

# A study of the Encyrtid genus *Aminellus* Masi

with systematic notes on related genera

(*Hymenoptera: Chalcidoidea*)

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(With 20 textfigures)

The purposes of this short paper are to make *Aminellus* better known as a genus, to make known the biology of the genus as a parasite of Coccinellidae, to make known the synonymy of the European species, and to validate two new reared Asiatic species, one of which has been received for determination several times by the Commonwealth Institute of Entomology. Systematic notes on related genera, some of them little understood, have been added and a new genus is described. I have much pleasure in submitting the paper as a contribution to the Festschrift for my friend Professor Dr. H. SACHTLEBEN.

## Description of the genus *Aminellus* MASI

- 1919 *Aminellus* MASI, Ann. Mus. civ. Stor. nat. Genova, (3) 8, 286—7.
- 1921 *Aminellus*: MERCET, Trab. Mus. nac. Cienc. nat. Madrid, p. 589—91.
- 1952 *Aminellus*: NIKOL'SKAYA, Opred. Faune SSSR, Moscow, 44, 442—3.
- 1953 *Aminellus*: FERRIERE, Mitt. Schweiz. ent. Ges., 26, 12, 23.
- 1955 *Aminellus*: HOFFER, Acta Mus. nat. Prag, 11 B (1), 18—9.

Head, and dorsum of mesothorax, more or less coarsely punctate (figs. 1—2): axillae not notably more shining, with punctuation decidedly weaker yet of comparable strength. Eyes strongly hairy. Malar sulcus very sharply impressed. Mandibles with a small upper truncation and two sharp teeth, of which the upper is much the longer (fig. 5). Axillae, when the mesoscutum is not bent forward, not appearing to meet in middle (fig. 2). Scutellum strongly convex (fig. 11), with at least a trace of a median keel in basal half, its hinder part with reticulate sculpture much shallower and finer: this hinder area is conspicuously strong-hairy (figs. 2, 11), but the hairs are not in a dense tuft comparable with that present in genera like *Chiloneurus*. Fore wings rather broad, with marginal vein absent, the radial emitted from the submarginal and extending a little beyond the post-marginal (fig. 10).

Female — head from above reniform (fig. 1) (sometimes described as menisciform), more or less strongly rounded in front, in side view well

curved, more strongly so above than below. Antennal insertion below level of eyes (as seen in side view). Scrobes very short, shorter above toruli than length of torulus, not nearly meeting above. Antennal scapes elongate (figs. 6, 8): flagellum only slightly flattened dorso-ventrally, gradually expanded to sixth funicle segment. Hypopygium broad, not sharply folded in mid line, not pointed at apex, and not covering apices of ovipositor sheaths (fig. 3).

Male — head from above more nearly rectangular (fig. 4), not strongly rounded in front, but with inter-scrobal prominence visible in this view. Antennal insertion about on lower level of eyes (as seen in side view). Scrobes very large, broadly confluent above, delimited above by a distinct though not sharp ridge that dips in the middle (fig. 5). Antennal scapes less elongate than in female (figs. 7, 9): flagellum quite strongly flattened dorso-ventrally.

#### *Aminellus niger* MASI

- 1832 *Encyrtus longicornis* FONSCOLOMBE, Ann. Sci. nat., **26**, 305 (non DALMAN 1820).  
 1872 *Encyrtus areolatus* WALKER, Notes on Chalcididae, (5), 79, **syn. n.**  
 1898 *Encyrtus areolatus*: DALLA TORRE, Catalogus Hymenopterorum, **5**, 255.  
 1909 *Encyrtus areolatus*: SCHMIEDEKNECHT, Genera Insectorum, **97**, 242.  
 1919 *Aminellus niger* MASI, Ann. Mus. civ. Stor. nat. Genova, (3) **8**, 11—13, **syn. n.**  
 1921 *Aminellus niger*: MERCET, Trab. Mus. nac. Cienc. nat. Madrid, p. 590—3.  
 1952 *Aminellus niger*: NIKOL'SKAYA, Opred. Faune SSSR, Moscow, **44**, 442—3.  
 1953 *Aminellus niger*: FERRIÈRE, Mitt. Schweiz. ent. Ges., **26**(1), 22, 42.  
 1955 *Aminellus niger*: ERDÖS & NOVICKY, Beitr. Ent., **5**, 174.

Head from above of female strongly rounded (fig. 1), median length to breadth = 1:2.1 to 2.4: frontovertex to total breadth = 1:2.6, considerably broader than an eye, with ocelli in a decidedly obtuse triangle. Head from above of male two and threequarters times breadth of its median length, with ocelli in an even more obtuse triangle: frontovertex to total breadth = 1:2.1. Inter-scrobal prominence normally convex, beset with coarse punctures in upper half. Frontovertex coarsely reticulate-punctate, the punctures deep, everywhere very distinctly but nowhere broadly separated: reticulate microsculpture of moderate strength.

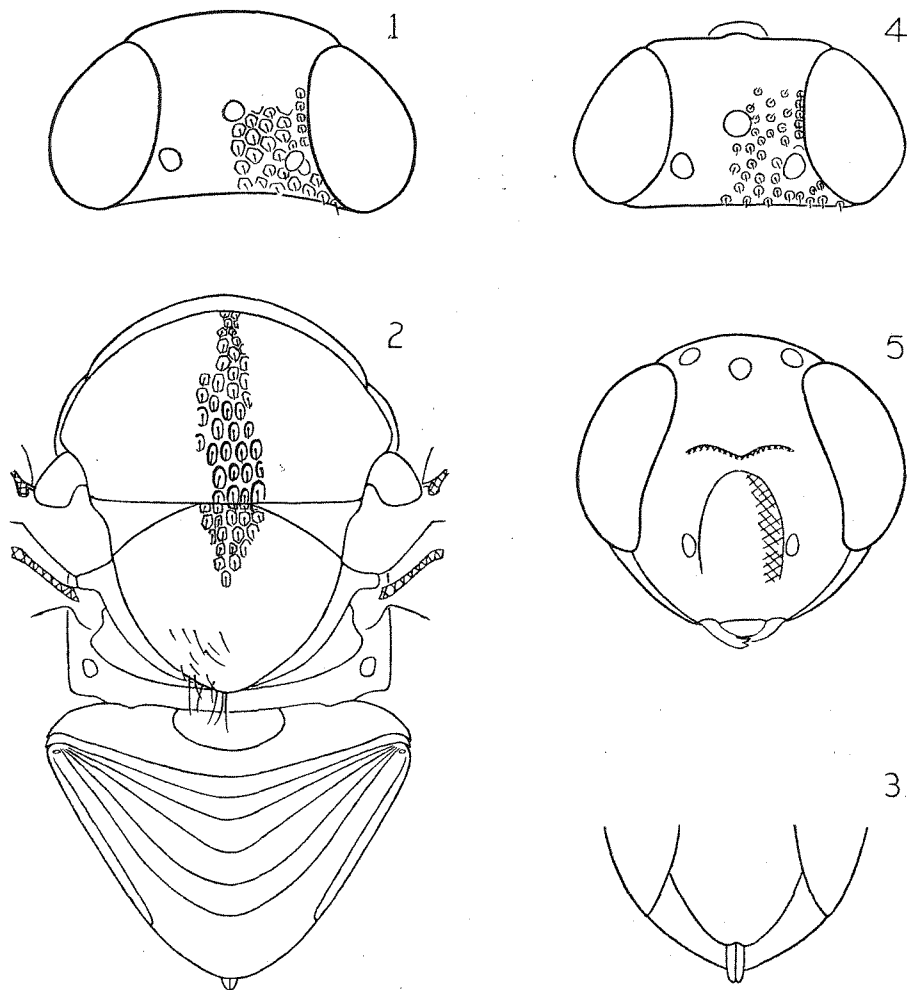
Antennae at base, in side view, of female as in fig. 6, of male as in fig. 7: male flagellum, as seen from above, spindle-shaped, the third funicle segment the broadest.

Mesoscutum, and scutellum above, coarsely and deeply reticulate-punctate, and with reticulate microsculpture of moderate strength: on mesoscutum in hinder half the punctures are still coarser and deeper, markedly coarser than those on scutellum near base, and the reticulations tend to run into longitudinal ridges, but near fore margin the sculpture is decidedly finer (fig. 2).

Head and body very dark blue-green, the mesopleura almost black. Antennae with scape pale yellow-testaceous, slightly darkened above near apex; with pedicellus and flagellum a medium brown, the pedicellus paler

at apex and beneath: antennae of male with scape medium testaceous, and with pedicellus and flagellum strongly infuscate above. Legs brownish-black; with femora at apex and tibiae at base narrowly paler; with tibiae broadly at apex and tarsi pale testaceous.

Material studied: France, 1 ♀ (syntype of *longicornis* FONS., sent by FONSCOLOMBE to WESTWOOD, and recently compared with the type in Paris by M. W. R. DE V. GRAHAM); Corsica, 1 ♀, T. A. MARSHALL (type of *areolatus* WALK.): Spain, Madrid, 1 ♀ on *Pinus*, 24. x. 1917, G. MERCET; Cerdedilla, 1 ♂ 1. viii. 1917, San Rafael 1 ♂ viii. 1922, G. BOLIVAR.



Figs. 1—3. *Aminellus niger* MASI (1) head of female, seen from above; (2) thorax and abdomen, seen from above; (3) apex of abdomen, seen from below. Figs. 4—5. *A. sumatraensis* sp. n. (4) head of male, seen from above; (5) the same, in facial view

I desire to place this case before the International Commission for a ruling as to which species name is to be used. The FONSCOLOMBE name which, with the syntype, was brought to my attention by Dr. GRAHAM, was placed in questionable synonymy with *obscurus* DALMAN by NEES ab ESENBECK 1834<sup>1)</sup>, but was in any case a primary homonym when proposed. The WALKER name was subsequently used twice in primary literature, and the type is in the British Museum (Natural History), but this is a nomen oblitum under the 1961 Code, Article 23. However, this provision has come in for much criticism, and several proposals for its amendment are now before the Commission, including one by GRAHAM which has special reference to the Hymenoptera parasitica. Personally I am in favour of considering the names of such 19th-century authors as WALKER and FÖRSTER as valid, when the location of the type can be traced and the identity of the species clarified by revisionary study. MASI's name has been used four times subsequently in primary literature, and I am not in doubt as to its identity.

*Aminellus indicus* n. sp.

Female — head from above less strongly rounded than in *niger* MASI, median length to breadth = 1:2·1: frontovertex one-third total breadth, i. e. equal in breadth to an eye; with ocelli in about a right-angled triangle. Inter-scröbal prominence normally convex, beset with coarse punctures in upper half. Frontovertex irregularly reticulate-punctate, the punctures smaller, shallower and less sharply defined than in *niger* MASI, and for the most part much more broadly separated, intermediate in condition between *niger* MASI and *sumatraensis* sp. n. (figs. 1 and 4): reticulate microsculpture rather fine.

Antennae at base, in side view, as in fig. 8.

Mesoscutum, and scutellum above, rather coarsely reticulate-punctate, the punctures of only moderate depth, and with reticulate microsculpture rather fine: on mesoscutum the punctures on hinder half are not markedly coarser and are if anything shallower than those near base of scutellum, and do not tend to run into longitudinal rugosities, and those further forward are somewhat smaller and much shallower.

Head and body colour as described for *niger* MASI. Antennae medium to rather dark testaceous, to a greater or lesser extent infusate above and on club. Legs brownish-black; with femora broadly at apex, tibiae and tarsi for the most part medium testaceous; with mid and hind tarsi at base and mid tibiae at apex much paler; with mid tibiae strongly and hind tibiae slightly darkened above near base.

Described from the following: India, Mysore, Bangalore, 1 ♀ vii. 1951, ex predator on *Pseudococcus* sp., „G. P. C.“ (holotype); 1 ♀ 20. i. 1959, ex pupa of *Cryptolaemus montrouzieri* MULS., 2 ♀♀ ix. 1960, ex *Jauravia* sp. on cotton, 1 ♀ xi. 1960, ex *Scymnus* sp. on guava, Commonwealth Inst. Biol. Control. Holotype in British Museum (Natural History).

<sup>1)</sup> Hymenopterorum Ichneumonibus affinium Monographiae, 2, 434. Stuttgart, 1834.

*Aminellus sumatraensis* n. sp.

Male — head from above (fig. 4) twice as broad as its median length, i. e. relatively much less broad than in the male of *niger* MASI, and with ocelli in a less obtuse triangle. Inter-scrobal prominence long and strongly convex, shining, with reticulate microsculpture but without coarse punctures. Frontoververtex irregularly punctate, the punctures of only moderate size and depth and nearly all broadly separated: reticulate microsculpture of moderate strength, very conspicuous.

Antennae at base, in side view, as in fig. 9: flagellum, as seen from above, much less strongly expanded in middle than in *niger* MASI.

Mesoscutum in greater part irregularly punctate, the punctures being of moderate size and depth but mostly well-separated, this sculpture weaker near fore margin: scutellum above reticulate-punctate, the punctures rather smaller than those on most of mesoscutum: reticulate microsculpture of moderate strength.

Head and body dark blue-green, somewhat less dark than in *niger* MASI and *indica* sp. n., merging to brownish in mouth region: mesopleura brown with slight metallic reflection. Antennae (male) dull testaceous, with greater or lesser amount of infuscation above, the scapes and pedicelli very pale in greater part beneath. Leg coloration much as described for *indicus* sp. n. but generally paler, the paler colouring more, the darker less, extensive.

Described from the following: Sumatra, Kaban Djahi, 3 ♂♂ 1930, ex „*Scymnus smithianus*“, C. P. CLAUSEN. Holotype in U. S. National Museum.

Key to the species of *Aminellus* MASI

1. Inter-scrobal prominence long, strongly convex, not beset with coarse punctures: head (fig. 4) and mesoscutum with punctures for the most part broadly separated: male alone known, with head less broad than in *niger* MASI (cf. fig. 1): Sumatra . . . . . *sumatraensis* n. sp.

Inter-scrobal prominence shorter and less convex, beset with coarse punctures in upper half: mesoscutum reticulate-punctate, and head with punctures at least decidedly less broadly separated than as above . . . . . 2

2. Head and dorsum of thorax (in both sexes) coarsely reticulate-punctate (figs. 1–2); on mesoscutum the punctures in hinder half are elongate and markedly coarser than those on scutellum near base (fig. 2): female head from above (fig. 1) with frontoververtex considerably broader than an eye, and with ocelli in a decidedly obtuse triangle: female antennae (fig. 6): southern Europe . *niger* MASI  
Head and dorsum of thorax less coarsely reticulate-punctate; the head sculpture about intermediate in condition between that of *niger* (MASI) and *sumatraensis* n. sp., the punctures on mesoscutum much shallower, and not markedly coarser than those on scutellum near base: female head from above with frontoververtex of about equal width to an eye, and with ocelli in about a right-angled triangle: female antennae (fig. 8): India . . . . . *indicus* n. sp.

Position of the genus *Aminellus* MASI

MERCET (1921)<sup>1)</sup> related this genus with the *Bothriothorax* group, chiefly with *Bothriothorax* and *Pentelicus*, which are discussed below. HOFFER (1955)<sup>2)</sup> placed it, together with *Eugahania* and other genera in the tribe (or better sub-tribe) *Discodini*, which he placed next to the *Bothriothoracini* (sensu HOFFER). The characters of some of these related genera are now considered.

Genus *Eugahania* MERCET 1926

I have for study a single female specimen from India, reared from nymphs of *Petaloccephala* (Homopt., Cicadellidae). Similar to *Aminellus* in the stout body form, head coarsely reticulate-punctate, in female strongly rounded in front, and with scrobes very short, not meeting above: immediately recognised by the very sharp, deep incision of the fore margin of the wing, and the peculiar sickle-shaped mandibles. The mesoscutum is not coarsely punctate, the scutellum is very flat and sharply margined, and the female scape is laminately expanded. The biology of this genus was not previously known.

Genus *Bothriothorax* RATZBURG 1844

Head, mesoscutum, and scutellum above except near apex, more or less coarsely punctate, the punctation reticulate to more elongate and broadly spaced. Mesoscutum and scutellum with reticulate microsculpture at least moderately strong, the scutellum not greatly more shining at apex: axillae much more shining, alutaceous, with at most a few scattered punctures at sides, the punctures much weaker than on scutellum. Head from above, in both sexes, strongly transverse, and antennal insertion below level of eyes. Scrobes above toruli about the length of a torulus, more or less distinctly meeting above but not margined by a distinct ridge. Malar sulcus absent. Antennal scapes elongate and rather slender. Scutellum moderately convex, margined round the rather pointed apex by a distinct, usually sharp, ridge, falling abruptly below this. Wings with subcosta hardly expanded, running to a punctiform marginal which is not remote from wing margin, and which gives off a postmarginal of about its own length, and a stout radial at about 50 to 60° (fig. 13).

Genus *Pentelicus* HOWARD 1895

I have for study three female specimens of *P. aldrichi* HOWARD, from South Dakota, determined by A. B. GAHAN, and compared with the type by myself in 1956, also a single specimen of an undescribed species.

<sup>1)</sup> Trab. Mus. nac. Cienc. nat. Madrid, p. 591, 1921.

<sup>2)</sup> Acta Mus. nat. Prag, 11B(1), 48—9, 1955.

This genus is so closely related to *Bothriothorax* as possibly to merit less than full generic status. It differs as follows: head less transverse; scrobes broad and not sharply defined: malar sulcus distinct, though not strong: female antennal scapes less elongate, decidedly though not broadly expanded in apical half: mesoscutum and scutellum with reticulate microsculpture decidedly strong, the scutellum more pointed at apex and more sharply margined, the margin running further forward, and with a distinct median keel running its full length: axillae sculptured like the scutellum. In contrast with the description given by HOWARD (1895)<sup>1)</sup>, I find the punctation of the mesoscutum to be more dense though less coarse than that of the head. The venation of the type species, *P. aldrichi* is figured here (fig. 14), the original description having proved misleading.

***Microsphenus* n. gen.**

Type species *Bothriothorax schlechtendali* MAYR 1875

Head coarsely punctate, in part reticulate: mesoscutum with moderate reticulate microsculpture, beset with coarse, well-separated punctures which tend to run in longitudinal rows. Head from above strongly transverse: antennal insertion at about lower level of eyes: scrobes distinctly meeting above: malar sulcus very weak, only discernible when viewed at a suitable angle. Antennal scapes elongate and slender. Scutellum strongly convex and, like the short axillae, alutaceous and shining, beset near base and sides with a few scattered punctures that are very much smaller than those on mesoscutum, not margined at apex but with a row of about six stout hairs which may delimit the frenum (fig. 15). Hypopygium sharply folded and sharply pointed, but not covering the apex of the ovipositor, whose sheaths project far beyond it (fig. 16). Hind femora and tibiae quite strongly flattened. Wings decidedly sparsely hairy, but more densely so along the lines of the radialis and cubitalis. Subcosta expanded at about two-thirds its length, running to a punctiform marginal which gives off a very short postmarginal, both well removed from wing margin, and a stout radial at about 45° (fig. 17).

Material studied: Germany, Halle, 1 ♀ vi, v. SCHLECHTENDAL (holotype, kindly sent on loan by Dr. MAX FISCHER): England, Essex, Epping Forest, 1 ♀ v. 1947, J. H. SHILLITO. The type was one of two specimens taken, in company with a Scolytid, on a dead stem of *Ulmus*, and the English specimen was also taken on *Ulmus*.

I believe the form of the hypopygium, together with the position in which these specimens died, argues a special oviposition posture: perhaps the hypopygium is adapted to being wedged in crevices in bark.

I fully support the action of FERRIERE (1956)<sup>2)</sup> in excluding *schlechtendali* MAYR from *Bothriothorax*, but can contra-indicate his suggested association

<sup>1)</sup> Proc. U. S. nat. Mus., 17, 612.

<sup>2)</sup> *Entomophaga*, 1, 63.

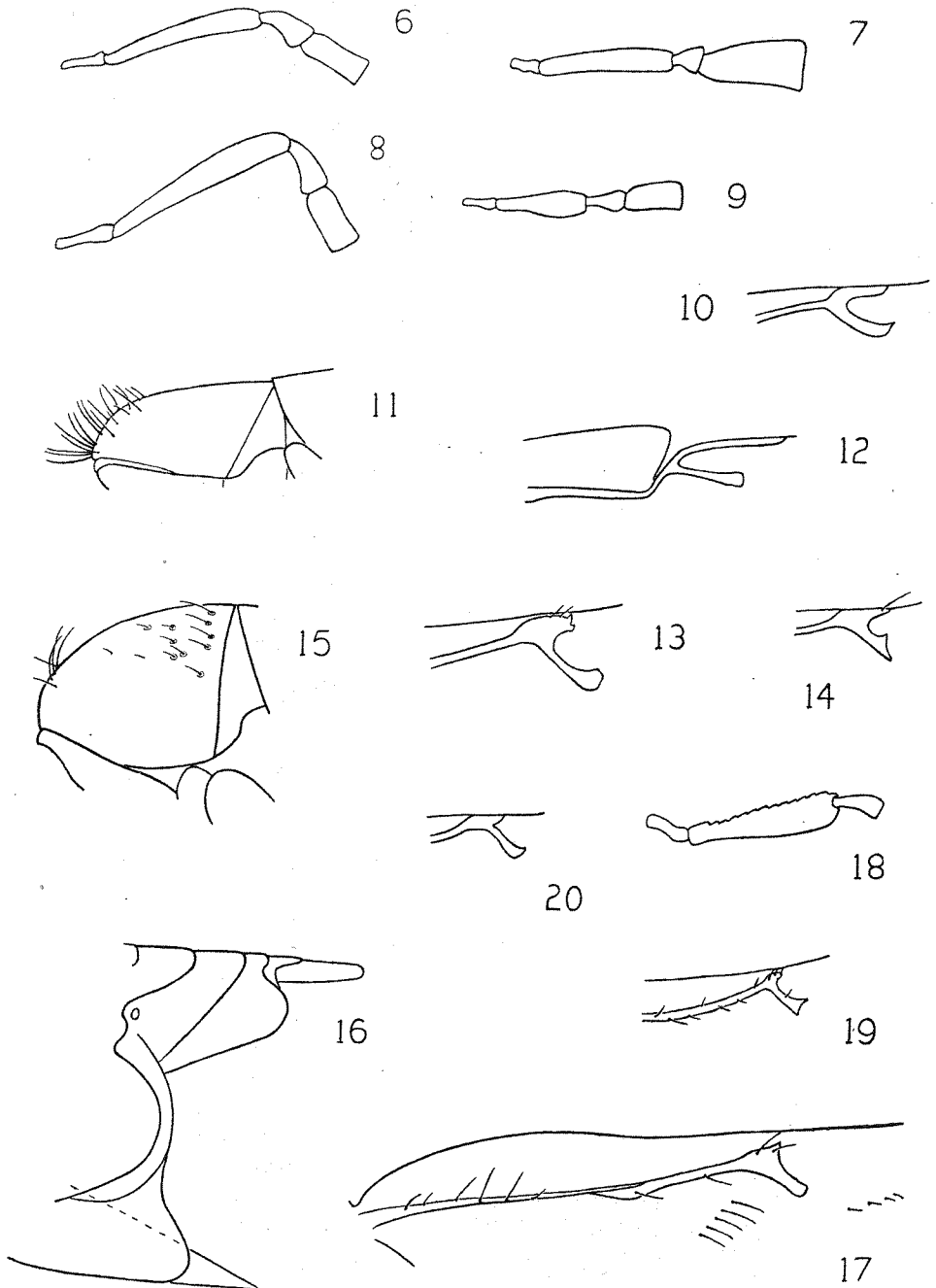


Fig. 6—18



of the species with *Eucantabria* MERCET, which was known only in the male. I have on loan from the U. S. National Museum a female specimen from Minnesota, USA. which, from a study of MERCET's description, I had determined as *Eucantabria* sp. Comparison with the type of *E. azurea* MERCET confirms this generic placement: the species are different, but all the characters given below, apart from those of the gaster, apply to the two sexes. The two genera may be separated as follows:

- A. Head from above strongly transverse, about as in *Bothriothorax* RATZBURG: eyes with pilosity very sparse, scaecely discernible x 100: toruli very much closer together than width of frontovertex, situated with their mid points if anything above the lower level of eyes: antennal scapes hardly expanded: mandibles with two sharp teeth and an upper truncation: axillae short: scutellum strongly convex (fig. 15), finely alutaceous and shining: hypopygium as described above and herein figured (fig. 16): hind tibiae strongly flattened, bearing one rather large and one small spur: wings decidedly sparsely hairy and with marginal cilia absent, but with rows of hairs discernible on the colourless part of the radius and the cubitus (fig. 17): head and mesoscutum a rather bright blue-green, with bronzy to violaceous reflections . . . . . *Microsphenus* n. gen.
- B. Head from above of more normal Encyrtid proportions: eyes with pilosity moderately dense, quite distinct x 45: toruli almost as far apart as width of frontovertex, situated just above the clypeus and far below the lower level of eyes: antennal scapes very decidedly expanded though not strongly dilated (fig. 18): mandibles with three sharp teeth, the middle one much the longest: axillae of normal proportions: scutellum of normal convexity, with reticulate microsculpture strong: hypopygium large, boat-shaped, and extending well beyond the tergites, but ovipositor sheaths are present and extend well beyond its apex: hind tibiae only slightly flattened, bearing two small spurs: wings (fig. 19) with surface pilosity and marginal cilia short, but of normal density: frontovertex especially a darker, more steely, green . . . . *Eucantabria* MERCET

#### Genus *Aratus* HOWARD 1896

Material available for study: *A. scutellatus* HOWARD 1896, unique male holotype and one female: *A. insularis* (HOWARD 1896), **comb. n.** (= *Bothriothorax insularis* HOWARD), female holotype and three female specimens compared with it: three other specimens belonging to different species. Holotypes and other material in British Museum (Natural History): specimens compared with holotypes in U. S. National Museum.

Head and mesoscutum beset with coarse, well-separated punctures, which sometimes run in longitudinal rows: scutellum strongly shining, at

Figs. 6—9. Basal segments of right antenna, in dextro-lateral view, of (6) *A. niger* MASI, female; (7) *A. niger* MASI, male; (8) *A. indicus* sp. n., female; (9) *A. sumatraensis* sp. n., male. — Figs. 10, 12—14, 17, 19—20. Part of right fore-wing of female (10) *A. niger* MASI (12) *Eugahania* sp.; (13) *Bothriothorax clavicornis* (DALM.); (14) *Pentelicus aldrichi* How.; (17) *Microsphenus schlechtendali* (MAYR); (19) *Eucantabria* sp.; (20) *Aratus insularis* How. — Figs. 11 and 15. Scutellum, in dextro-lateral view, of female of (11) *A. niger* MASI; (15) *M. schlechtendali* (MAYR). — Fig. 16. Apex of female abdomen, in sinistro-lateral view, of *M. schlechtendali* (MAYR). Fig. 18. Base of female antenna, in dextro-lateral view, of *Eucantabria* sp.

most finely alutaceous and beset with fine, very sparse, piliferous punctures at sides: axillae not much less shining. Head of female from above of normal Encyrtid proportions or only rather strongly transverse (i. e. not as in *Bothriothorax*): antennal insertion about at or below the lower level of eyes: scrobes meeting above: malar sulcus very weak. Female antennae with scapes of moderate length and only a little expanded, and flagellum of moderate length and moderately clavate. Mandibles with three sharp teeth, the middle one much the longest. Scutellum rather flat, not margined behind. Gaster relatively elongate, with female hypopygium rather boat-shaped but not elongate in relation to the gaster, not extending beyond the last tergite, and with ovipositor sheaths extending beyond the hypopygium. The marginal vein is longer than broad and the postmarginal very short (fig. 20). The punctation of the head and mesoscutum is much less coarse in *scutellatus* How. than in *insularis* (How.), which is probably why HOWARD placed the species in different genera.

This genus may perhaps not be very closely related to *Bothriothorax*. The modern specimens in the U. S. National Museum are recorded as reared from unidentified Diptera in fruit.

#### Acknowledgments

I am very grateful to the following for the loan of material from the collections of which they have charge: Dr. B. D. BURKS, Washington, Professor G. CEBALLOS, Madrid, Dr. MAX FISCHER, Vienna and Dr. M. W. R. DE V. GRAHAM, Oxford.

#### Summary

The above paper deals with the Encyrtid genus *Aminellus* MASI, its biology as a parasite of Coccinellidae, the synonymy of the single European and descriptions of two new Asiatic (*A. indicus*; *A. sumatraensis*) species. There are given notes on related genera with descriptions of one new (*Microsphenus*) based on a European species.

#### Zusammenfassung

Die vorliegende Arbeit behandelt die Encyrtiden-Gattung *Aminellus* MASI, deren Biologie als Parasiten von Coccinelliden und die Synonymie der europäischen Arten. Es werden Bemerkungen über benachbarte Gattungen gegeben, sowie zwei neue asiatische Arten (*A. indicus*; *A. sumatraensis*) und eine neue Gattung (*Microsphenus*), auf einer europäischen Art begründet, beschrieben.

#### Резюме

В настоящей работе обсуждается род *Encyrtidae* *Aminellus* MASI, его биология, как паразита *Coccinellidae* и синонимы европейских видов. Делаются замечания о соседних родах, а также описываются два новых азиатских вида (*A. indicus*; *A. sumatraensis*) и новый род (*Microsphenus*).