopleuron completely coarsely reticulate-rugose, precoxal suture indistinguishable. Propodeum divided into dorsal and posterior surfaces by a weak medial transverse carina which is raised into two low broad humps medially and into two strong flanges laterally; completely, regularly reticulate-rugose with no distinct carinae. Carapace rounded, about 1.5 times as long as broad, deep; posteroventral rim not significantly in front of apex. Hypopygium short. Ovipositor short, straight, thick at base, abruptly narrowed shortly before apex. Hind coxa punctate except dorsally transversely striate.

Colour black, fore tibia pale, at least in part.

♂. Same as ♀ except posteroventral rim of carapace distinctly before apex; head more strongly contracted.

#### MATERIAL EXAMINED

5 ♂, 12 ♀. **Belgium:** 1 ♀ (lectotype of *limitatus*). **France:** 3 ♂, Lent, Ain (*Audras*) (MNHN); 1 ♂, Megere, vi.1948 (*Granger*) (MNHN); 1 ♂, 'env. Paris', 20.vi.1889 (*Chrétien*) (MNHN); 1 ♀, Chartrettes, 21.vi.1942 (MNHN); 1 ♀, Drôme, Chap-en-Vercors, vii.1938 (MNHN); 1 ♀, St. M-Vésubie, 27.vii.1950 (*Granger*) (MNHN); 1 ♀, Le Vésinet, 1867 (*Sichel*) (MNHN). **Sweden:** 3 ♀, Solna, Bergshamra, viii.1976 (*Quinlan & Huddleston*) (BMNH); 1 ♀ (lectotype of *scabricula*) (ZI); 1 ♀ (lectotype of *clypealis*) (ZI); 2 ♀ (paralectotypes of *clypealis*), Thomson colln (ZI).

HOSTS. No reared material examined.

#### Species inquirendae

##### *Ascogaster atriceps* (Ratzeburg)

*Chelonus atriceps* Ratzeburg, 1844: 33. ?Syntype, GERMANY (IP) [examined].

The purported syntype of *C. atriceps* is in too poor condition to be identified.

***Ascogaster contractus* (Ratzeburg)**

*Chelonus contractus* Ratzeburg, 1848: 24. Syntypes, GERMANY (lost).

***Ascogaster dentiventris* Telenga**

*Ascogaster dentiventris* Telenga, 1941: 311. Syntypes, U.S.S.R. (lost).

***Ascogaster erythrothorax* Marshall**

*Chelonus erythrothorax* Marshall, 1898: 171. Syntypes, FRANCE (lost).

***Ascogaster kabystanicus* Tobias**

*Ascogaster kabystanicus* Tobias, 1976: 235. Holotype ♂, U.S.S.R.: Azerbaidzhan, 19.v.1972 (*Kasparyan*) (AS) [examined].

This species belongs to the *caucasica*-group in which the males are extremely difficult to differentiate.

***Ascogaster lapponicus* Thomson**

*Ascogaster lapponicus* Thomson, 1874: 588. Syntypes, SWEDEN (lost).

***Ascogaster pallidicornis* Curtis**

*Ascogaster pallidicornis* Curtis, 1837: folio 672. Syntypes, GREAT BRITAIN (lost).

One specimen named *pallidicornis* in Curtis's collection disagrees in most particulars with the original description and cannot therefore be a syntype.

***Ascogaster quadridens* (Herrich-Schäffer)**

*Chelonus quadridens* Herrich-Schäffer, 1838: 154. Syntypes, GERMANY (lost).

This species has been placed in synonymy with *quadridentata* but the latter never has pale marks at the base of the carapace as described for *quadridens*.

***Ascogaster rubripes* (Lucas)**

*Chelonus rubripes* Lucas, 1849: 339. Syntypes, ALGERIA (lost).

***Ascogaster similis* (Nees von Esenbeck)**

*Chelonus similis* Nees von Esenbeck, 1816: 262. Syntypes, GERMANY (lost).

***Ascogaster tersus* Reinhard**

*Ascogaster tersus* Reinhard, 1865: 366. Syntypes, GERMANY (lost).

One specimen named *tersus* in Reinhard's collection disagrees with the original description and cannot therefore be a syntype.

**Excluded species*****Phanerotoma maculata* (Wollaston) comb. n.**

*Ascogaster maculata* Wollaston, 1858: 24. Holotype ♀, MADEIRA (BMNH) [examined].

**Acknowledgements**

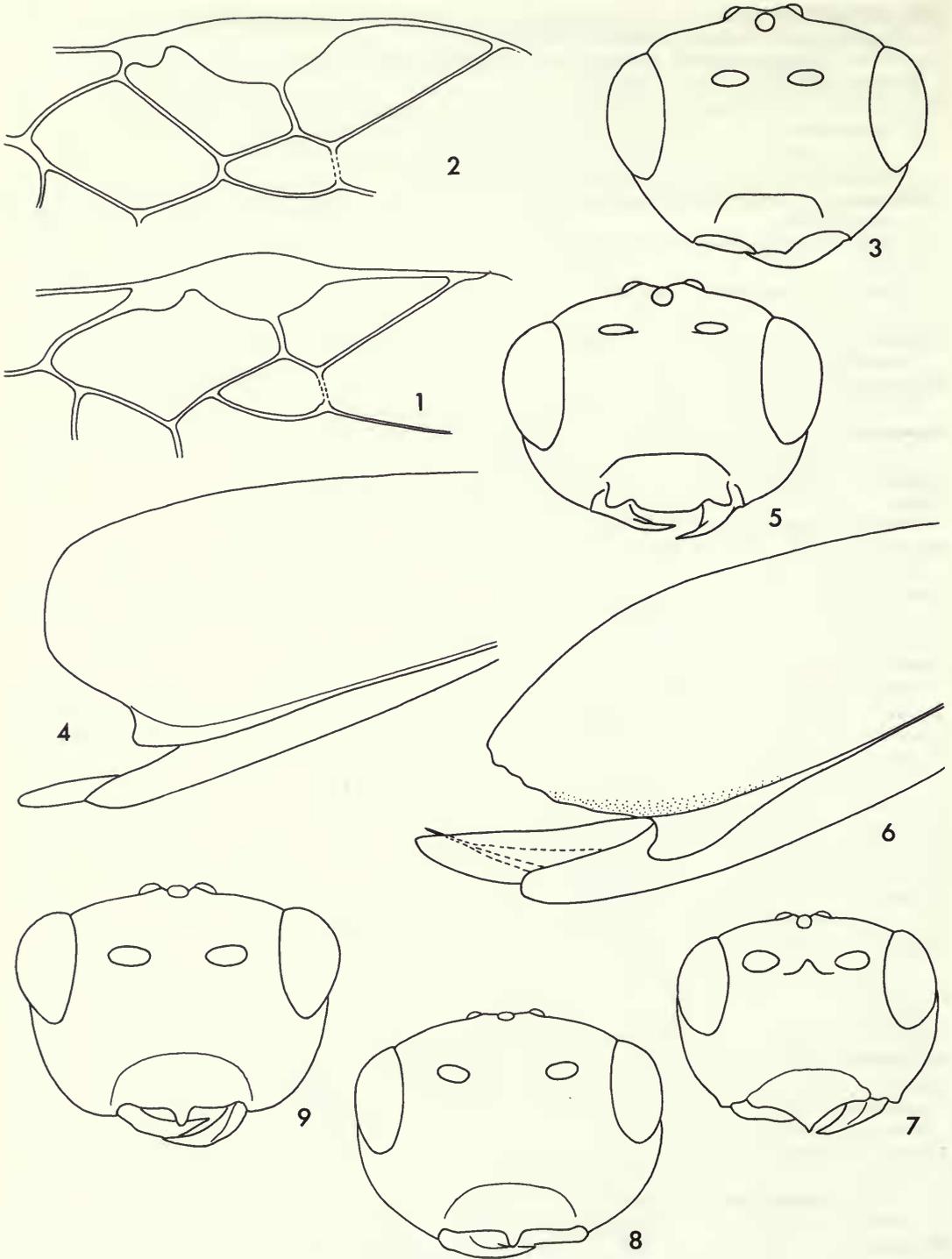
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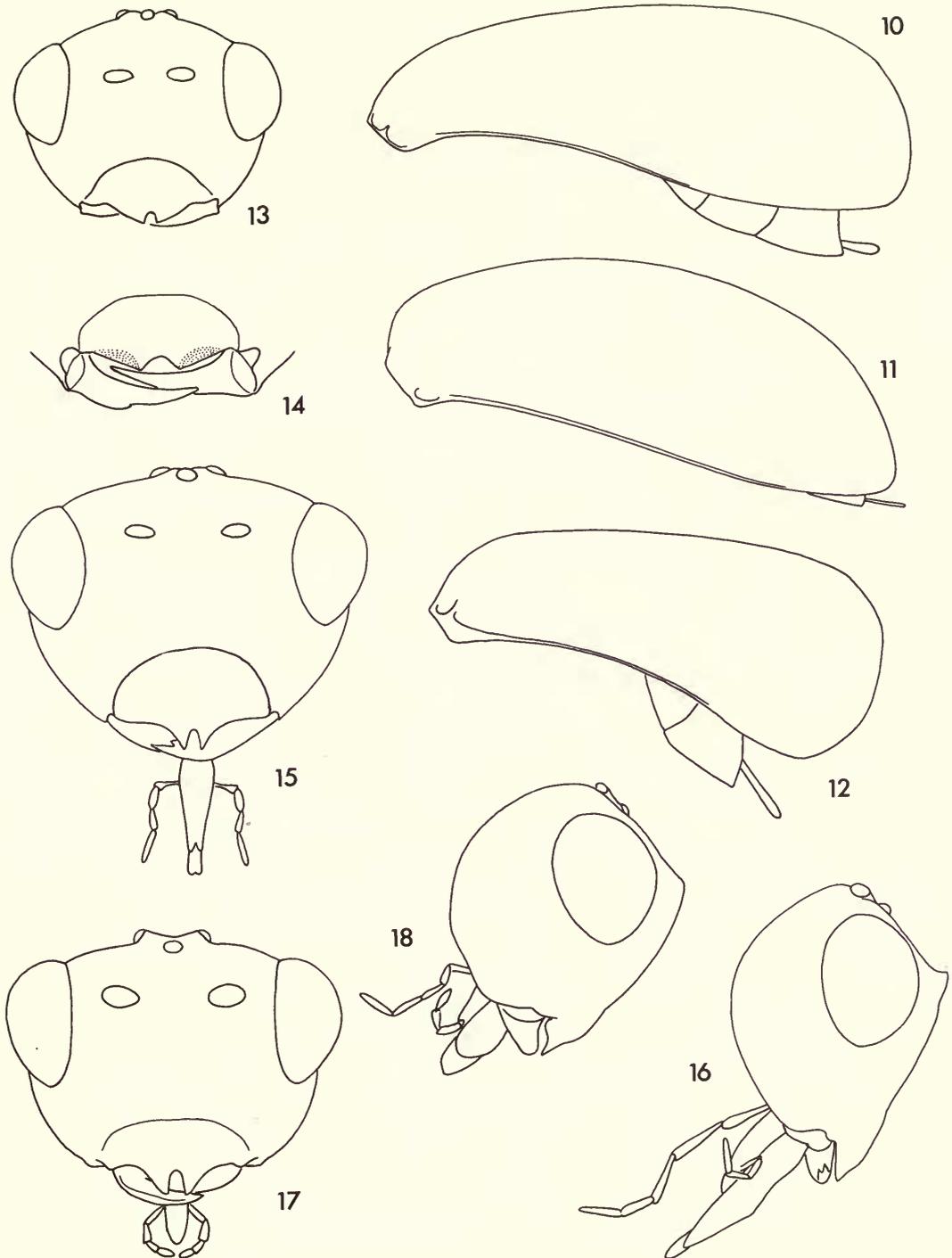
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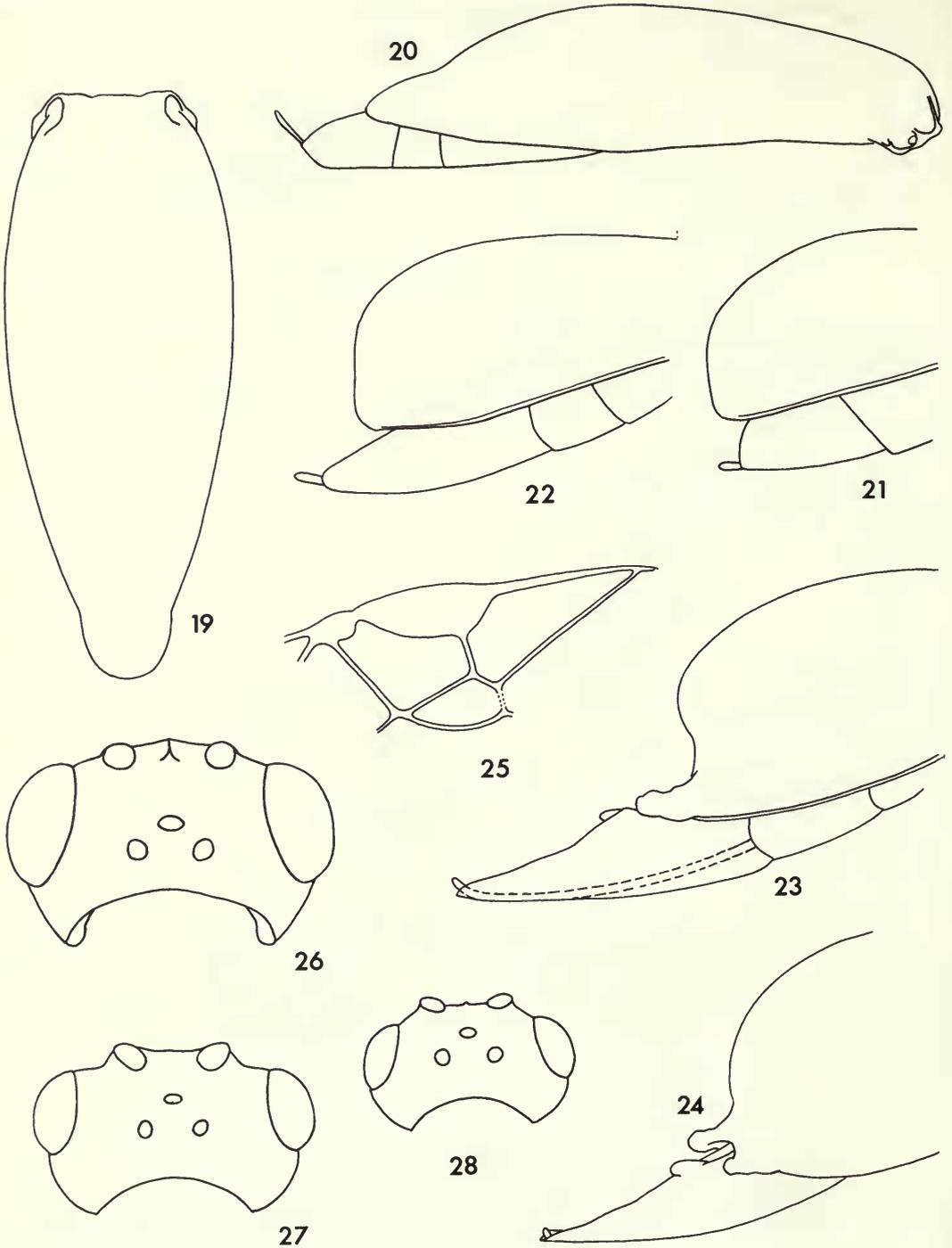
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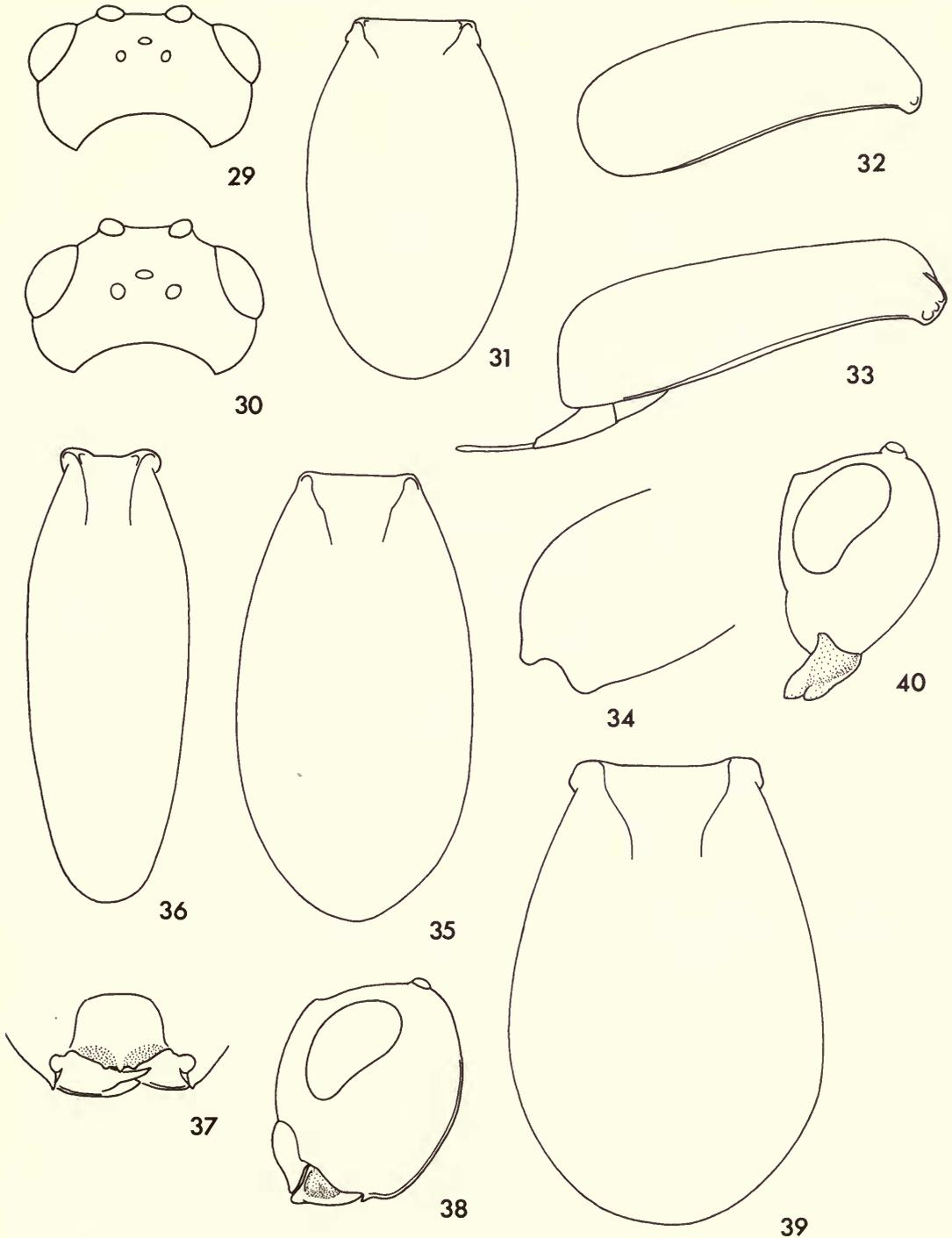
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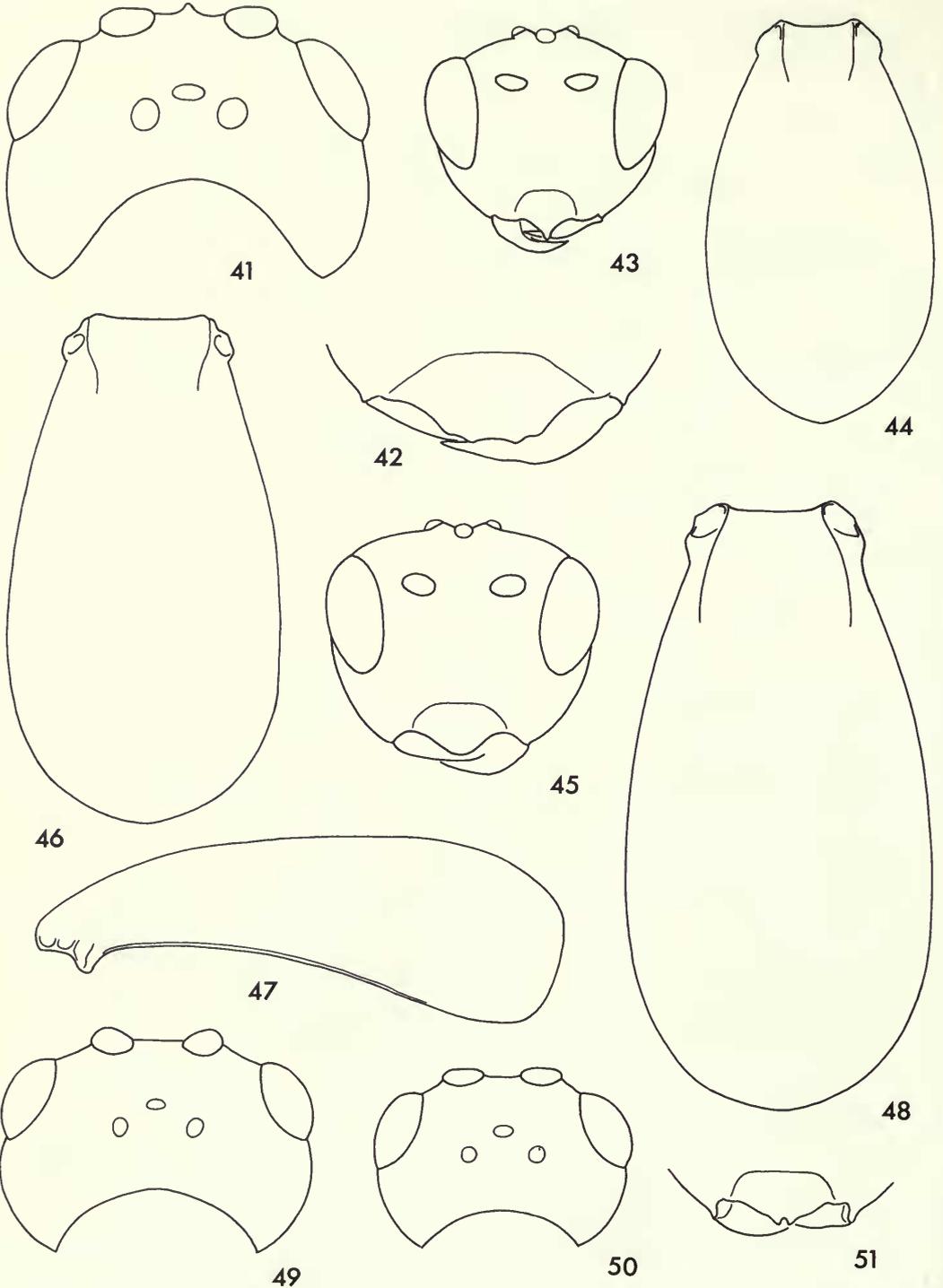
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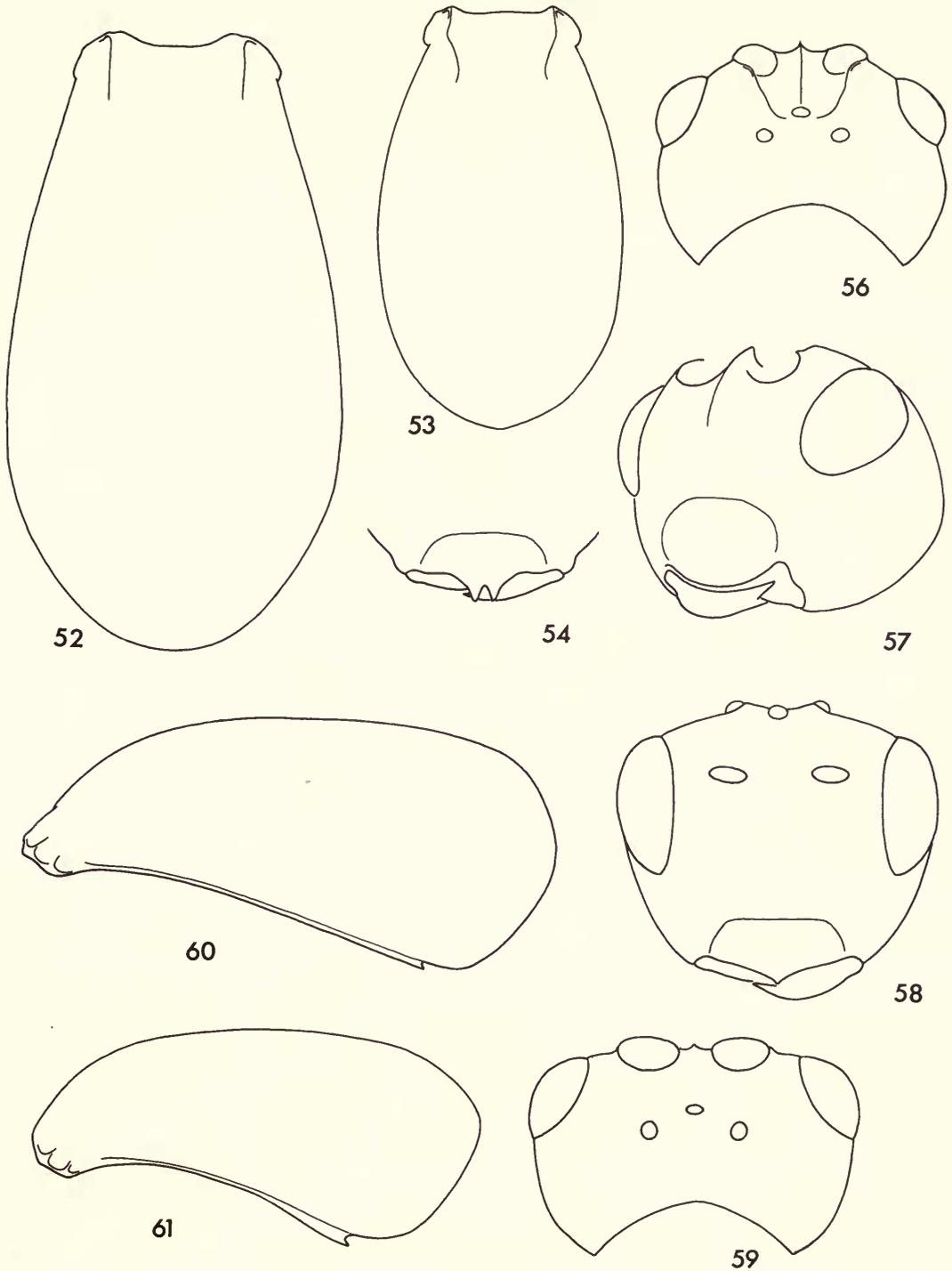
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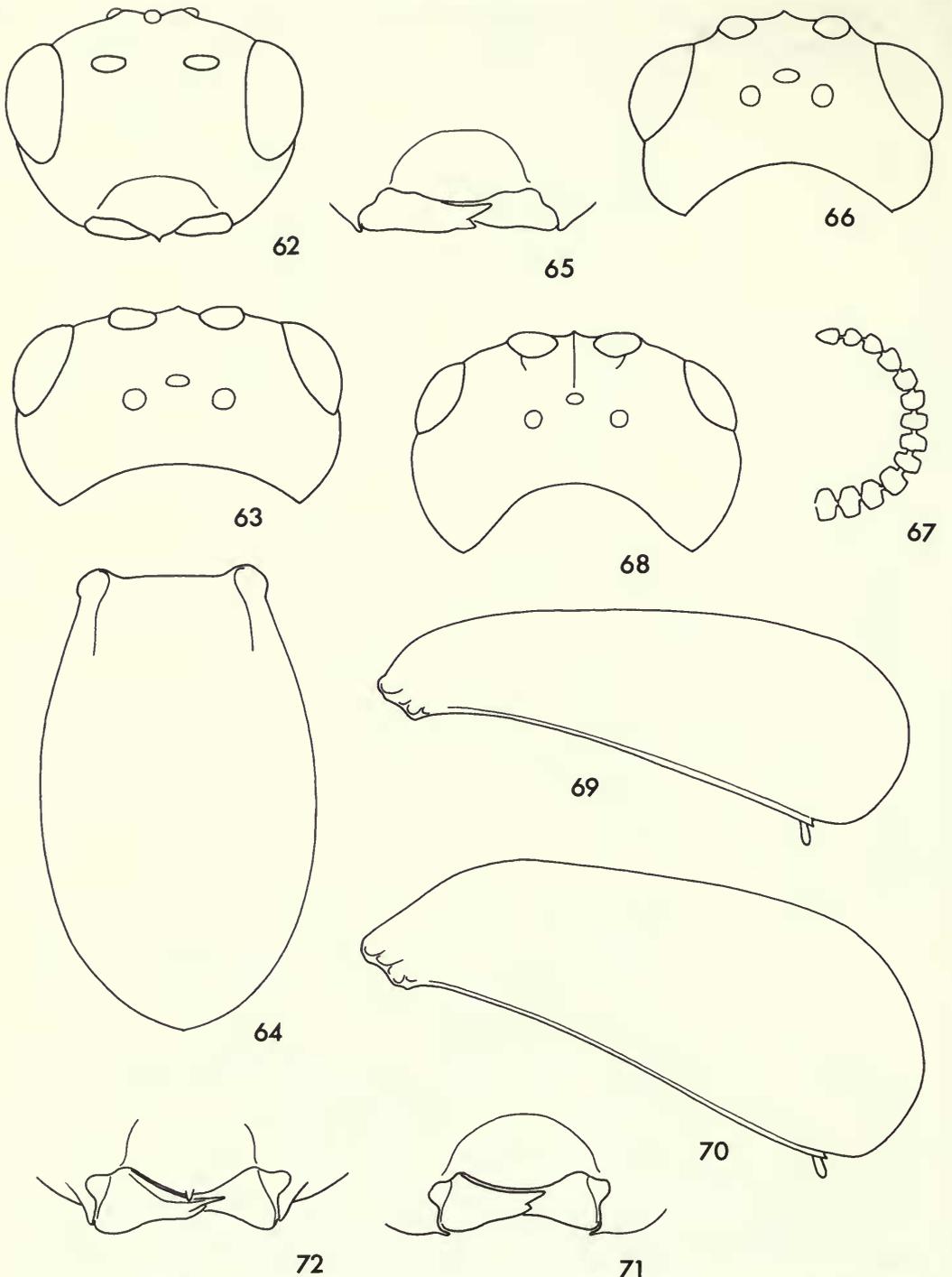
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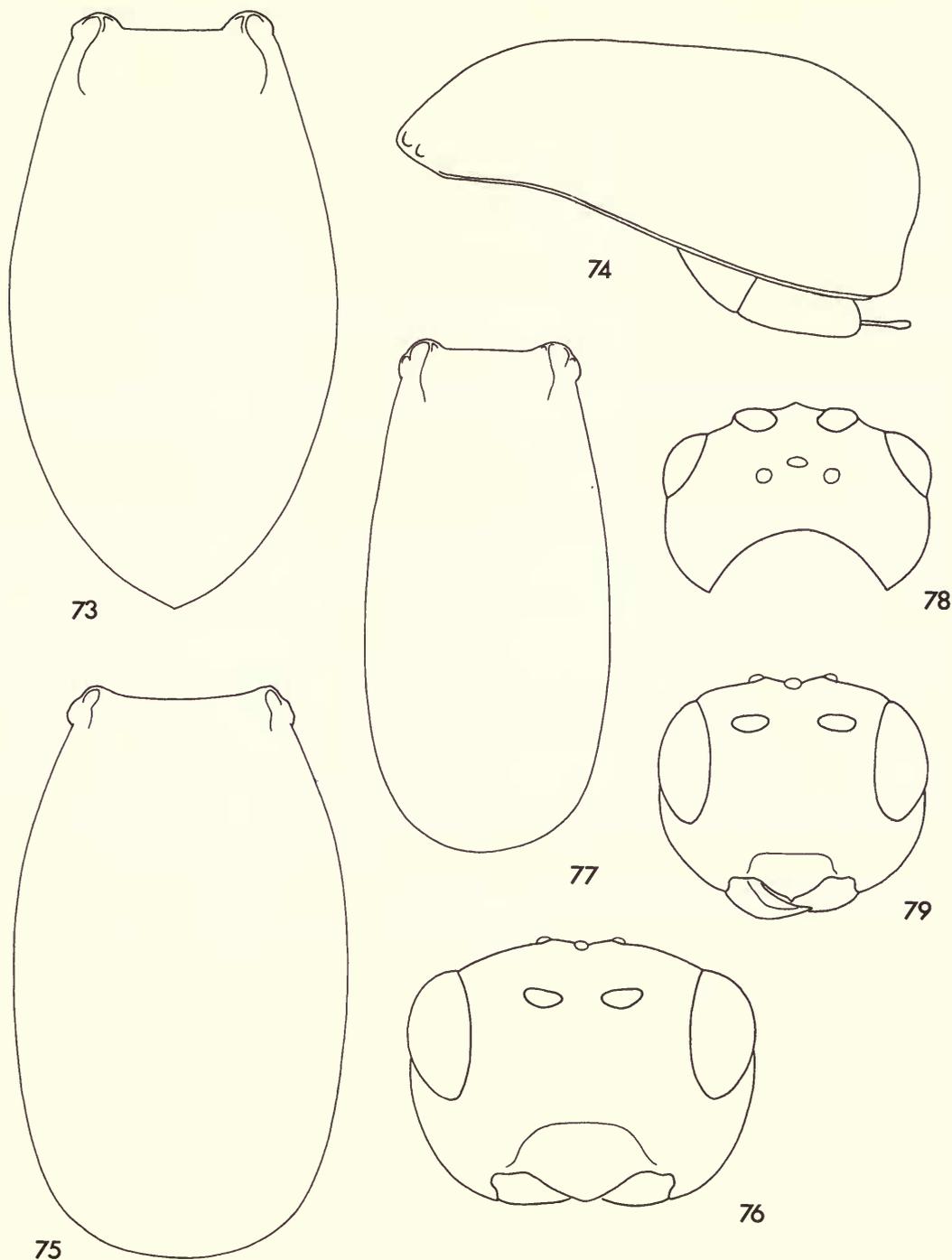
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