

# Key to the Nearctic genera of Eulophidae, subfamilies: Entedoninae, Euderinae, and Eulophinae (Hymenoptera: Chalcidoidea).

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(last update: October 13, 2003)

This key will always be a work in progress. It is currently designed to aid in the identification of Nearctic Eulophids of the subfamilies Eulophinae, Euderinae, and Entedoninae. The unplaced Chalcidoid genus *Cales* is also included because of its similarity to Eulophids, but this is not to be taken as a recommendation for its placement in Eulophidae. A key to the subfamily Tetrastichinae may be included at a future date, but it presented too many logistic difficulties to be completed at this time, and Nearctic genera of Tetrastichinae can be identified with minimum difficulty using the keys published by LaSalle (1994) and Schauff, LaSalle, & Coote (1997), consulting Schauff & Garrison (2000) for the only new Nearctic generic record of Tetrastichinae since 1997 that I am aware of. The key to subfamilies includes couplets for Tetrastichinae, to aid in recognizing the genera that are not currently included in the key. I also intend to eventually include all Eulophid genera worldwide in this key, but have not yet done so because of the extreme difficulty of acquiring reliably identified material of many genera described from the Neotropical, Ethiopian, Oriental, and Australasian regions. I hope that the appearance of this key in the Internet will help demonstrate to individuals with the authority to loan specimens from those regions that I am serious enough in my aims to justify their loaning specimens for this purpose.

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## Justification for constructing this key:

This key is designed to be usable by both beginners and non-specialist Hymenopterists alike. It is designed to be the most accurate key available for these groups, regardless of medium of distribution. Each major recent generic key to the Eulophidae, including but not limited to Boucek (1959, 1988), Askew (1968), Schauff (1991), and Schauff, LaSalle, & Coote (1997), has been consulted thoroughly in the preparation of this work, and a serious attempt has been made to critically troubleshoot the potential diagnostic characters of each genus involved. I have attempted to provide the most accurate and informative characters from the available references and from my own studies of specimens. There are still potential problems with this key, but these problems can be fixed with further study.

This key represents an attempt to establish a single reference, as reliable as possible, for the identification of Eulophid genera. I take full responsibility for the information stated in this key, and I take that responsibility seriously. I intend to improve this key on a continuous basis, correcting errors, including new information, and keeping it updated nomenclaturally. I strongly encourage other workers to point out any possible errors, inaccuracies, or omissions discovered in this work, and their efforts will be acknowledged both on the couplet page they improve and in a special acknowledgments page. I would like this page to be a part of a forum for insect identification, absolutely controlled by myself but reflecting the most reliable information available from experts. It can validly be stated that an accurate key to Eulophid genera is impossible to construct given the current state of Eulophid classification. I reply to that by pointing out that this cannot remove the need for serious identification of Eulophids, which this key attempts to serve as well as possible. I certainly recognize that most genera of Eulophidae are imperfectly distinct from related genera, such that an absolutely accurate key is impossible to make. This key will probably never be perfect, but it is the most ambitious step towards providing an identification reference for Eulophid genera, and it is intended to improve as the classification of the family reaches a more satisfactory state. The alternative is to rely upon highly unreliable references that frustrate rather than aid the audience that they are intended to serve. This work does not provide a perfect alternative, but is intended to represent an improvement over previously available identification references. It is not intended to aid experts who already have a dynamic and highly accurate notion of the genera keyed here, as they do not and should not need keys for their group of specialty, but their aid in improving this key will be important in determining the rate of its improvement. I am aware of some areas in this key that should prove difficult to navigate, and they are discussed in a special page entitled, [Problems and resources needed](#).

Current valid names under the ICZN code of nomenclature will be followed in this work, despite any disagreement that has not resulted in formal nomenclatural changes. In the event that internet publication of nomenclatural changes actually become valid or common, this page will never include attempted nomenclatural changes, and is not intended to establish such changes in any way. Unpublished names or nomenclatural changes will not be posted in this site until the work in which they are published is printed and distributed.

This key is intended to be useful only in identification, and not as a strong source of phylogenetic information, although some speculation concerning phylogenetic relationships is included in comments about certain genera. The arrangement of couplets in this key is intended to reflect overall similarity and difficulty in distinguishing included genera, and has never and will never be altered reflect phylogenetic information at the expense of accurate identification. The similarity of dichotomous keys to dendrograms has misled many workers to produce keys that reflect preferred phylogenetic hypotheses, but have little or no utility for comparing organisms that are easily confused in practical attempts at identification. This mistake will be avoided here as much as possible.

There has been much recent furor (mostly in personal communication) about wording in key couplets. I have made a special effort to avoid using vague or misleading terminology and logical formulae in my key. Some

uses of the word "usually" cannot be avoided due to the lack of morphological uniformity in Eulophid genera, but use of this word has been kept to the minimum possible without sacrificing accuracy, and in all cases some universal character has been used as the primary character backed up by the "usually" clauses. Frequently, the universal character is one that most researchers avoid examining, such as a genitalic or sensillar character, and the use of non-universal characters at that point seems advisable. Simple logical formulae, such as if...then, and..., and/or, etc. statements have been used when necessary, but in many cases these have been avoided by making the genus key to more than one terminus. Whenever used, the words constructing the formulae are bolded. Also, whenever genera key to more than one terminus, the omission of qualifiers denoting special exceptional groups of a genus (such as species or species groups that violate the conventional definition of a genus) has proven frustrating in my efforts to use keys in general. It is impossible in those cases for the user to know if only one rare species of a genus keys to that terminus or if many common species key there. I have made a special effort, in the cases where a genus keys to more than one terminus, to note if most species, only rare forms, or only certain species groups key to a particular terminus.

This is entirely an internet-based work, and it is designed to reflect the obvious advantages of internet media over bound printed media. This is not to say that bound printed media do not have advantages as well, and I fully recognize that many or most workers will greatly prefer the printed version. The couplets comprising this key can be printed individually, but the included images will likely be of very poor quality. This is a problem that I hope to remedy in the future. Furthermore, it will probably be noticed by visitors to this site that the pages I design are simple in comparison to most other web pages. This is not because I am unskilled in making web pages, but because I prefer simplicity in identification references and broad compatibility in web pages designed to be useful to workers using any platform or computer system. The superfluous effect provided by entertaining decorations is deliberately sacrificed so that I have more time to construct keys that are as useful and accurate as possible.

Finally, I would like to state that it is my goal to make many more of these keys. For most groups, this requires an extensive amount of background research. The literature alone is of course not sufficient for constructing a key to anything, let alone a key aspiring to be as good as I want mine to be. With further study, and with visits to large entomological collections, I hope to construct presentable keys to genera of other Hymenopteran groups, such as Pteromalidae, Encyrtidae, Platygasterinae, Megaspilidae, and so on. Also, I believe that my system is especially well-suited for keys to species. I hope to demonstrate this in the coming years. I do not have a problem collaborating with individuals who would like to make use of my method, and I will devote as much effort as possible to helping bring about keys that use my method. Collaboration would certainly make my life easier, as a person's lifetime is limited and I can't learn every group I would like to make keys for. I would like to caution, however, that I think it best if I have extensive input into how the key is made. I cannot/will not prevent people from using my method, but I wish to be active in improving the science of diagnostic tool construction, and I would like to do as much as I can to further this goal. Also, it would be preferable to have a standard source of keys that can be trusted, and I am driven to bring about such a source.

Roger A. Burks

## How to use this key

hop to: [home](#) [jump-in points](#)

This key is constructed using basic html, and is intended to function like a printed dichotomous key, but it can be used for non-linear approaches to identification by advanced users. Bolded characters are either unique or relatively distinctive, and are well worth memorizing for sight identification. Advancing in the key is done simply by clicking the links. When a genus is keyed, a link is provided. Clicking this link brings the user to a summary page for that genus, which includes a diagnosis, known relatively reliable host information, a comments section, and most importantly, a comparative section listing the differences between the genus and each genus likely to be confused with it in turn. The comparative section is the most important advantage of this key over other existing keys, as it seeks to overcome limitations involved in linear dichotomous keys to insure the user has access to the best information available to identify specimens. Such advantages should be clear to anyone who has consulted diagnoses to insure that a specimen has been keyed properly. It is relatively easy to make a mistake in a dichotomous key, but consulting the comparative sections and diagnoses should greatly reduce the chances of error. I have striven to provide the most accurate information possible, and any mistakes found in this key should be reported to me immediately so that I can fix the problem.

Each couplet and generic home-page has a set of links allowing the user to hop to different parts of the key in non-linear fashion. These links are abbreviated as follows: **Eul** refers to sections of the Eulophid subfamily key, **eul** to the main body of the Eulophinae key, **cir** to the key to Eulophines with 2 funicular segments, **ent** to the main body of the Entedoninae key, **euderom** to the Euderomphalini key, and **eud** to the Euderinae key. These links are chosen to represent helpful jumping-in points for users experienced in the use of this key. Also, these pages have a **prev** link that allows genera to be keyed out in reverse, beginning at the [genus list](#).

## Jump-in points

[Eul 1](#): Beginning of key.

[Eul 4](#): Series separating most Entedoninae, Eulophinae, Euderinae, and Tetrastichinae.

[cir 1](#): Eulophinae with 2 funicular segments.

[euderom 1](#): Euderomphalini, tiny Entedonine parasitoids of whiteflies.

[eul 1](#): Beginning of key to Eulophinae with >2 funicular segments.

[eul 5](#): Branch between forms with complete notauli and forms with incomplete notauli.

[eul 10](#): *Elachertus*-group genera that are not always easily sight-identified.

[eul 14](#): *Elachertus* and genera very similar to it.  
[eul 17](#): Beginning of key to Eulophinae with incomplete notauli and >2 funicular segments.  
[eul 20](#): Eulophinae that must often be separated using a combination of characters.  
[eul 24](#): Begin forms near *Necremnus* and *Sympiesis* that are not easily sight-identified.  
[eul 27](#): The more difficult genera, near *Necremnus* and *Sympiesis*.

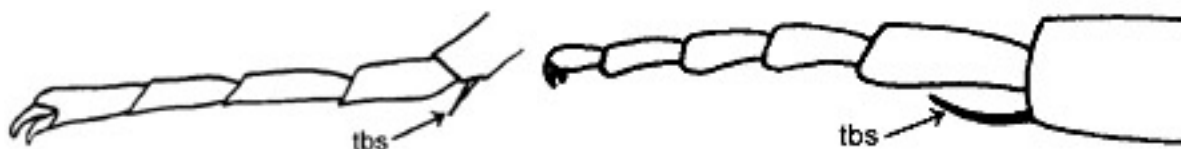
[ent 1](#): Beginning of key to Entedoninae excluding Euderomphalini.  
[ent 5](#): Forms with vertexal suture (except *Goetheana*, which is easily sight-identified).  
[ent 10](#): Branch between forms near *Horismenus*, with the mesepisternal extension, and remaining genera.  
[ent 13](#): Genera past the *Horismenus*-group branch, begin large-bodied Entedonines and *Emersonella*.  
[ent 16](#): Genera more similar to *Chrysocharis* and the *Omphale-Closterocerus* group  
[ent 21](#): More difficult genera, some of them requiring slide-mounted specimens.  
[ent 26](#): *Omphale-Closterocerus* group.

[eud 1](#): Beginning of key to Euderinae.  
[eud 5](#): Euderinae without a median propodeal carina.

## How to recognize a Eulophid

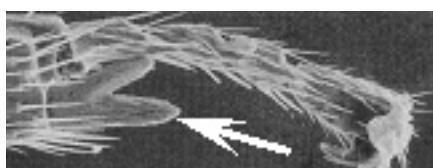
hop to: [home](#)

The only near-universal criterion for recognition of Nearctic Eulophids to family is a combination of leg characters: All tarsi 4-segmented, **and** protibial spur short and straight (1a).



1a-b: Eulophid protarsus (left), and Pteromalid protarsus (right). tbs=protibial spur.

This combination of characters separates Nearctic Eulophids from all other Chalcidoidea except the unplaced genus *Cales*, which is included in this key. The two Eulophid exceptions to this combination of characters are: the Oriental Entedonine genus *Trisecodes* Delvare & LaSalle, with 3 tarsal segments, which is separated from Trichogrammatids only by subfamily and generic characters; and the Tetrastichine genus *Crataepus*, which has a large, forked protibial spur (2a) the form of which is unique and serves well as an identification character. *Idioporus* LaSalle & Polaszek is a Neotropical genus with 4-segmented tarsi, and is currently classified as a Eunotine Pteromalid. In *Idioporus*, the protibial spur is long and curved though not as stout as in other Pteromalids. Tetracampids have a short, straight protibial spur like that of Eulophids, but the tarsi are 5-segmented except for most males, which have 4-segmented mesotarsi. Many Tetracampines strongly resemble Eulophines of the *Elachertus* genus-group.



2a: *Crataepus* protibial spur.

I have encountered specimens of many other Chalcidoid families misidentified as Eulophids by otherwise authoritative experts, but for the most part this has been due to misapplying generic characters that happen to be shared by species in those other families. This is especially common when a single criterion for family placement is being used or if the Eulophid genus involved is essentially monothetic, such as *Hemiptarsenus*. It should be noted that it is normally very difficult to count tarsal segments in small insects like Chalcidoids. This can be partially alleviated by using backlighting (focusing the light on the stage under the specimen) on a white background to highlight separations between segments. **The protibial spur is usually much easier to see, and should be regarded as the primary character for beginners to assess.** It can be difficult to assess as well, however, if both forelegs are buried in glue or folded under the body.

Image credits: 1a-b: Grissell & Schauff (1997). 2a: Schauff, et al. (1997).

## Glossary

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This key is intended for all users below specialist level, but it is most accessible to intermediate users who are aware of basic terminology. I have endeavored to use as little obscure descriptive terminology as possible, as such terms are almost always ambiguous and misleading. Specialized terms, however, are unavoidable. Given the high quality of the [glossary](#) provided by Gibson *et al.* (1998), I do not see the need to replicate their effort for the large number of terms included therein. The full citation for their glossary is:

**Gibson, G.A.P., Read, J.D. and Fairchild, R. 1998.**

Chalcid wasps (Chalcidoidea): illustrated glossary of positional and morphological terms.  
URL - [http://www.agr.gc.ca/science/ecorc/chalcid/intro\\_e.htm](http://www.agr.gc.ca/science/ecorc/chalcid/intro_e.htm). June 15, 1998.

Specialists of each group in Chalcidoidea use their own specialized terms. This key is no different in that respect, and I have adopted certain terms not given as such in that glossary. Below is a glossary of terms and usage not included in the glossary by Gibson *et al.* (1988).

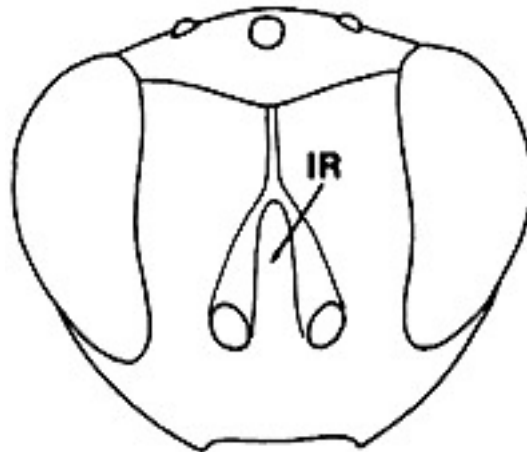
**Areolate:** In surface sculpture, forming a relatively large, diamond-shaped or pentagonal structure, always defined by carinae.

**Denticle:** Literally, "tiny tooth." Used in this key to refer to small apical divisions that can only ambiguously be referred to as "teeth" because they are not socketed, such as the apical "teeth" of mandibles.

**Flagellar formula:** Numerical series listing the number of anelli, funicular segments, and claval segments in order. Example: a flagellar formula of 1,4,3 means that there is 1 anellus, 4 funicular segments, and 3 claval segments.

**Fusate:** Darkly pigmented, when referring to area of wing membrane. Also called fumate, infumate, infusate, and probably by some other names by different authors. The choice between these terms seems arbitrary to me. Antonym = hyaline.

**Interscrobal process/ridge:** Area between the scrobal grooves/depressions (see figure).



Interscrobal ridge = IR

**Mandibular formula:** Numerical series listing the number of mandibular denticles for the left and right mandibles in order. Example: a mandibular formula of 3:4 means that the left mandible has 3 denticles, and the right has 4 denticles.

**Median panels (of propodeum):** Area between plica and median carina. If plicae and median carina are absent, then it is the area between the imaginary place where a plica should be and the median axis.

**Nodose/nodulose:** In antennal structure, segments separated by visible narrow stems. Essentially the same as pedunculate or pedicellate.

**Paraspiracular carina:** Propodeal carinae arising lateral to the spiracles and proceeding laterally and posteriorly. This term was until recently treated as synonymous with plicae, but in the Entedoninae there are distinct paraspiracular carinae that extend outside the propodeal spiracles to delimit the paraspiracular depression. This is distinct from plicae, which arise medial to the spiracles.

**Postanellar flagellomeres:** All flagellomeres, ie: funicular and claval segments, arising apical to the anelli.

**Pronotal collar:** see pronotal carina in Gibson *et al.* (1988).

**Punctate:** In surface sculpture, having many tiny pits.

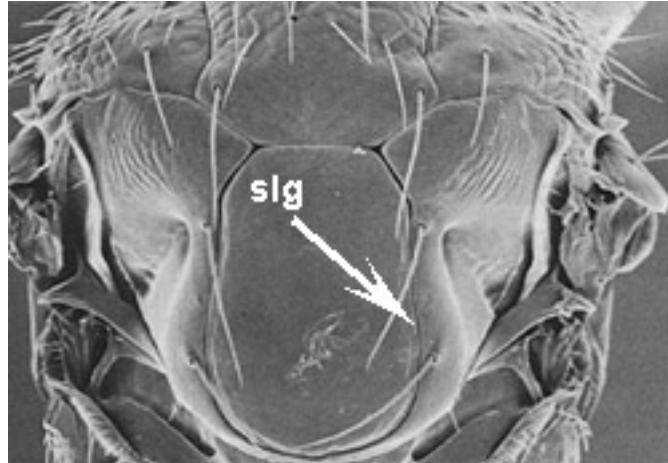
**Reticulate:** In surface sculpture, a pattern formed by closely-approximated pits defined by tiny carinae, almost invariably referring to densely punctate sculpture in Chalcidoidea.

**Ruga:** In surface sculpture, a wrinkle-like irregular elevation.

**Scrobal groove:** = scrobal sulcus in Gibson *et al.* (1988).

Subapical: Near the apex.

Sublateral groove(s): Different usage from that of Gibson *et al.* (1988): This groove is not associated with the axillula in Eulophinae, but is a special dorsal scutellar groove, U-shaped if complete (see figure).



Sublateral groove = slg

Transverse fronto-facial groove: = frontofacial sulcus in Gibson *et al.* (1998). Sometimes referred to as "transverse groove" in this key when the reference should be obvious.

Image credits: Interscrobal ridge: Hansson (1990). Sublateral groove: Schauff (1985b).

## Problems and possible difficulties in using this key.

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This is the first key that I am aware of in which the author has exhaustively listed the possible difficulties involved in using it. This is not to mean that these difficulties are permanent or insurmountable. It is hoped that greater knowledge and availability of material will gradually remove each of the problems listed here.

*Pediobius* has proven to be a difficult genus to characterize without leaving occasional exceptions. Boucek (1988) has made apparently the most successful attempt at characterizing the genus, but it is based upon negative character states in many cases. A dubiously placed specimen can be compared with the other genera listed in that key in order to test whether a specimen belongs in that genus or in one of its more narrowly-defined extralimital satellite genera.

Probably the first difficulty encountered by users of this key is in distinguishing Tetrastichines from other Eulophids. I have found it impossible to characterize Tetrastichines using universal or unique characters, or to even construct a simple logical formula or set of characters defining the group. Even the current solution, keying the subfamily to several different termini, is not entirely satisfactory because of the possibility of overlooked exceptions in every case. This problem will eventually be alleviated by keying Tetrastichines *genus by genus* (or genus-group) vs. the other subfamilies of Eulophidae, if no characters can be found to define the subfamily or divide it into significant groups.

Several Entedonine species constitute exceptions to the defining characters of the subfamily. These exceptions include species with numerous scutellar or submarginal vein setae. There is little I can do to alleviate this problem other than abolishing the use of subfamilies in this key, which is undesirable because it would probably reduce identification accuracy by adding complications difficult for the uninitiated to surmount. Fortunately, species violating both setal characters are not known from the Nearctic.

Certain Entedonine genera, namely *Closterocerus*, *Omphale*, and *Perditorulus*, are ultimately only identifiable once specimens have been slide-mounted, and even this sometimes works only for males. This problem is regrettable, but only partially avoidable. The other characters provided for distinguishing these genera are only reliable to a point, and any serious attempts at identification of these genera requires slide-mounting. With a certain level of expertise, species of these genera can be sight-identified without resorting to slide-mounting. This is only recommended for workers who know what they are doing. A key to genera constructed according to those principles would become large and unwieldy due to the vast number of species that would have to be dealt with, and even then it would be unsatisfactory due to the large number of undescribed species that would inevitably be encountered.

*Achrysocharoides* vs. *Chrysocharis* is a difficult couplet because no unique or universal character exists for either genus, other than the scutellar pits for *Achrysocharoides*. It is hoped that the set of characters provided can serve to separate the genera as accurately as possible. The best solution to this problem appears to be an effective gestalt for the two genera, and familiarity with species-groups. This may eventually be reflected in the key, but I know too little about exceptional species of these two genera to produce a satisfactory set of criteria regarding them.

Roger A. Burks

last updated: October 5, 2003

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**Updates and time line.** Only major updates and changes in the content meaning of key couplets, diagnoses, or comparative information will be listed here.

5.x.2003. Version 1.5. Massive update, providing new information for every genus, new figures for several, and incorporating A.V. Gumovsky's (2001) taxonomic changes. The printable version is vastly improved, and is up to date again.

1.ii.2003. *Asecodes* and similar genera are updated, to better reflect the differences between this genus and *Closterocerus* especially, and also *Neochrysocharis*, *lonympha*, and *Omphale*. A major revision of the key is in process, in preparation for an expansion to world genera, as well as the upcoming addition of more original figures and a more accurate section distinguishing *Omphale*, *Closterocerus*, *Neochrysocharis*, *Asecodes*, and smaller related genera.

2.x.2002. Updated [couplet 4](#) of the subfamily key so that dwarf *Cirrospilus* and *Aulogymnus* should be more easily separable from Entedoninae. The junction between the submarginal and premarginal veins is more obviously broken in dwarf specimens of those two genera, so that one is better off relying upon the presence of parallel scutellar grooves, especially when the number of scutellar setae is not easily discernable. It is unfortunate that no perfect morphological differences between the *Cirrospilus* group and Entedoninae are apparent, but these steps should successfully separate all but perhaps a very few specimens.

22.vi.2002. Updated *Euplectrus* and *Platyplectrus* pages to reflect new observations concerning their distinction. Fixed links that open new pages so that they no longer need JavaScript, using the target function instead. This will make the site more easily navigable by those whose browsers do not use JavaScript, and allow several new pages to be open at once using these links, instead of just one.

16.vi.2002. Serguei V. Triapitsyn corrected the entry and key couplet for *Goetheana* to better reflect its generic limits. Particularly, the scape in males is only grossly enlarged in *G. shakespearei* Girault, not at all or only moderately so in other species.

11.vi.2002. Added statements about *Pediobius* and *Euplectrus* vs. *Platyplectrus* in the [problems](#) page. Revised the [justifications](#) page to more accurately reflect my attitudes and goals and remove problematic statements (which I apologize for).

17.v.2002. First uploading of the page onto the Internet.

10.iii.2002. Completion of version 1.0, including complete key to Nearctic genera of Eulophinae, Entedoninae and Euderinae.

## Acknowledgments

First, I thank my friends, bosses, and co-workers at the University of California at Riverside, who have been patient enough to discuss keying philosophy with me and listen to my lengthy rants. These include John Pinto, Gary Platner, John Heraty, Dave Hawks, Doug Yanega, Serguei Trjapitsyn, Jutta Burger, Tom Prentice, Kathleen Campbell, Jung-Wook Kim, Gevin Kenney, Matt Buffington, James Munro, Albert Owen, and Jeremiah George. John Heraty also reviewed the key pre-release and made many helpful suggestions that have been incorporated into the current version.

I also thank the people at The National Museum of Natural History Systematic Entomology Laboratory for allowing my visit and making it pleasant and productive, for the loan of specimens, and for discussing with me various taxonomic problems in the family and the philosophy and difficulties of constructing keys. These include Mike Schauff, Mike Gates, Eric Grissell, David Smith, Terry Nuhn, and Tami Carlow.

Finally, I thank the people at the entomological collections that I have visited and/or borrowed material from. This includes:

John Noyes, Andy Polaszek, Neil Springate, Stuart Hine, and Suzanne Lewis at The Natural History Museum, London.

Christer Hansson at Lund Museum, Sweden.

Jim Woolley at Texas A&M University.

Lynn Kimsey and Steve Heydon at the University of California, Davis.

Robert Zuparko at The California Academy of Sciences.

If I forgot anyone, please let me know and I will include you!

Roger A. Burks  
October 5, 2003

## References

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References are given in my own preferred format. Indentation has been avoided in order to provide for maximum readability across different computer platforms and window sizes. Each genus page has its own reference list, and figures taken from these references are cited on each page they are displayed on. It is perhaps more appropriate to call the references listed on each genus page a "works consulted" list, since not all of these references contain material used in the diagnoses, but are the essential works that should be consulted by workers interested in a particular genus. There is additionally a [master reference list](#) of all works cited in this key. The master list is the one used in citing sources of figures in the key and introductory material.

## Eulophid genus key: genus list & links

This page is where you should start if you want to key a genus backwards, starting from the couplet keying it and going step-by-step back to the first couplet. This is done using the **prev** links found on each page. Genera keying out more than once have **prev1**, **prev2**, etc. links for this purpose.

hop to: [home](#) [Euderinae](#) [Eulophinae](#)

### Genera unplaced to family

[Cales](#)

### Entedoninae

[Achrysocharoides](#)

[Alachua](#)

[Aleuroctonus](#)

[Ametallon](#)

[Callifrons](#)

[Ceranisus](#)

[Chrysocharis sensu strictu](#)

[Chrysocharis \(Zaommomyia\)](#)

[Chrysonotomyia](#)

[Closterocerus](#)

[Derostenus](#)

[Edovum](#)

[Emersonella](#)

[Entedon](#)

[Entedonastichus](#)

[Entedononecremnus](#)

[Eprhopalotus](#)

[Euderomphale](#)

[Goetheana](#)

[Grahamia](#)

[Holcopelte](#)

[Horismenus](#)

[Ionympha](#)

[Mestocharis](#)

[Neopomphale](#)

[Omphale](#)

[Paracrias](#)

[Pediobius](#)

[Perditorulus](#)

[Proacrias](#)

[Thripobius](#)

## **Euderinae**

[Acrias](#)

[Allocerastichus](#)

[Astichus](#)

[Carlyleia](#)

[Euderus](#)

[Hubbardiella](#)

[Parasecodella](#)

## **Eulophinae**

[Alveoplectrus](#)

[Aulogymnus](#) (includes *Olynx*, *Pseudolynx*, *Scotolinx*)

[Cirrospilus](#)

[Colpoclypeus](#)

[Cristelacher](#)

[Dahlbominus](#)

[Dasyeulophus](#)

[Deutereulophus](#)

[Diaulinopsis](#)

[Dicladocerus](#)

[Diglyphomorpha](#)

[Diglyphus](#)

[Dimmockia](#)

[Elachertus](#)

[Elasmus](#)

[Eulophus](#)

[Euplectromorpha](#)

[Euplectrus](#)

[Grotiusomyia](#)

[Hemiptarsenus](#) (includes *Notanisomorpha*)

[Hoplocrepis](#)

[Hyssopus](#)

[Microlycus](#)

[Miotropis](#)

[Necremnus](#)

[Notanisomorphella](#)

[Paraolinx](#)

[Platyplectrus](#)

[Pnigalio](#)

[Stenomesus](#)

[Sympiesis](#)

[Trichospilus](#)

[Xanthellum](#)

[Zagrammosoma](#)

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1. **Metacoxa grossly swollen and laterally flattened** (a1). Scutellum with triangular, laminar posterior projection (b1). Metatibiae with short, stout setae arranged brush-like in either diamond-shaped patterns or parallel rows (a1). Body wedge-shaped. Forewing elongate and narrow, with marginal vein approaching submarginal vein length, many times longer than the very short stigmal and postmarginal veins.

Eulophinae: [Elasmus Westwood, 1833](#)

1'. Metacoxa not grossly swollen or flattened against body. Scutellum without laminate posterior projection. Metatibiae often with bristles and setae, but not arranged in patterns or tight rows. Body rarely wedge-shaped. Forewing usually not shaped as above, with submarginal vein usually longer to nearly as long as marginal vein; stigmal and postmarginal veins relatively longer.

[couplet 2](#)



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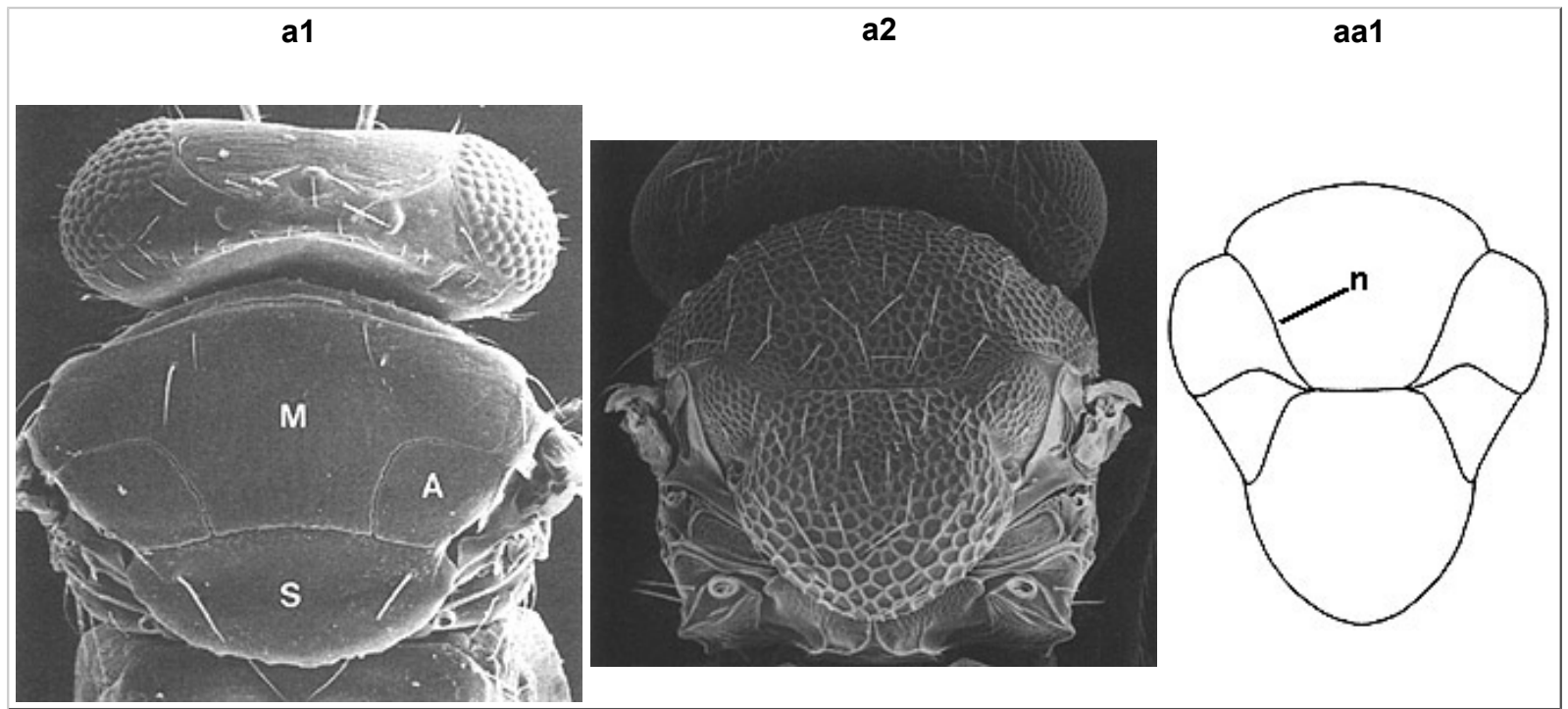
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2. Tiny (about 1mm), stout-bodied wasps ([a1](#), a2) with mesoscutum (a1: m) very broad, essentially hiding pronotum from dorsal view **and** scutellum (a1: s) projecting posteriorly over metanotum and medial part of propodeum, hiding them from dorsal view. Notauli absent, but axillar grooves (axilla=a1: a) often resembling notauli curving at right angles; scutellum with 2 or more pairs of setae (which may be very tiny).

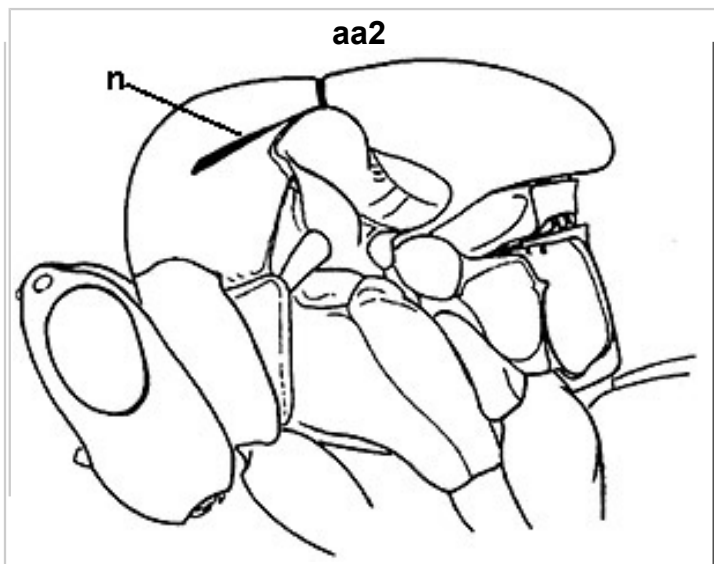
[Entedoninae: Euderomphalini](#)

2'. Usually larger wasps. Pronotum **and** medial part of propodeum almost never hidden from dorsal view, but if so, then notauli obvious and complete ([aa1](#): n. *Eprhopalotus*) or indicated ([aa2](#): n. Euderinae: *Hubbardiella*) only in posterior half of mesoscutum. Scutellum with 1 pair of setae in similarly tiny Entedoninae.

[couplet 3](#)



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Image credits: a1, a2: LaSalle & Schauff (1994). aa1: Schauff (1991). aa2: Schauff, et al (1997).

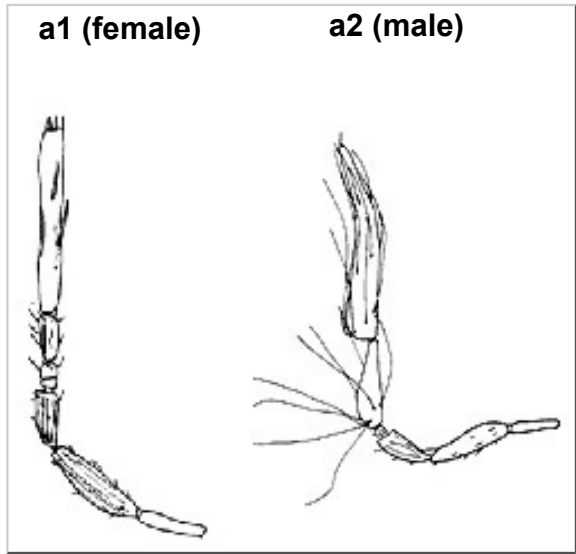
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3. Flagellum ([a1](#), [a2](#)) 3- or 4-segmented, including an elongate club. Petiole ([b1](#)), broadly joined to propodeum (about the same width as propodeum); gaster never petiolate. **Submarginal vein with 1 dorsal seta** ([c1](#): s). Very small, poorly sclerotized wasps without metallic coloration or pitted sculpture.

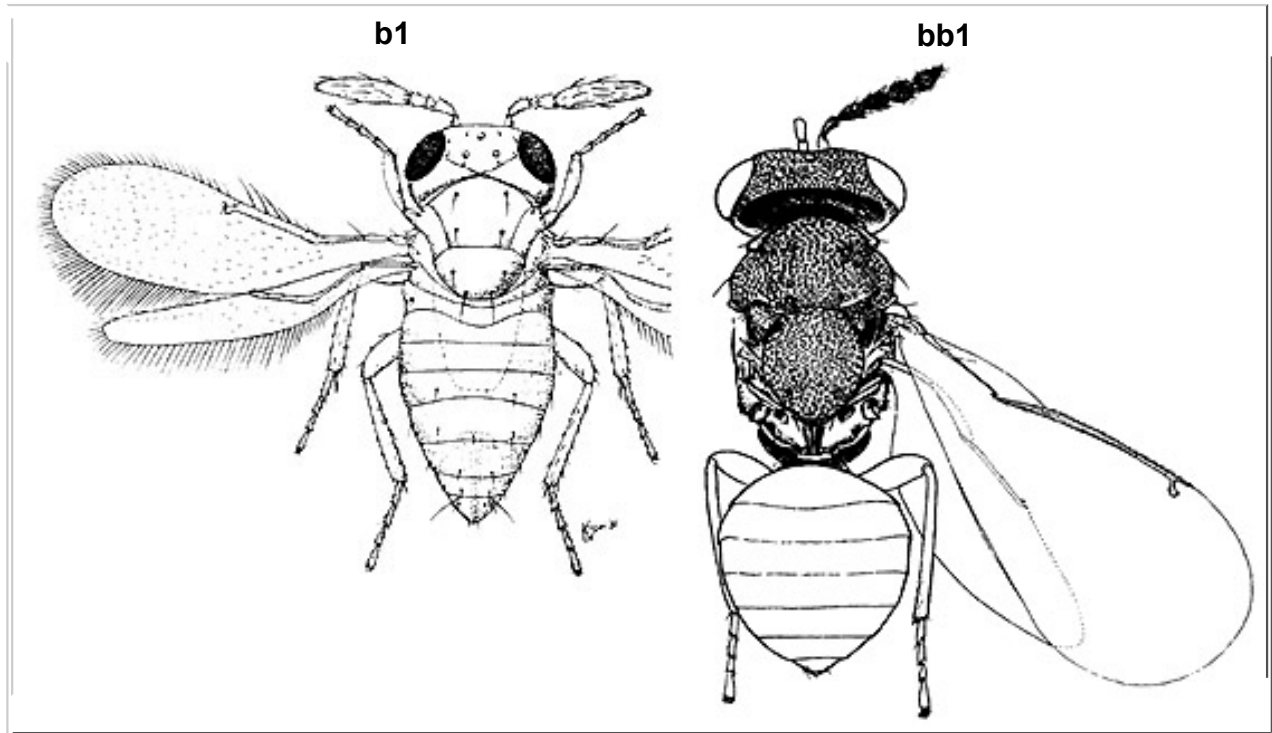
[Cales Howard, 1907](#) [genus unplaced to family in Chalcidoidea]

3'. Flagellum almost always with more than 4 segments. Metasoma not broadly joined to propodeum ([bb1](#)), gaster constricted at petiole or strongly petiolate. Submarginal vein ([cc1](#): s) usually with 2 or more dorsal setae. Most species larger, well-sclerotized, with pitted sculpture ([bb1](#)) and/or black or metallic colored, except for some Entedoninae (most notably, the *Ceraninus* group).

[couplet 4](#)



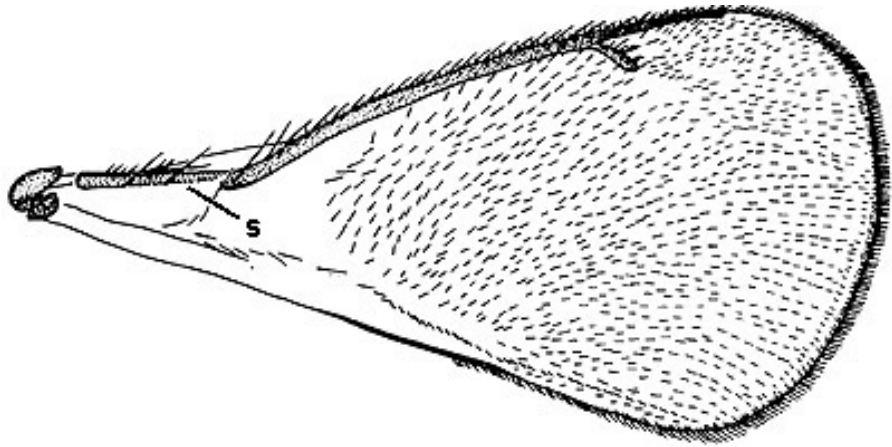
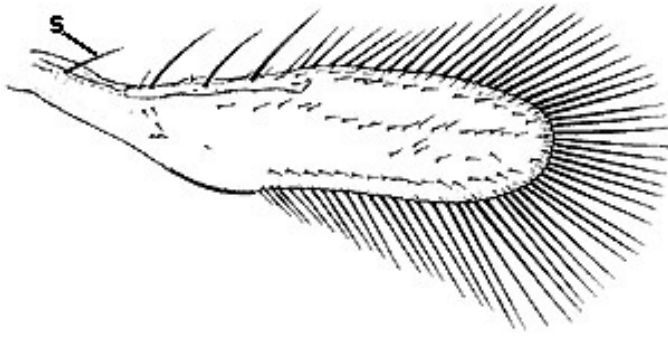
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[back to top](#)

c1

cc1



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Image credits: a1-2: Hayat (1983). c1: Woolley (1997). b1: Viggiani & Carver (1988). bb1: Boucek (1988). cc1: Schauff (1991).

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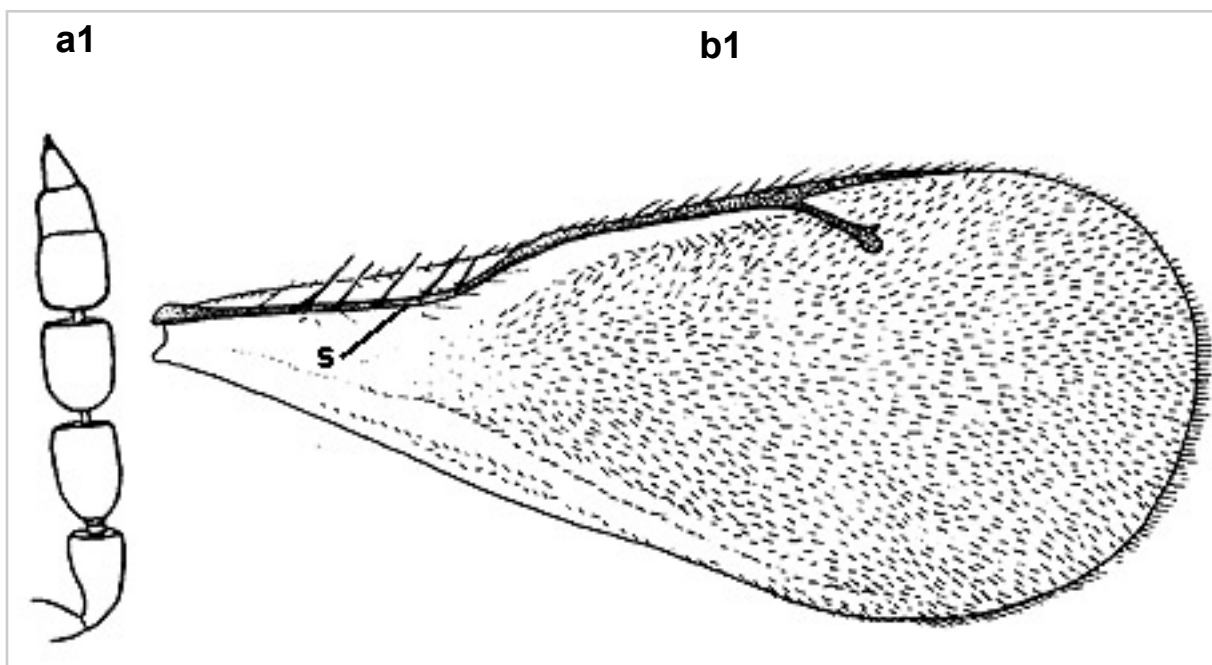
4. Antenna (a1) with only 2 funicular segments **and** submarginal vein (b1: s) smoothly meeting premarginal vein (except in some *Aulogymnus*), with more than 2 dorsal setae, **and** scutellum ([c1](#)) with 2 pairs of setae.

note: Some *Aulogymnus* and some very small specimens of *Cirrospilus* do not place well in this couplet because the junction between the submarginal and premarginal veins is broken. They always have 3 or more submarginal vein setae, **and** 2 pairs of scutellar setae, **and** parallel or subparallel dorsal scutellar grooves that do not curve to meet posteriorly (as in [d1](#)), **and** 2 funicular segments (for all *Cirrospilus* and all applicable species of *Aulogymnus*).

[Eulophinae: \*Cirrospilus\* group](#) and convergent species

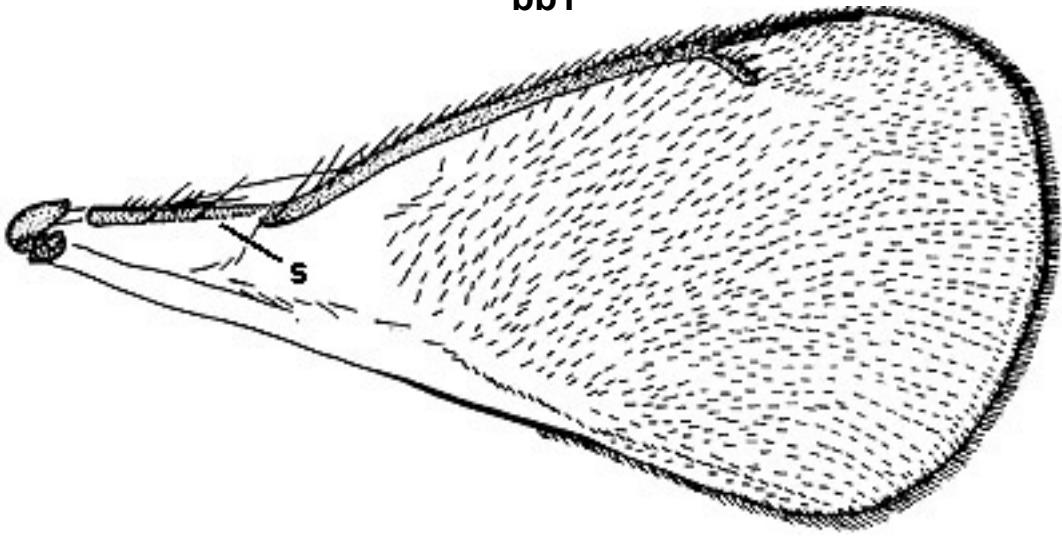
4'. **If** antenna with 2 funicular segments, **then** submarginal vein ([bb1](#): s) not smoothly meeting premarginal vein (ie: parastigma projecting far posteriad of submarginal vein and their junction broken) **and** scutellum ([cc1](#)) almost always with 1 pair of setae.

[couplet 5](#)



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**bb1**

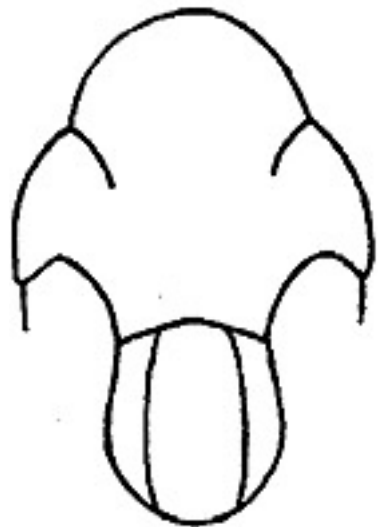
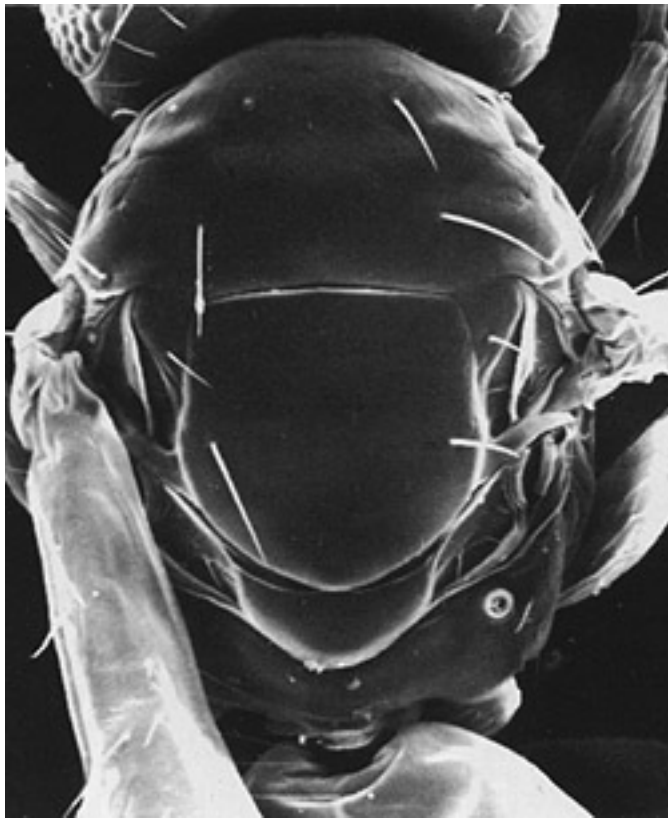
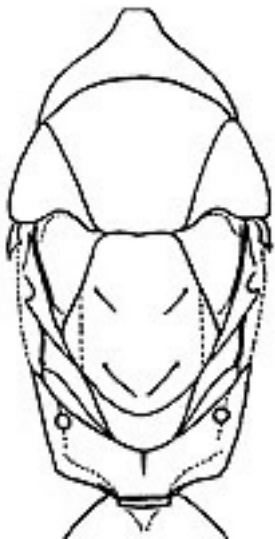


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**c1**

**cc1**

**d1**



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Image credits: a1, c1, d1: Askew (1968). b1: Schauff (1991). bb1: Schauff, et al. (1997). cc1: Trjapitsyn & Headrick (1995).

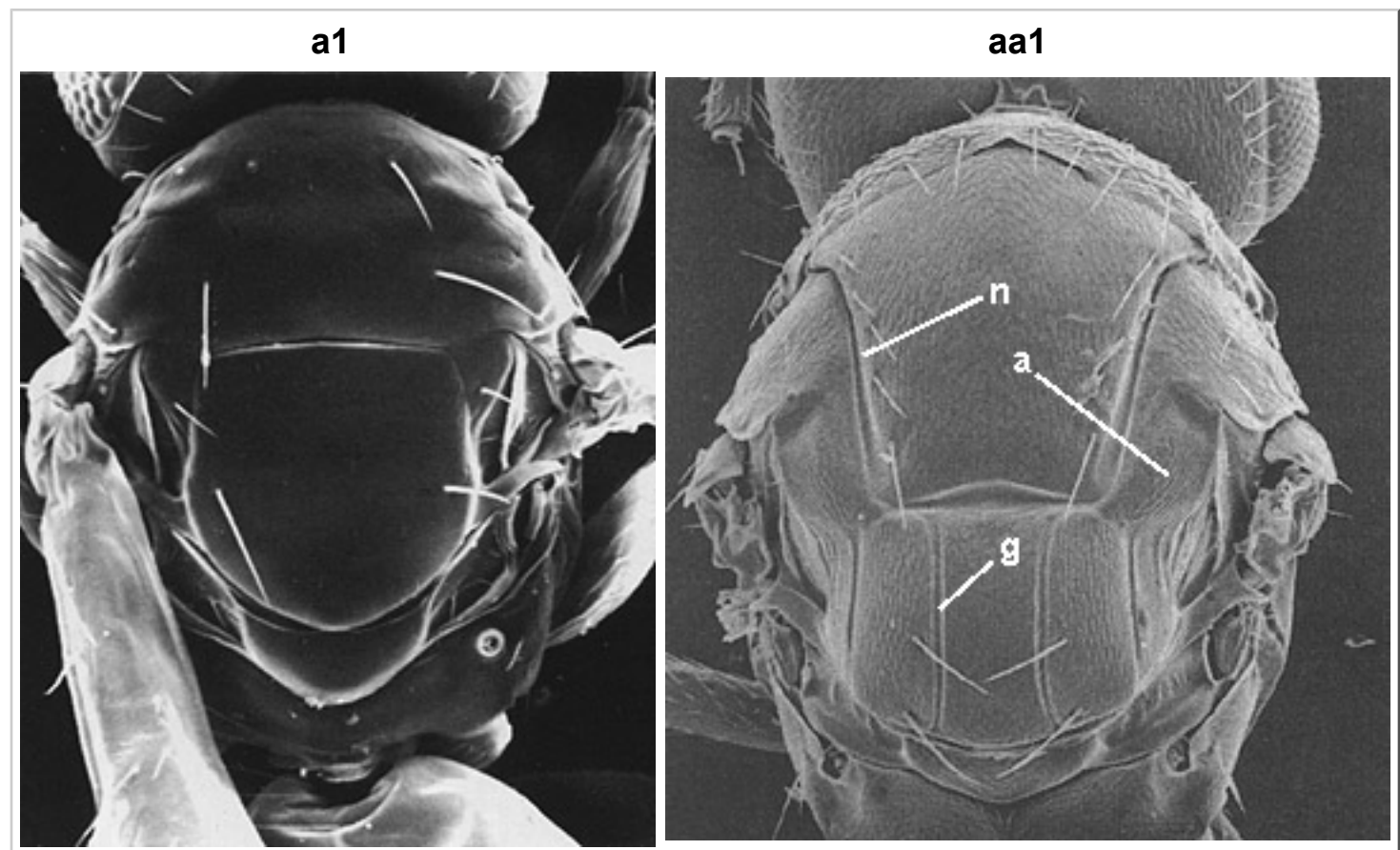
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5. Scutellum with 1 pair of dorsal setae ([a1](#)). [Submarginal vein not smoothly merging with premarginal vein, almost always with only 2 dorsal setae. Usually 5 or fewer flagellomeres beyond anelli.]

almost all [Entedoninae \(excluding Euderomphalini\)](#)

5'. Scutellum with 2 or more pairs of dorsal setae ([aa1](#)) [or setae too small to locate or count].

[couplet 6](#)



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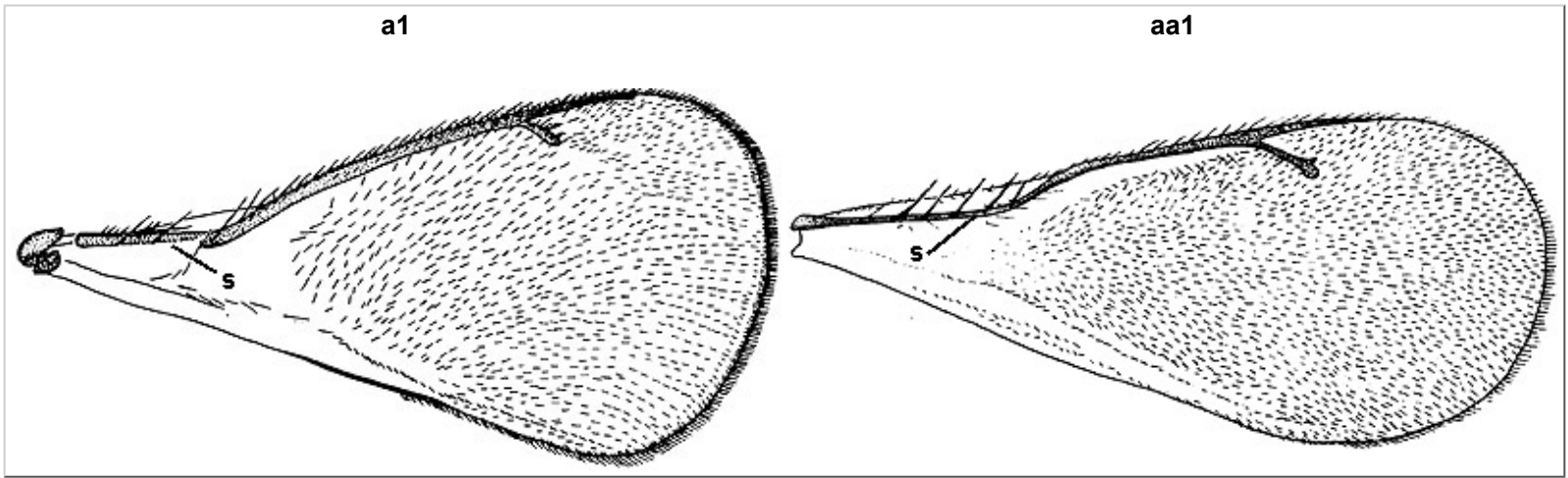
Image credits: a1: Trjapitsyn & Headrick (1995). aa1: Schauff, et al. (1997).

6. Submarginal vein (a1: s) with only 1 or (more commonly) 2 dorsal setae, never smoothly meeting premarginal vein.

[couplet 7](#)

6'. Submarginal vein (aa1: s) with 3 or more dorsal setae, often (some Eulophinae) smoothly meeting premarginal vein, **or** specimen brachypterous or apterous.

[couplet 8](#)



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Image credits: a1: Schauff (1991). aa1: Schauff, et al. (1997).

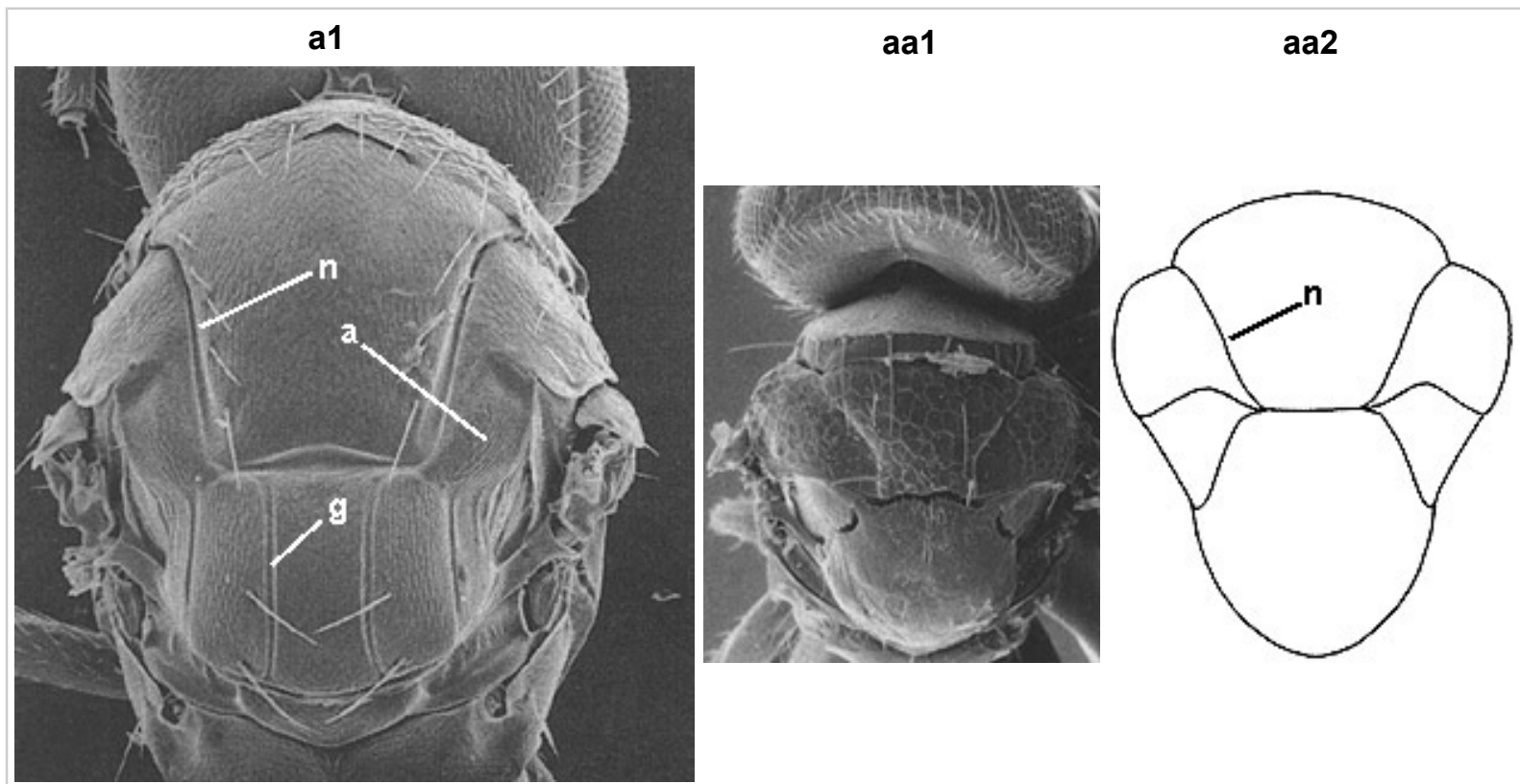
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7. Notauli ([a1](#): n) complete as straight, deep, linear grooves. Scutellum usually with parallel submedian grooves (a1: g). Usually half or more of dorsal axillar surface (a1: a) advanced anteriorly of scutellar margin.

some Tetrastichinae [Not keyed at this time. See Schauff, LaSalle, & Coote, 1997]

7'. Notauli almost always absent or incomplete, sometimes reaching scutellar margin as greatly broadened troughs or carinae converging sharply posteriorly ([aa1](#)), **but** if complete as vaguely or distinctly linear grooves ([aa2](#): n) then scutellum without a pair of parallel grooves **and** less than half of dorsal axillar surface advanced anteriorly of scutellar margin.

a very few exceptional [Entedoninae](#)



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Image credits: a1: Schauff, et al. (1997). aa1-2: Schauff (1991).

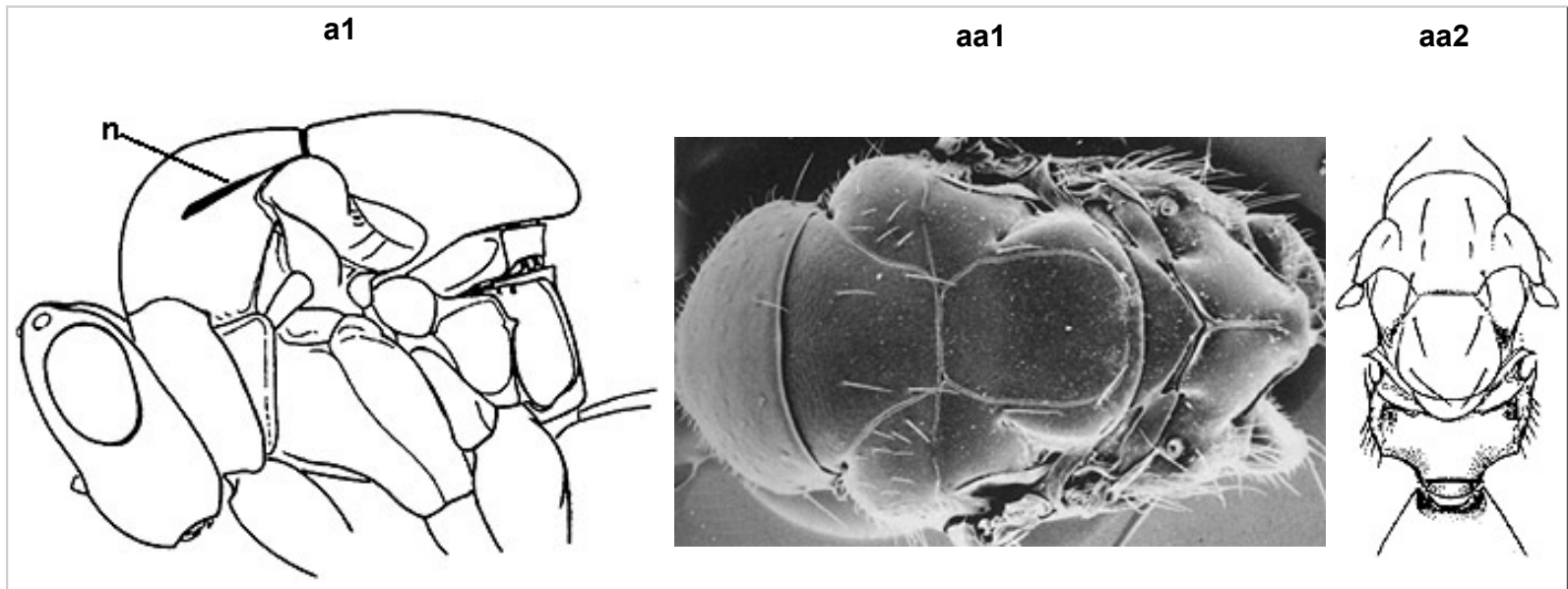
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8. Pronotum not visible in dorsal view (a1), scutellum projecting shelflike over the nearly vertical propodeum. Notauli (a1: n) distinct but present only in posterior part of mesoscutum.

[Euderinae: \*Hubbardiella\* Ashmead, 1904](#)

8'. Pronotum visible in dorsal view, usually with distinct horizontal collar. Scutellum not projecting over propodeum. Notauli complete (aa1), absent, or present in anterior half of mesoscutum (aa2).

[couplet 9](#)



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Image credits: a1: Schauff, et al. (1997). aa1: Schauff (1985c). aa2: Boucek (1988).

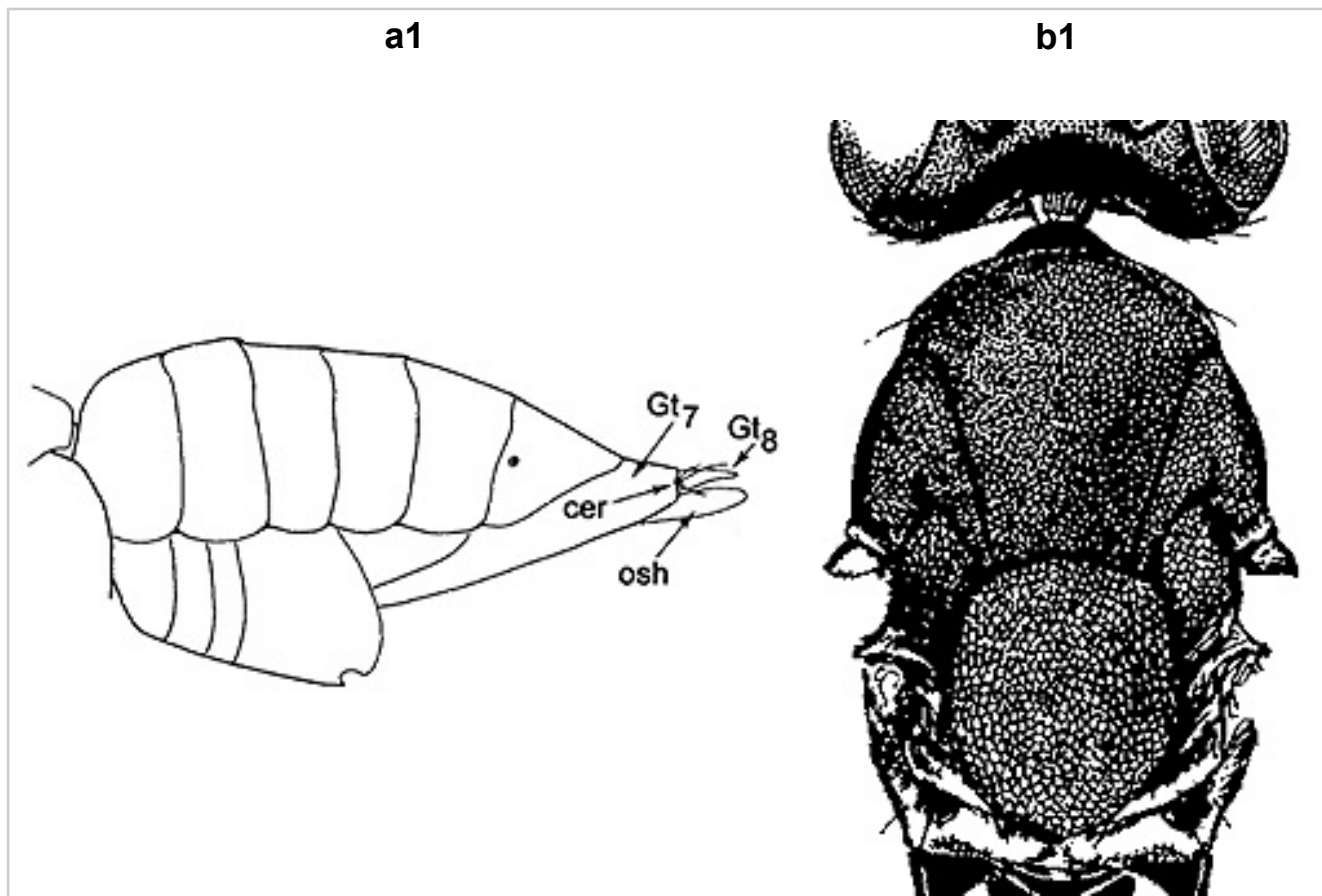
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9. Gaster ([a1](#)) with 8 distinctly separated tergites in females (7 in males), the 8th tergite present as an epipygium [spiracles always present on Gt6--use it as easy landmark]. Forewing ([d1](#)) usually with rows of setae radiating from stigma and always with an entirely exposed row of admarginal setae. Notauli distinctly complete ([b1](#)); scutellum **never** with submedian or sublateral grooves. Antenna ([c1](#), [c2](#)) always with 7 postanellar flagellomeres (5 funiculars and 2 clavals, or 4 funiculars and 3 clavals, though apical segment often very small).

[Euderinae](#)

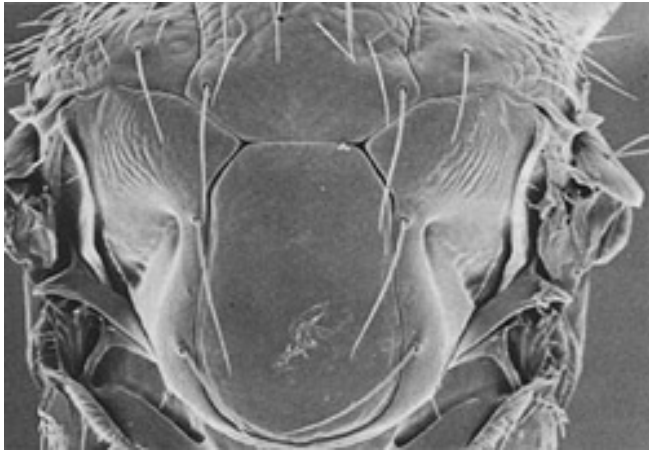
9'. Gaster with 7 distinctly separated tergites in females and males, epipygium absent. Notauli often incomplete (Eulophinae). Scutellum ([bb1](#), [bb2](#)) often with submedian or sublateral grooves. Forewing ([dd1](#)) without rows of setae radiating from stigma, usually with a long row of admarginal setae, but dorsal surface of wing with setae covering the area so that they are not exposed. Antenna frequently with fewer than 7 postanellar flagellomeres (4 funiculars and 2 clavals, or 3 funiculars and 3 clavals).

[couplet 10](#)



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**bb1**



**bb2**

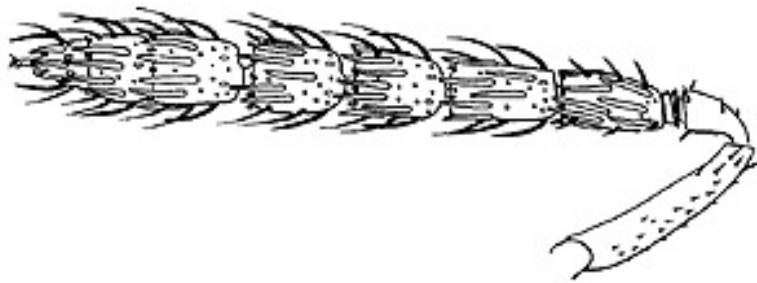


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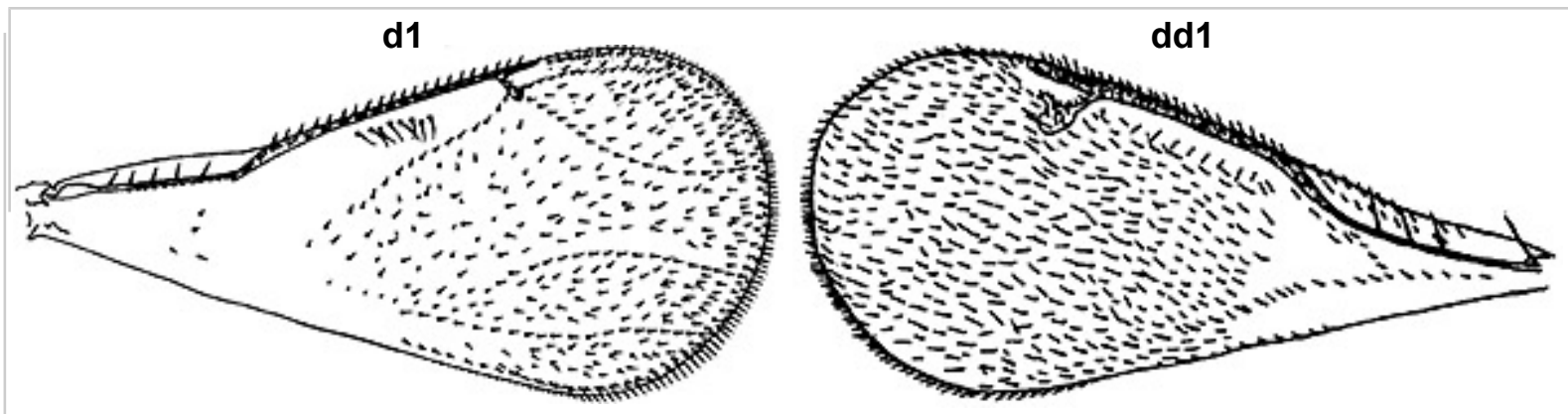
**c1**



**c2**



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Image credits: a1, c1-2, d1: Coote (1994). b1: Boucek (1988). bb1: Schauff (1985b). bb2, cc1: Schauff, et al. (1997). dd1: Schauff & LaSalle (1993).

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10. Postmarginal vein (a1) 0.75x or less stigmal vein length **and** notauli ([b1](#): n) complete as deep, linear grooves.

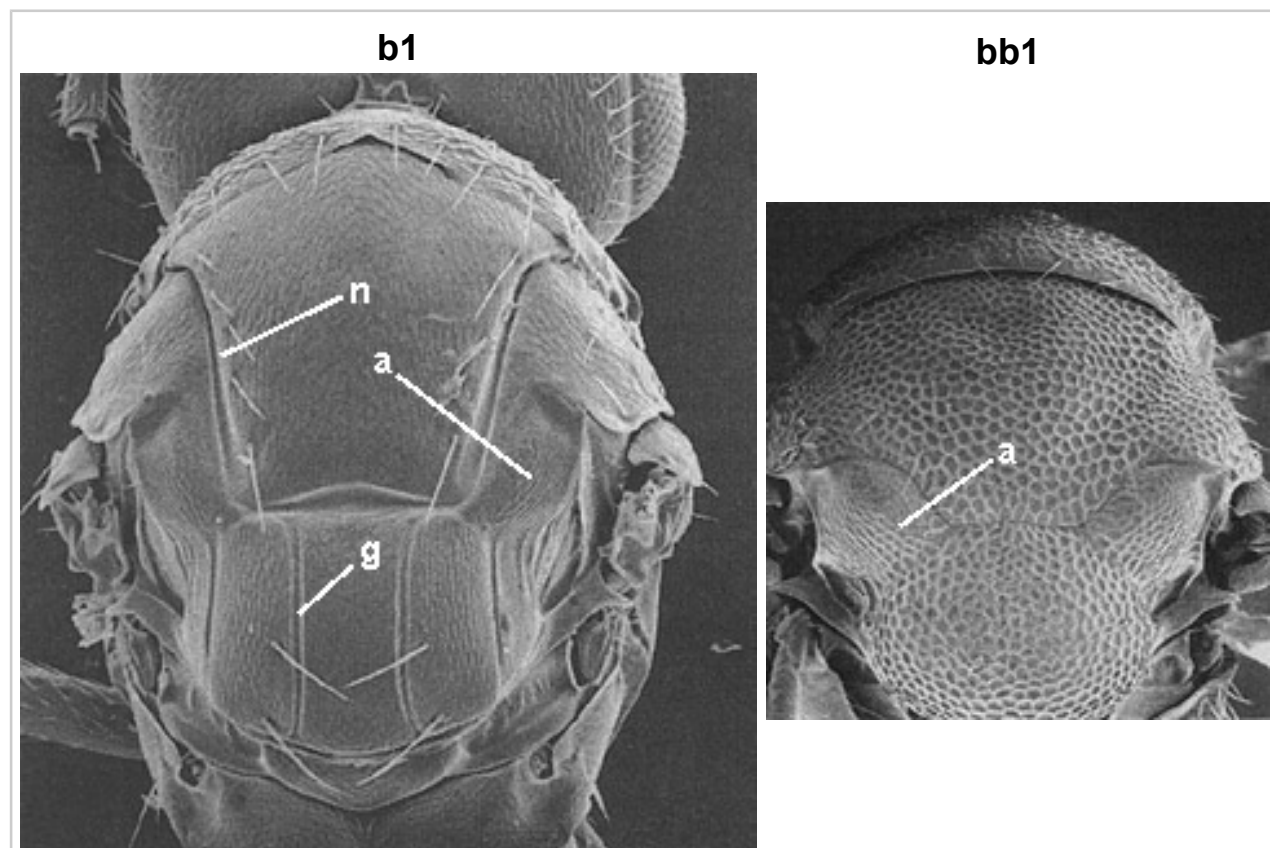
almost all Tetrastichinae [Not keyed at this time. See Schauff, LaSalle, & Coote, 1997]

10'. Postmarginal vein (aa1) > 0.75x stigmal vein length, **and/or** notauli incomplete ([bb1](#)). [or specimen brachypterous or apterous]

[couplet 11](#)



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Image credits: a1, b1, bb1: Schauff, et al. (1997). aa1: Boucek (1988).

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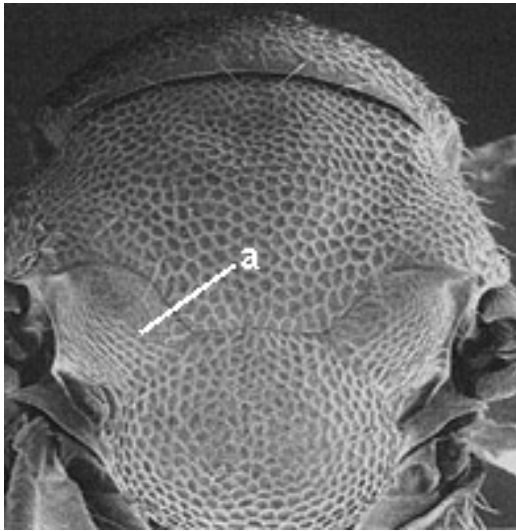
11. Notauli incomplete ([a1](#)).

[Eulophinae \(part\)](#)

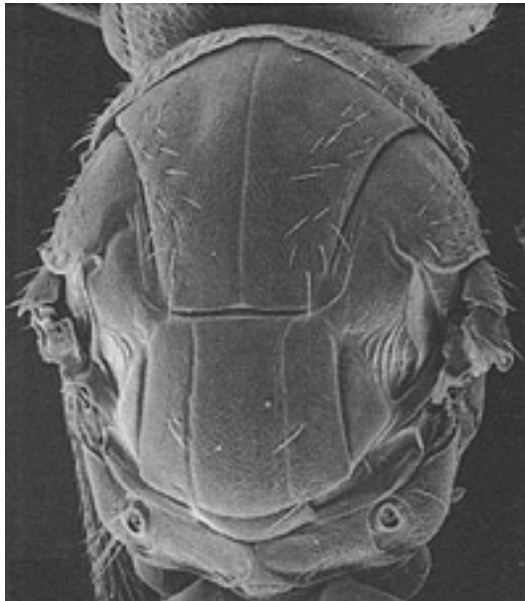
11'. Notauli complete ([aa1](#), aa2)

[couplet 12](#)

**a1**



**aa1**



**aa2**



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Image credits: Schauff, et al. (1997).

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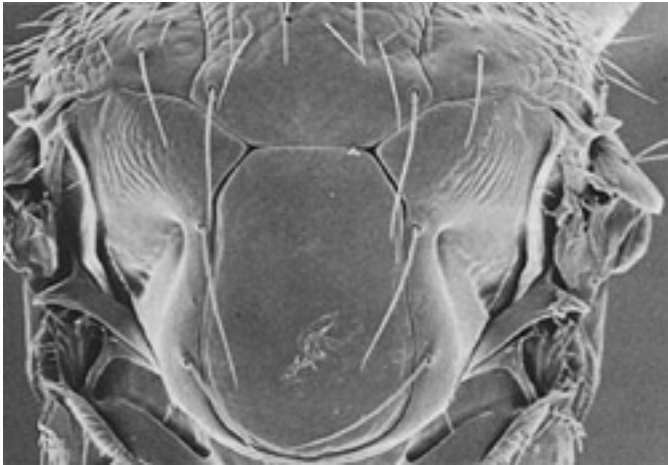
12. Scutellum with sublateral grooves (**not** axillular grooves) curving posteriorly at scutellar apex to meet or almost meet medially (a1).

most remaining [Eulophinae](#)

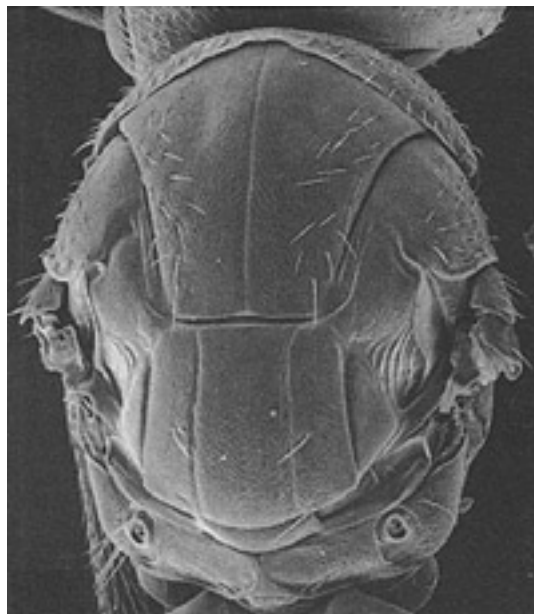
12'. Scutellum without grooves at all, or with parallel submedian or sublateral grooves (aa1).

[couplet 13](#)

**a1**



**aa1**



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Image credits: a1: Schauff (1985b). aa1: Schauff, et al. (1997).

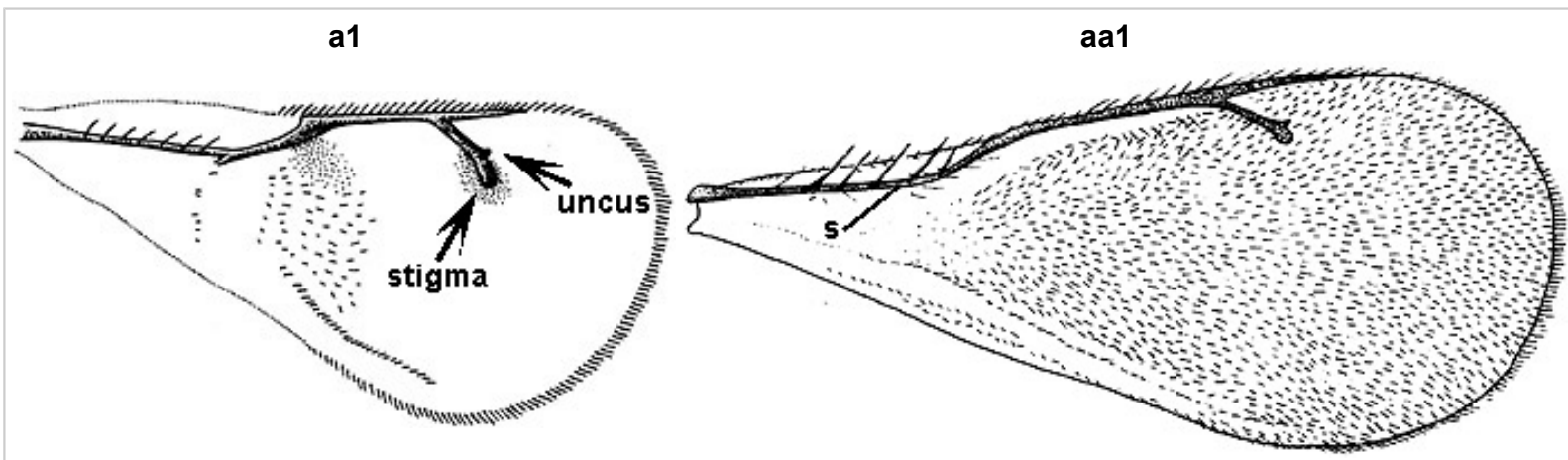
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13. Stigma elongate and bulbous: uncus arising 2x or more its own length from stigmal apex ([a1](#)).

Eulophinae: [Aulogymnus Förster, 1851](#)

13'. Stigma not elongate: uncus arising less than 2x its own length from stigmal apex ([aa1](#)).

[couplet 14](#)



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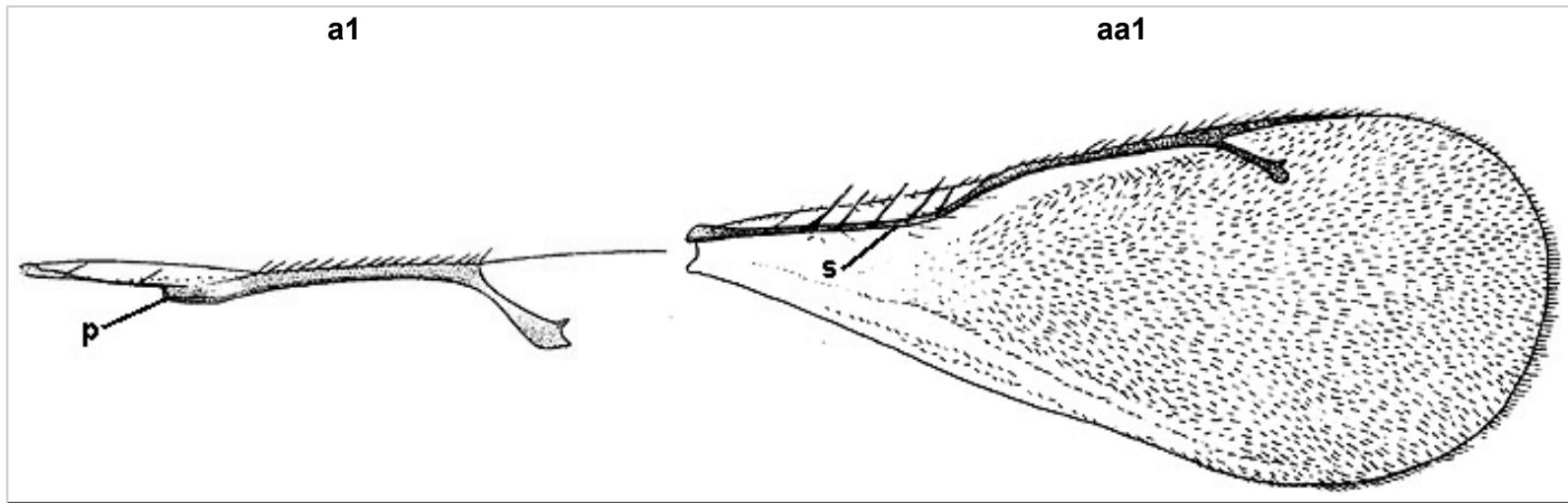
Image credits: a1: modified from Pujade i Villar (1991). aa1: Schauff, et al. (1997).

14. Females with 3 funicular segments; antenna often with 3 or more anelli. Submarginal vein (a1) not smoothly meeting premarginal vein because parastigma (a1: p) extends strongly posteriad of submarginal vein. Scutellum (b1) with some sculpturing (raised or sunken). Flagellomeres (c1) symmetrical in males.

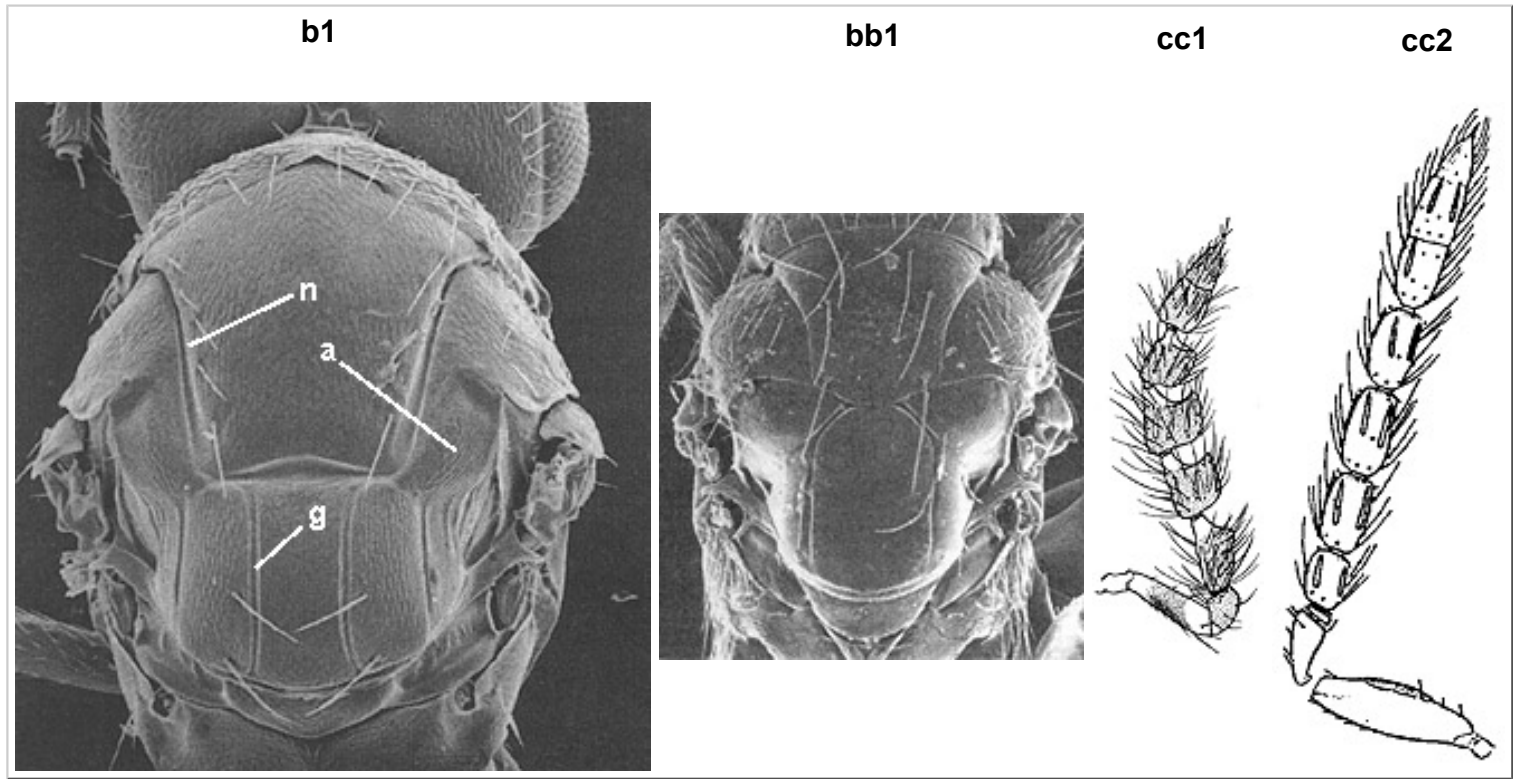
a few Tetrastichinae [Not keyed at this time. See Schauff, LaSalle, & Coote, 1997]

14'. Females with 4 funicular segments; antenna never with more than 2 anelli. Submarginal vein (aa1: s) smoothly meeting premarginal vein, or only a small extension where basal vein meets parastigma. **Either** scutellum smooth and shiny except for sublateral grooves (bb1) **or** flagellomeres asymmetrical (serrate or lobate) in males (cc1).

a few [Eulophinae](#) (*Miotropis*, *Paraolinx*, and possibly some *Grotiusomyia*)



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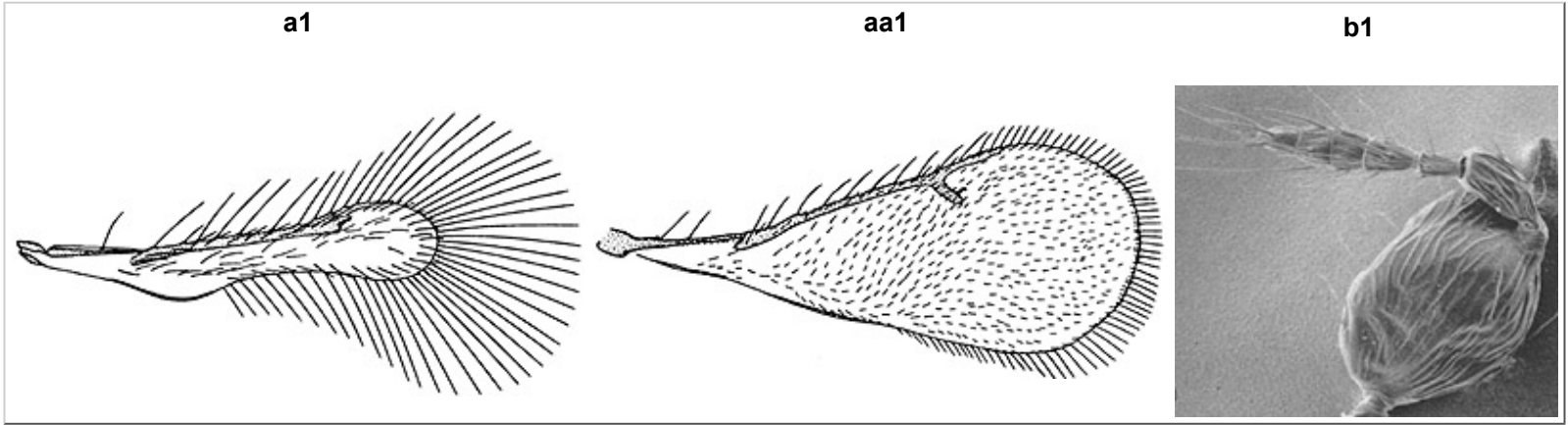
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1. Forewing (a1) very narrow, with fringe setae longer than maximum width of forewing membrane. Scape (b1) grossly swollen in males (only in *G. shakespearei*, the only species known from the Nearctic).

[Goetheana Girault, 1920](#)

1'. Forewing (aa1) not so narrow, much broader (at least 2x broader) than length of longest fringe setae. Scape rarely swollen (notable exception is some male *Ceranisus*).

[couplet 2](#)



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Information on this page corrected by Serguei V. Triapitsyn (June 14, 2002).

Image credits: a1, aa1, b1: Schauff (1991).

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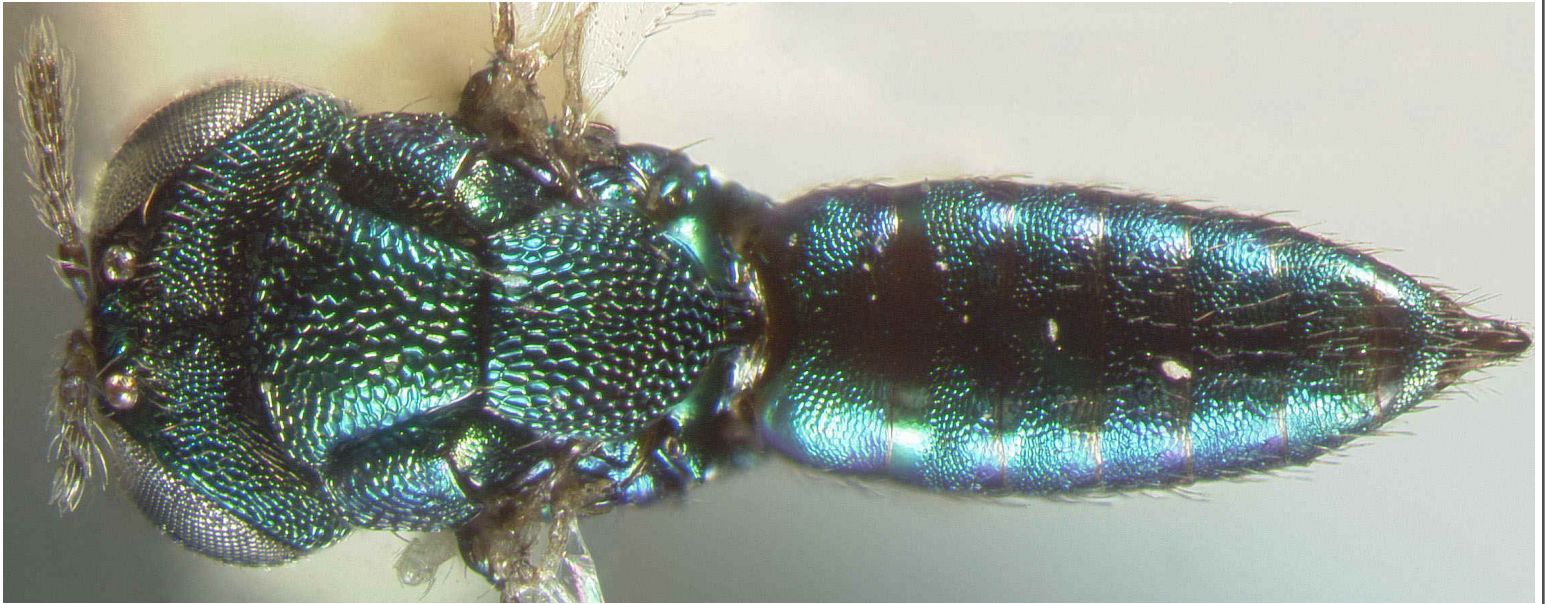
2. Notauli complete as narrow grooves ([a1](#)) **and** pronotum without a collar, essentially hidden from dorsal view by mesoscutum. Propodeum very short medially, but with median carina flanked by grooves and a supracoxal flange ([b1](#)). [Scutellum projecting posteriorly over median area of propodeum.]

[\*Eprhopalotus\* Girault, 1916](#)

2'. Notauli seldom complete as distinct grooves, often absent. Pronotum usually not hidden from dorsal view. Propodeum variable, but never as above and without such structures when similarly short.

[couplet 3](#)

**a1**



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**b1**



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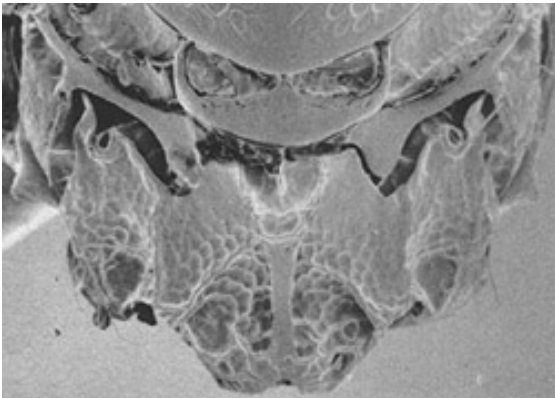
3. Median carina of propodeum forming a cup-shaped structure (a1) anteriorly **and** propodeum with triangular lateral invaginations (a1, a2) that the metanotum projects into conspicuously.

[Mestocharis Förster, 1878](#)

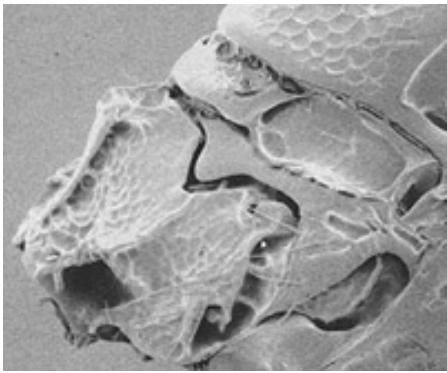
3'. Median carina of propodeum rarely forming a cup-shaped structure (similar form in some species of *Chrysocharis* (aa1) with anteriorly split median carina). Propodeum **never** with similar invaginations.

[couplet 4](#)

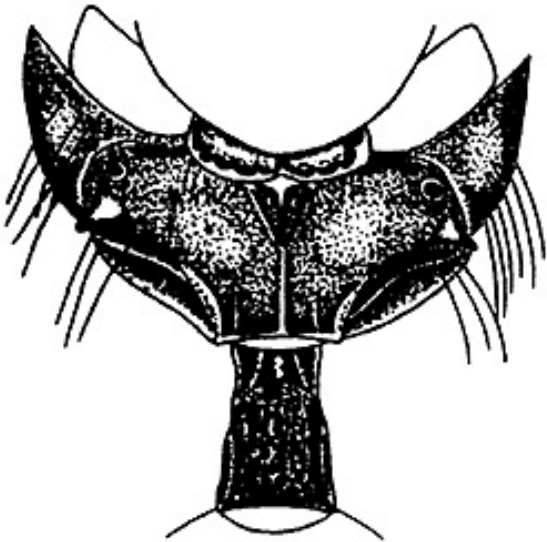
a1



a2



aa1



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Image credits: a1, a2: Schauff (1991). aa1: Hansson (1985a).

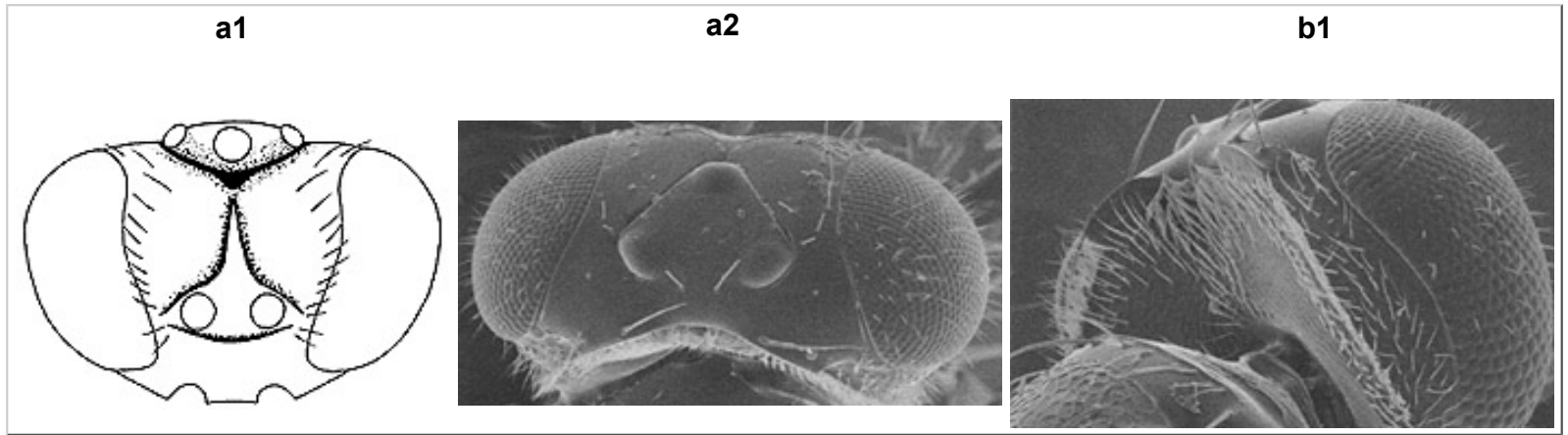
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4. **Ocellar triangle surrounded** (at least anteriorly) **by close-fitting sutures** (a1, a2) **and** temples and occiput densely covered with conspicuous white setae (a2, b1). Clypeus (a1) with a truncate median projection flanked by deep incisions. **Vertex** (b1) **with medially interrupted dorsal carina**.

[\*Derostenus\* Westwood, 1833](#)

4'. Ocellar triangle not surrounded by close-fitting sutures. Temples and occiput without similar whitish setae. Clypeus not flanked by incisions. Vertex not carinate **or** carina not medially interrupted.

[couplet 5](#)



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Image credits: a1: Hansson (1986b). a2, b1: Schauff (1991).

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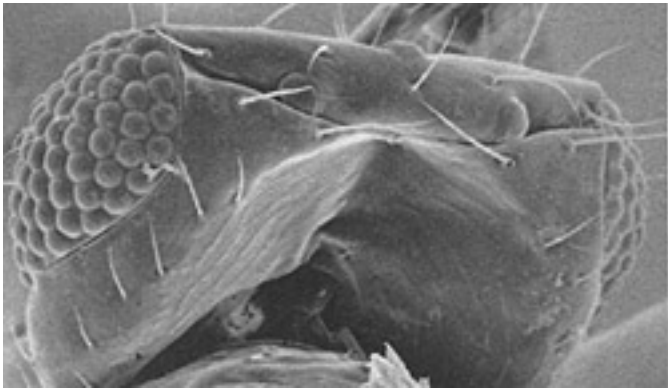
5. Head with complete suture across vertex ([a1](#), difficult to assess when head collapsed, but no other satisfactory characters exist).

[couplet 6](#)

5'. Head without suture across vertex.

[couplet 8](#)

**a1**



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Image credits: Schauff (1991).

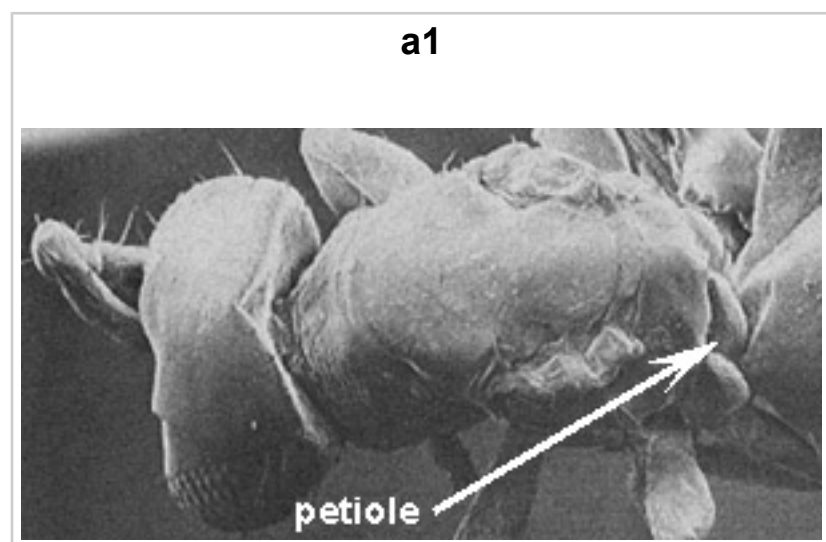
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6. **Petiole conspicuous, quadrate to longer than broad** (a1). Fringe setae about 0.5x forewing width in macropterous forms; some females (a1) brachypterous. [Malar sulcus split ventrally, fronto-facial sutures extending above median ocellus to near top of eye]

[\*Entedonastichus\* Girault, 1920](#)

6'. Petiole much broader than long, not conspicuous. Fringe setae usually shorter than 0.5x forewing width; no known brachypterous forms. [Malar sulcus split and fronto-facial sutures extending to near top of eye in *Thripobius*, but not in *Ceranisus*].

[couplet 7](#)



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Image credits: modified from Yoshimoto (1981).

7. Malar sulcus ([a1](#)) simple, not split. Fronto-facial sutures reaching eyes at level of median ocellus.

[\*Ceranisus\* Walker, 1842](#)

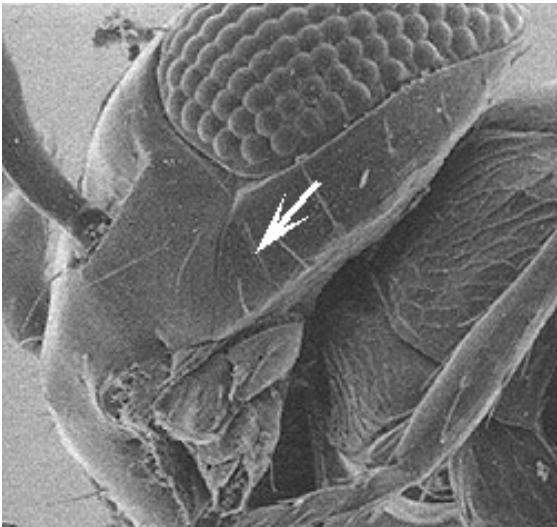
7'. Malar sulcus ([aa1](#)-posterior branch of sulcus indicated, [bb1](#)) split ventrally (when discernable). Fronto-facial sutures ([bb1](#)) extending to near top of eye, sometimes ending in the suture crossing the vertex.

[\*Thripobius\* Ferrière, 1938](#)

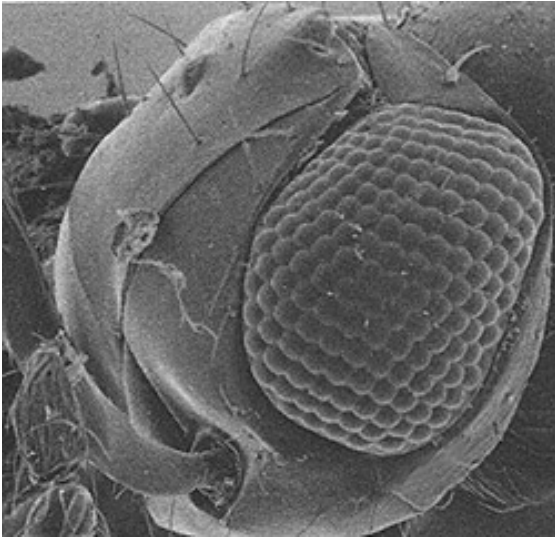
a1



aa1



bb1



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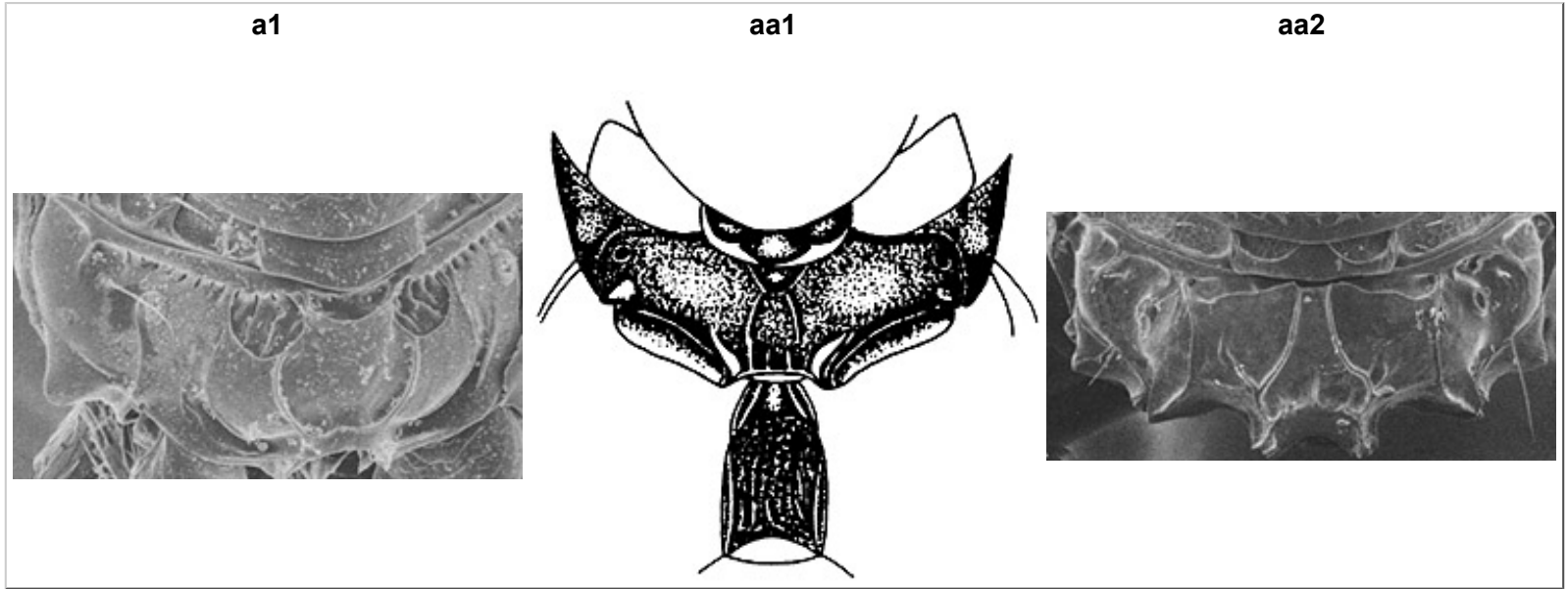
Image credits: a1: Trjapitsyn & Headrick (1995). aa1, bb1: Schauff (1991).

8. Propodeum with a pair of shallow anterior cavities ([a1](#)) revealing longitudinal wrinkle-like sculpture (sometimes the borders of the cavities are not evident). Face ([b1](#)) with transverse frontal groove straight or arched, not v-shaped; scrobal sulci uniting before reaching transverse fronto-facial groove. Lateral lobe of metanotum (sunken area between dorsellum and hind wing cavity) crossed by a longitudinal carina.

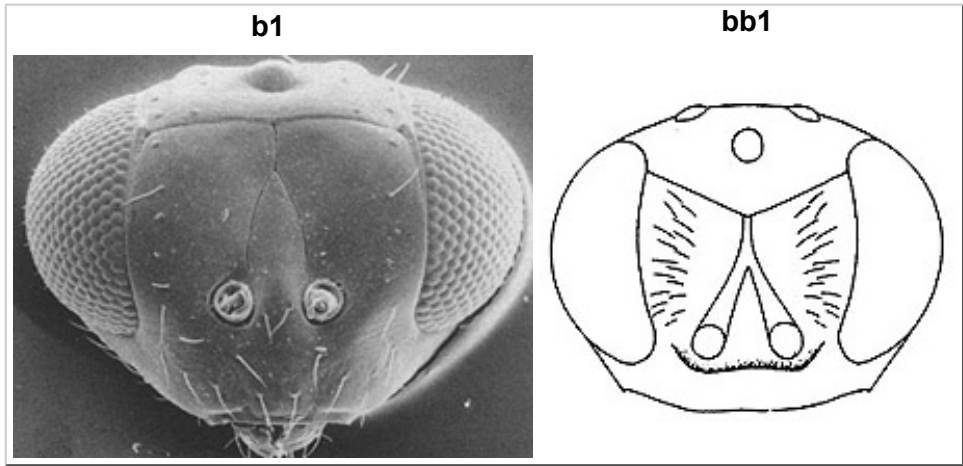
[Emersonella Girault, 1916](#)

8'. Propodeum carinae variable, but never with such wrinkle-like sculpture at the same spot. Lateral lobe of metanotum without carina. Face variable, but not as above in similar genera.

[couplet 9](#)



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9. Pronotal collar carinate ([a1](#)), **and** petiole with at least a dorsal anterior shelf and often the entire base encircled by a complete flared carina ([b1](#)), **and** face with transverse frontal suture \\_/ shaped, with the scrobal grooves reaching it separately as sulci not marking points of facial collapse ([c1](#)), **and** propodeum with plicae and a median carina, raised strip, or pair of carinae ([d1](#)), **and** first gastral sternite rigid and not collapsing when dried, more convex than the following tergites ([b1](#)). Propodeum in most species with diverging submedian carinae or a posteriorly split median carina, but many Neotropical species with a raised, flat, smooth median strip. First gastral sternite with a strongly sclerotized, reticulate area at petiolar base ([b1](#)).

[Pediobius Walker, 1846](#)

9'. Characters not present in combination. Especially, petiole usually without anterior shelf. Most species without divergent submedian carinae on propodeum. Gaster in some similar genera (especially [Proacrias](#)) more weakly sclerotized and first tergite not forming a rigid structure ([bb1](#)).

[couplet 10](#)

a1



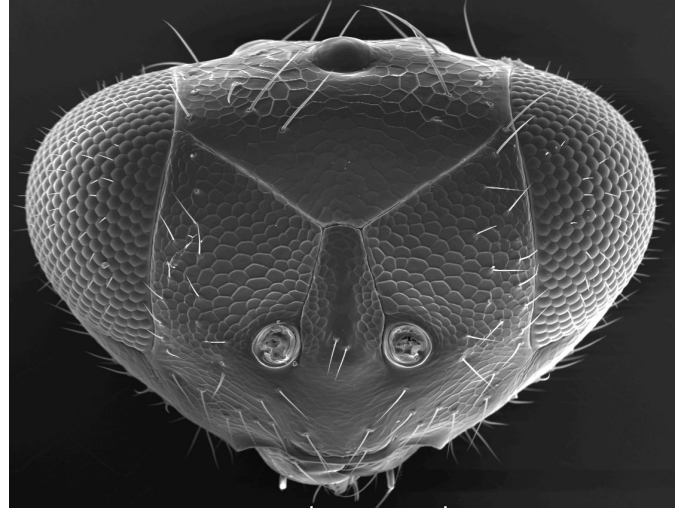
b1



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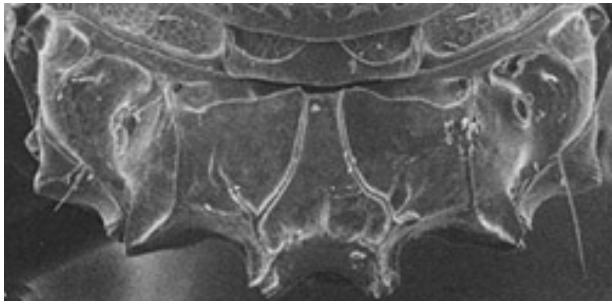
bb1

c1



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**d1**



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Image credits: a1, c1: Schauff (1991). aa1: Hansson (1986a). aa2: Hansson (1985a).

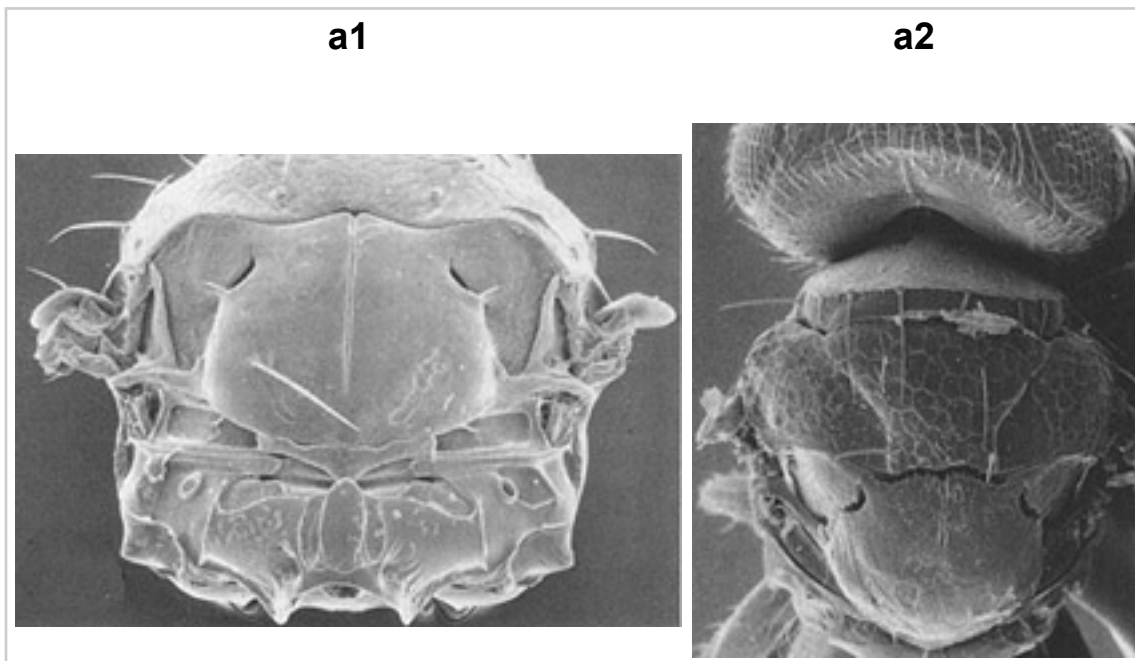
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10. Large pit present on dorsal part of axillar-scutellar suture ([a1](#), [a2](#)). Pronotal collar anteriorly carinate, vertex not sharply margined posteriorly ([a2](#)). Propodeum with a median raised flat strip ([a1](#)) instead of a median carina in all except *Alachua*. Scutellum with a median groove in most species. Transverse frontal groove \\_ / shaped, with scrobal grooves meeting it separately.

[couplet 11](#)

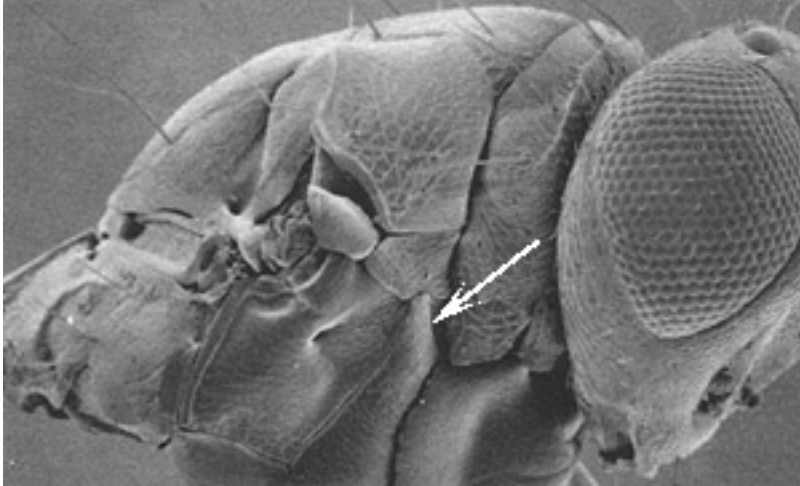
10'. Axillar-scutellar suture without pit (do not confuse it with a pit sometimes present at the top of the axillula, which is further ventrad from this area). Pronotal collar, vertex, face, and scutellum variable, but rarely as above in combination. Propodeum rarely with a flat raised strip.

[couplet 13](#)

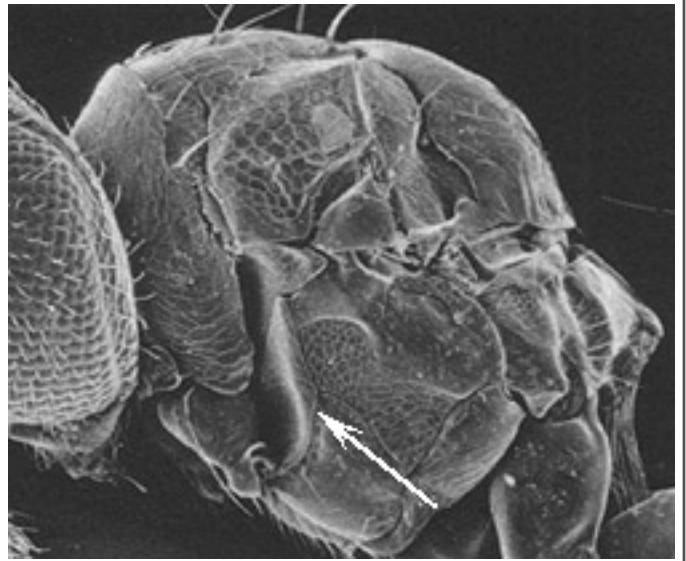


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**b1**



**bb1**



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Image credits: a1: Schauff (1987). aa1, b1, bb1: Schauff (1991).

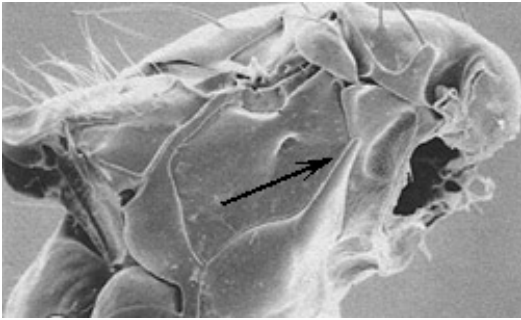
11. Body almost entirely unsculpted. Propodeum ([b1](#)) with only small anterior projection, **with scattered setae**. Most of body with long setae ([a1](#), [b1](#), [c1](#)).

[Alachua Schauff & Boucek, 1987](#)

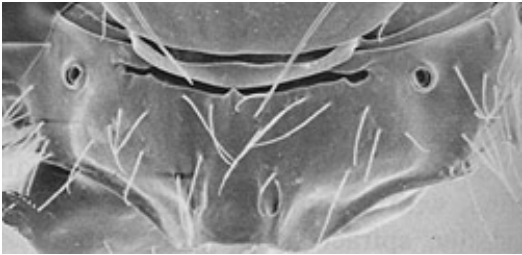
11'. Body strongly sculpted. Propodeum ([bb1](#)) with extensive sculpturing and nearly always with distinct raised median strip placed in a longitudinal depression, never with setae beyond the callus and perimeter.

[couplet 12](#)

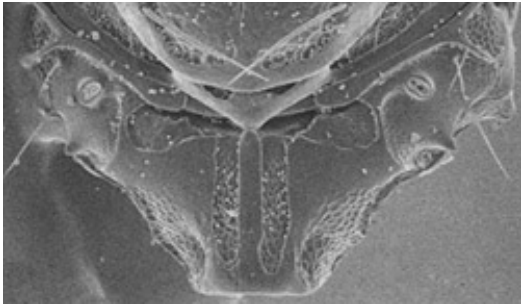
**a1**



**b1**

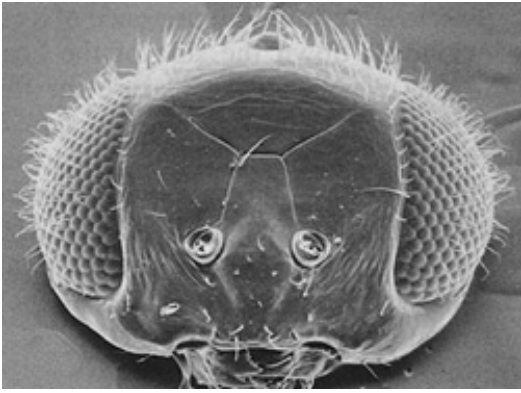


**bb1**



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**c1**



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Image credits: [a1](#), [b1](#), [c1](#): Schauff & Boucek (1987). [bb1](#): Schauff (1991).

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12. Petiole transverse, without longitudinal ribs. In most species, median groove of scutellum ([a1](#)) extending more than half scutellar length. Mesopleuron ([b1](#)) without epicnemial carina (although diagonal mesopleural sulcus extending from mesocoxa is present).

[\*Horismenus\* Walker, 1843](#)

12'. **Petiole longer than broad, with longitudinal ribs** ([bb1](#)). Median groove of scutellum ([aa1](#)) extending less than half scutellar length. Mesopleuron with epicnemial carina ([bb1](#), indicated by arrow).

[\*Edovum\* Grissell, 1981](#)

**a1**

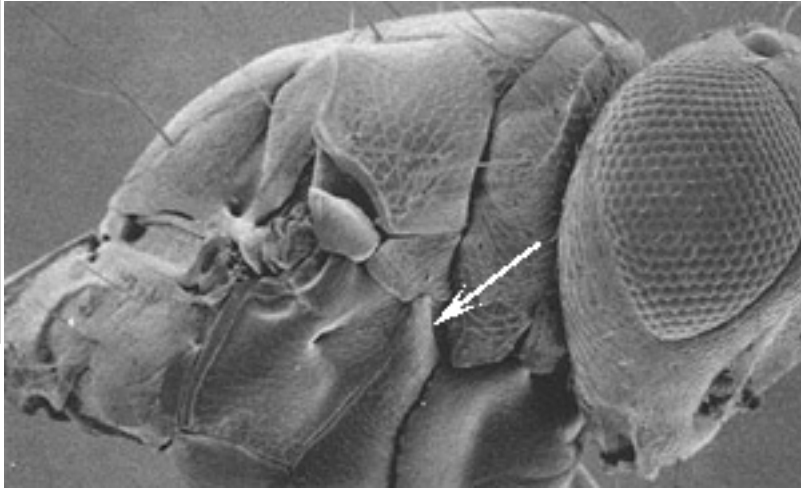


**aa1**

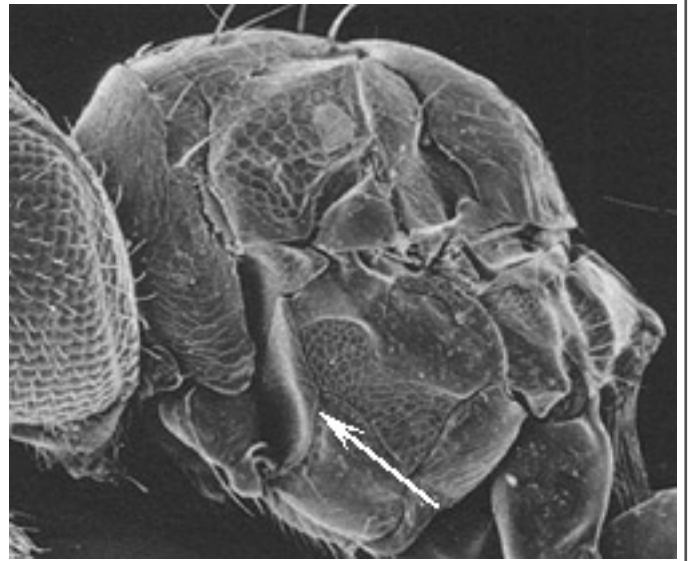


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**b1**



**bb1**



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Image credits: a1: Schauff (1987). aa1, b1, bb1: Schauff (1991).

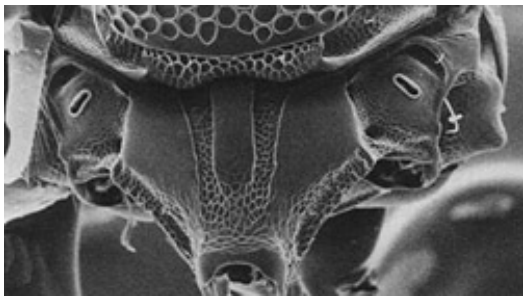
13. Propodeum (a1-a3) with raised median strip or triangle flanked by a sunken area, nucha in most species long and sculpted, **and** pronotal collar not carinate. Vertex, when carinate medially, touching or nearly touching lateral ocelli.

[Paracrias Ashmead, 1904](#)

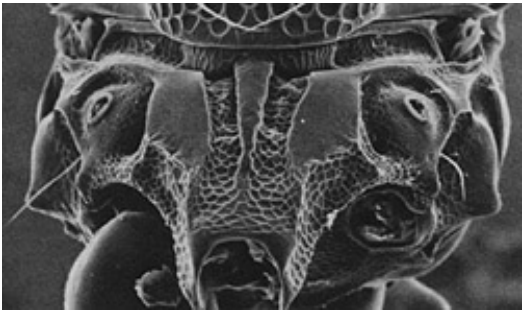
13'. Propodeum ([aa1](#), aa2) weakly sculpted or entirely smooth, almost never with raised median strip, nucha short and unsculpted.

[couplet 14](#)

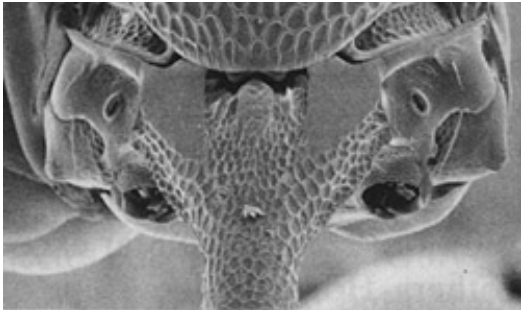
a1



a2

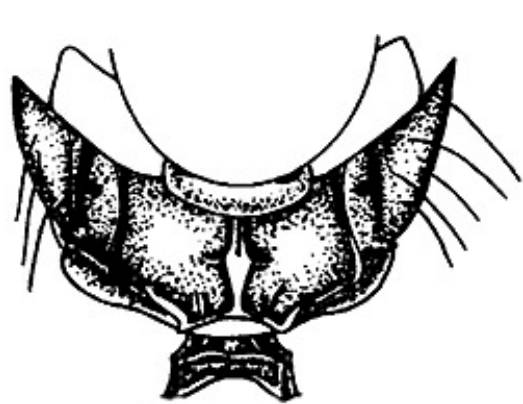


a3

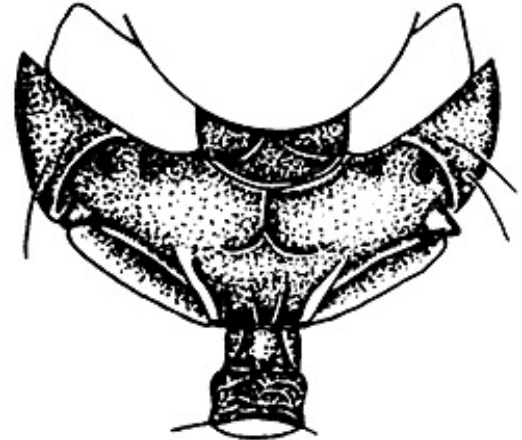


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aa1



aa2



[back to top](#)

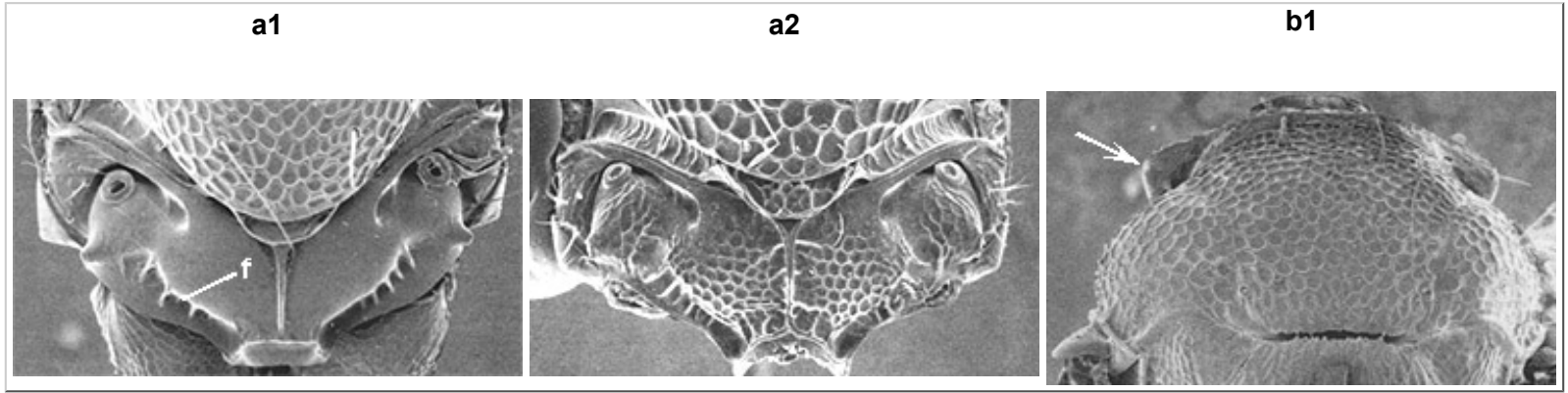
Image credits: a1, a2: Schauff (1985a). a3: Woolley & Schauff (1987). aa1: aa2: Hansson (1985a).

14. Propodeum ([a1](#), a2) with single, strong median carina placed in a groove (sometimes groove difficult to see) **and** costulate transverse foveae separating median panels from supracoxal flange (a1: f). Propodeum never with plicae.

[Entedon Dalman, 1820](#)

14'. Propodeum often with incomplete carina, or single carina not placed in a groove, rarely with similar costulate fovea, and without the two characters in combination. Propodeum with plicae in many similar genera.

[couplet 15](#)



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Image credits: a1, a2: Schauff (1988). b1: Schauff (1991).

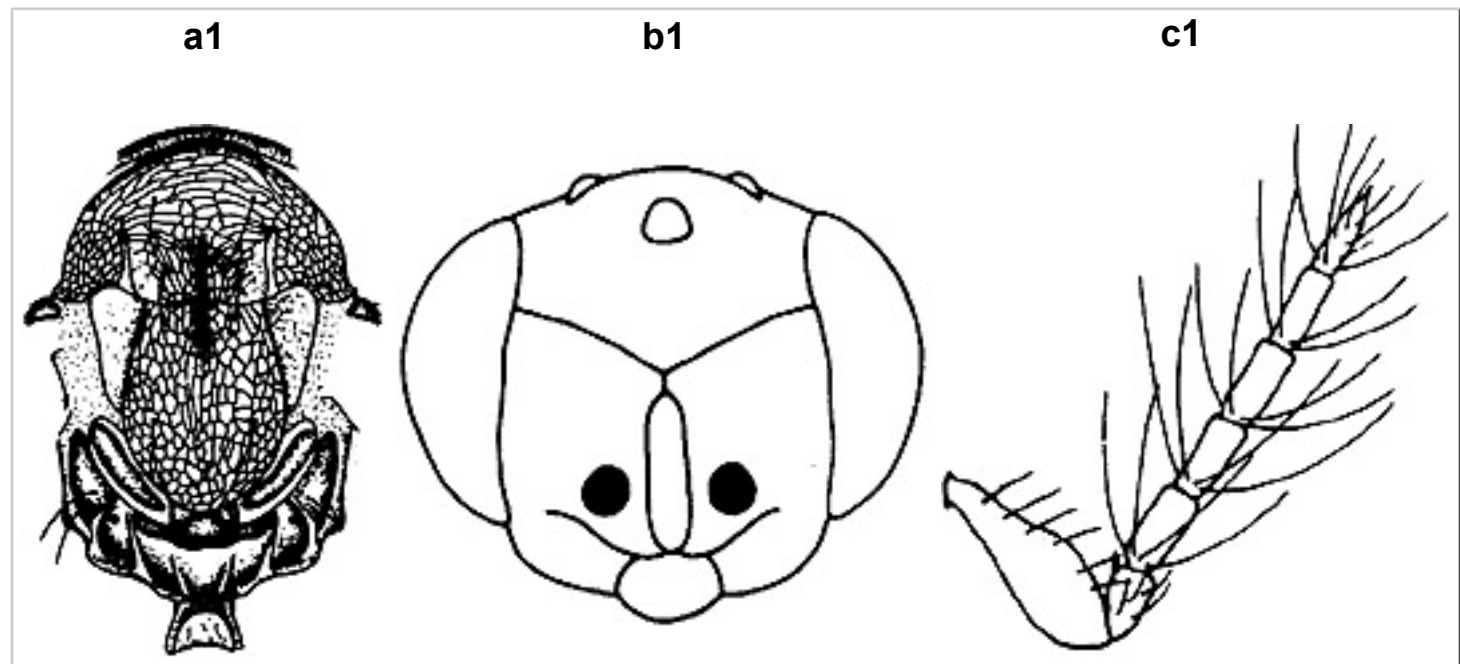
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15. Median furrow ([a1](#)) extending from posterior part of mesoscutum to anterior part of scutellum. Face ([b1](#)), frons, and occiput completely smooth and shiny; interscrobal process sharply raised, set off by distinct sulcus; clypeus set off by distinct sutures, frons with transverse ridge separating lower face from middle of face. Funicular segments in males ([c1](#)) each with a basal whorl of long setae. Notauli narrow and deep posteriorly, absent or very shallow anteriorly ([a1](#)).

[Holcopelte Förster, 1856](#)

15'. Mesoscutum and scutellum almost never with median furrow (exception: some *Chrysocharis*, which do not have clypeus set off by sutures, the distinctive interscrobal process, or a smooth, shiny face). Face usually with some sculpture; clypeus set off by sutures only in *Omphale*, *Perditorulus*, *Callifrons*, and *Chrysonotomyia*. Funicular segments often without whorls of setae in males. Notauli not deep posteriorly in similar genera, especially *Omphale*.

[couplet 16](#)



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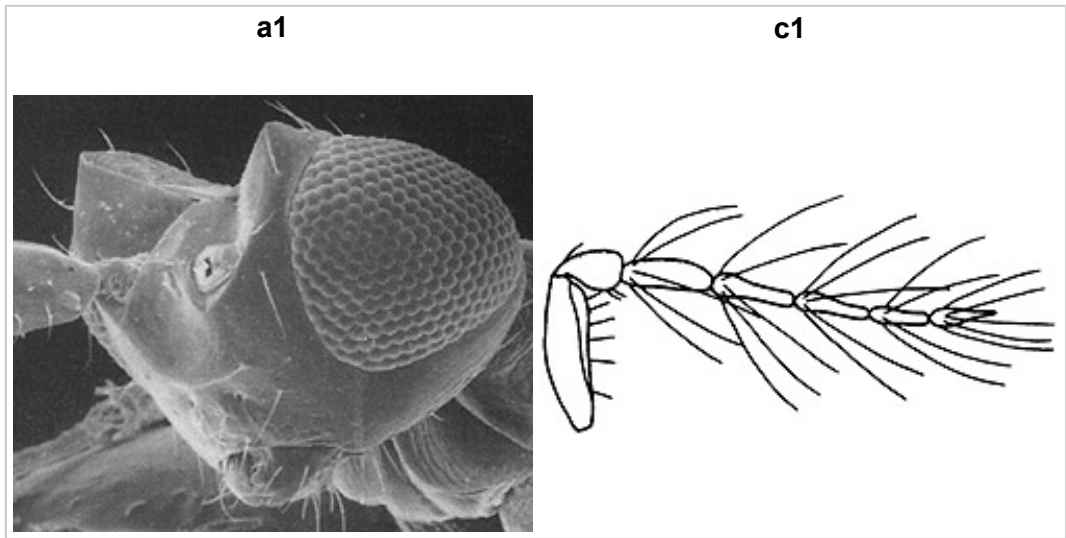
Image credits: a1, b1, c1: Hansson (1988b).

16. Upper portion of frons ([a1](#)) strongly projecting anteriad, dorsal surface of head very long; occiput very strongly concave, sharply margined. Clypeus set off by distinct sulci. Scape and 2 basal flagellomeres ([b1](#)) strongly flattened in females; males with a whorl of long setae ([c1](#)) at the base of each flagellomere; peg sensilla ([d1](#): sa) of flagellum elongate, strongly asymmetrical (requires slide mounting). Forewing ([e1](#)) distinctive in shape: submarginal vein only slightly shorter than marginal vein and disc distinctly expanded beyond venation; disc with distinct longitudinal fuscate band branching apically (but sometimes fuscate area reduced to traces near venation in males).

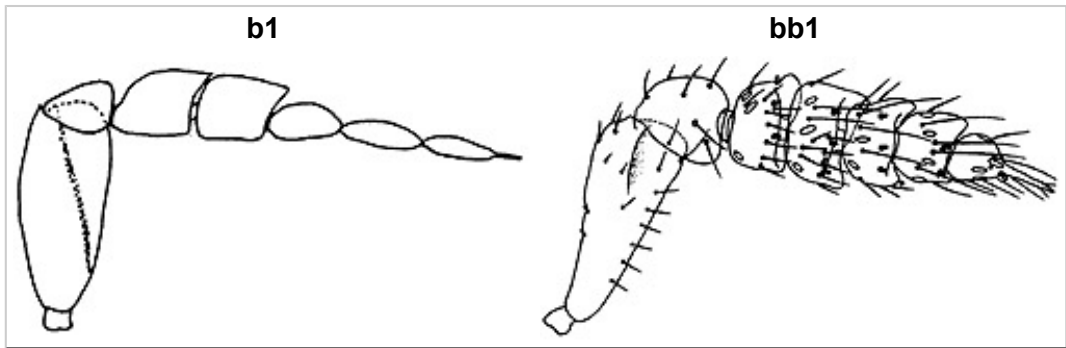
[Callifrons Schauff, Yoshimoto, & Hansson, 1994](#)

16'. Upper portion of frons very rarely (some species of *Closterocerus*) similarly shaped, and never to this degree. Clypeus often not set off by distinct sulci. Flagellum usually not flattened (except in *Closterocerus* ([bb1](#))), and never with only basal funicular segments flattened; flagellum sometimes without whorls of setae in males; flagellar peg sensilla usually not asymmetrical ([dd1](#): sa) or only slightly asymmetrical (dd2: sa), strongly asymmetrical only in some *Omphale*. Forewing rarely with similar markings (exception: *Closterocerus tau* Girault, ([ee1](#))).

[couplet 17](#)



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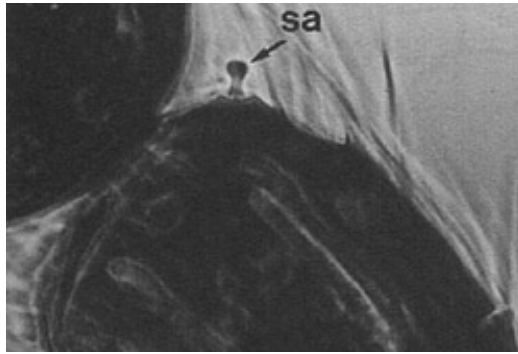


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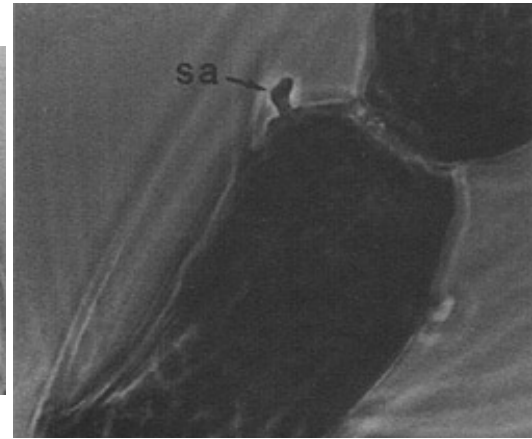
d1



dd1

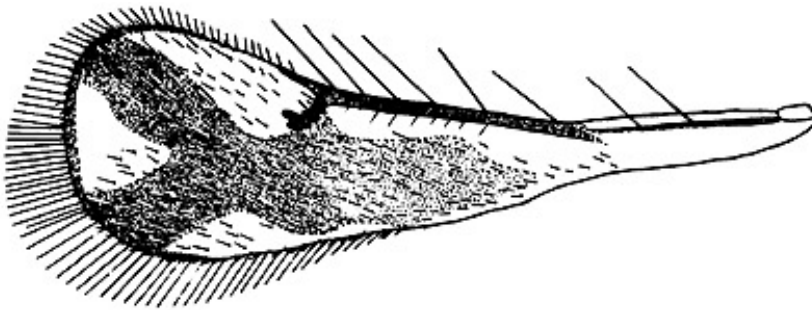


dd2



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e1



ee1



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Image credits: a1: Schauff, et al. (1997). b1, c1, e1: Schauff, et al. (1994). bb1: Schauff (1991). d1, dd1, dd2: Hansson (1996a). ee1: Hansson (1994a).

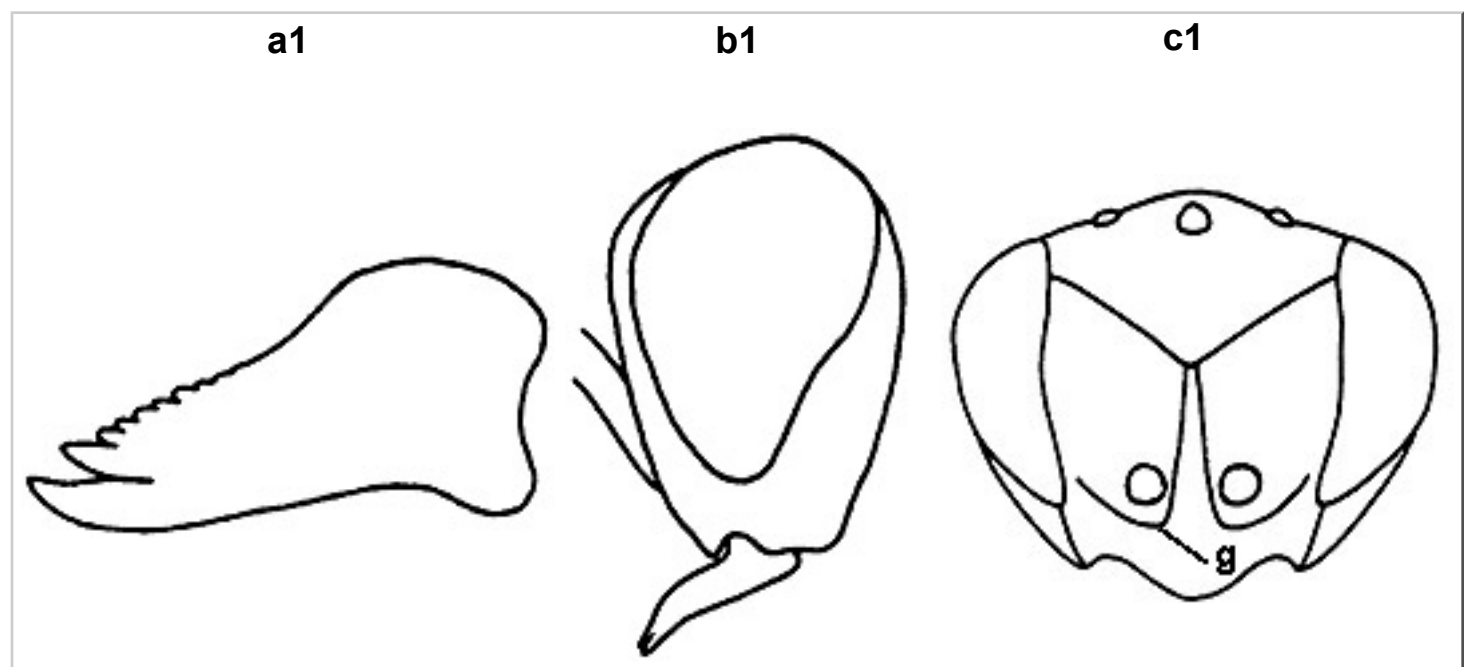
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17. Mandibles ([a1](#)) very long and narrow, with several tiny dorsal teeth and 2 large apical ones. Gena ([b1](#)) with strong incision for base of mandible to fit into when open; scrobal grooves ([c1](#): g) extending below toruli. Scape with sensory pores present only at apex in males (requires slide mounting). Males with subbasal pale spot on gaster. Ovipositor very short, its base very far posteriad.

[Ionympa Graham, 1959](#)

17'. Mandibles not long and narrow, with 2 or 3 equal teeth (or without teeth) and without tiny dorsal teeth (except in some *Chrysocharis*, which do not share any of the other characters given above). Gena without strong lateral incision; scrobal grooves not extending below toruli in most species. Scape in males usually with sensory pores along its entire length (except *Closterocerus*). Color variable. Ovipositor length usually only slightly less than gastral length.

[couplet 18](#)



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Image credits: a1, b1, c1: Hansson (1996b).

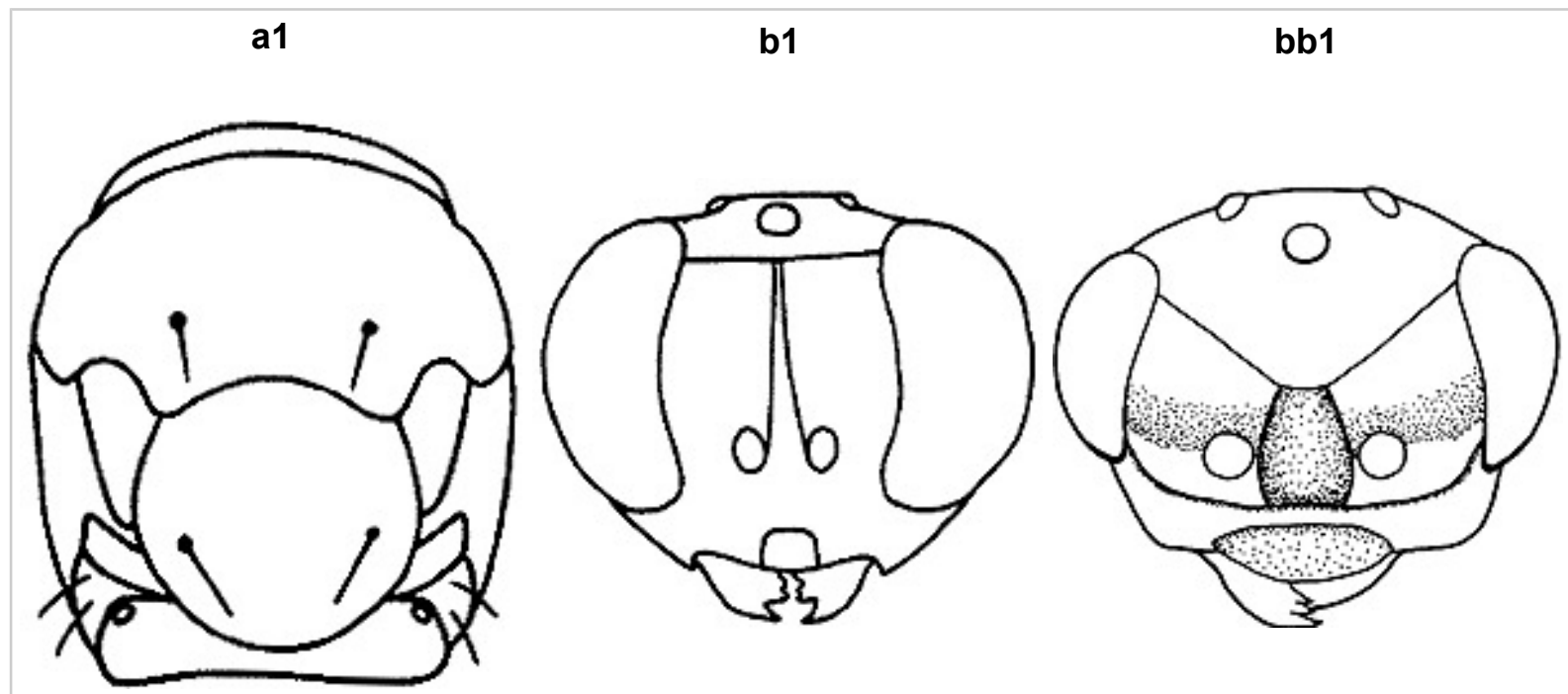
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18. **Mesoscutal midlobe** ([a1](#)) **with 1 pair of setae** (the posterior pair) **and** scrobal grooves ([b1](#)) long and narrow, extending almost parallel and very close together to end separately in the straight transverse frontal groove near the median ocellus (facial collapse may make the transverse groove appear V-shaped), **and** clypeus ([b1](#)) set off by distinct sutures.

[couplet 19](#)

18'. Mesoscutal midlobe almost always with 2 pairs of setae, **or** scrobal grooves broadly separated ([bb1](#)). Clypeus often not set off by distinct sutures ([bb1](#)); transverse fronto-facial groove often v-shaped. [[Closterocerus](#) (*Achrysocharis*) differs only in that the clypeus is not outlined by sutures]

[couplet 21](#)



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Image credits: a1, b1, c1: Hansson (1994b). bb1: Hansson (1996a).

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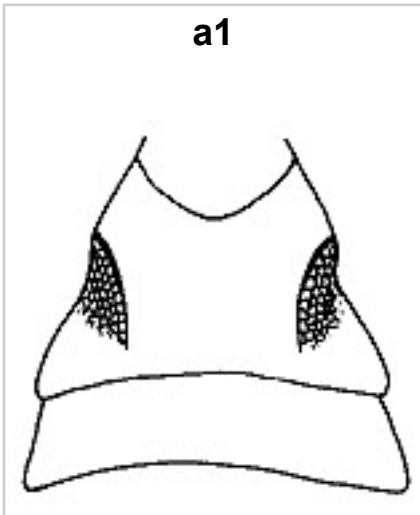
19. **Gt1 in females with lateral indented, distinctly sculpted areas** (a1). [semi-aquatic egg parasitoids of Odonata]

[\*Ametallon\* Ashmead, 1904](#)

19'. Gt1 in females without special lateral indented areas.

[couplet 20](#)

**a1**



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Image credits: a1: Hansson (1996a).

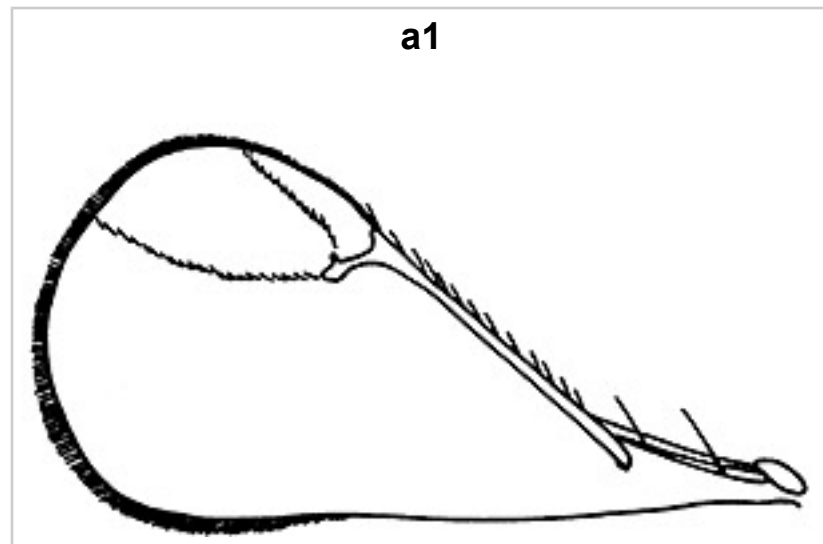
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20. Forewing with 2 setal tracks radiating from stigmal apex.

[\*Chrysonotomyia\* Ashmead, 1904](#)

20'. Forewing with at most 1 setal track radiating from stigmal apex (the one radiating from the uncus only).

*Closterocerus* [subgenus: \*Achrysocharis\* Girault, 1913](#)



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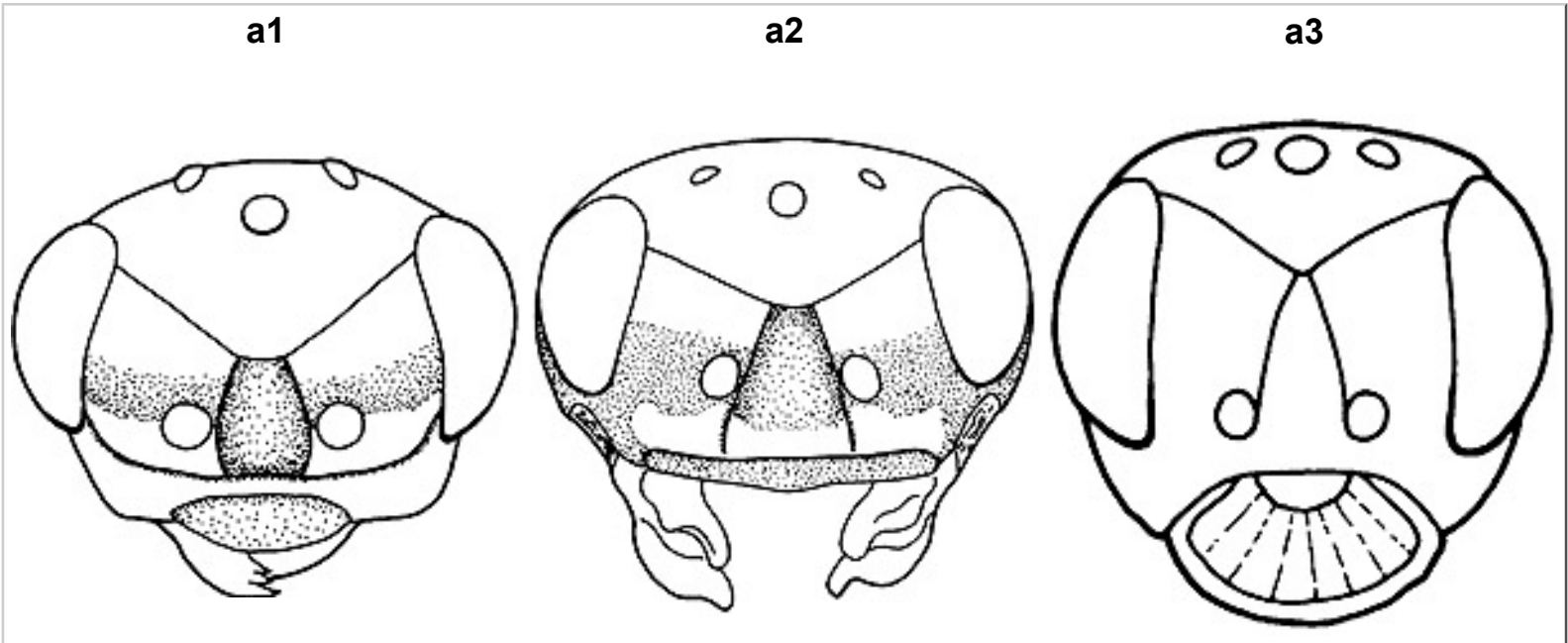
Image credits: Hansson (1994b)

21. Clypeus ([a1](#)-[a3](#)) set off by distinct sutures, **and** shape strongly modified: semicircular in shape ([a1](#)), several times broader than long ([a2](#)), or strongly protruding ([a3](#)).

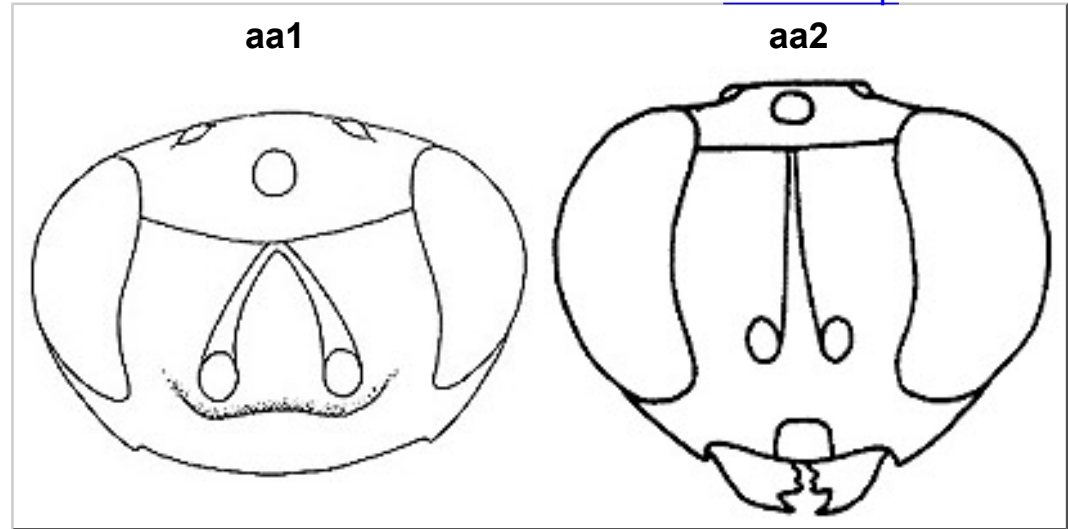
many [Omphale Haliday, 1833](#)

21'. Clypeus either not set off by sutures ([aa1](#)) **or** set off by faint sutures ([aa2](#)) but shape unmodified: length about equal to width, not strongly protruding or distinct from face in any other way (a different color from rest of face in a few species).

[couplet 22](#)



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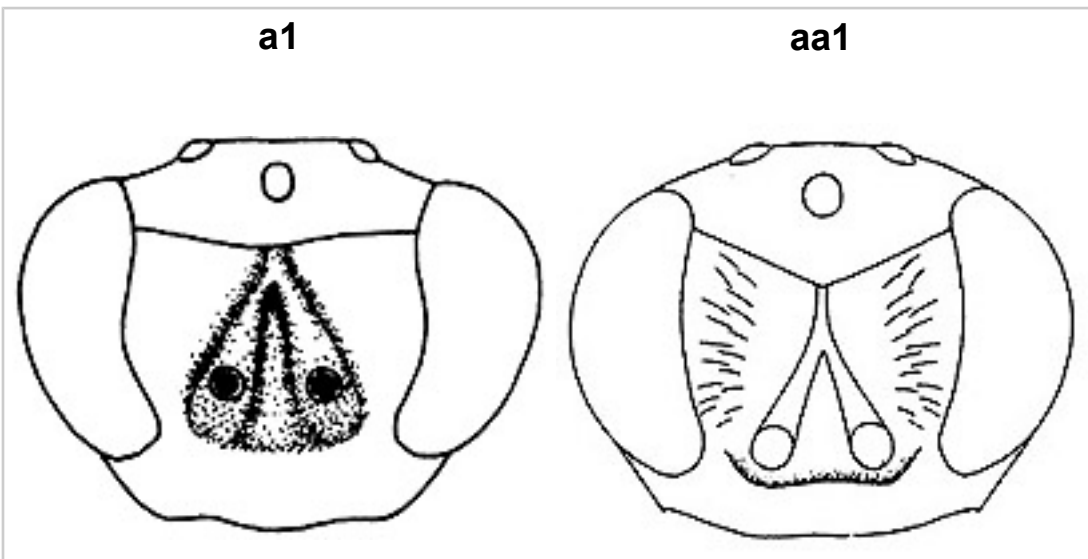
return to: [home](#) [prev](#) [Eul 1](#) [Eul 4](#) [eud 1](#) [eul 1](#) [ent 1](#) [ent 5](#) [ent 10](#) [ent 13](#) [ent 16](#) [ent 26](#)

22. Transverse fronto-facial groove ([a1](#)) nearly straight, above middle of face, **and** interscrobal ridge not meeting transverse groove, **and flagellar formula strictly 1,4,1** ([b1](#)); scape relatively long and narrow: about 5x longer than broad. Postmarginal vein about 2x stigmal vein length.

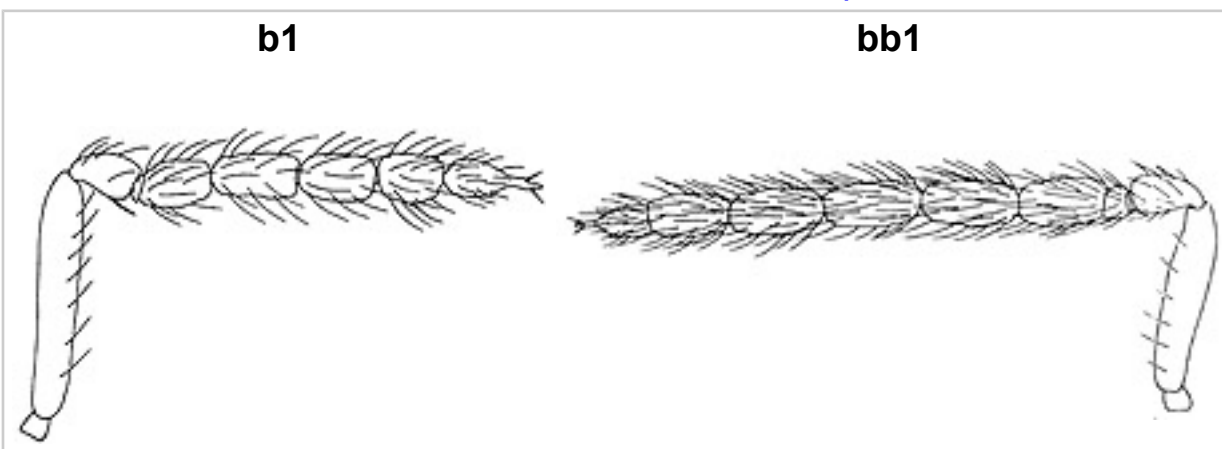
[Grahamia Erdős, 1966](#)

22'. Transverse fronto-facial groove ([aa1](#)) usually v-shaped, **if not** (*Achrysocharoides*, some *Chrysocharis*) **then** postmarginal vein  $< 1.5 \times$  stigmal vein length **or** antenna with 3 distinct anelli. Many species with 2 claval segments. Scape usually not so long and narrow. Postmarginal vein often much longer or shorter.

[couplet 23](#)

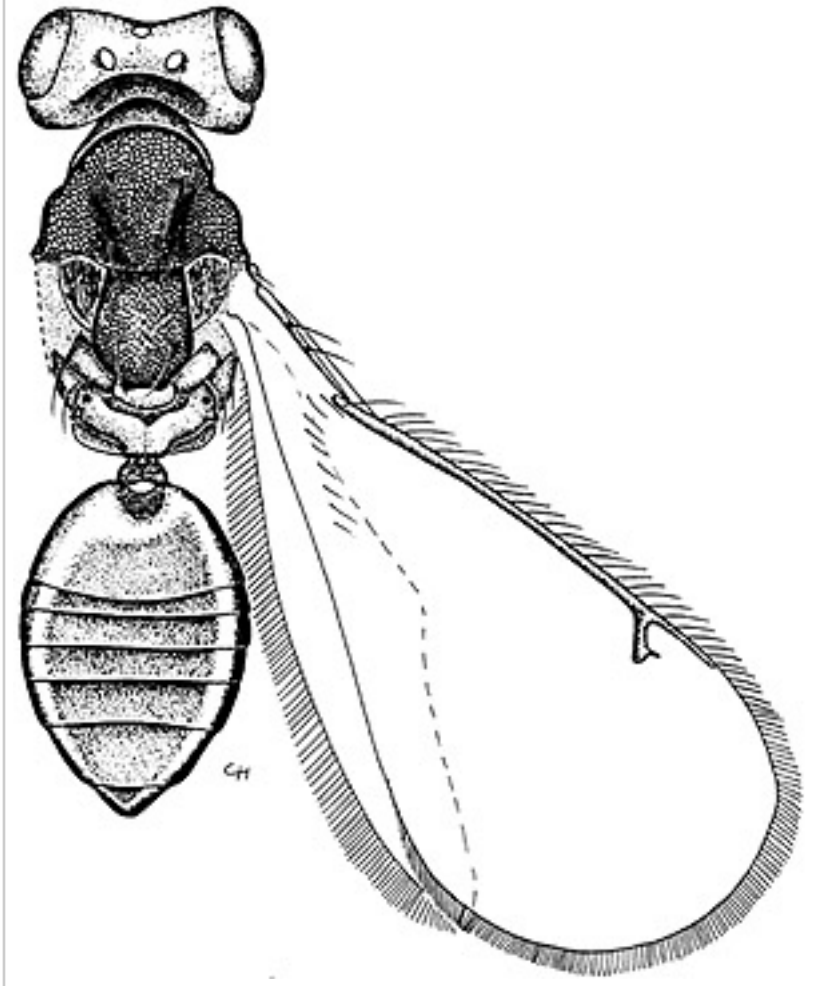


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c1



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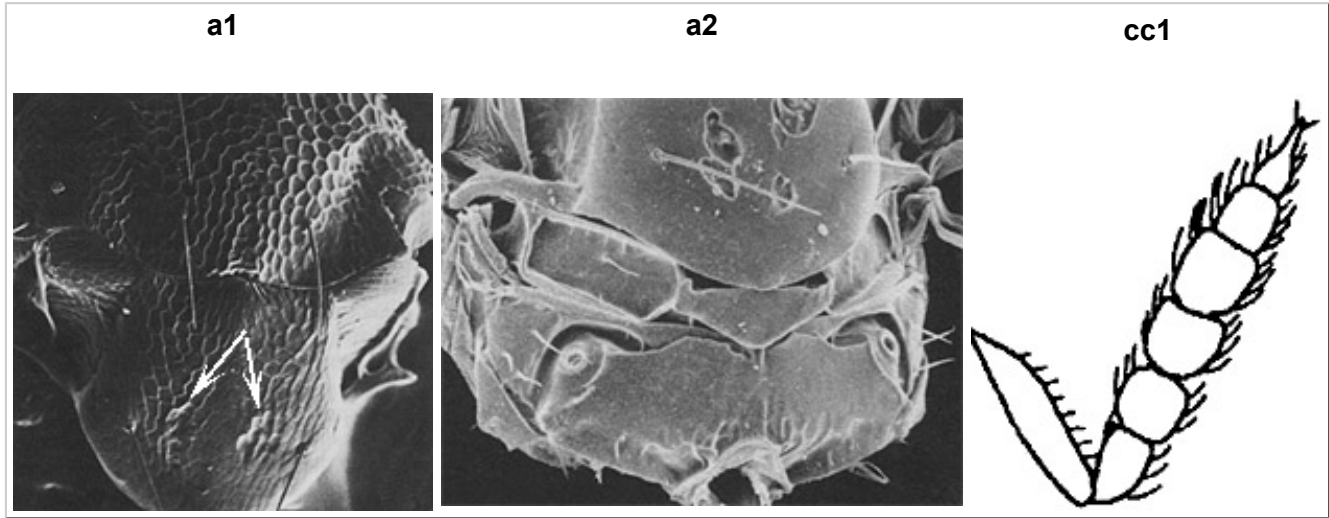
Image credits: a1, b1, c1: Hansson (1988a). aa1, bb1: Hansson (1985a).

23. Transverse fronto-facial suture straight or very nearly so, although near middle of face ([bb1](#), [bb2](#)), **and** flagellum with 1 or 2 claval segments--3 or 4 funicular segments, **and** postmarginal vein not more than 1.4x stigmal vein length (usually shorter than stigmal vein), **and** eye densely covered in setae visible under normal (up to 50x) magnification ([bb1](#), [bb2](#)). Scutellum, and sometimes mesoscutum, with distinct pits in some species ([a1](#), [a2](#)). Petiole not more than 1.75x longer than broad.

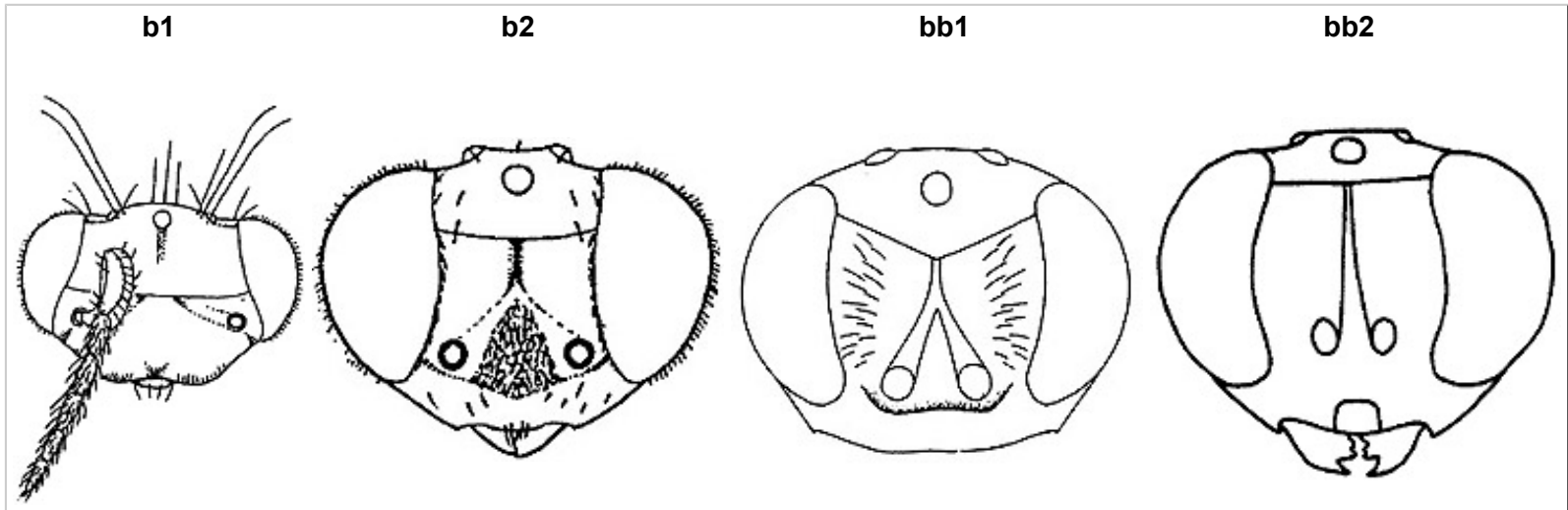
[Achrysocharoides Girault, 1913](#)

23'. **Either**: transverse fronto-facial suture V-shaped ([bb1](#)), **or** straight and very near to median ocellus (as in [bb2](#)), **or** flagellum with 3 claval segments--2 funicular segments ([cc1](#)), **or** postmarginal vein >1.4x stigmal vein length, **or** eye not appearing setose under normal magnification. Scutellum and mesoscutum without special pits. Petiole >1.75x longer than broad in some *Chrysocharis*.

[couplet 24](#)



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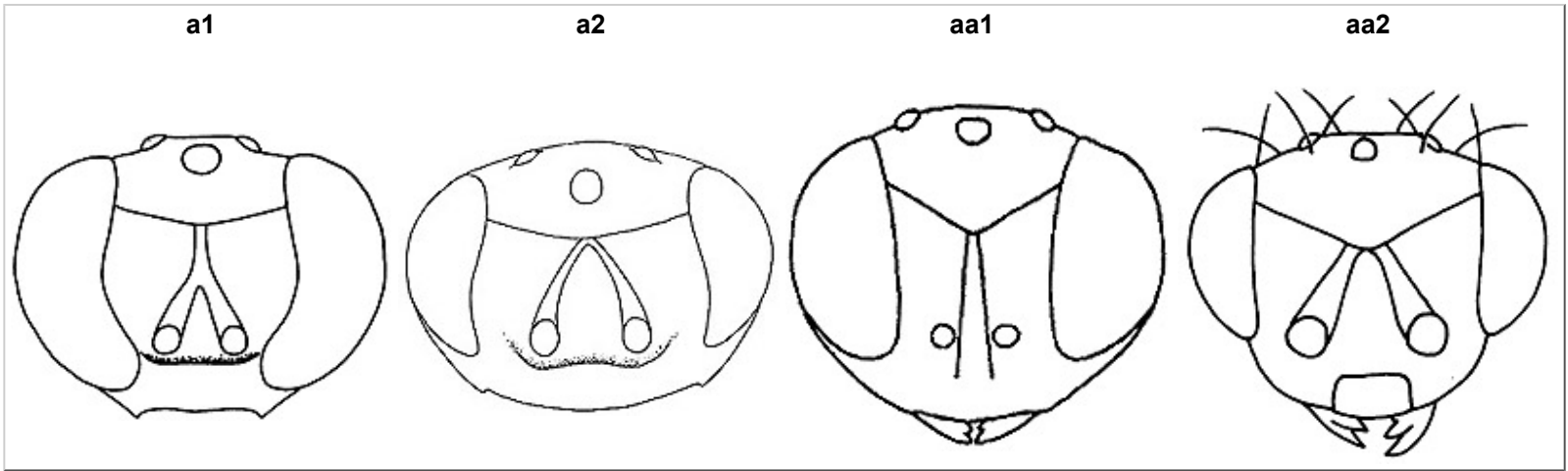
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24. Scrobal depressions (a1, a2) meeting before reaching transverse fronto-facial groove, thus **interscrobal ridge not meeting transverse groove** (although it comes very close to doing so in many species ([a2](#))); **scrobal grooves/depressions not extending below toruli**. **Flagellum in females ([b1](#)) with 3rd anellus enlarged, about 1/3 1st funicular segment length--**and 1st funicular segment always about as long or longer than broad (also occurs in males of some species). Many species with a long, sculptured petiole ([c1](#)). Propodeum in most species with specialized antero-median structure formed by pits and/or carinae (c1; most often a triangle or pair of pits); many species with median carina or similar set of carinae, and a few with plicae as well.

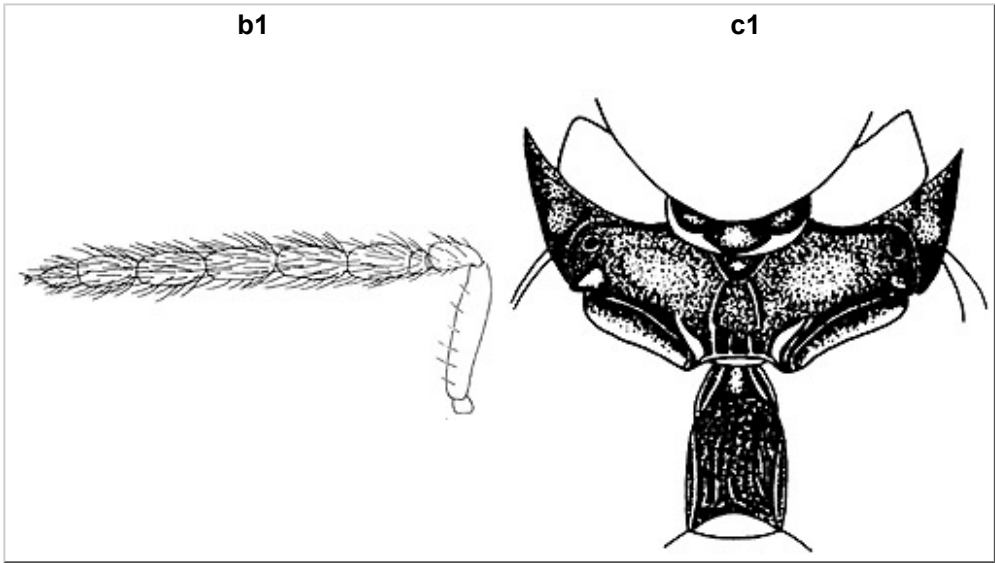
[Chrysocharis Förster, 1856 sensu strictu](#)

24'. Scrobal depressions ([aa1](#), aa2) reaching transverse fronto-facial groove independently, thus interscrobal groove reaches transverse groove; scrobal grooves extending below toruli in many species ([aa1](#)). Flagellum in females (and males) with 3rd anellus always several times broader than long, usually very difficult to discern, only approaching 1st funicular segment length in some species of *Neochrysocharis* in which the 1st funicular segment is also transverse. Petiole rarely longer than broad, only commonly so in *Chrysocharis* (*Zaommomyia*). Propodeum in most species with no more than a weak median carina, only similarly elaborate in *Chrysocharis* (*Zaommomyia*).

[couplet 25](#)



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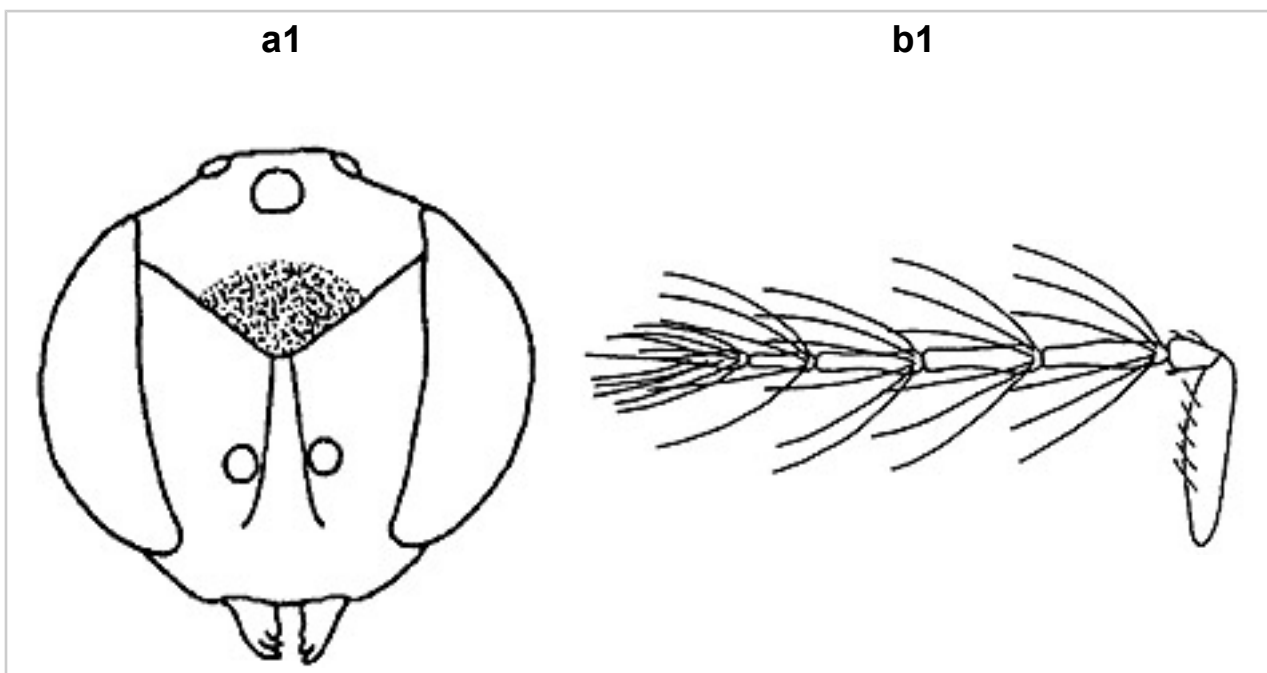
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25. Postmarginal vein  $>1.5\times$  stigmal vein length. **Triangular area present immediately above transverse ridge different color and/or sculpture from rest of frons (a1)**, sometimes sharply angled and set off by an arched dorsal ridge. Males with a basal whorl of erect setae on each funicular segment (b1). **Propodeum usually with median carina or submedian carinae, some species with plicae (c1, c2)**. Flagellum strictly with 1-2 claval segments and 3-4 funicular segments.

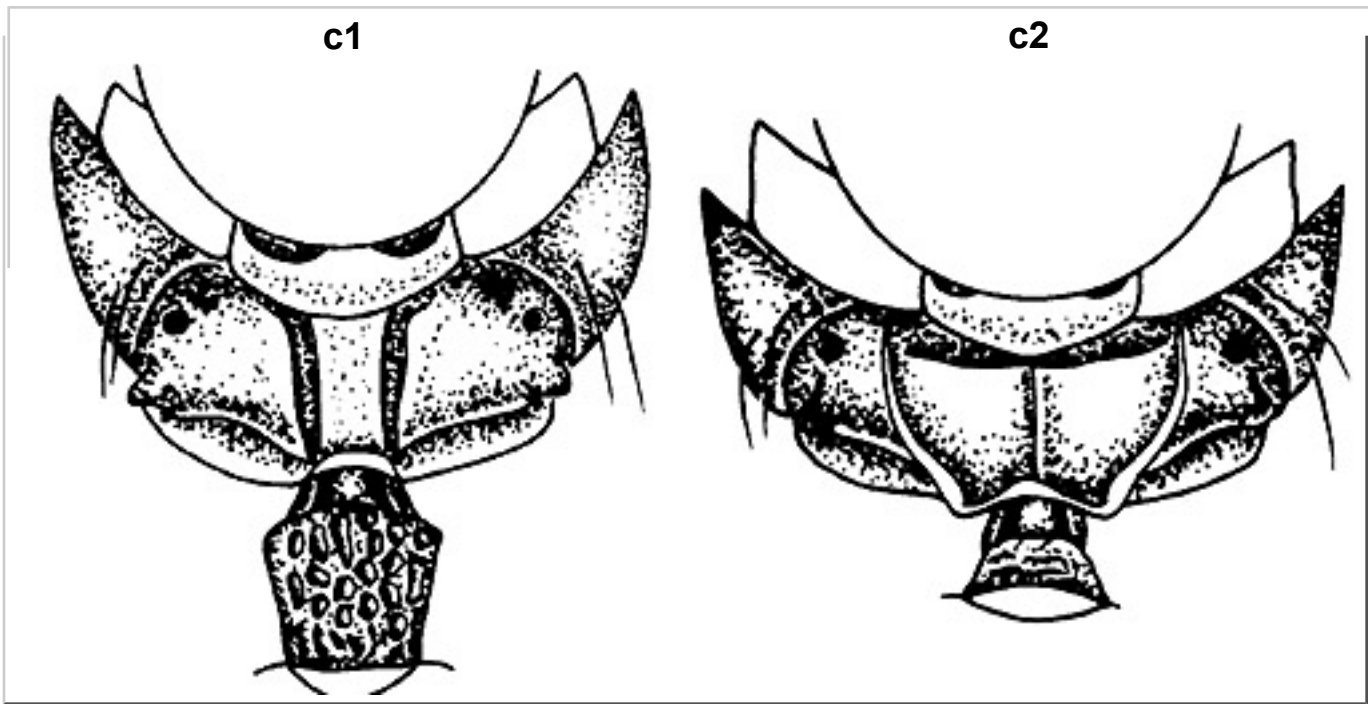
*Chrysocharis* [subgenus: Zaommomyia Ashmead, 1904](#)

25'. Postmarginal vein rarely up to  $1.5\times$  stigmal vein length. Upper frons without similar triangular area. Males with or without whorl of setae on each funicular segment. Propodeum at most with a weak median carina, without plicae. Flagellal formula variable, many species with 3 claval segments and 2 funicular segments.

[couplet 26](#)



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Image credits: a1, b1: Hansson (1997b). c1-c2: Hansson (1986a).

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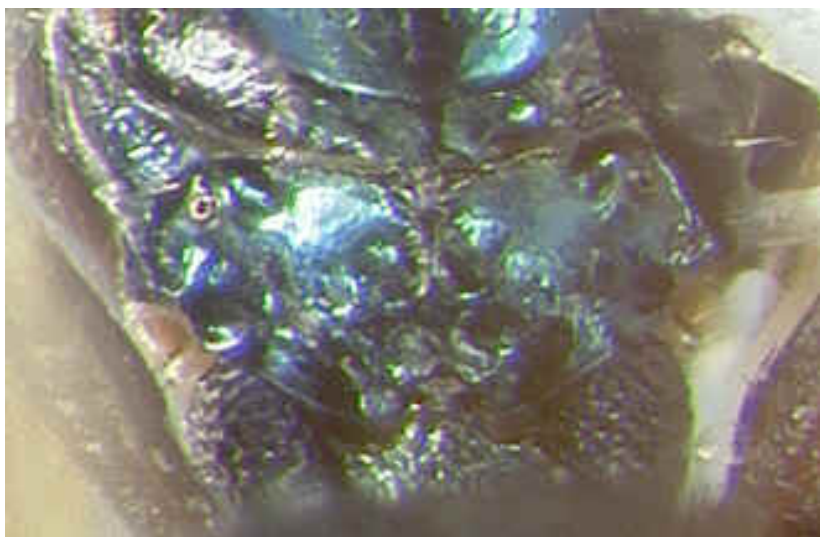
26. Propodeum with a modified median carina: **either** broadened and flattened ([a1](#)), **or** posteriorly split ([a2](#)).

*[Proacrias](#)* [Ihering, 1914](#)

26'. Propodeum with a simple, narrow median carina or without carinae. Pronotal collar mostly smooth, or not formed.

[couplet 27](#)

**a1**



**a2**



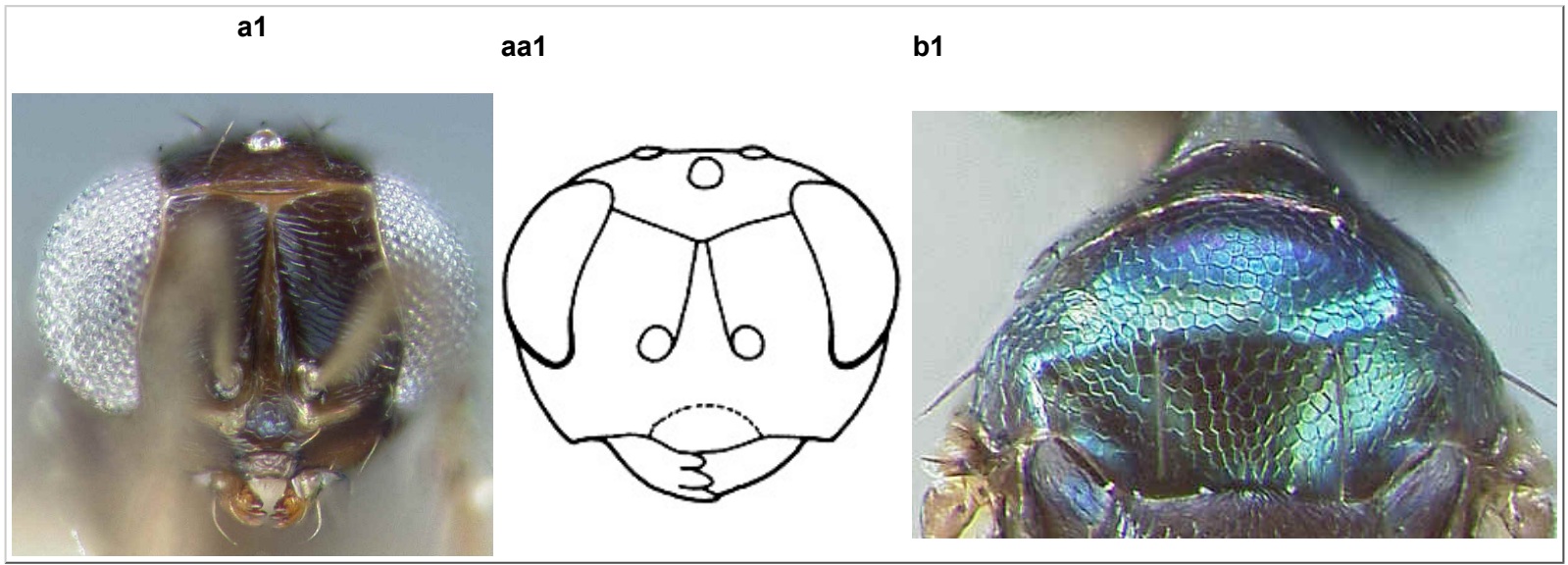
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27. Transverse frontal suture straight, positioned near median ocellus ([a1](#)--sometimes shallowly V-shaped if face is collapsed), **and** scrobal grooves nearly parallel, close together throughout their length, **and** mesoscutal midlobe with 1 pair of setae ([b1](#); the setae sometimes very tiny).

*Closterocerus* [subgenus: Achrysocharis Girault, 1913](#)

27'. Transverse frontal suture V-shaped ([aa1](#)). Scrobal grooves variable. Only a few *Omphale* (about 2 species) with 1 pair of mesoscutal midlobe setae, and they have a much different face.

[couplet 28](#)



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Image credits: aa1: Hansson (1996a).

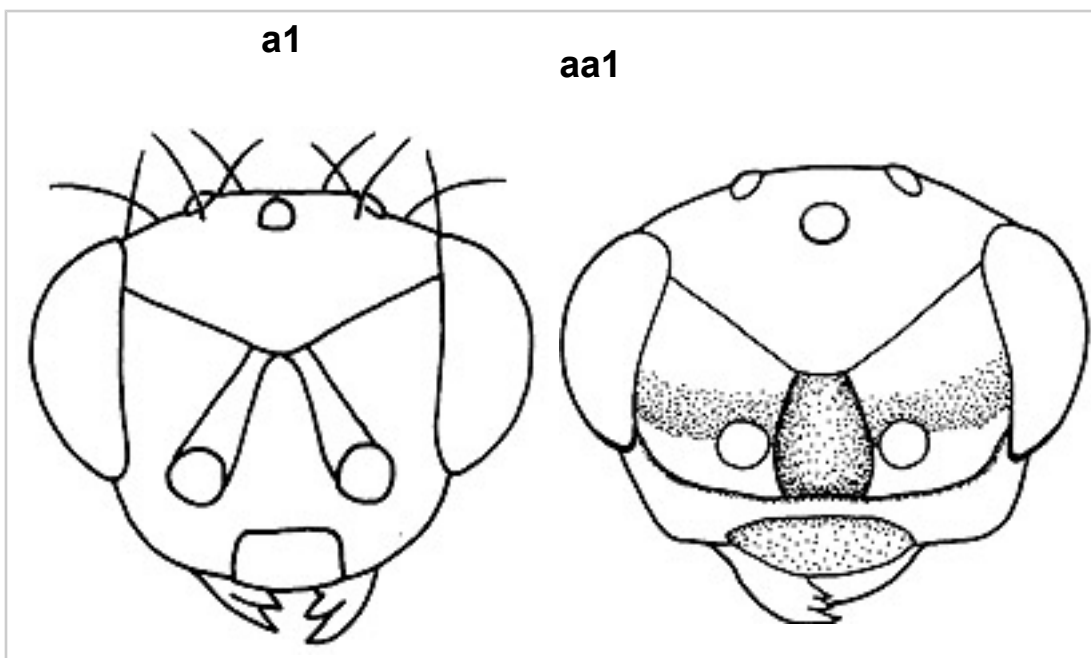
return to: [prev](#) [Eul 1](#) [Eul 4](#) [eud 1](#) [eul 1](#) [ent 1](#) [ent 5](#) [ent 10](#) [ent 13](#) [ent 16](#) [ent 21](#)

28. Vertex ([a1](#)) and mesosomal dorsum with strong, elongate setae. Peg sensilla of flagellum always strongly ([b1](#)) asymmetrical, never mushroom-shaped. **Male genitalia** ([c1](#)) **without volsellar setae**, but sometimes (c2) one pair of parameral setae placed in same area as volsellar setae (and probably are volsellar setae); **parameres** (d2: p) **often elongate or sinuate** (especially helpful in species with ambiguously placed parameral setae). Body <1mm in length; color always brownish with weak metallic luster ([d1](#)).

[Perditorulus Hansson, 1996](#)

28'. Combination of characters not present: vertex and mesosomal dorsum rarely with elongate setae ([aa1](#)). Peg sensilla of flagellum only asymmetrical in some *Omphale*, usually short and L-shaped ([bb1](#)). Male genitalia always with volsellar setae and short parameres ([cc1](#), cc2). Body generally different in color, size and shape.

[couplet 29](#)

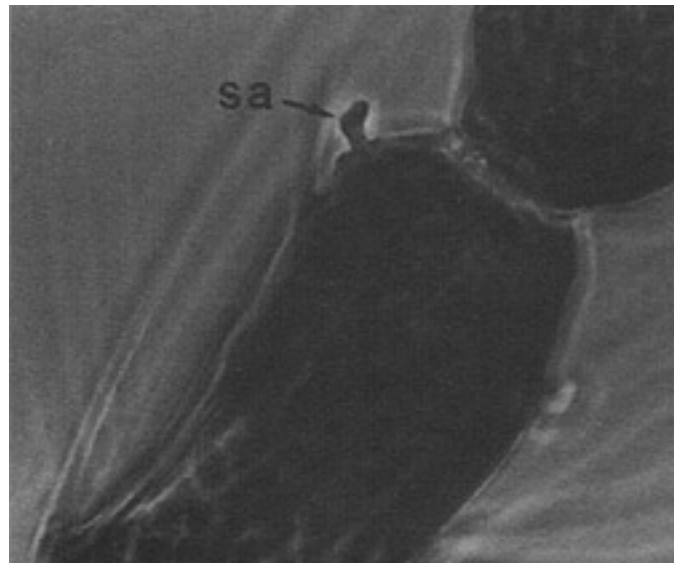


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**b1**



**bb1**



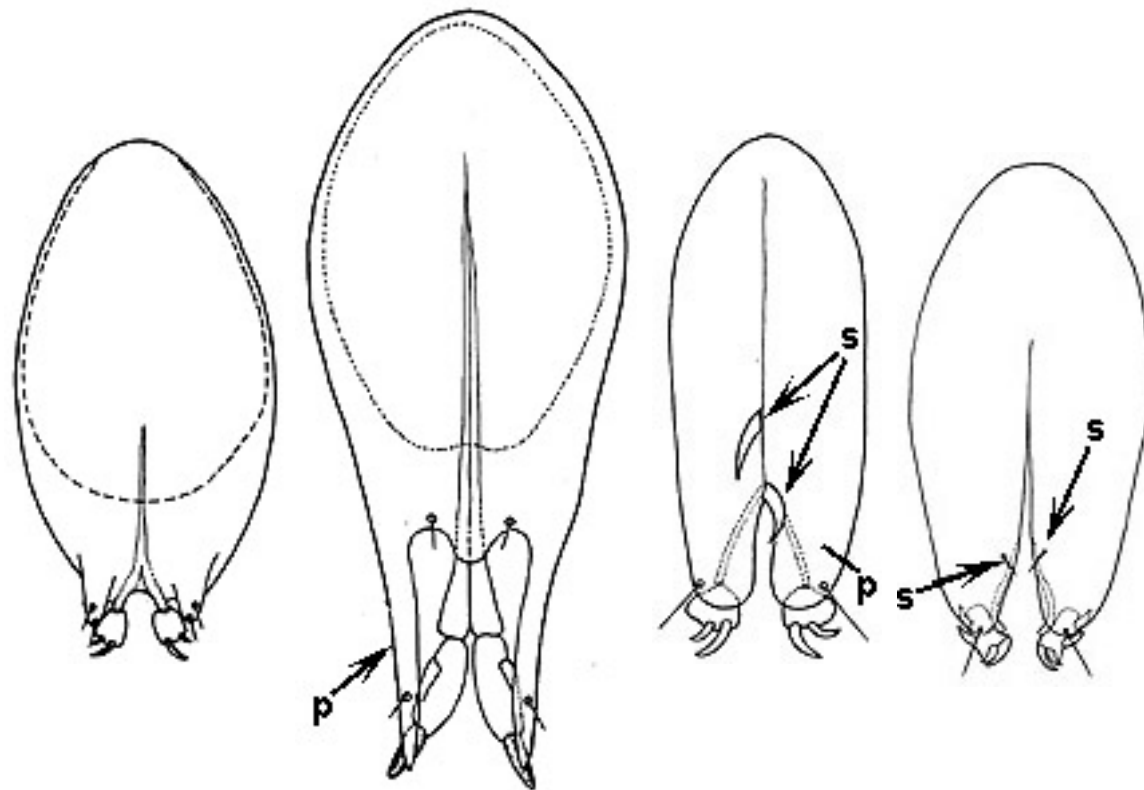
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**c1**

**c2**

**cc1**

**cc2**



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d1



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Image credits: a1, c1-2: Hansson (1996c). aa1, b1, bb1, cc1-2: Hansson (1996a).

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29. Scrobal grooves extending below toruli ([a1](#)). Face without a cross-ridge between toruli and mouth, and clypeus, if indicated at all, very small and not longer than broad. Face, when collapsed, impressed along midline from near mouth to frontal fork. Male genitalia with volsellae not enlarged.

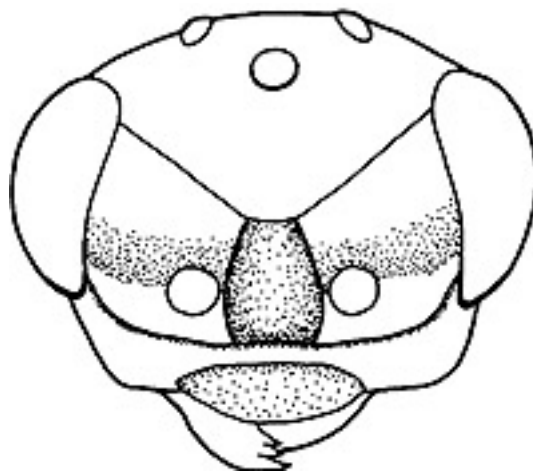
most [Closteroцерus Westwood, 1833](#)

29'. Scrobal grooves not extending below toruli in many species, frequently very distant from each other in middle or ventrally. Face in most species with a characteristic cross-ridge between toruli and mouth ([aa1](#)); when collapsed, face not collapsing below toruli. Clypeus either outlined by sutures, **or** cross-ridge present, **or** with convex apical margin. **Male genitalia with volsellar setae grossly enlarged** ([bb1](#), bb2: s) in nearly all species, sometimes visible on ventral side of genitalia without slide-mounting ([bb3](#)--volsellae indicated with arrow on whole mount).

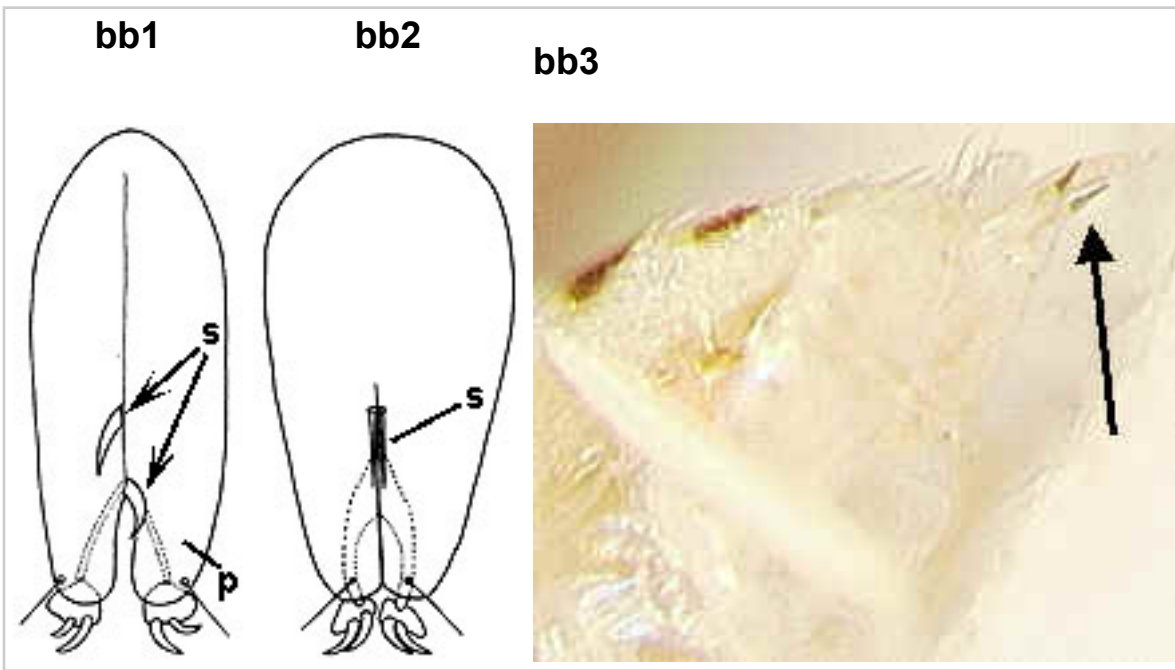
[Omphale Haliday, 1833](#)

a1

aa1



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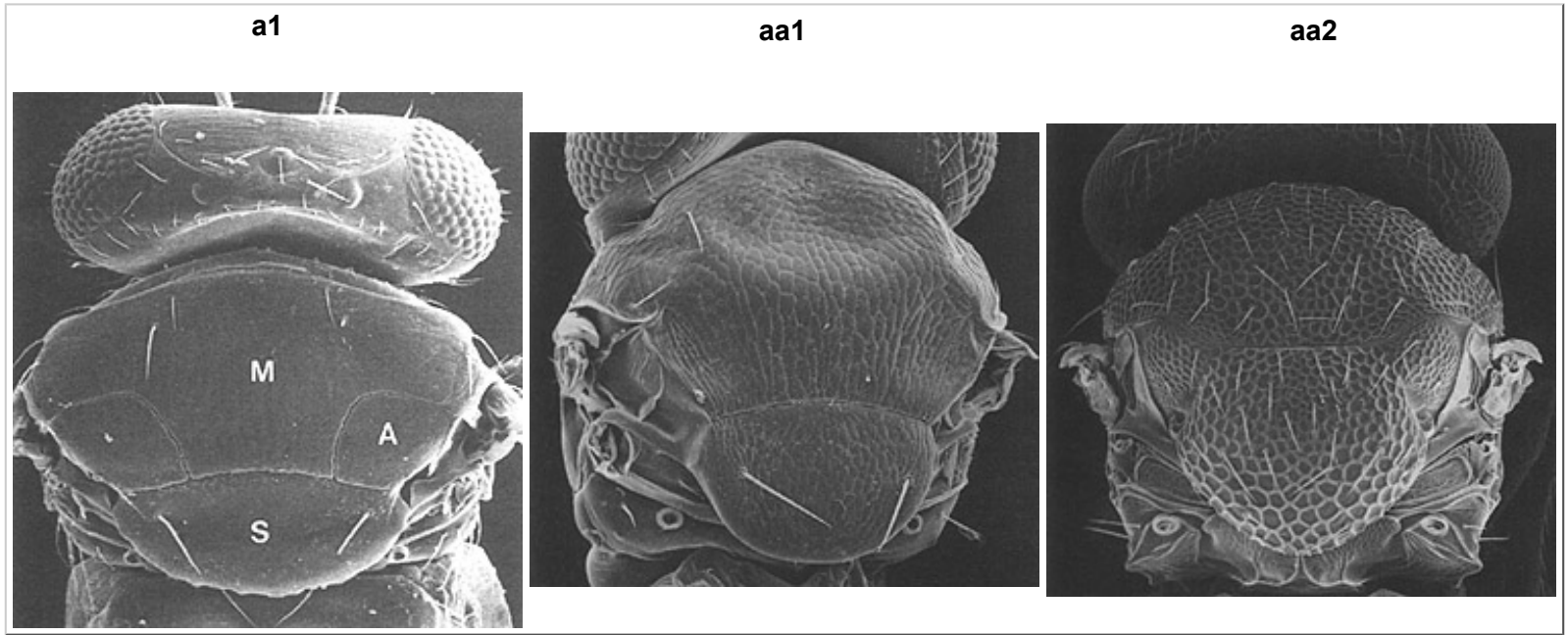
Image credits: aa1, bb1-2: Hansson (1996a).

1. Axillae ([a1](#): A) advanced entirely anteriad of scutellar margin, on same plane as distinctly flat mesosoma and scutellum, **and** indicated by distinct grooves. Mesoscutal midlobe ([a1](#): M) and scutellum ([a1](#): S) with only 2 pairs of setae each. Malar sulcus ([b1](#): MS) directed posteriad. Antenna ([c1](#)) with 3 preclaval flagellomeres, the apical one much longer and broader than the preceding ones.

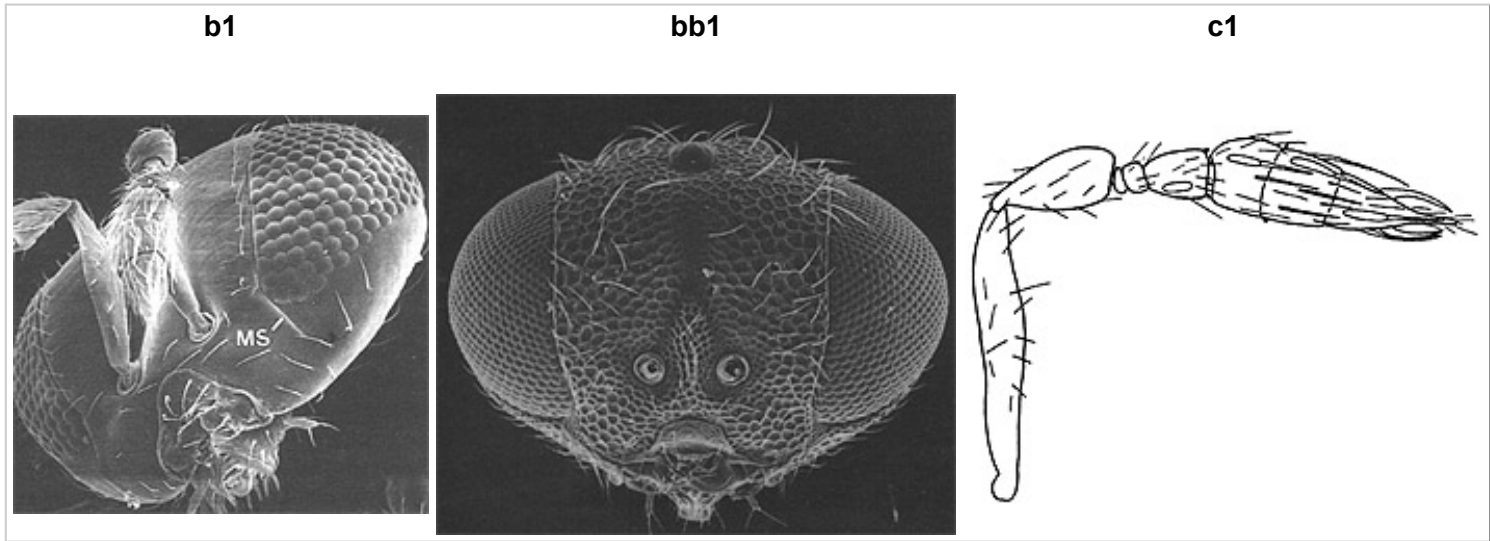
[Euderomphale Girault, 1916](#)

1'. Axillae either not indicated by grooves ([aa1](#)) or advanced only about halfway anteriad of scutellar margin (aa2). Mesoscutal midlobe (aa2) often with much more than 2 pairs of setae. Malar sulcus ([bb1](#)) complete or incomplete, never directed posteriad. Antenna often different.

[couplet 2](#)



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2. Midlobe of mesoscutum ([a1](#)) with only 1 pair of setae. Antenna ([b1](#)) with only 1 distinct preclaval flagellomere, the preceding flagellomeres very strongly reduced or not visible at all. 1st gastral tergite ([c1](#)) with transverse membranous area basally.

*Neopomphale* LaSalle & Schauff, 1994

2'. Mesoscutum ([aa1](#)) with numerous setae. Apical pair of preclaval flagellomeres ([bb1](#), [bb2](#)) more equal in length, basal flagellomere (of the three) visible at least under high magnification. 1st gastral tergite without basal membranous area.

[couplet 3](#)

a1



aa1

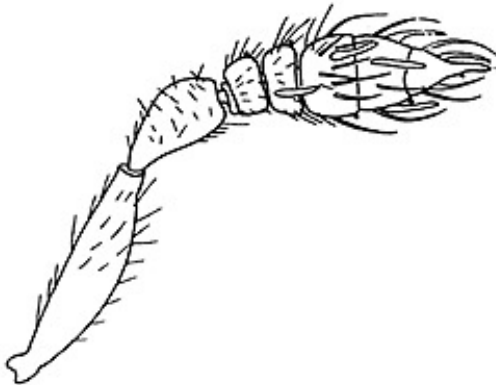


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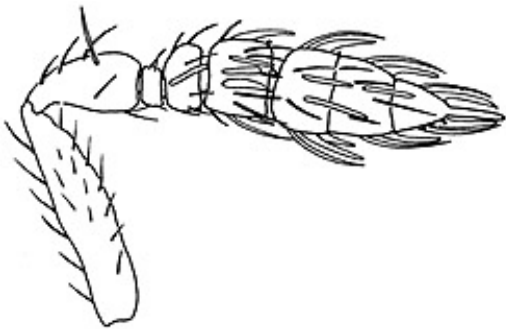
b1



bb1

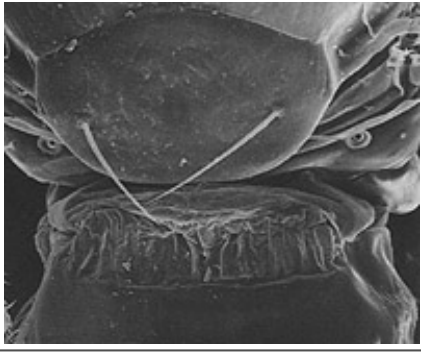


bb2



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**c1**



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Image credits: LaSalle & Schauff (1994).

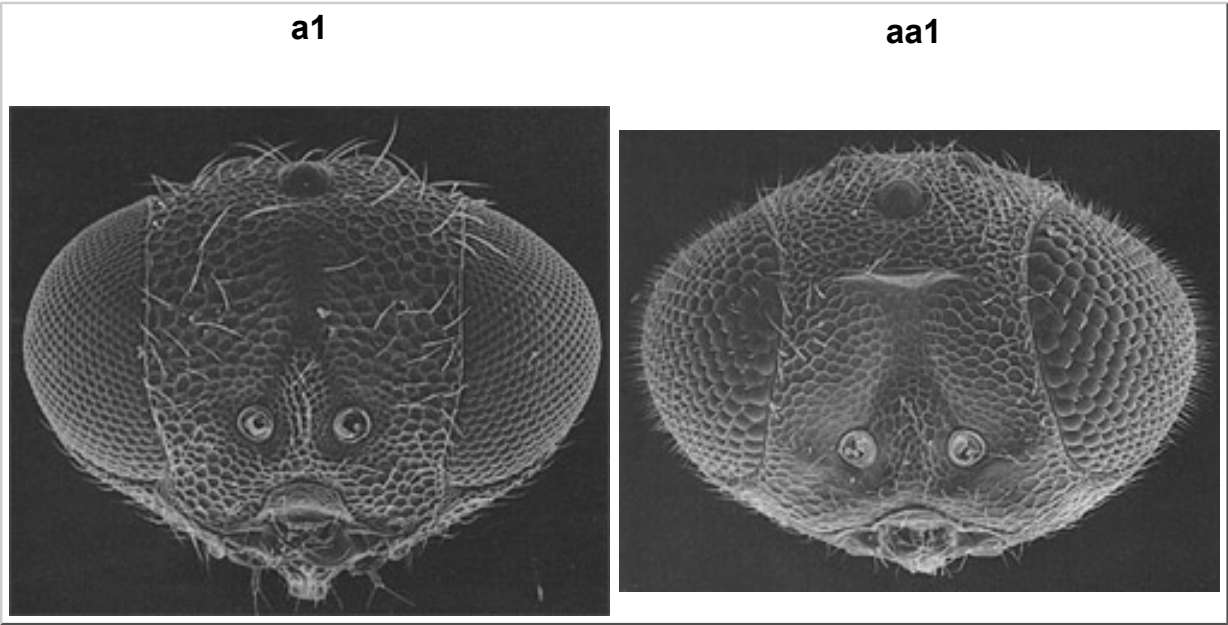
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3. **Eyes not setose** ([a1](#)). Gaster ([b1](#), [b2](#)) not collapsing, with metallic luster; gt1 usually smooth, shiny, and brightly metallic, while other tergites sculpted and more dull; hypopygium <0.25x gastral length; ovipositor sheaths ([b2](#)) greatly enlarged. Mesotibial spur short, usually not pectinate.

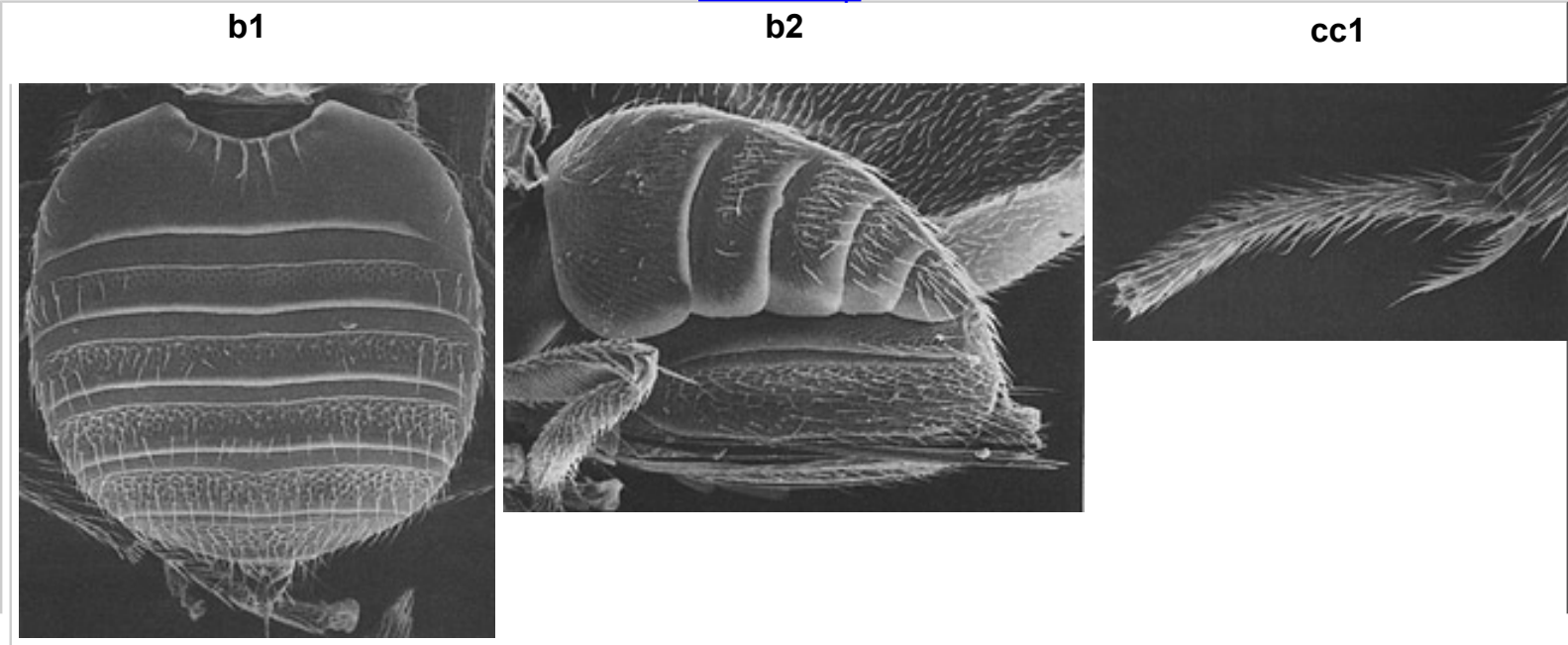
[\*Entedononecremnus\* Girault, 1915](#)

3'. **Eyes setose** ([aa1](#)). Gaster more weakly sclerotized, without metallic luster, with at least some pale markings; ovipositor sheaths not enlarged. **Mesotibial spur** ([cc1](#)) **large and pectinate**.

[\*Aleuroctonus\* LaSalle & Schauff, 1994](#)



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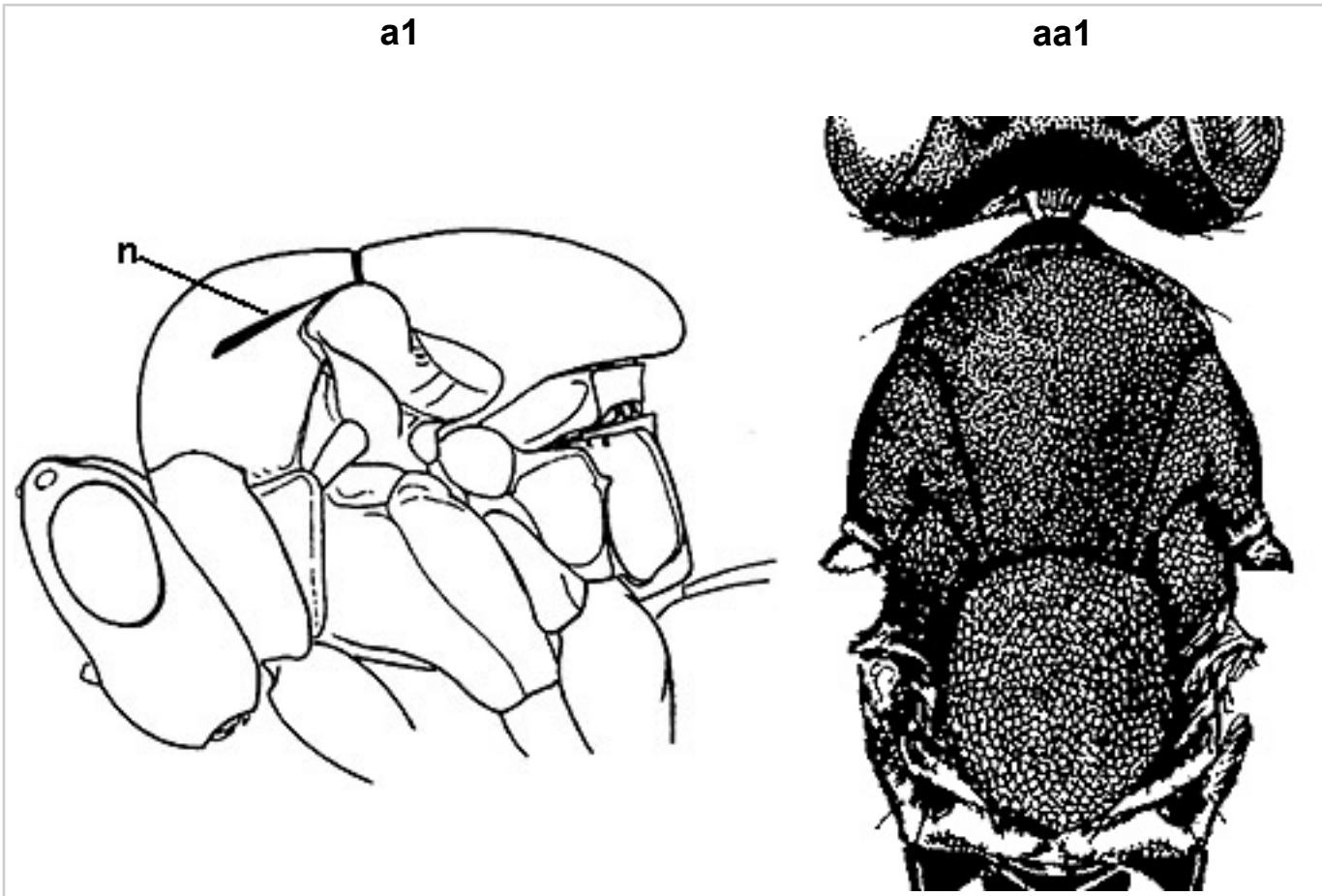
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1. Notauli (a1: n) present only in posterior part of mesoscutum.

[\*Hubbardiella\* Ashmead, 1904](#)

1'. Notauli complete (aa1).

[couplet 2](#)



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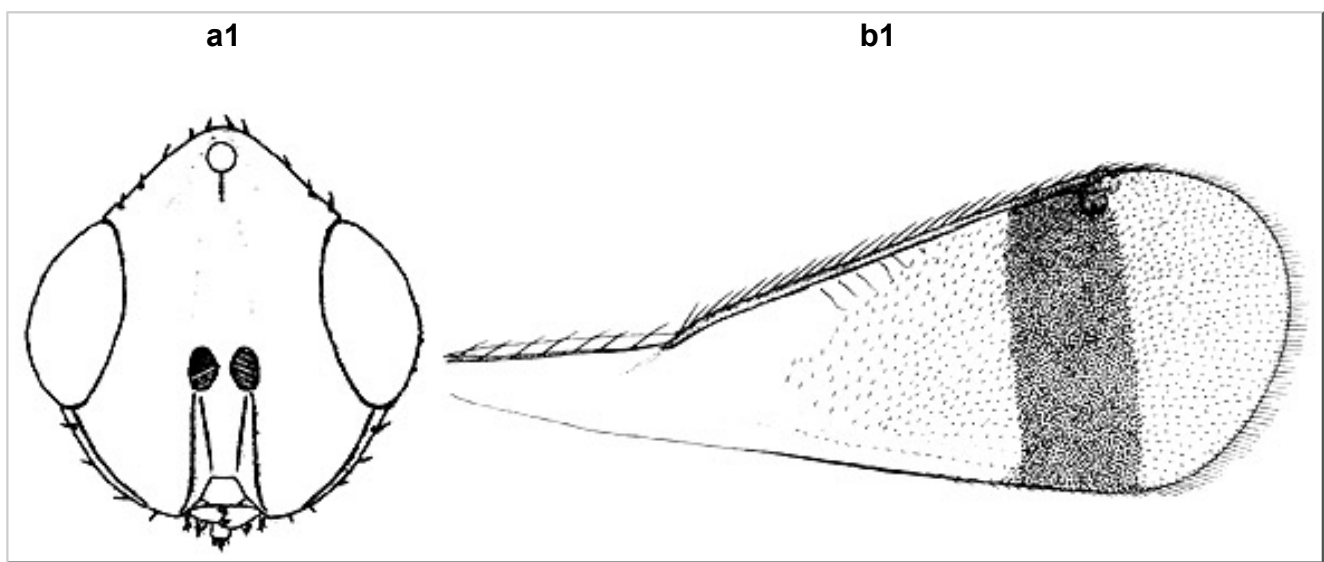
Image credits: a1: Schauff, et al. (1997). aa1: Schauff (1985c). aa2: Boucek (1988).

2. **Vertex (a1) strongly convex, extending far above eye level; 1 or 2 grooves extending below each torulus to mouth margin.** Male antenna always with nodose flagellomeres. Forewing (b1) with stigma often enlarged; discal area often with fuscate regions. Apical gastral tergite elongate in females, as long or longer than preceding tergite, covering most of the unusually long ovipositor sheaths.

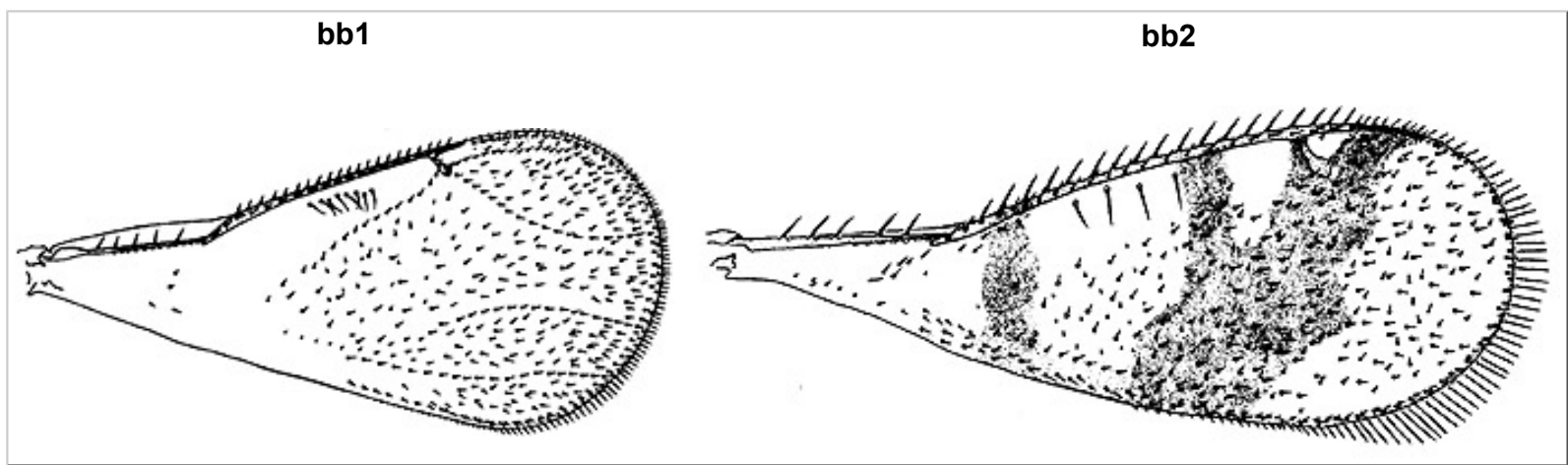
[Acrias Walker, 1847](#)

2'. Vertex evenly rounded or flat in facial view, hardly extending above eye level; no grooves extending below toruli in most species. Male antenna sometimes without nodose flagellomeres. Forewing (bb1, bb2) variable, but usually without enlarged stigma or fuscate regions. Apical gastral tergite often shorter than preceding tergite.

[couplet 3](#)



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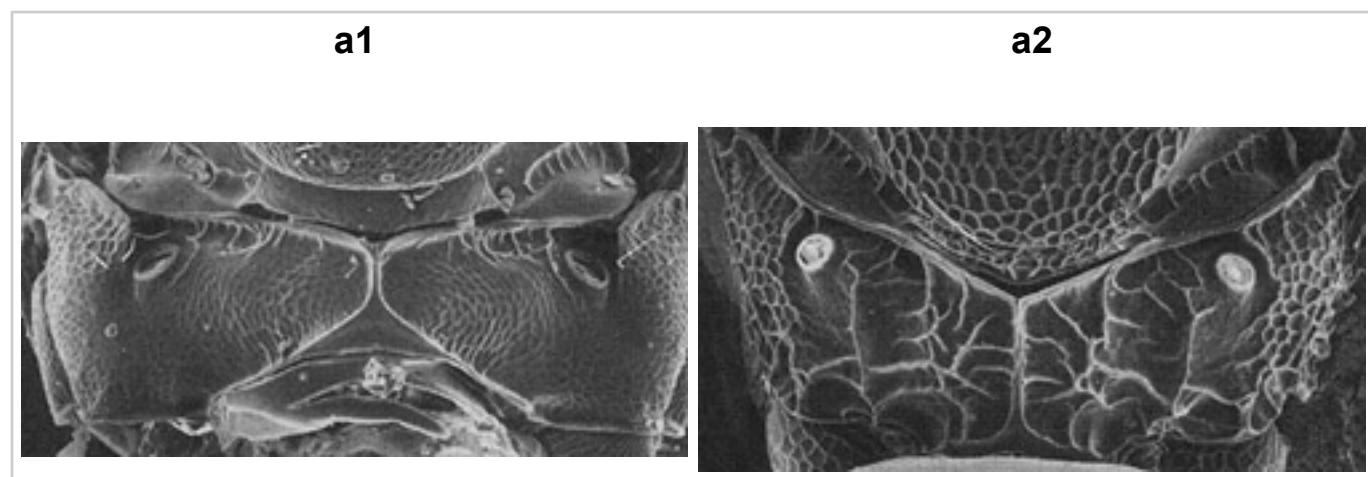
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3. Propodeum (a1) with simple median carina, or with very strong rugae that may partially obscure the carina (a2) (rarely the carina may appear to be absent when the propodeum is extremely short). Mesepimeron not extending partially over metapleuron, transepimeral sulcus always evident.

[couplet 4](#)

3'. Propodeum without simple median carina, but in some species of *Astichus* with a divergent set of areoles. Mesepimeron extending partially over metapleuron, transepimeral sulcus absent in many species (i.e.: no division between upper and lower mesepimeron).

[couplet 5](#)



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Image credits: Schauff, et al. (1997).

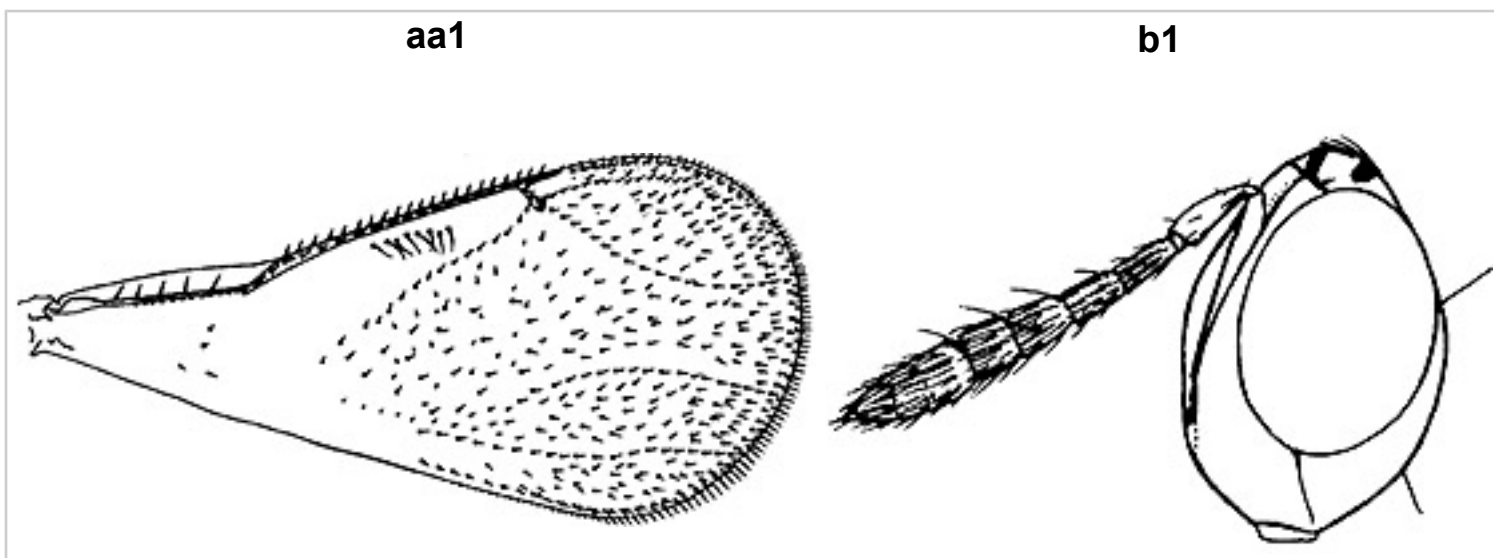
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4. Forewing with indistinct or no setal tracks radiating from stigma **and** female antenna ([b1](#)) with both pedicel and 1st funicular segment 2x longer than broad, apical funicular segments much shorter than basal ones. Male antenna ([c1](#)) with nodose flagellomeres and 1st funicular segment with two complete whorls of erect setae, sometimes with 5 funicular segments. Propodeum with median carina, but not strongly rugose. [Note: This genus has not been formally synonymized with *Euderus*, but has recently been treated as a likely synonym. Some species form apparent intermediates between the two genera, but I prefer to define *Parasecodella* strictly as above. The intermediates will key to *Euderus*.]

[\*\*\*Parasecodella\* Girault, 1915\*\*](#)

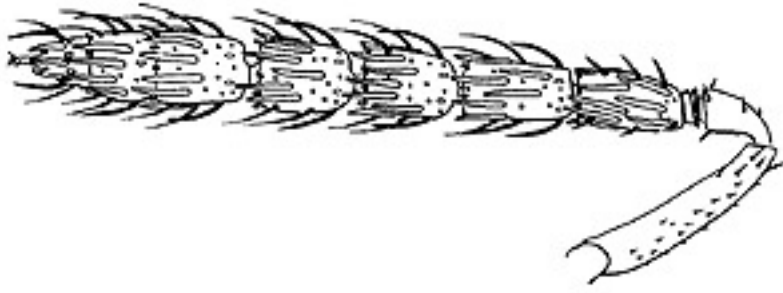
4'. Forewing ([aa1](#)) usually with distinct setal tracks radiating from stigma, and basal funicular segments ([bb1](#)) usually not both 2x longer than broad or longer than apical funicular segments (never both forewing and antennal character present at the same time, although a few have one of these characters). Male antenna usually similar to female antenna ([bb1](#)), but sometimes as above, rarely with 5 funicular segments. Propodeum ([dd1](#)) strongly rugose in subgenus *Secodelloidea* Girault.

[\*\*\*Euderus\* Haliday, 1844\*\*](#)

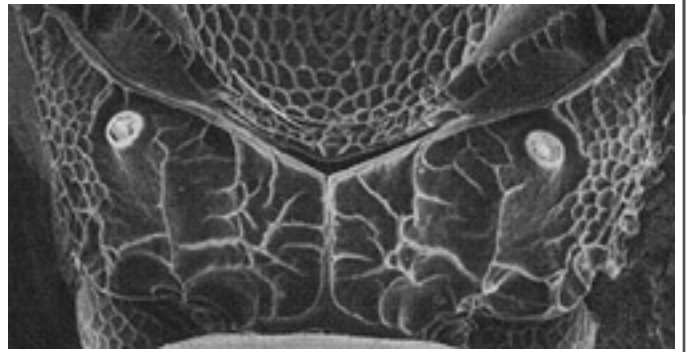


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**bb1**



**dd1**



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**c1**



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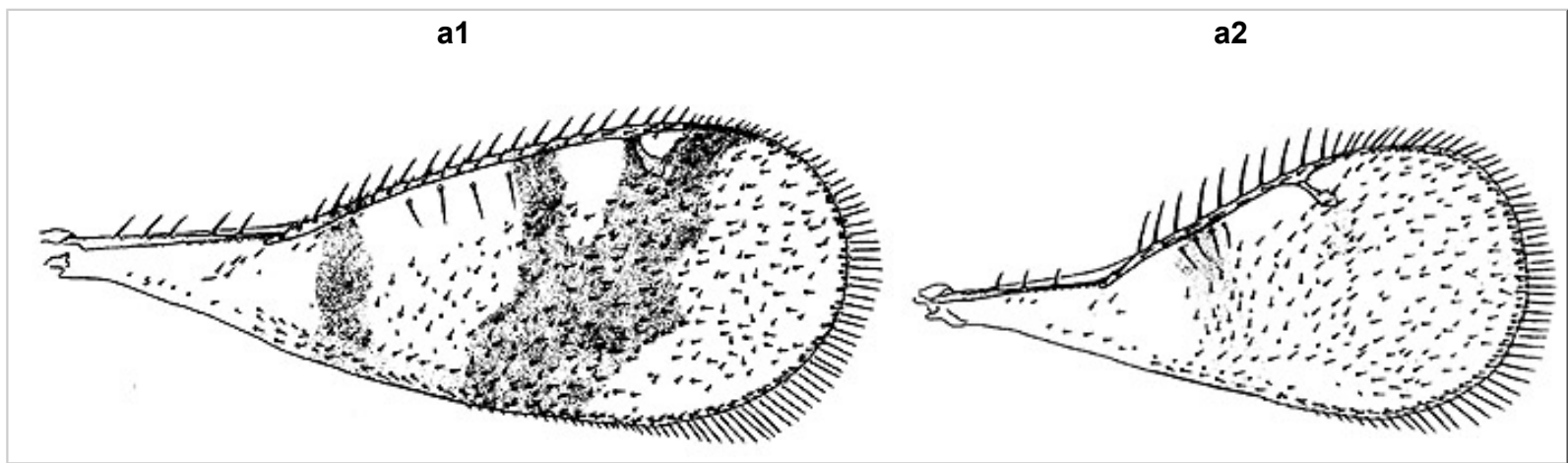
Image credits: aa1, bb1: Coote (1994). b1, c1: Boucek (1988). dd1: Schauff, et al. (1997).

5. **Either:** forewing ([a1](#), a2) with fuscate regions near venation, **or** female antenna ([b1](#)) with 1 or 2 white funicular segments in contrast to the other segments (rarely basal halves of postanellar flagellomeres white in contrast to dark apical halves). Forewing with at most 1 setal track extending from stigmal apex (this extending from the uncus and defining the radial cell).

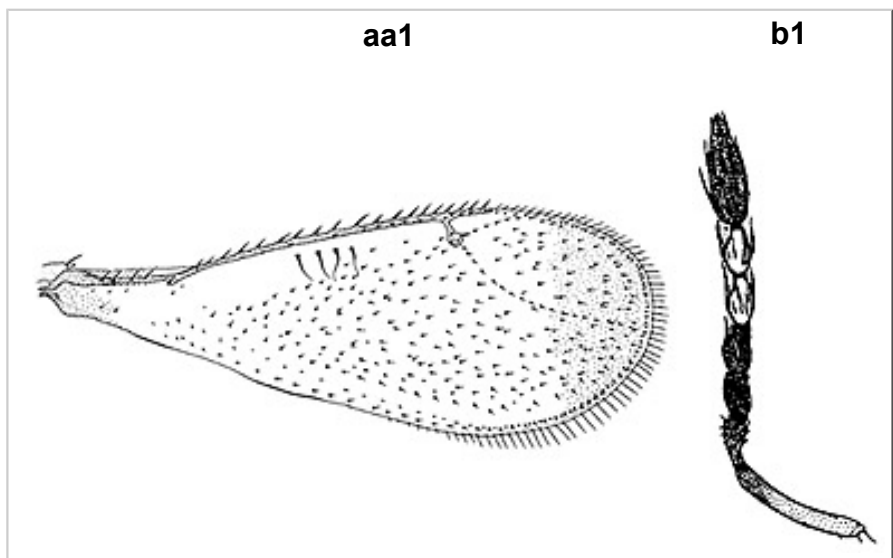
[Astichus Förster, 1856](#)

5'. Forewing ([aa1](#)) almost never with fuscate regions (rarely present in some *Euderus*, which have >1 rows of setae extending from stigmal apex), often with >1 rows of setae extending from stigmal apex. Female antenna without contrasting white and dark segments. Forewing with 2 rows of setae extending from stigmal apex in some species.

[couplet 6](#)



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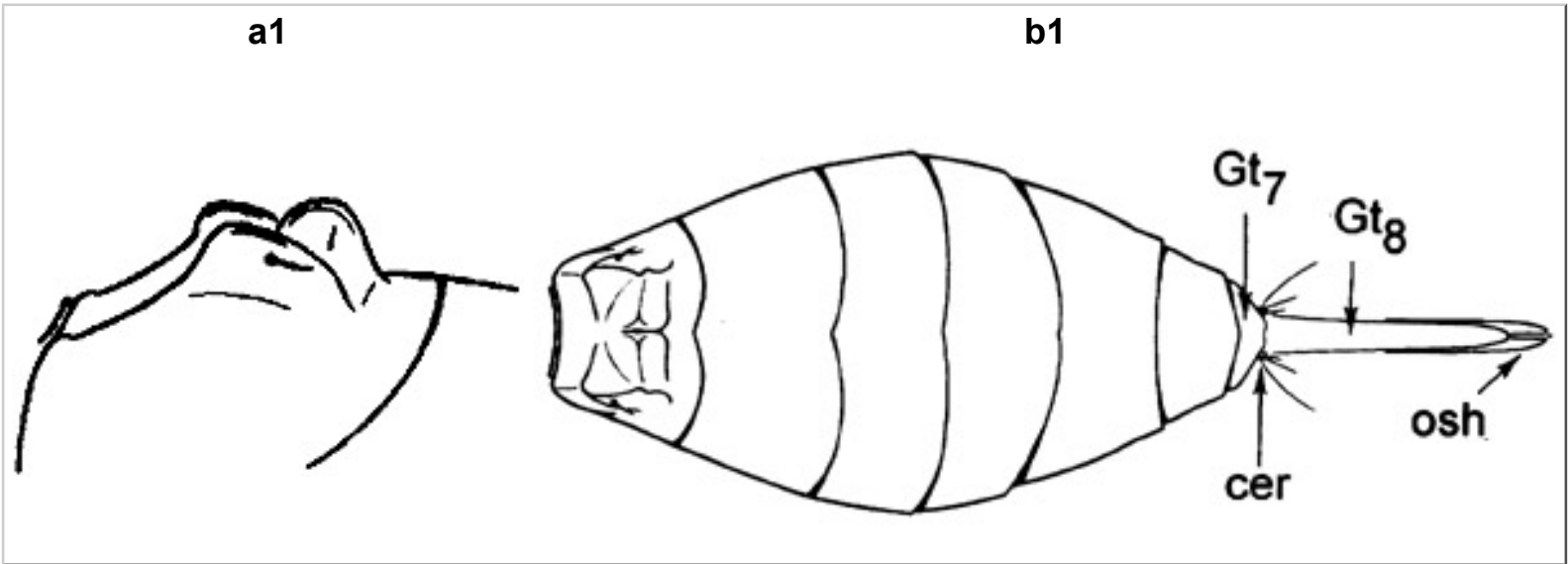
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6. Gt1 ([a1](#), b1) with 2 or 3 dorsal carinae in females, 1 in males. Radicle ([c1](#)) elongate, about 0.5x pedicel length or more. Forewing ([d1](#)) with 2 rows of setae radiating from stigma.

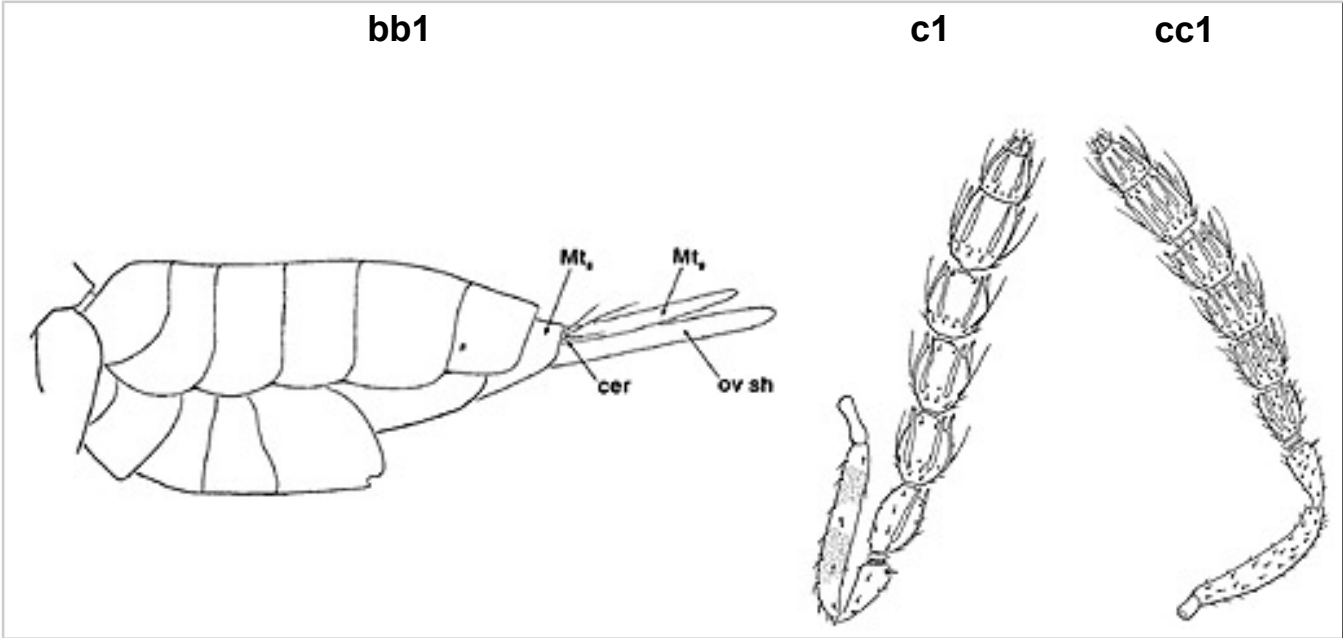
[\*Allocerastichus\* Masi, 1924](#)

6. Gt1 ([bb1](#)) without dorsal carinae. Radicle ([cc1](#)) not elongate. Forewing without setal tracks radiating from stigmal apex ([dd1](#)).

[\*Carlyleia\* Girault, 1916](#)



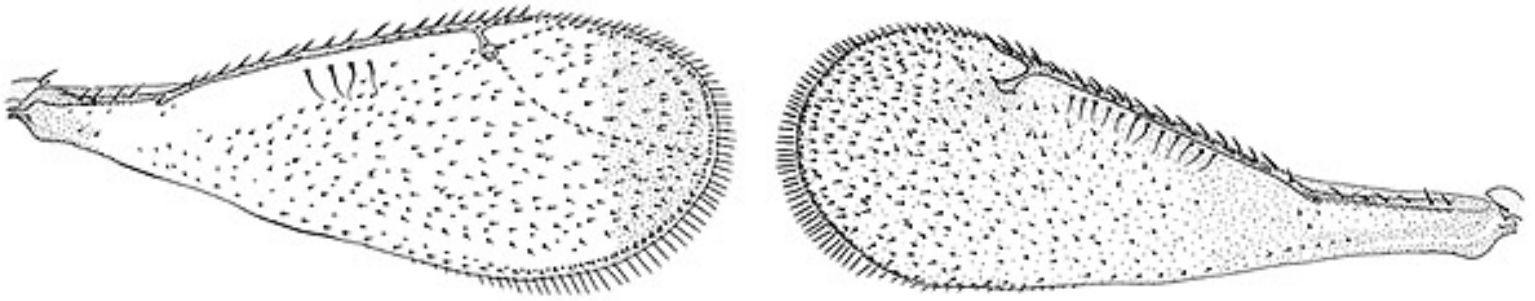
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**d1**

**dd1**



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Image credits: Coote (1994).

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1. Largest metatibial spur (a1) very large (sometimes the only spur present), longer than basal metatarsal segment. [Notauli complete]

[2. \*Euplectrus\* group](#)

1'. Metatibial spur not very large, shorter than basal metatarsal segment. [Notauli often incomplete]

[couplet 5](#)

**a1**



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Image credits: Wijesekara & Schauff (1997).

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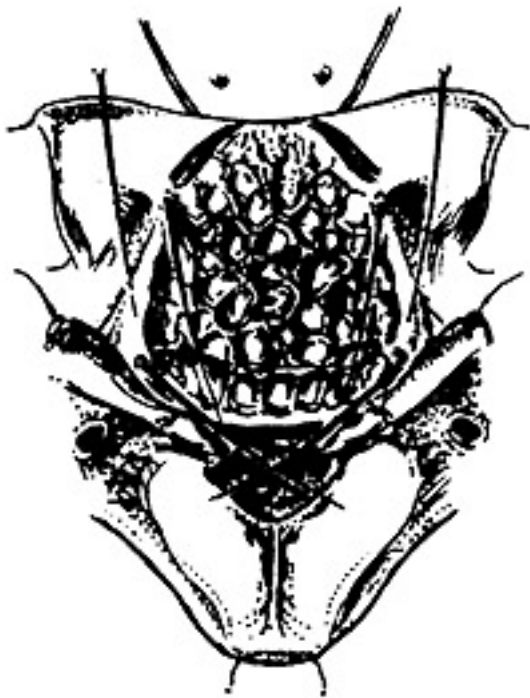
2. Propodeum with a single median carina that may have an anterior cup (ie: a split carina converging or merging posteriorly).

[couplet 3](#)

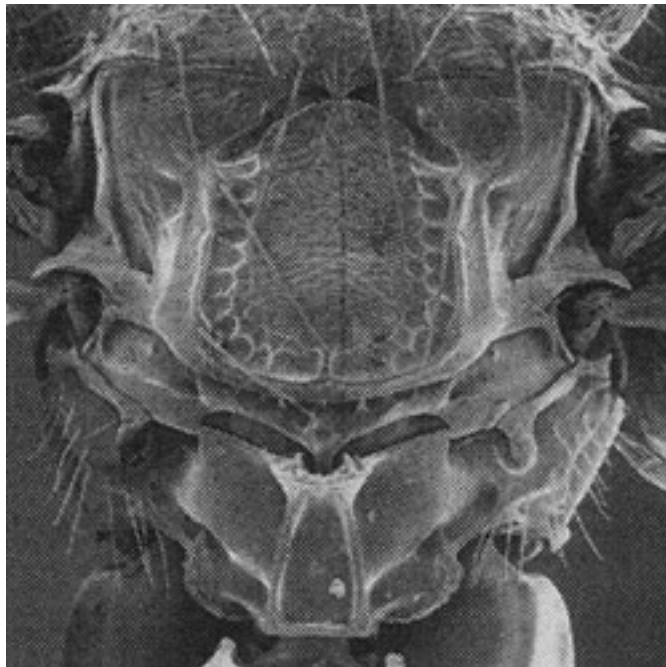
2'. Propodeum with two submedian carinae or a split median carina, diverging posteriorly

[couplet 4](#)

**a1**

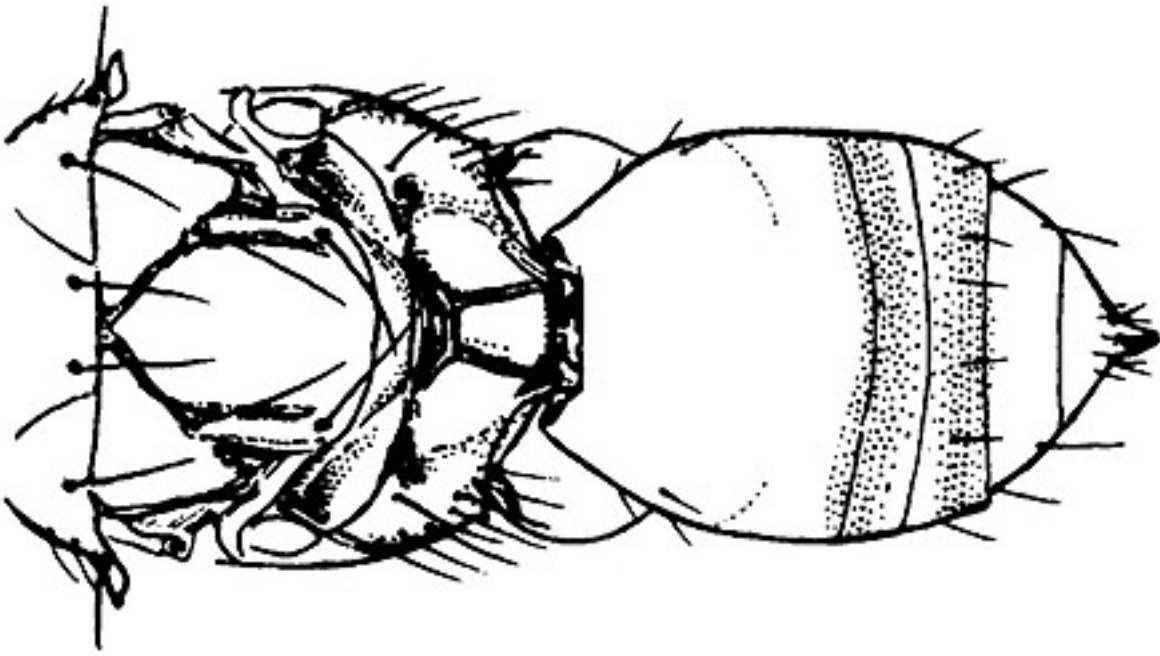


**aa1**



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aa2



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Image credits: a1, aa2: Boucek (1988). aa1: Schauff, et al. (1997).

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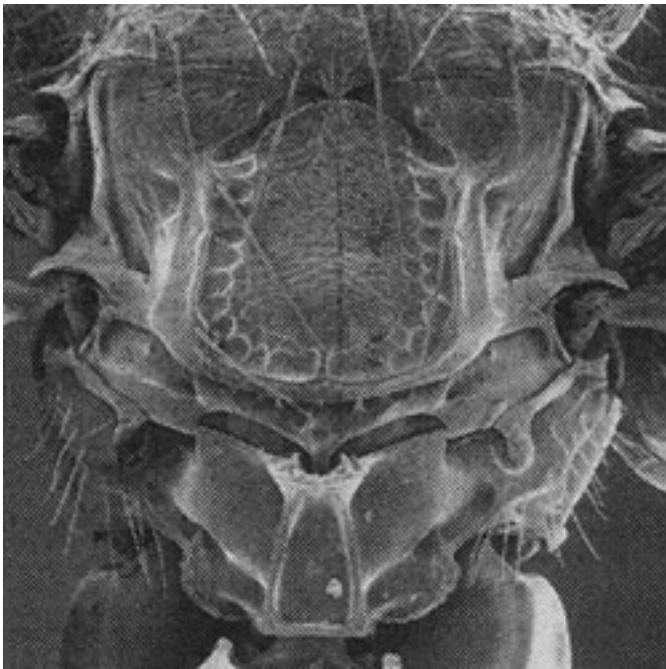
3. Pronotal collar smoothly convex in profile, never shelflike, often without apparent anterior carina but at any rate less than 3x broader than long. Scutellum (as in [b1](#)--*Alveoplectrus*) nearly always with sublateral grooves or carinae, at least sculpted in some way.

[\*Platyplectrus\* Ferrière, 1941](#)

3'. Pronotal collar distinctly horizontal and shelflike, more than 3x broader than long, unsculpted behind anterior carina [these characters failing to apply in some small males, which are recognizable using the scutellar character]. Scutellum ([bb1](#)) smooth, without sublateral grooves or carinae.

[\*Euplectrus\* Westwood, 1832](#)

**b1**



**bb1**

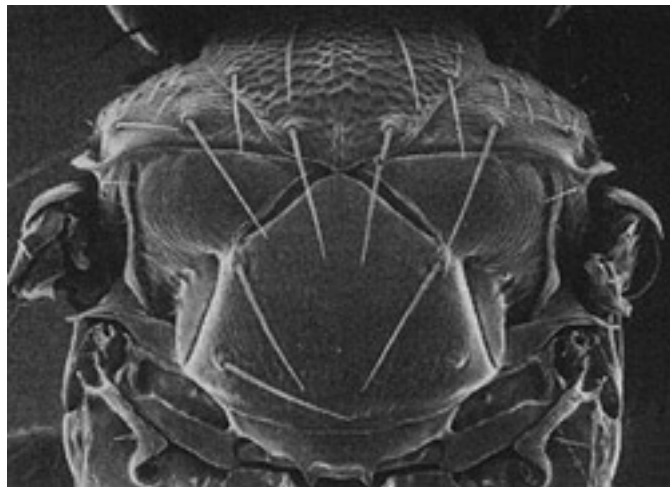


Image credits: Schauff, et al. (1997).

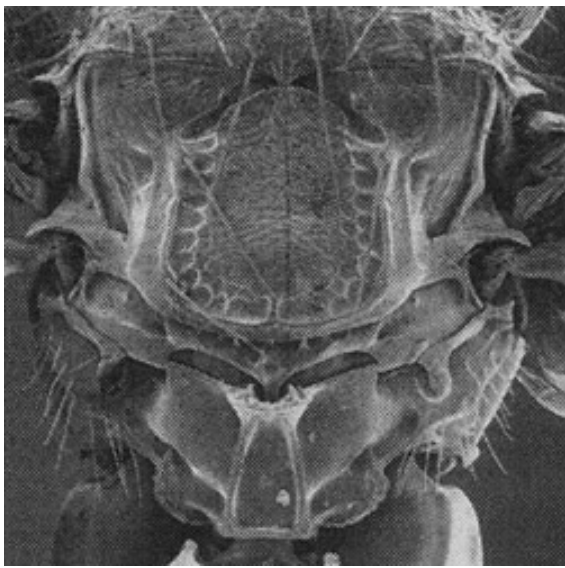
4. Sublateral grooves of scutellum ([a1](#)) curving to meet posteriorly. Dorsellum ([b1](#)) with medial pit (where the longitudinal and transverse carinae meet), and tiny posterior projection (b1, b2) into basal cup of propodeum. Basal protarsal segment with strigil ([c1](#)).

[Alveoplectrus Wijesekara & Schauff, 1997](#)

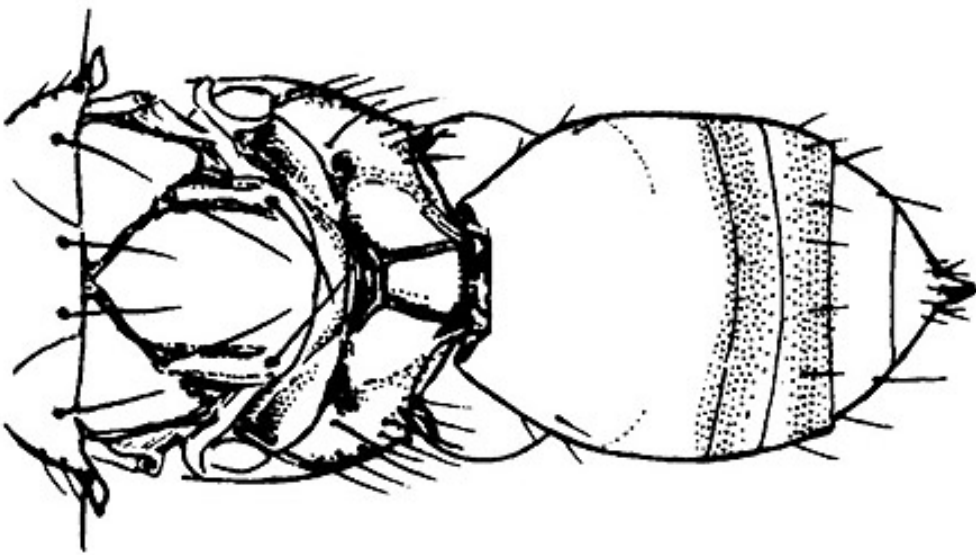
4'. Scutellum ([aa1](#)) with nearly parallel sublateral grooves that do not meet posteriorly. Dorsellum without median pit, without posterior projection. Basal protarsal segment without strigil.

[Euplectromorpha Girault, 1913](#)

a1

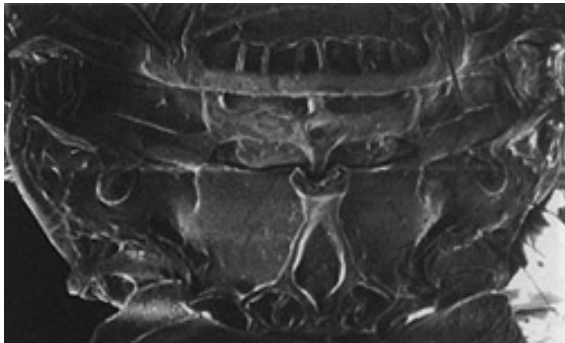


aa1

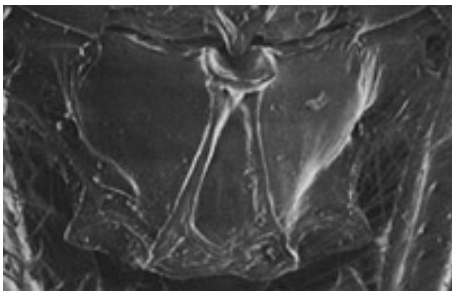


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b1



b2



c1



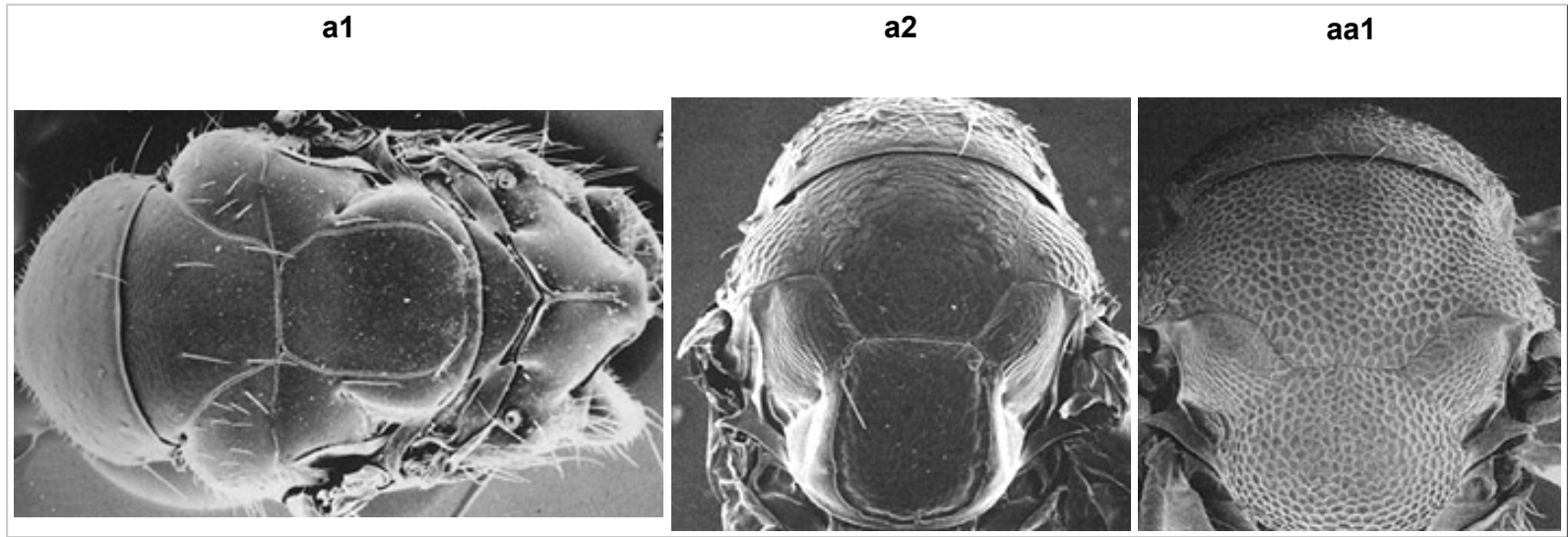
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5. Notauli distinctly ([a1](#)) complete or faintly ([a2](#), [a3](#)) complete; scutellum ([a1](#), [a2](#)) usually with distinct sublateral grooves that usually curve to meet posteriorly, but sometimes ([b1](#)) with nearly parallel grooves that may not apparently meet. Males usually without branched flagellomeres [short branches in *Paraolinx*, *Deutereulophus*, and *Grotiusomyia*], flagellum essentially similar to that of females. Propodeum ([a1](#)) mostly shiny (rarely with some rugae), with a strong median carina.

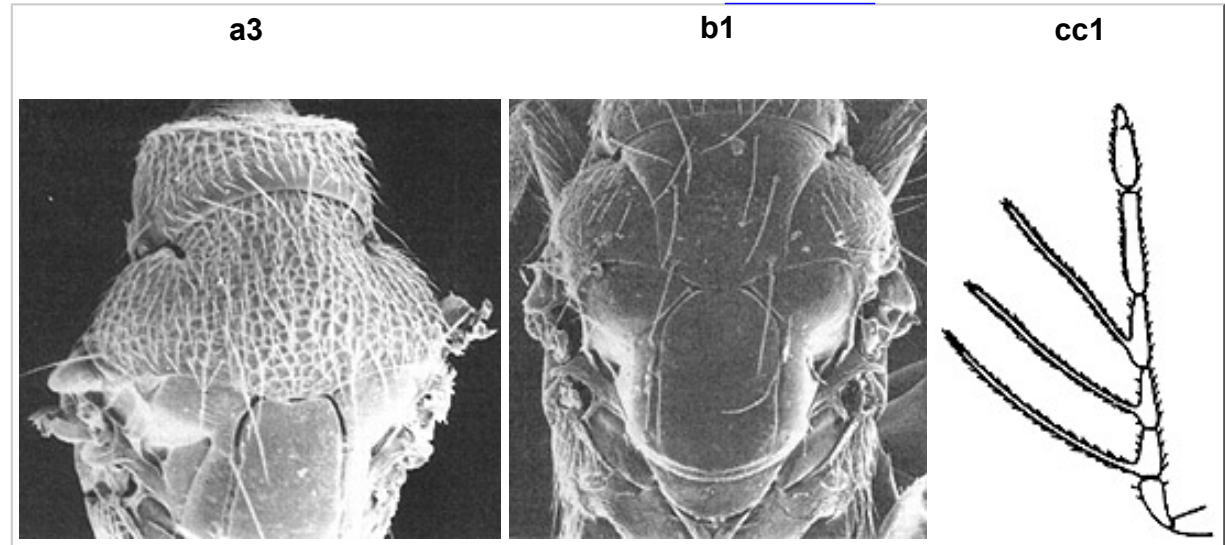
[6. Elachertus group and convergent species.](#)

5'. Notauli ([aa1](#)) incomplete or absent [May need careful examination with very good lighting for a few forms; doubtful cases should be tried both ways]; scutellum almost never with sublateral grooves, but sometimes with parallel submedian grooves not meeting posteriorly. Male antenna ([cc1](#)) usually with 2-3 branched funicular segments. Propodeum variable, but often without median carina or with uniformly reticulate median panels.

[17. Eulophus group and convergent species.](#)



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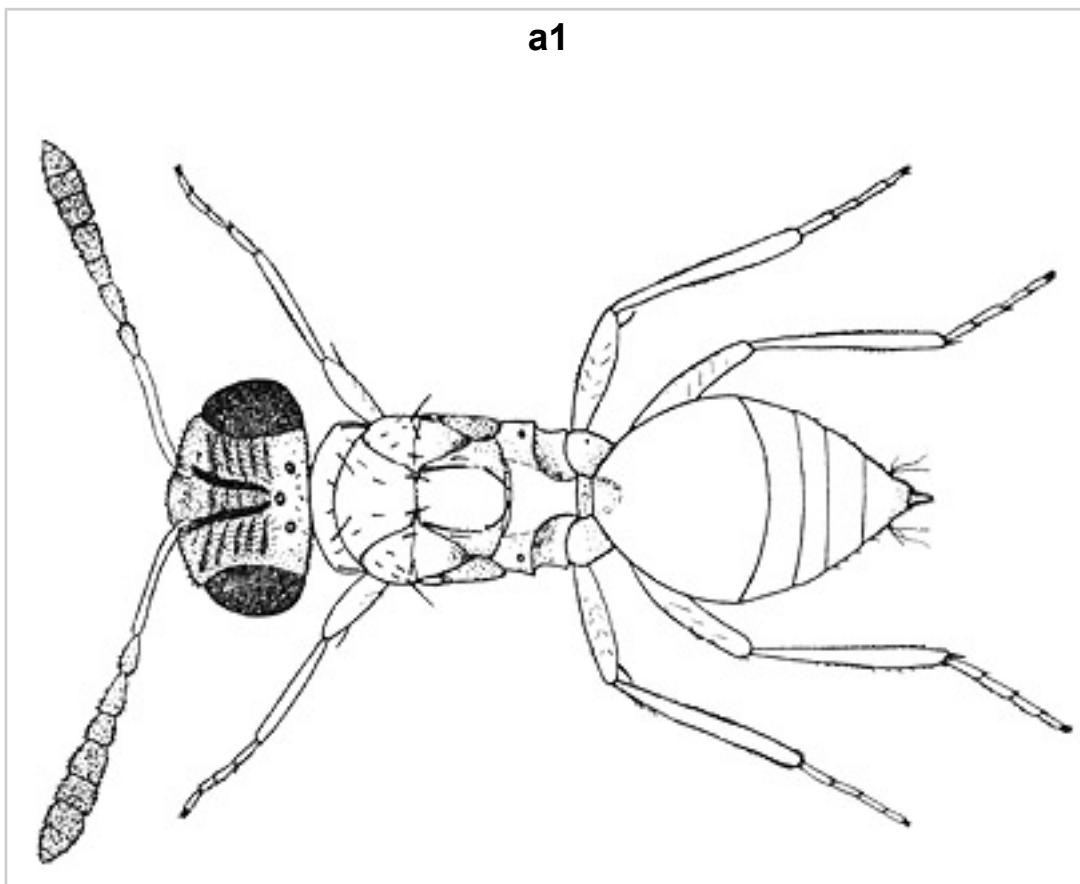
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6. (Females only) Brachypterous ([a1](#)), forewings not capable of reaching petiole, **and** propodeum with semi-transparent laminar flanges overhanging metacoxae and a sharp tooth projecting laterally posterior to spiracle. Color orange to amber, with shiny black scrobal grooves extending from toruli to median ocellus. Most specimens with transverse facial ridges extending from scrobal grooves to eye margin.

female [Xanthellum Erdös & Novicky, 1951](#)

6'. Brachypterous forms very rare, but **if** brachypterous **then** propodeum without laminar flanges overhanging metacoxae, without tooth posterior to spiracle, **and** face without shiny black scrobes contrasting with orangish head and body. [Some species *Miotropis* with similar coloration, but they are macropterous.]

[couplet 7](#)



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Image credits: Askew (1968).

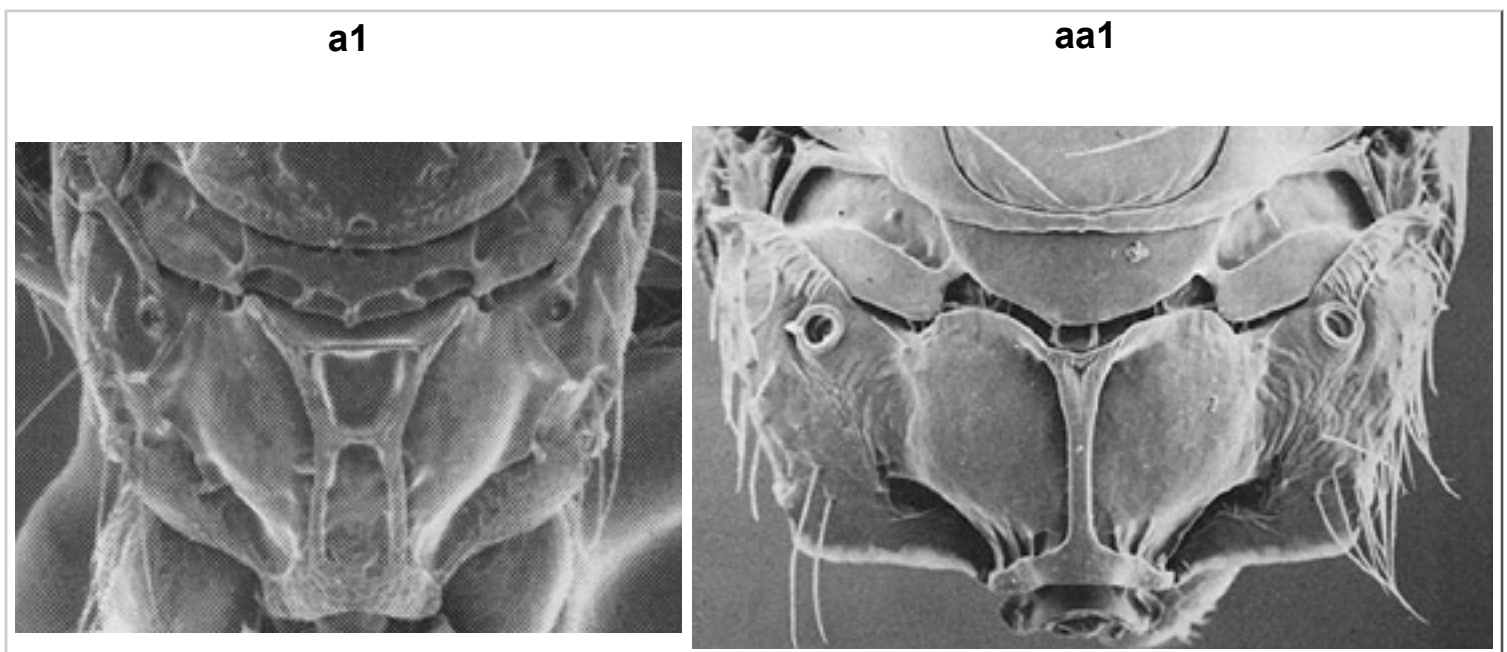
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7. Propodeum (a1) with 2 submedian carinae connected at middle, forming an H- or X-shaped structure.

[\*Stenomesus\* Westwood, 1833](#)

7'. Propodeum (aa1) with 1 median carina that may have a basal cup but never splits posteriorly, or without complete median or submedian carinae.

[couplet 8](#)



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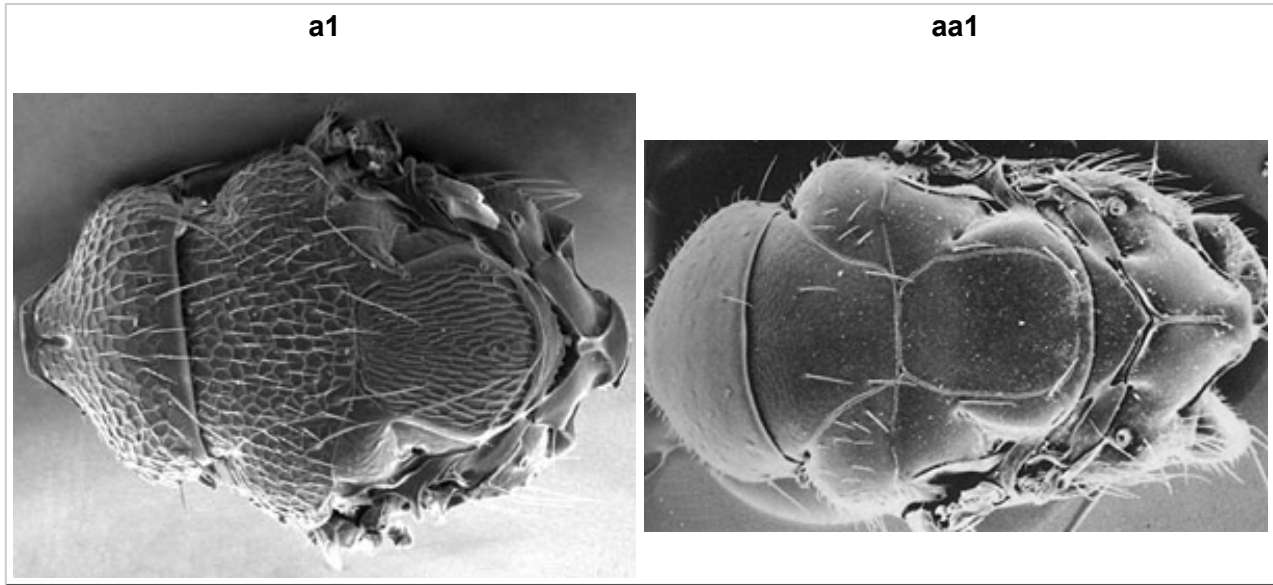
Image credits: a1: Schauff, et al. (1997). aa1: Schauff (1985b).

8. Scutellum strongly reticulate ([a1](#)), **sublateral grooves present posteriorly**, curving to meet anterior to scutellar apex. Clypeal margin ([b1](#)) distinctly convex **and** all funicular segments quadrate or broader than long ([b2](#)). Propodeum ([c1](#)) with strongly elevated median panels (median panels of propodeum raised sharply above supracoxal flange and areas lateral to plicae), **bearing 1 lateral seta and forming tooth-like elevation at posterior corner**. Extremely poorly known genus, very rare in Nearctic.

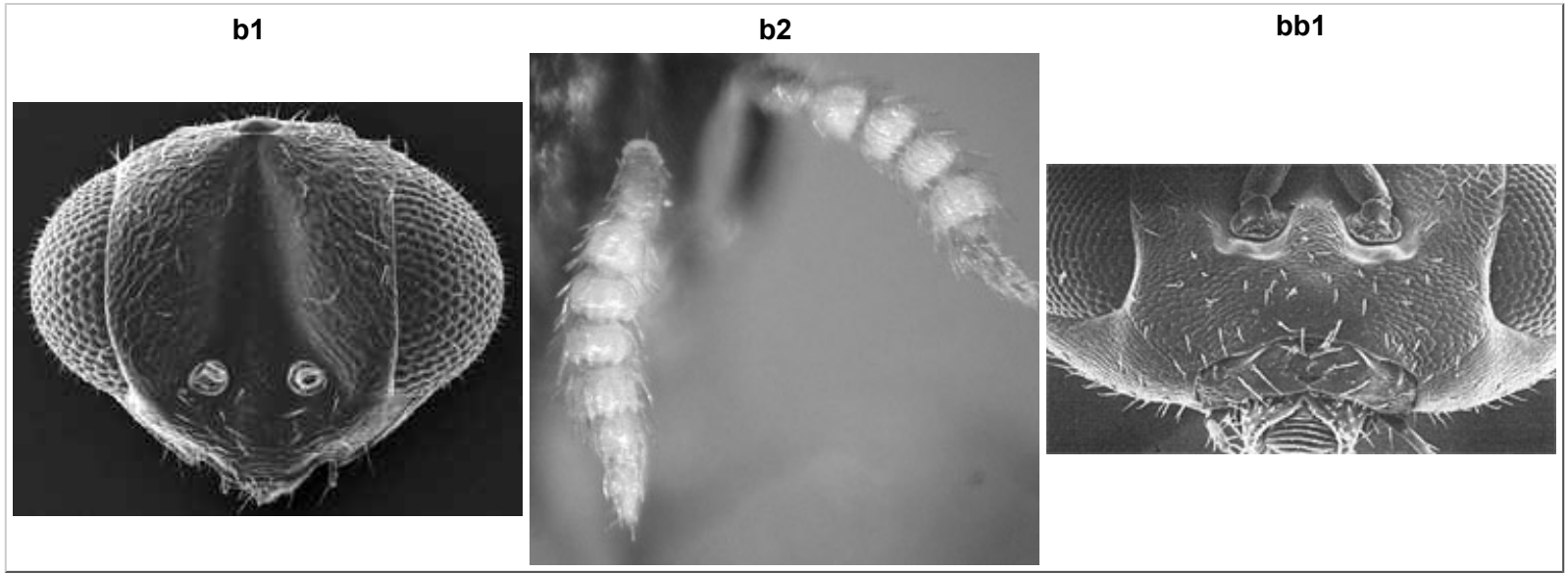
[Grotiusomyia Girault, 1917](#)

8'. Scutellum ([aa1](#)) usually not reticulate, and never with sublateral grooves fainter or absent anteriorly while complete posteriorly (completely absent in many, not meeting posteriorly in *Miotropis*). Clypeal margin ([bb1](#)) often straight or slightly concave. Usually some or all funicular segments longer than broad. Propodeal plicae ([aa1](#)) not forming special elevation.

[couplet 9](#)

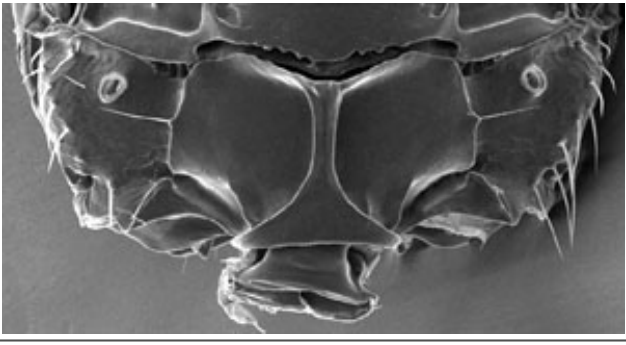


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**c1**



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Image credits: aa1: Schauff (1985c). bb1: Schauff, et al. (1997).

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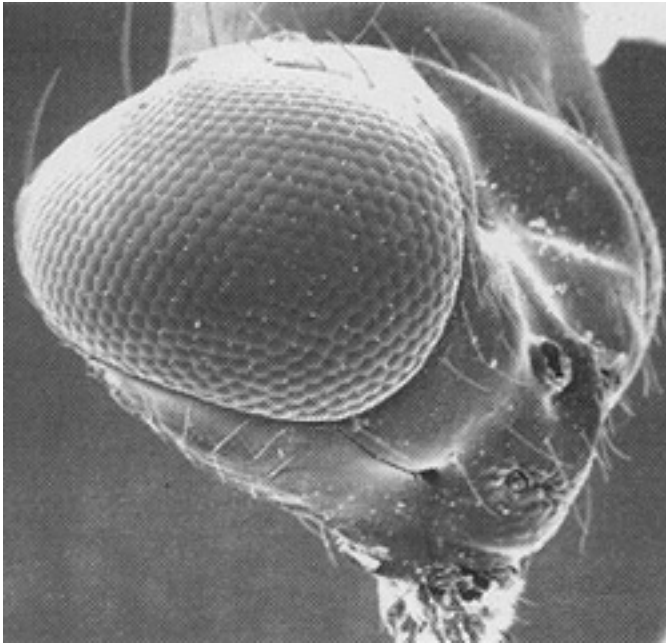
9. Head broad (a1, a2), with face strongly narrowed in ventral half; occipital carina (a2) present near occipital foramen, vertex sharply margined. **Mandibles reduced, not capable of meeting medially, without denticles. Forewing (b1) with distinct tuft of enlarged, darkened setae near parastigma** (sometimes represented only by distinctly darkened spot in the veenation); also with transverse fuscate stripes.

[\*Hoplocrepis\* Ashmead, 1890](#)

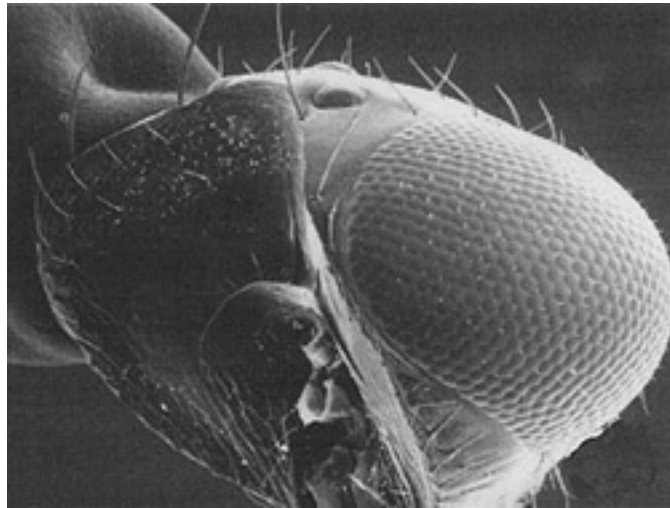
8'. Head usually not similarly shaped (but convergent in some species. Mandibles capable of meeting medially, with denticles. Forewing without parastigmal tuft, often without fuscate areas.

[couplet 10](#)

a1

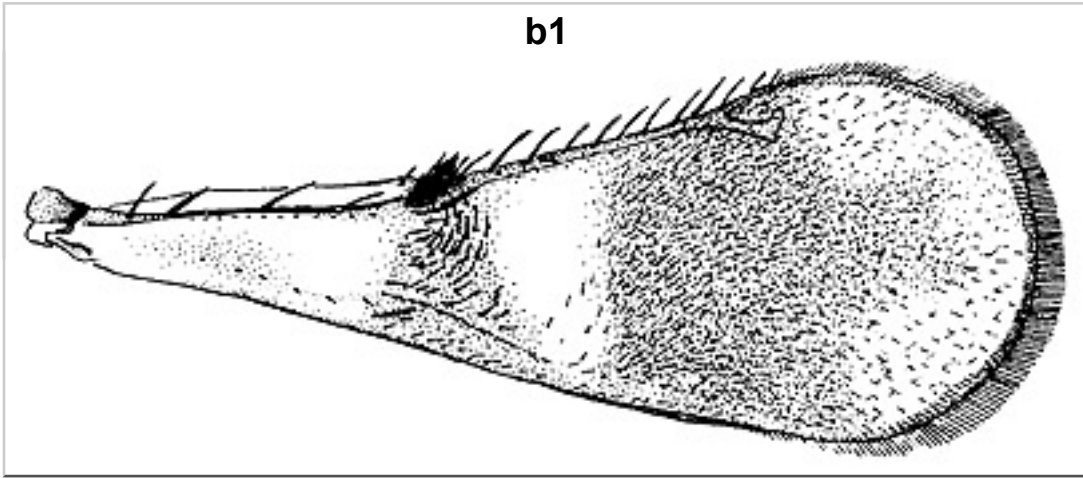


a2



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**b1**



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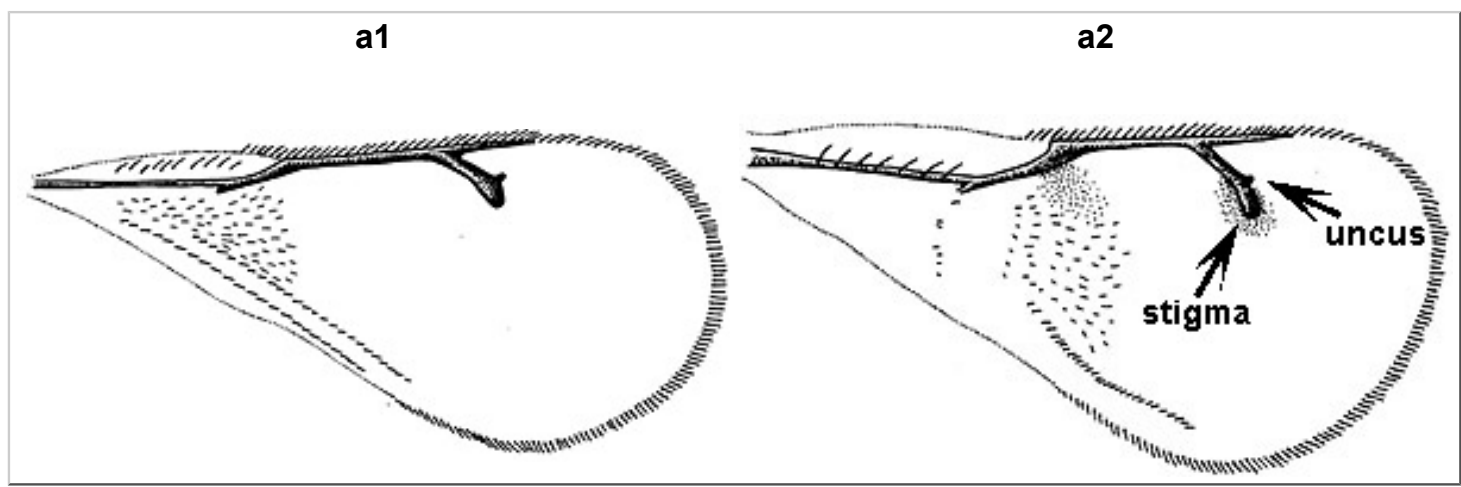
Image credits: Schauff, et al. (1997).

10. **Stigma elongate**, ([a1](#), a2) **with uncus arising much more than its own length from stigmal apex**. Flagellar formula 2,3,2 ([b1](#)) or 2,4,1 (b2) in males and females. Scutellum ([c1](#)) without dorsal grooves or with parallel submedian grooves [not the axillular grooves] that are very close together.

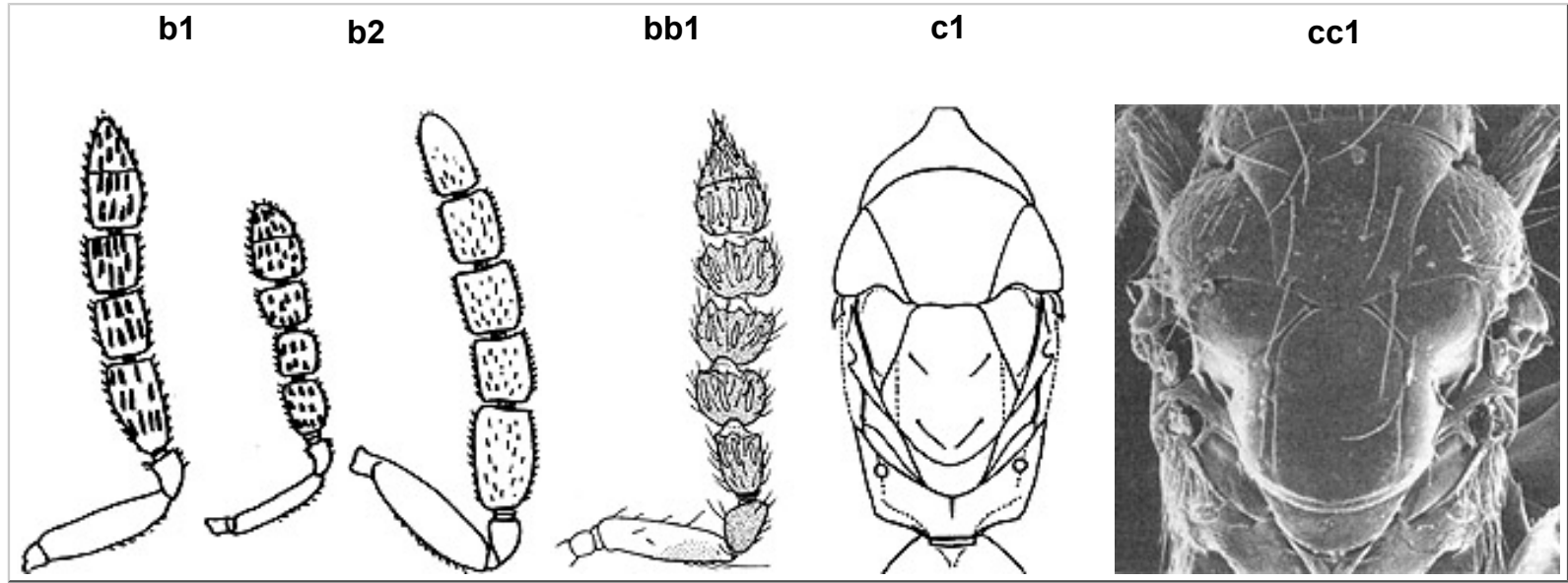
[Aulogymnus Förster, 1851](#)

10'. Stigma not elongate, with uncus arising its own length or less from stigmal apex. Flagellum ([bb1](#)) usually with 6 or more distinct segments past the anelli, but club sometimes apparently fused into one segment. Scutellum usually with sublateral grooves, without grooves, or with parallel grooves ([cc1](#)) that are far apart. [Best approach: Use one or more of these characters must be used to *exclude* these species from being *Aulogymnus*]

[couplet 11](#)



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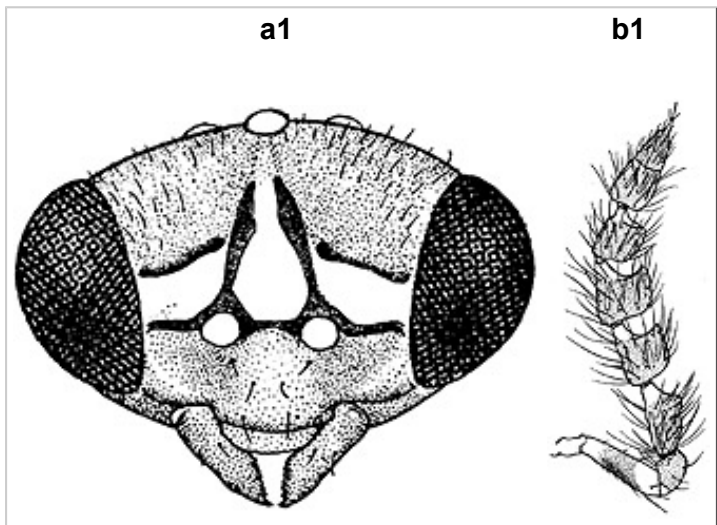


11. Females with transverse white stripe ([a1](#)) on face at level of toruli, bordered above and below by dark stripes, although this pattern is sometimes reduced to a simple white spot near each eye (not present at all in males). **Mandibles long, with many tiny denticles.** Flagellomeres ([b1](#)) expanded in males. **Scutellum ([c1](#)) without submedian or sublateral grooves.**

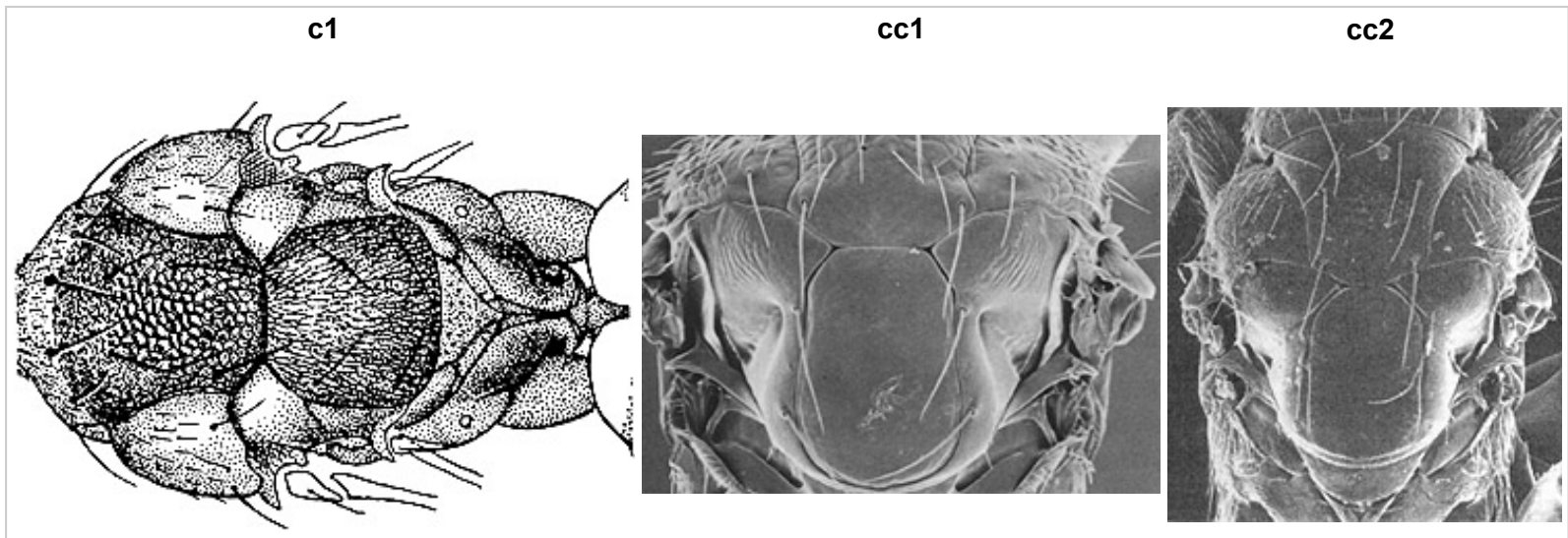
[Paraolinx Ashmead, 1894](#)

11'. Face without similar pattern (though sometimes with transverse black stripes). Mandibles not as above, with a few equal denticles or without denticles. Flagellar segments seldom expanded in males [only known in *Deutereulophus* and *Grotiusomyia*]. Scutellum with sublateral grooves curving to meet ([cc1](#)) near posterior edge of scutellum or with parallel sublateral grooves ([cc2](#)), only rarely (some *Miotropis*) without sublateral grooves.

[couplet 12](#)



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12. Scutellum ([a1](#)) with sublateral grooves of scutellum incomplete (under up to normal 50x magnification) or absent, **straight and subparallel if present, not curving to meet posteriorly** [most/all with very faintly complete scutellar grooves, under high-resolution magnification].

[\*Miotropis\* Thomson, 1878](#) and a very few [\*Elachertus\* Spinola, 1811](#)

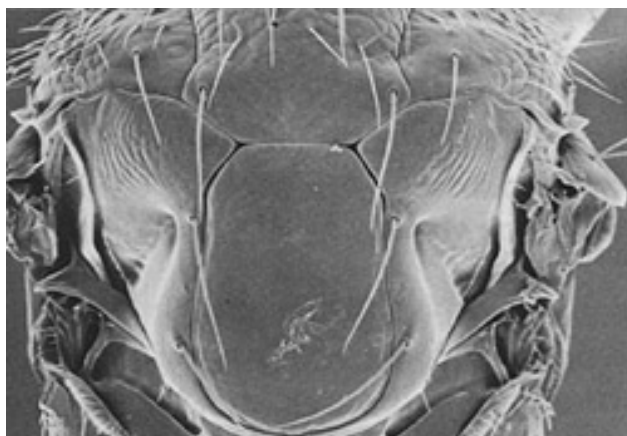
12'. Scutellum ([aa1](#), aa2, [aa3](#)) with sublateral grooves complete, curving to meet near posterior apex of scutellum.

[couplet 13](#)

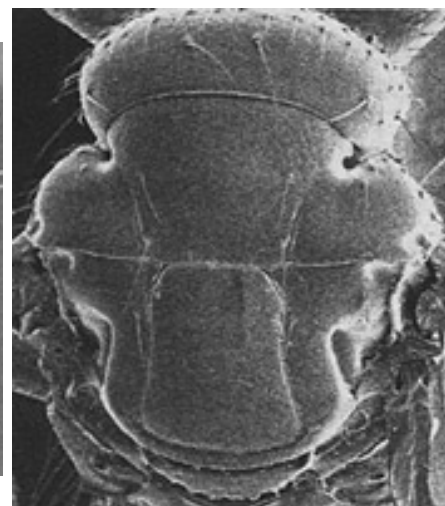
a1



aa1



aa2



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**aa3**



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Image credits: a1, aa2: Schauff, et al. (1997). aa1: Schauff (1985b). aa3: Schauff (1985c).

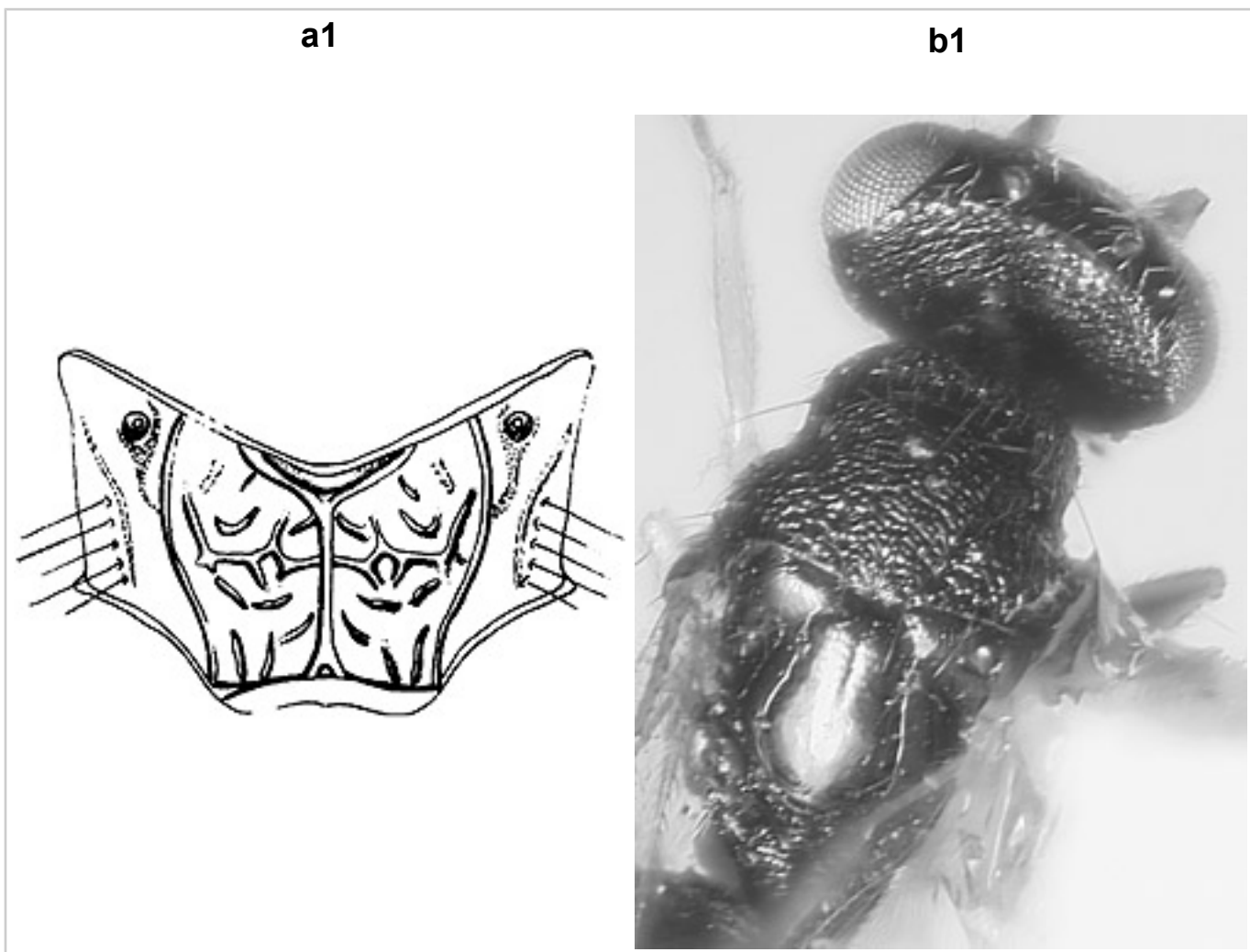
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13. **Median panels of propodeum with irregular transverse costulae/strong rugae**; plicae present. Scutellum with median groove ([b1](#); sometimes faint or incomplete).

[\*Diglyphomorpha\* Ashmead, 1904](#)

13'. Propodeum without transverse costulae, often without plicae. Scutellum without median groove.

[couplet 14](#)



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Image credits: a1: Schauff, et al. (1997).

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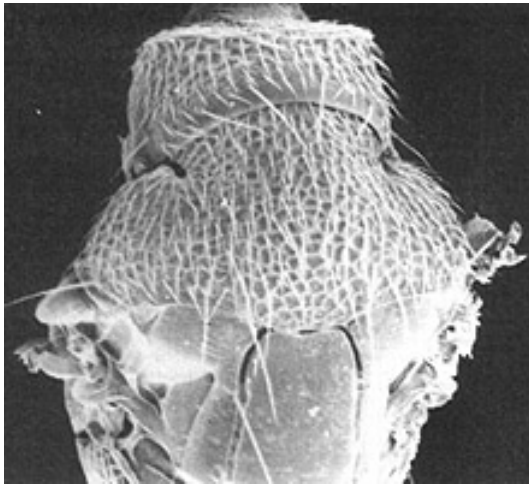
14. Pronotum subquadrate ([a1](#)), strongly defined **and** collar carinate. Mesoscutum reticulate, with many setae. **2 occipital carinae** ([b1](#)), one faintly present near ocelli, the other strongly defined near occipital foramen.

[Cristelacher Schauff & LaSalle, 1993](#)

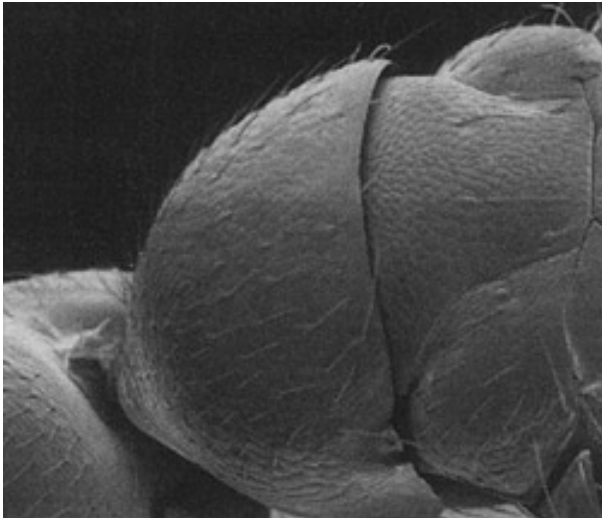
14'. Pronotum often not subquadrate, but if plausibly so ([aa1](#), aa2) then collar not carinate. Mesoscutum seldom as above (known to be similar in some *Elachertus*). At most with 1 occipital carina.

[couplet 15](#)

a1



aa1



aa2



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b1

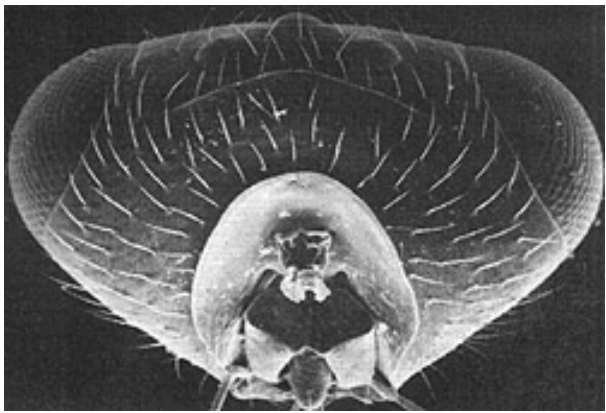


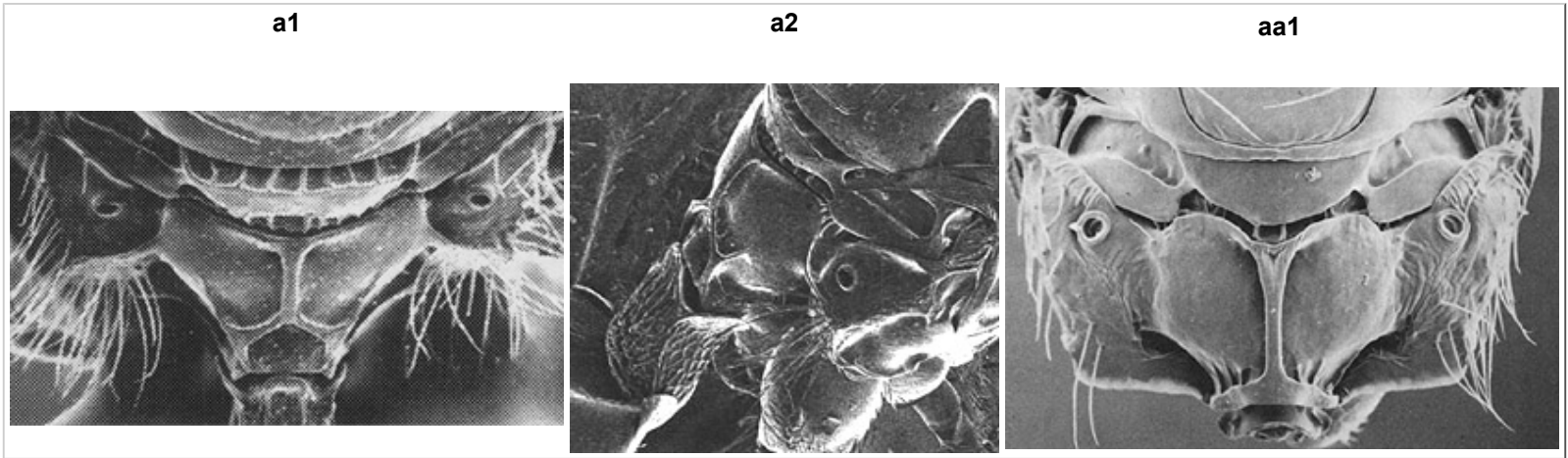
Image credits: Schauff, et al. (1997).

15. **Median carina of propodeum** ([a1](#), a2) forked at nucha, forming large areole enclosing nucha; plicae incomplete, **projecting from anterior corners of nuchal areole**; **carina present posterior to spiracle**, patch of setae usually present posterior to carina, distinct from callus setae. **Petiole with dorsal and lateral flanges**. **Occiput strongly concave**, **vertex carinate**, eye reaching posterior margin of head in dorsal half (similar to *Hoplocrepis*). **Basal flagellomeres** ([b1](#)) in males and females **serrate to mildly pedunculate**. Pronotum ([c1](#)) semiglobose anteriorly, collar relatively long and broader than anterior portion of mesoscutum; sublateral scutellar grooves sinuate and converging medially.

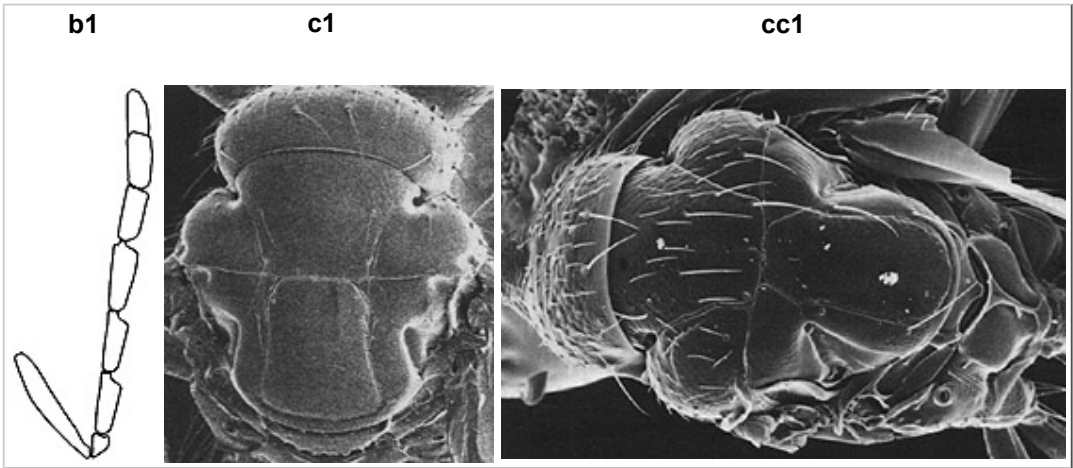
[Deutereulophus Schulz, 1906](#)

15'. Propodeum ([aa1](#)) not at all as above: median carina not forked at nucha; plicae not as above, often completely absent; carina absent posterior to spiracle, without patch of setae distinct from callus setae. Petiole without dorsal and lateral flanges. Head not shaped as above, eye not reaching posterior margin of head in dorsal half. Basal flagellomeres in males and females not serrate. Pronotum ([cc1](#)) usually not shaped as above; sublateral scutellar grooves usually not sinuate. [Some apparently undescribed species, especially from the Neotropics, form intermediates between *Deutereulophus* and *Elachertus*. These specimens key to *Elachertus* here. I prefer to define *Deutereulophus* strictly, as above.].

[couplet 16](#)



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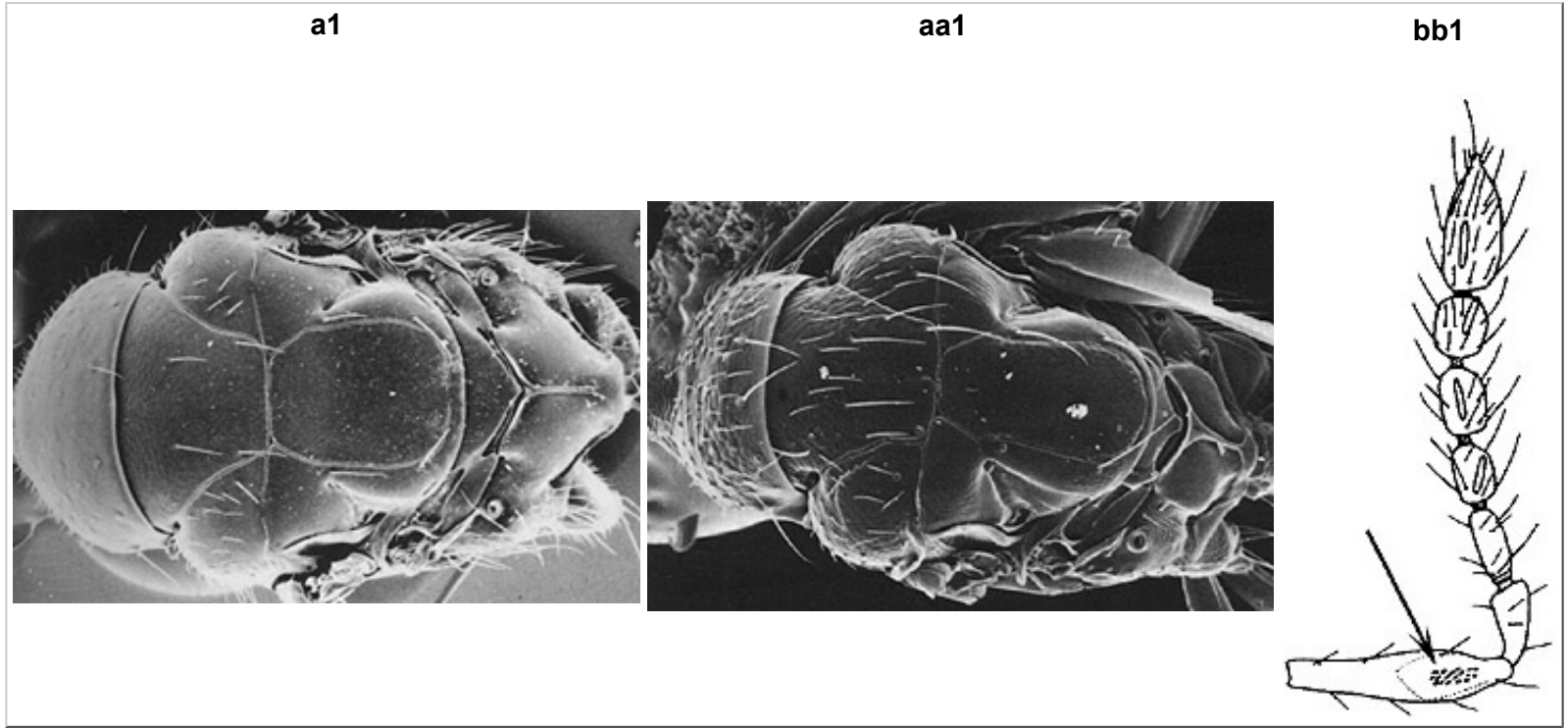
Image credits: a1, c1: Schauff, et al. (1997). a2, b1: Schauff (2000). aa1, bb1: Schauff (1985b).

16. Mesoscutal midlobe (a1) with 2 pairs of setae. Scape in males with sensory pits arranged at least along entire ventral margin of scape.

[Hyssopus Girault, 1916](#)

16'. Mesoscutal midlobe ([aa1](#)) with more than 2 pairs of setae. **Scape in males with sensory pits ([bb1](#), indicated with arrow) restricted to its apical third, the pits forming tight group, separated from each other by less than their own diameter** (usually requires slide mounting of scape).

[Elachertus Spinola, 1811](#) and male [Xanthellum Erdös & Novicky, 1951](#)



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Image credits: a1: Schauff (1985c). aa1, bb1: Schauff (1985b).

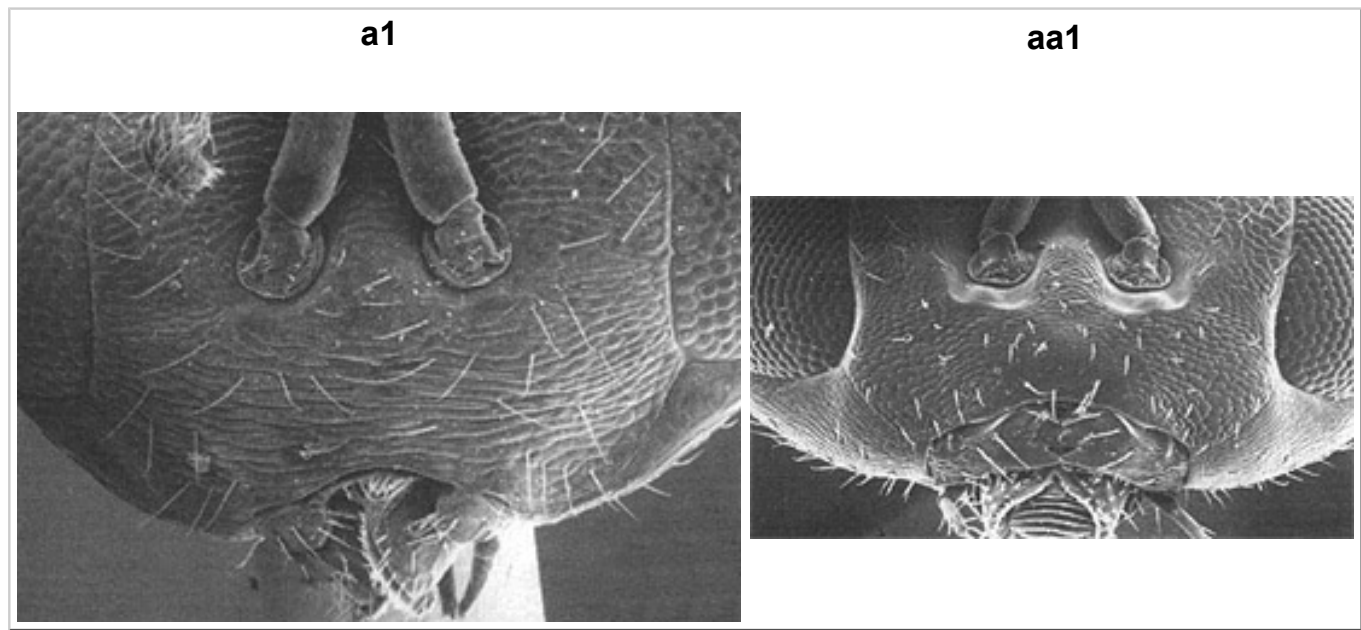
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17. **Mandibles reduced ([a1](#)), not capable of meeting medially. Basal metatarsal segment ([b1](#)) shorter than 2nd segment, subequal or shorter than mesotibial spur. Flagellum usually 3-segmented in females ([c1](#)) (always 4-segmented in males). Postmarginal vein subequal or slightly longer than stigmal vein (at most 1.7x stigmal vein length).**

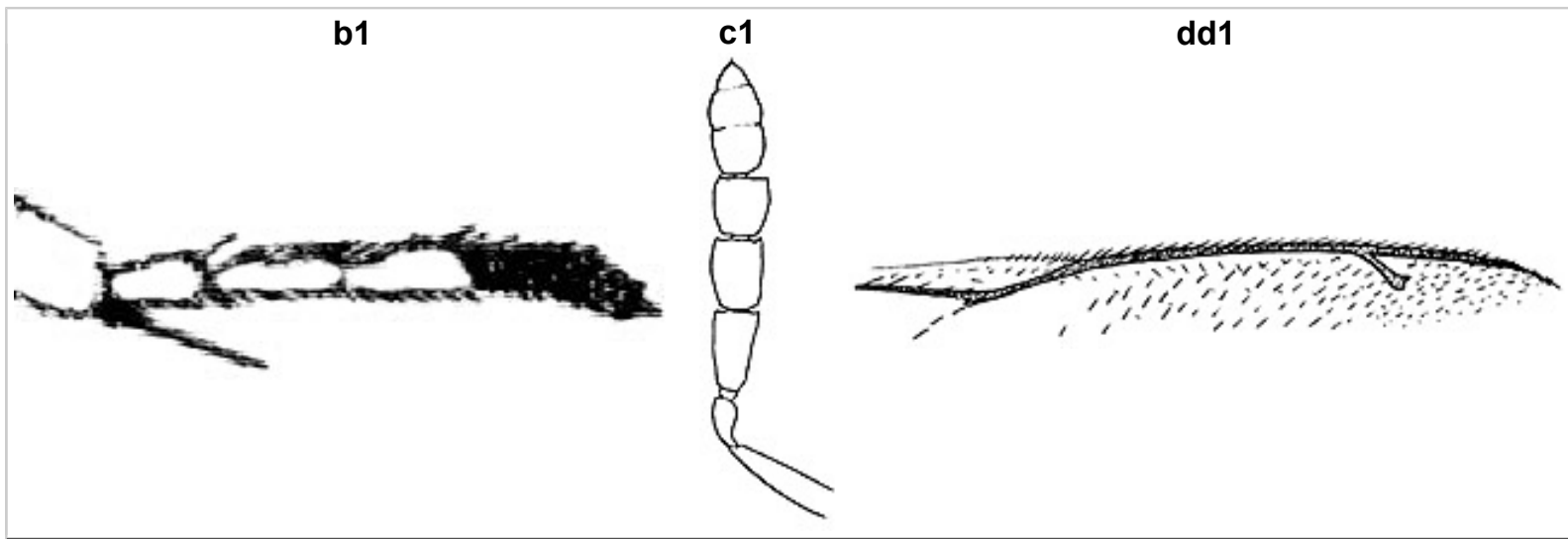
[Eulophus Geoffroy, 1762](#)

17'. Mandibles not strongly reduced ([aa1](#)), capable of meeting medially. Basal metatarsal segment equal or longer than second metatarsal segment and metatibial spur. Flagellum often 4-segmented in females (3-segmented in male *Colpoclypeus*). Postmarginal vein ([dd1](#)) often more than 1.7x stigmal vein length.

[couplet 18](#)



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Image credits: a1, aa1: Schauff, et al. (1997). b1, c1: Askew (1968). dd1: Boucek (1988)

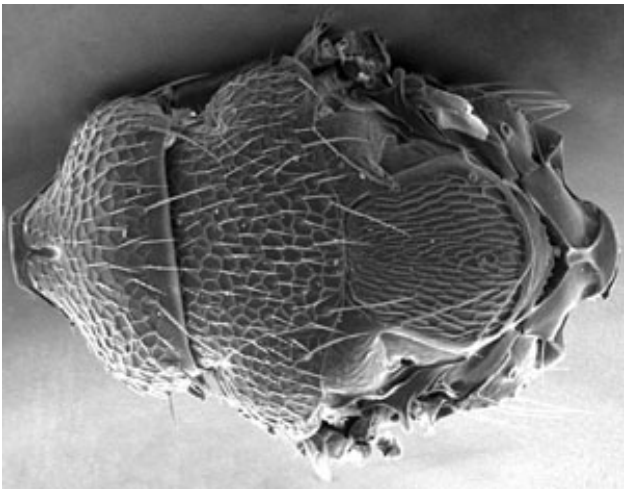
18. Scutellum strongly reticulate ([a1](#)), **sublateral grooves present posteriorly**, curving to meet anterior to scutellar apex. Clypeal margin ([b1](#)) distinctly convex **and** all funicular segments quadrate or broader than long ([b2](#)). Propodeum ([c1](#)) with strongly elevated median panels (median panels of propodeum raised sharply above supracoxal flange and areas lateral to plicae), **bearing 1 lateral seta and forming tooth-like elevation at posterior corner**. Extremely poorly known genus, very rare in Nearctic.

[Grotiusomyia Girault, 1917](#)

18'. Scutellum ([aa1](#)) usually not reticulate, and never with sublateral grooves fainter or absent anteriorly while complete posteriorly (completely absent in many, not meeting posteriorly in *Miotropis*). Clypeal margin ([bb1](#)) often straight or slightly concave. Usually some or all funicular segments longer than broad. Propodeal plicae ([aa1](#)) not forming special elevation.

[couplet 19](#)

a1

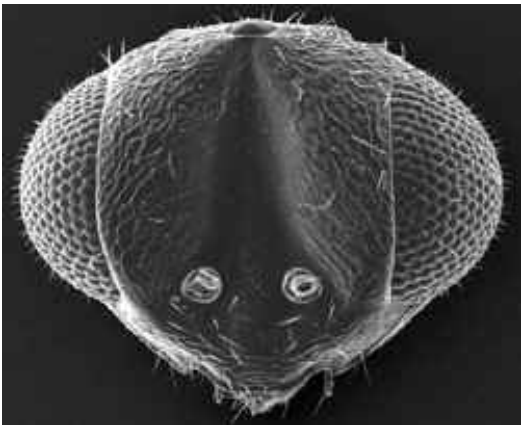


aa1



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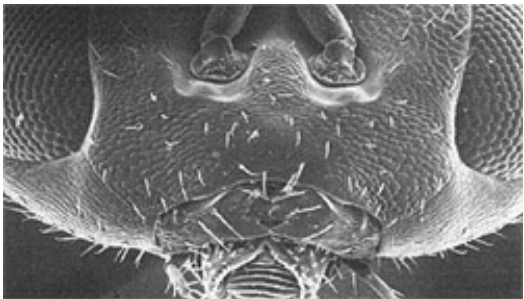
b1



b2

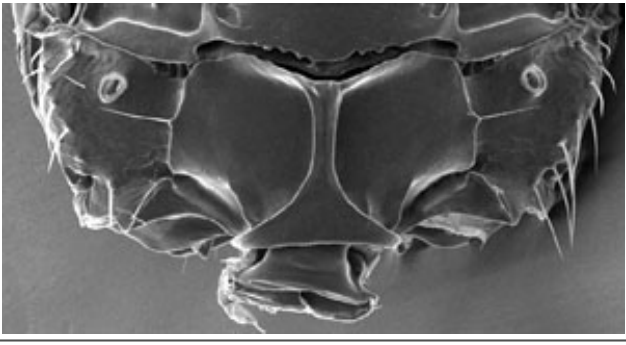


bb1



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**c1**



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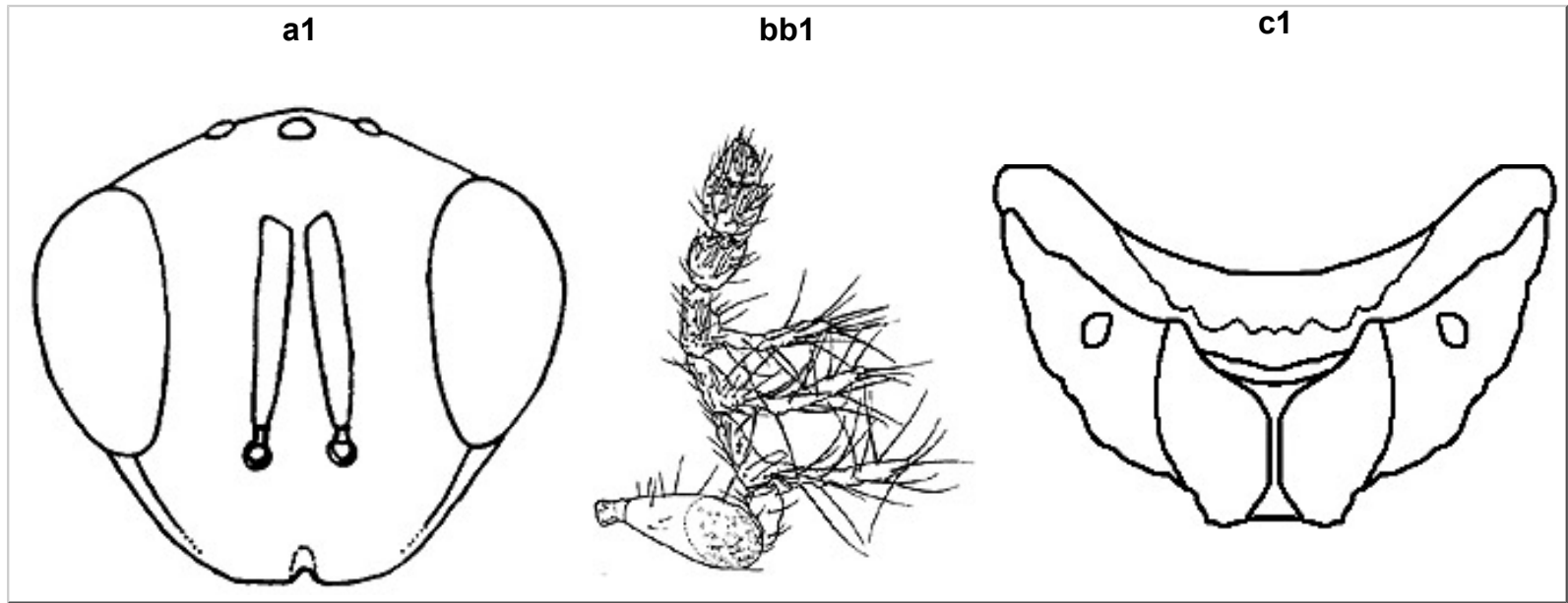
Image credits: aa1: Schauff (1985c). bb1: Schauff, et al. (1997).

19. [Males only, females with 2 funicular segments] Clypeal margin ([a1](#)) sharply incised **and** male antenna with 3 funicular segments, **flagellar segments unbranched**. Scutellum without submedian grooves. **Metanotum strongly sculpted, and dorsellum crenulate/multidentate** (c1). Propodeum (c1) with complete median carina and plicae.

[Colpoclypeus Lucchese, 1941](#)

19'. Clypeal margin usually not incised (only in *Dasyeulophus* and *Dimmockia*, with a lobed clypeal margin). Antenna almost always with 4 funicular segments in males [3 in a few *Microlycus*], almost always 2-3 of them branched ([bb1](#)). Metanotum usually smooth, never with crenulate dorsellum. Propodeum often with incomplete or absent median carina and plicae.

[couplet 20](#)



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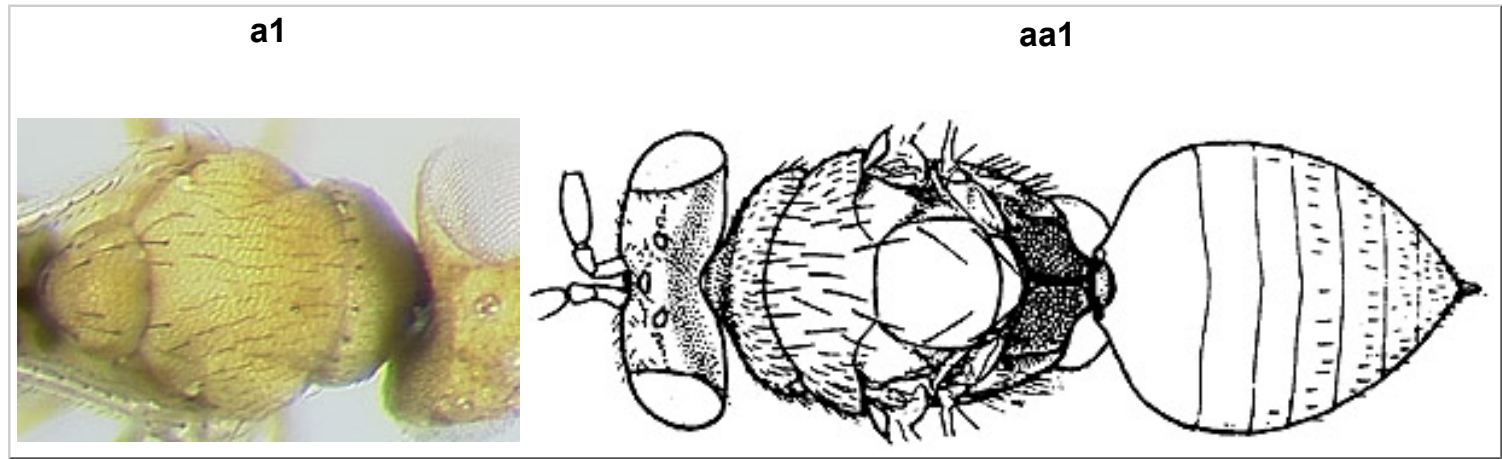
Image credits: a1: Askew (1968). bb1: Ikeda & Huber (1996)

20. **Scutellum and mesoscutal midlobe ([a1](#)) with numerous evenly or irregularly distributed setae** (scutellum with >3 pairs of setae in nearly all specimens). All funicular segments ([b1](#)) subquadrate to broader than long. Propodeum ([c1](#)) only slightly longer than dorsellum medially. Stigma unusually large and rounded ([d1](#)). Body usually weakly sclerotized, collapsing if air dried.

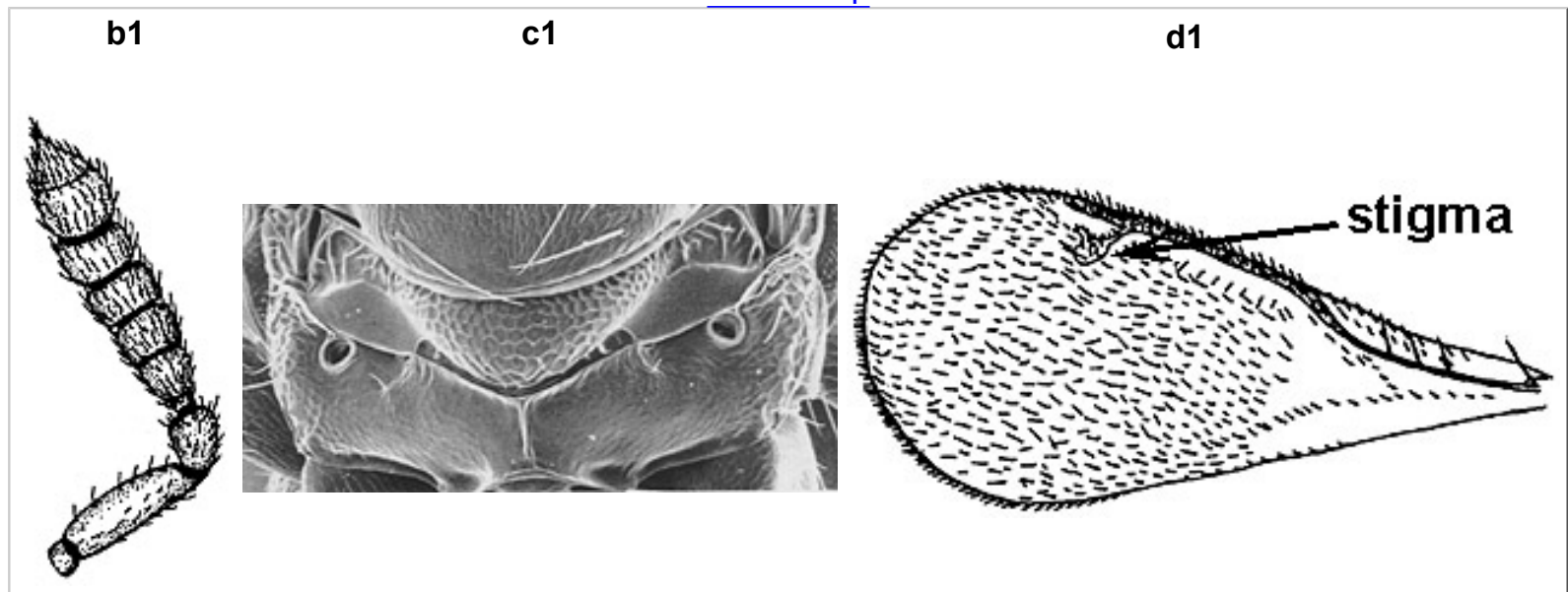
*[Dasyeulophus](#)* [Schauff & LaSalle, 1993](#)

20'. Scutellum ([aa1](#)), at least, with only 2 (very rarely 3) pairs of setae, and mesoscutal midlobe often with only paired setae. Usually at least some funicular segments longer than broad (except *Microlycus* and possibly some others). Propodeum ([aa1](#)) usually distinctly longer than dorsellum. Body often strongly sclerotized. Stigma ([dd1](#)) relatively much smaller.

[couplet 21](#)

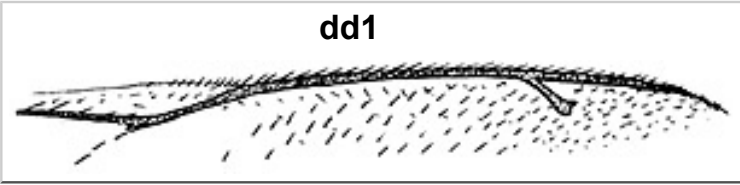


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**dd1**



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Image credits: aa1, dd1: Boucek (1988). b1, c1, d1: Schauff & LaSalle (1993).

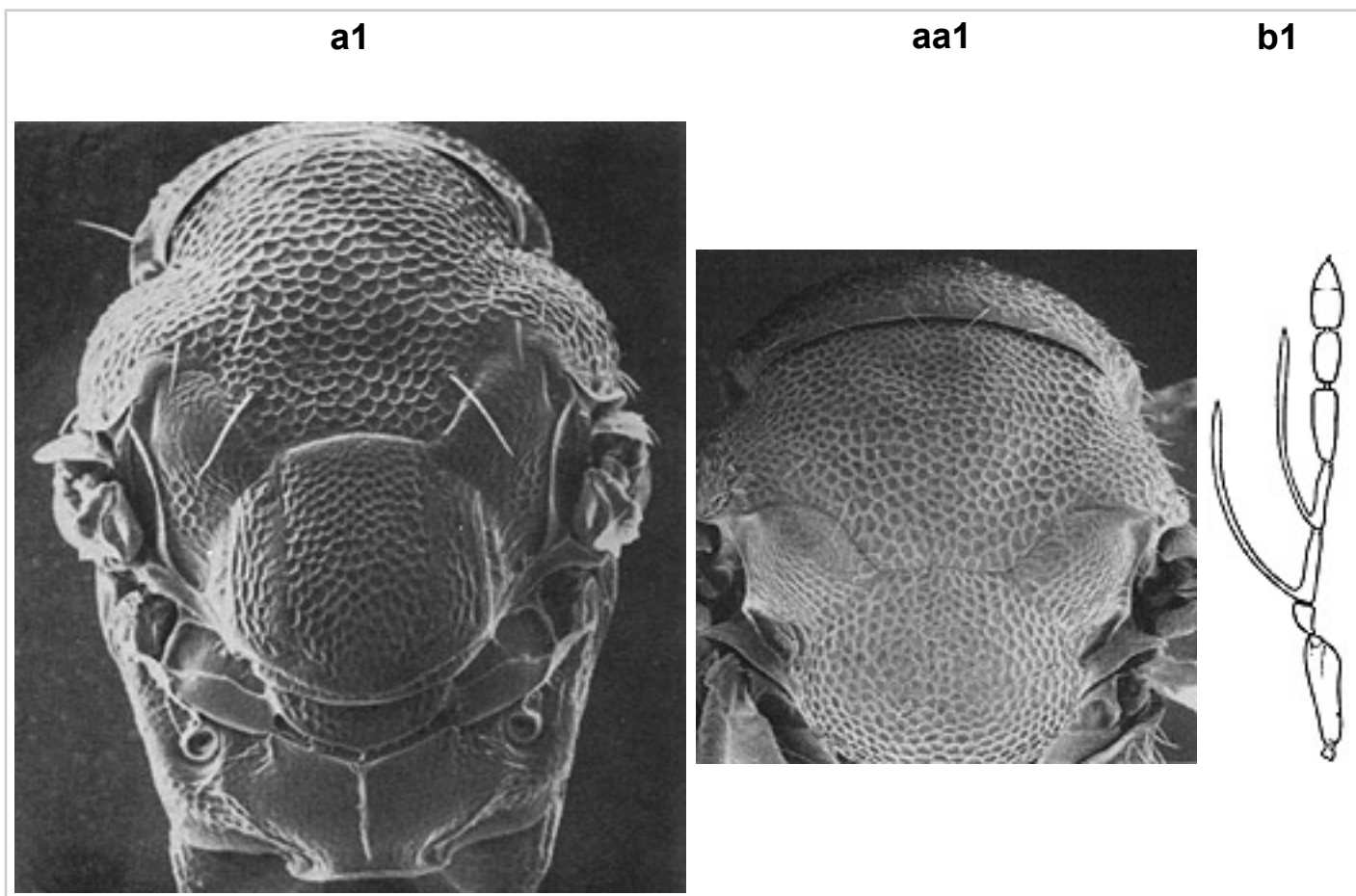
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21. **Scutellum** ([a1](#)) **almost always with straight submedian grooves** indicated by change in sculpture. **Flagellum with 2 branches in males** ([b1](#)); females with 3 funicular segments. Propodeum with median carina.

most female and all male [Dycladocerus Westwood, 1832](#)

21'. Scutellum ([aa1](#)) without submedian grooves. Flagellum in males unbranched or with 3 branches; females often with 4 funicular segments. Propodeum often without median carina.

[couplet 22](#)



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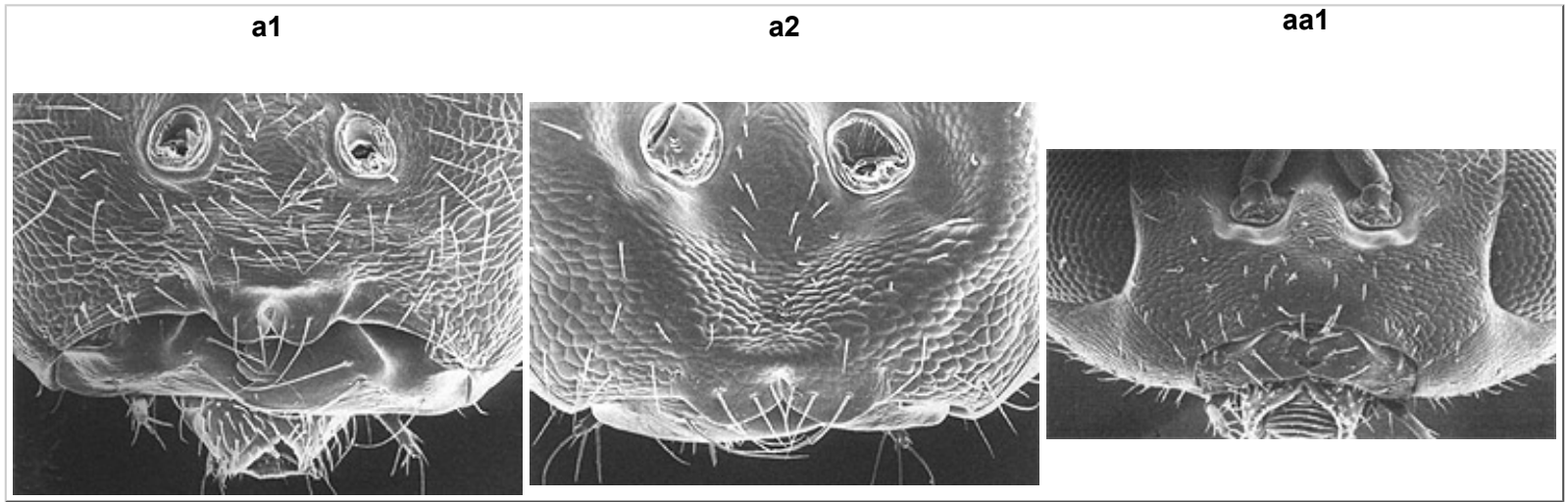
Image credits: a1: Yoshimoto (1976). aa1: Schauff, et al. (1997). b1: Graham (1963).

22. **Clypeal margin** ([a1](#), [a2](#)) **bilobed, lobes thin and flange-like**. Propodeum ([b1](#), [b2](#)) with strong median carina and plicae (similar to *Notanisomorphella*).

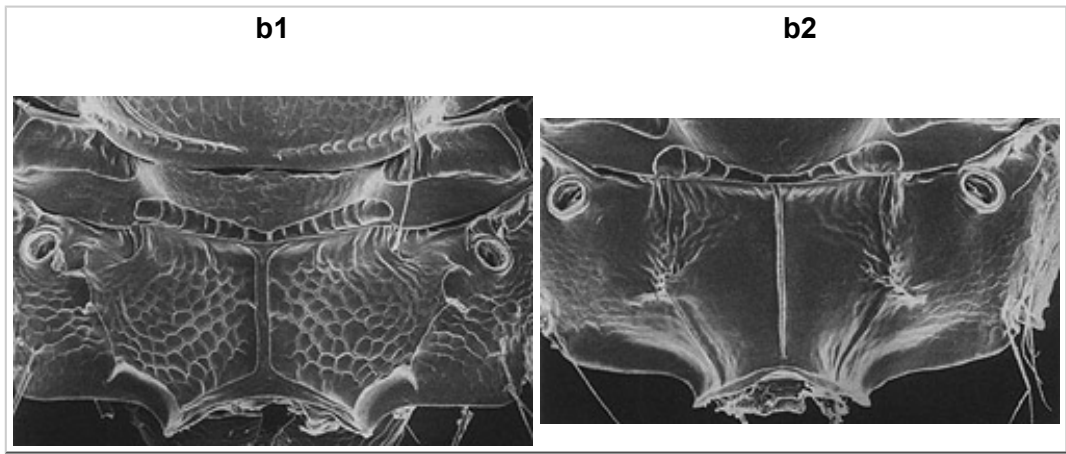
[Dimmockia Ashmead, 1904](#)

22'. Clypeal margin not bilobed or sharply emarginate, at most broadly concave ([aa1](#)). Propodeum often without median carina and/or plicae.

[couplet 23](#)



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Image credits: a1, a2, b1, b2: Ikeda & Huber (1996). aa1: Schauff, et al. (1997).

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23. **Toruli** ([a1](#)) **very high on face, far above lower eye margin; scape distinctly exceeding vertex** (ie: greater than 2x its own width above the vertex in profile). Body and legs elongate. **Forewing** ([a1](#)) **and costal cell unusually long and narrow** in macropterous forms: forewing at least 2.6x as long as wide and costal cell 10-15x as long as wide; some females brachypterous. Flagellum with 4 or 5 funicular segments.

some [Hemiptarsenus Westwood, 1833](#)

23'. Toruli not so high on face, scape hardly if at all exceeding vertex (rarely exceeding vertex by about 1-1.5x its own width in profile in *Sympiesis*, especially in males or specimens with collapsed heads. See next couplet). Body, legs, and forewing not all as elongate at the same time. Flagellum often with 3 funicular segments, especially in females.

[couplet 24](#)

a1



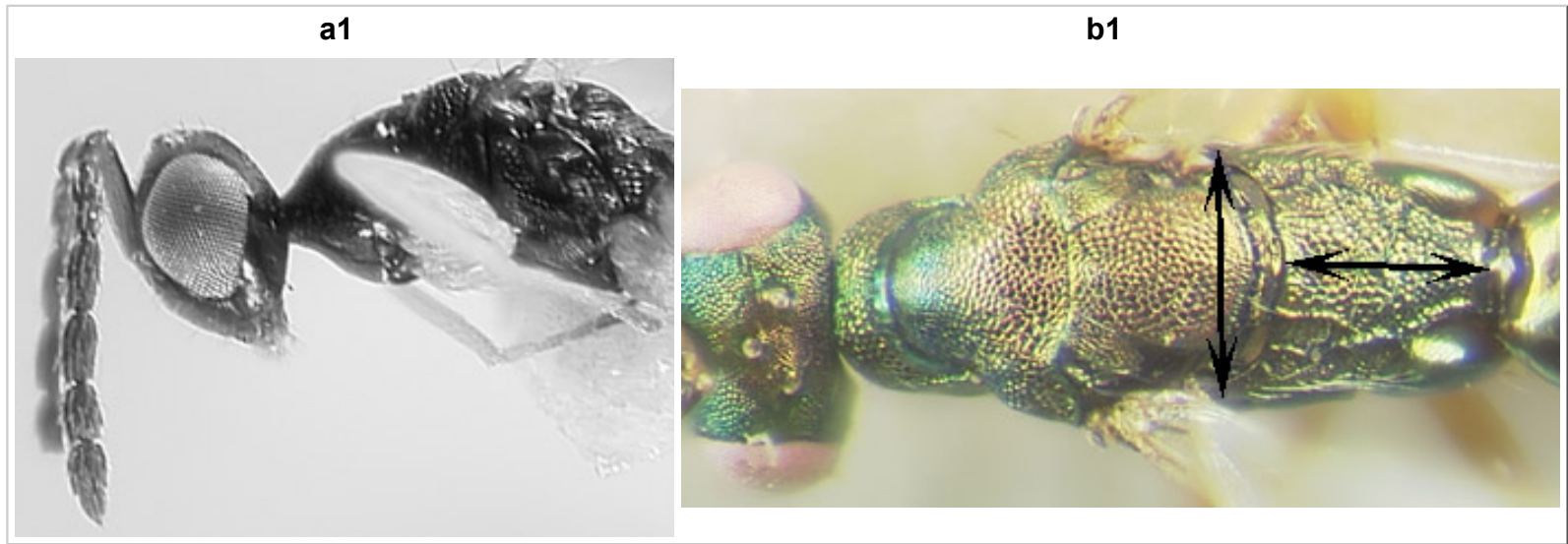
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24. Scape exceeding vertex in profile ([a1](#)) **and** propodeum ([b1](#)) less than 1.75x broader than long--medial length nearly always about equal to width at widest point (ie: length along median carina vs. width at anterior-most point of propodeum, shown by arrows). Flagellum (a1) with 4 or 5 funicular segments.

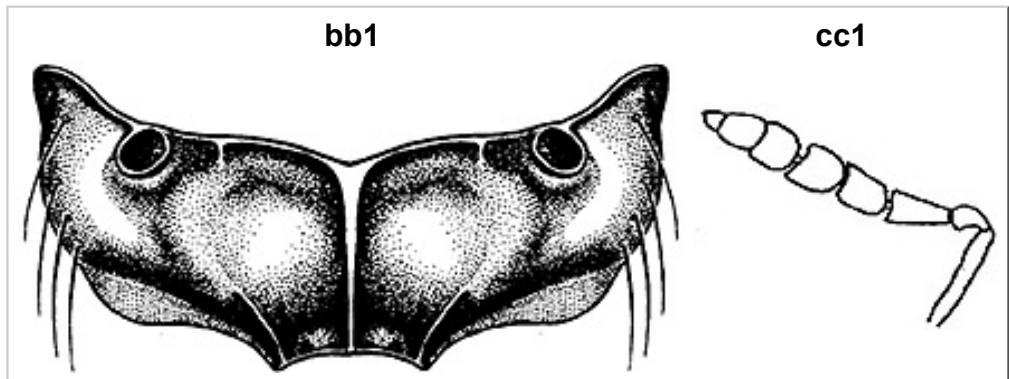
many [Hemiptarsenus Westwood, 1833](#)

24'. Scape seldom exceeding vertex (a few species of *Sympiesis*, *Pnigalio*, possibly others), but if so then propodeum more than 2x broader than long ([bb1](#)). Flagellum sometimes with 3 funicular segments ([cc1](#)).

[couplet 25](#)



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Image credits: bb1: Miller (1970). cc1: Erdös (1951).

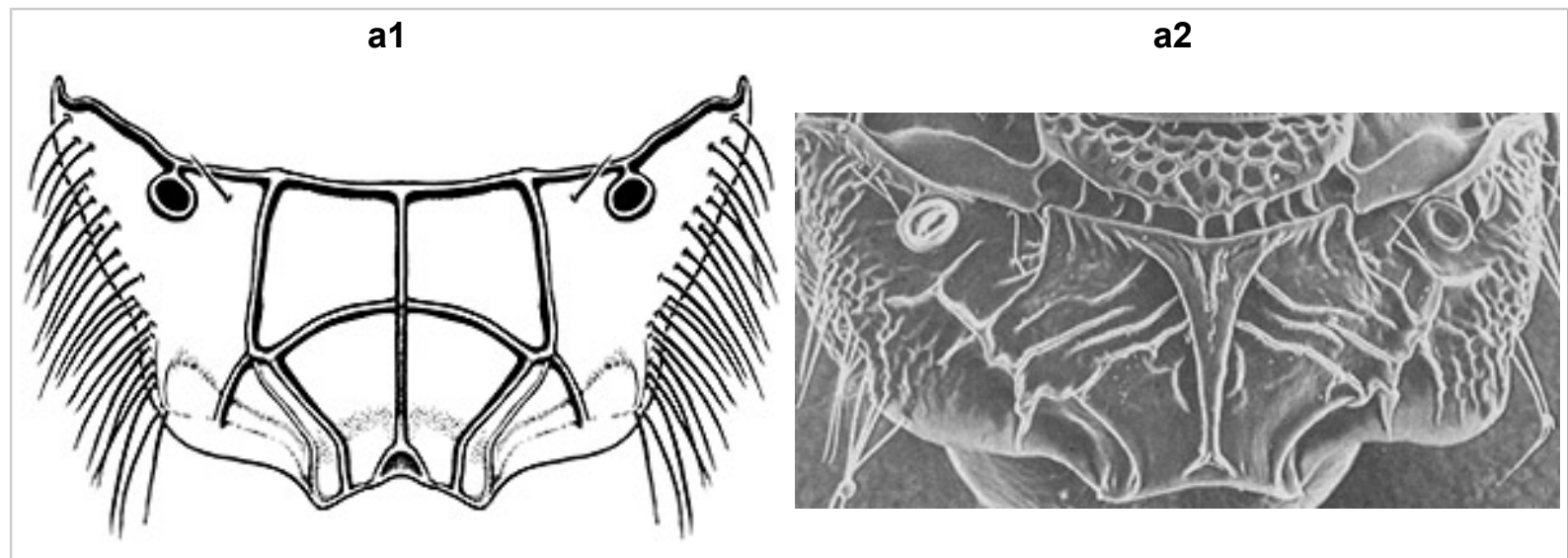
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25. Propodeum with costula ([a1](#)) or transverse rugae ([a2](#)) connecting median carina to plicae.

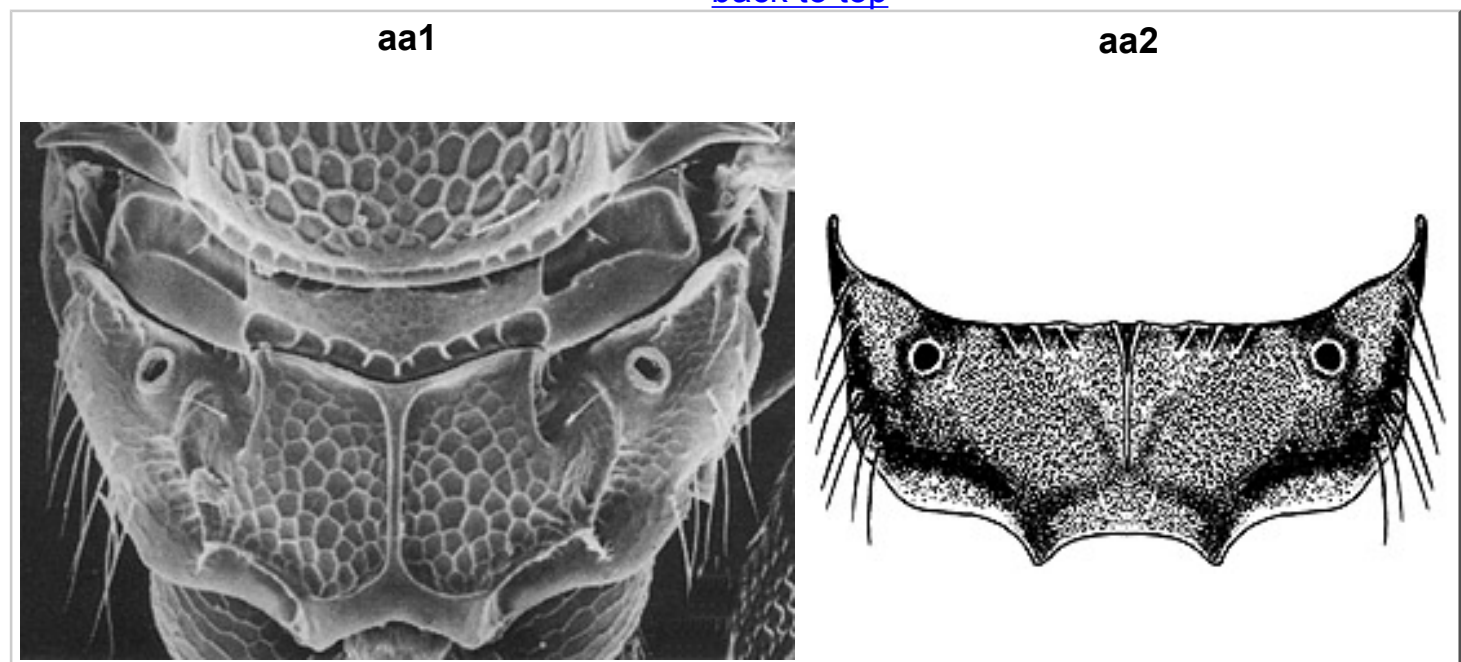
most [Pnigalio Schrank, 1802](#)

25'. Propodeum without costula ([aa1](#), aa2), frequently without median carina and/or plicae.

[couplet 26](#)



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Image credits: a1, aa2: Miller (1970). a2: Yoshimoto (1983). aa1: Schauff, et al. (1997).

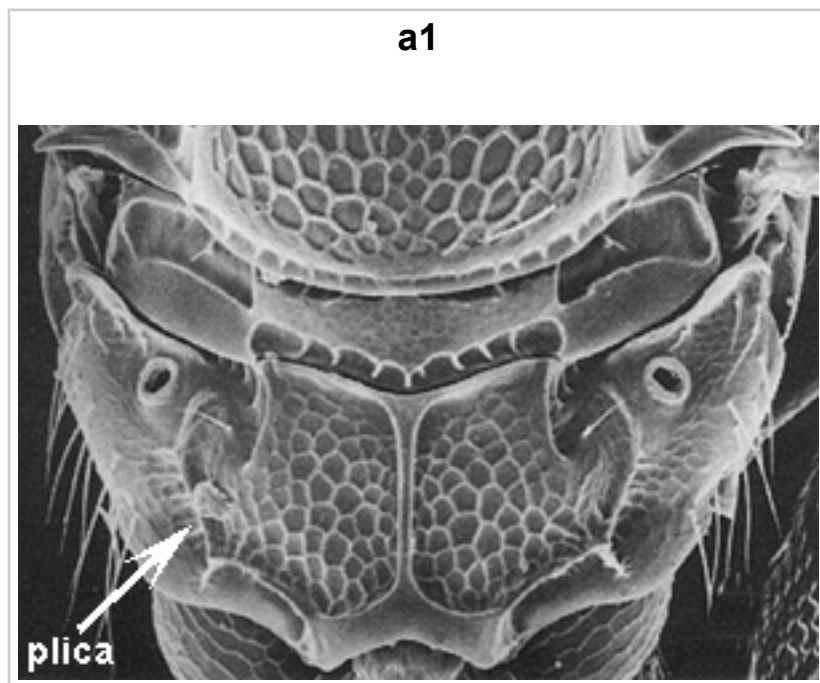
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26. Propodeum ([a1](#)) with complete "step-like" plicae immediately medial to spiracles (enclosed median panels of propodeum sharply elevated above lateral areas) **and** flagellum with 4 funicular segments. Median panels shiny or reticulate.

[\*Notanisomorphella\* Girault, 1913](#)

26'. Propodeum rarely with plicae, but **if** median panels sharply raised above lateral areas **then** flagellum with 3 funicular segments [median panels slightly raised in some *Sympiesis* with weak plical folds, as in *Hemiptarsenus* in couplet 24].

[couplet 27](#)



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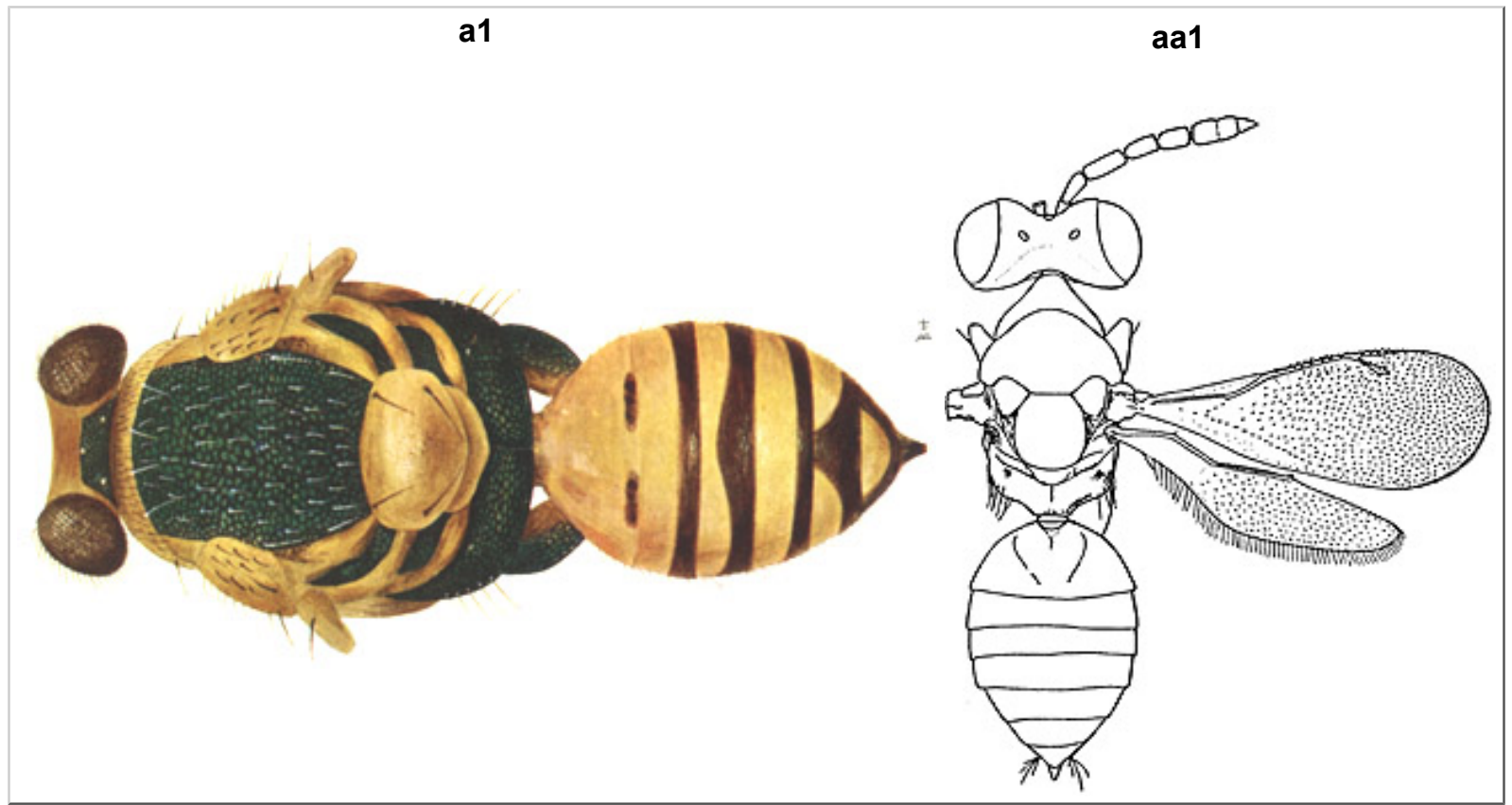
Image credits: modified from Schauff, et al. (1997).

27. Body ([a1](#)) short and stout: 0.9-1.9mm in length; scutellum distinctly broader than long. **Scape short: subequal length between lateral ocelli**; apical pair of funicular segments subquadrate to much broader than long in females ([b1](#), [b2](#)). [Color dark **or** mixed yellow-green.]

[Microlycus Thomson, 1878](#)

27'. Body ([aa1](#), [aa2](#)) not short and stout; scutellum especially as long or longer than broad. Apical pair of flagellomeres usually distinctly longer than broad in females ([aa1](#), [aa2](#)).

[couplet 28](#)



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aa2

b1

b2

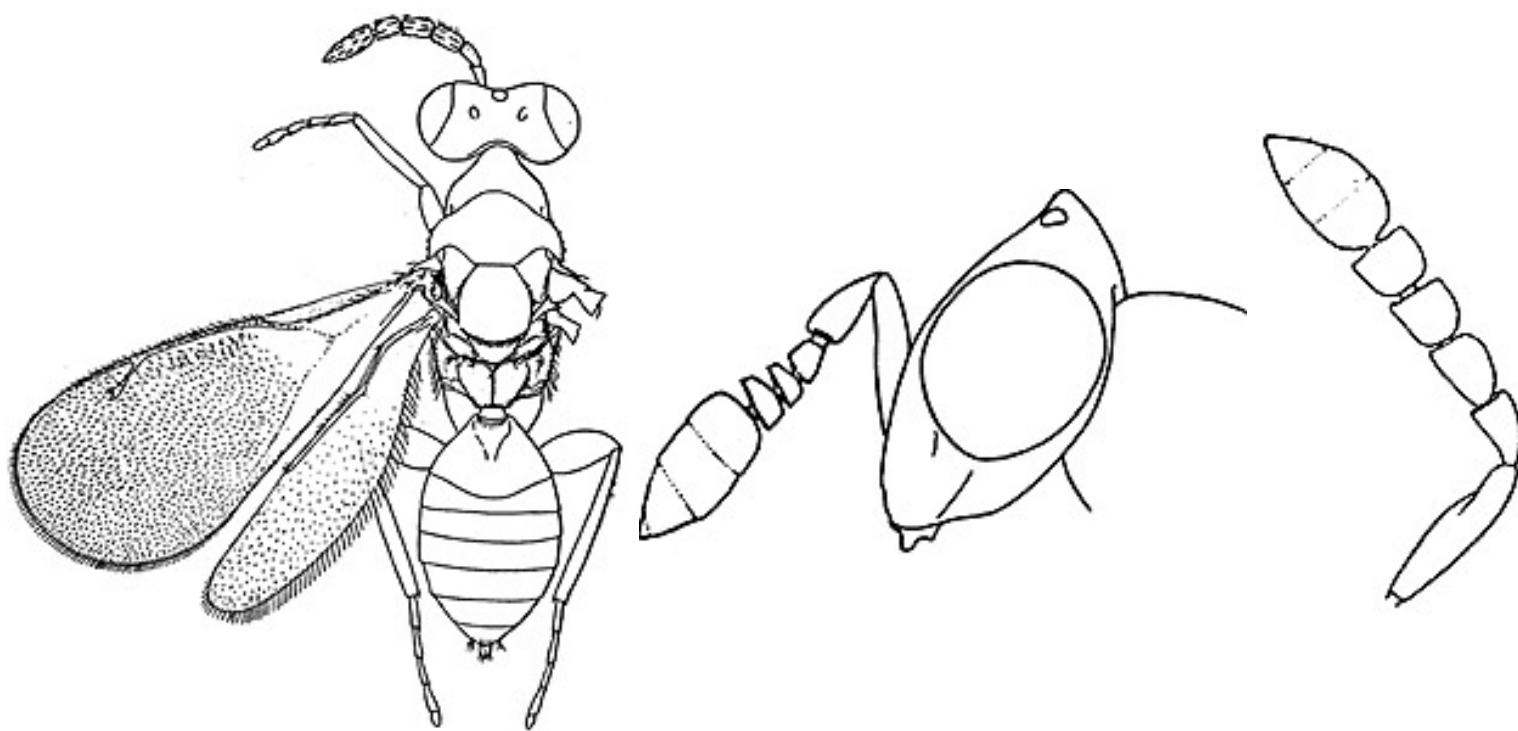


Image credits: a1: Kerrich (1969). aa1-2, b1-2: Boucek (1959).

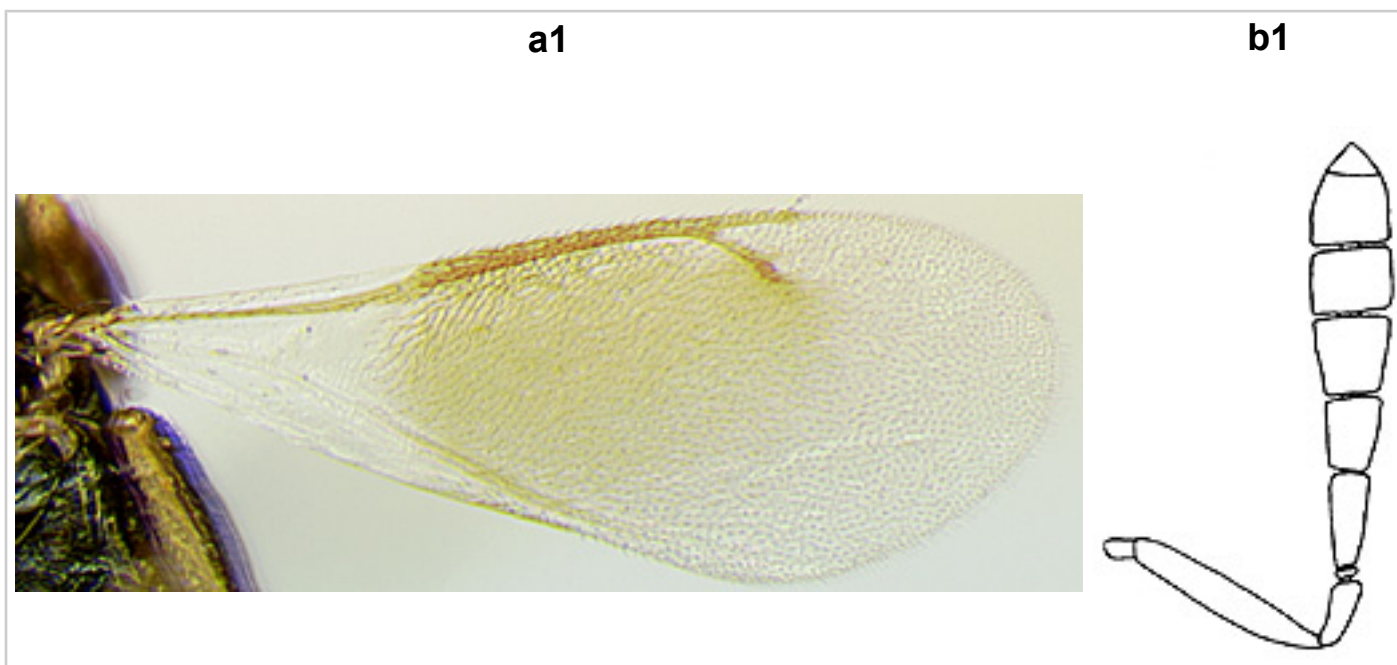
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28. Forewing disc ([a1](#)) almost always with fuscate cloud posterior to marginal and postmarginal veins [lost in some specimens]. Flagellum flattened ([b1](#)) and broadening apically in females, with 4 funicular segments (although 4th segment often appearing to be part of club), **and** postmarginal vein <2x stigmal vein length ([c1](#)) **and** propodeum with complete simple median carina, without plicae. Uncus separated by more than its own length from stigmal apex ([c1](#)). [Scape and coxae light tan to white ([d1](#)).]

***Dahlbominus* Hincks, 1945**

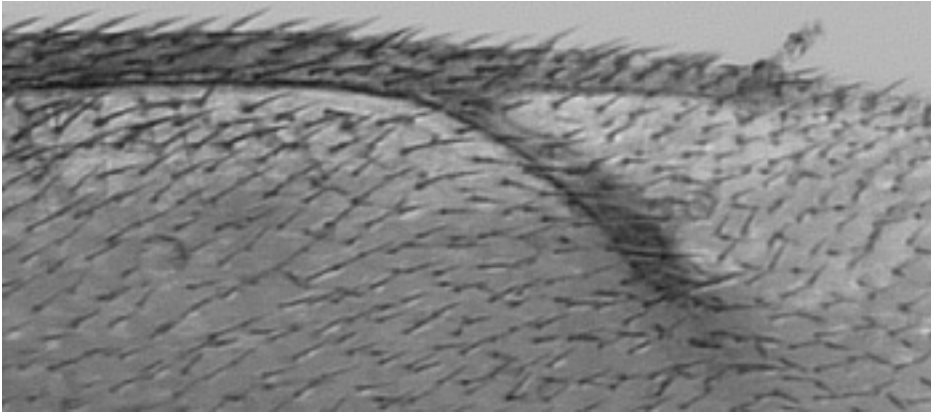
28'. **Either** postmarginal vein >2x stigmal vein length, **or** flagellum with 3 funicular and 3 claval segments. Forewing usually without uniform fuscate cloud. Median propodeal carina often absent. Flagellum often cylindrical in females. Uncus often separated by less than its own length from stigmal apex. [Scape and coxae seldom light-colored, only in a few *Sympiesis*.]

[couplet 29](#)



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**c1**



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**d1**



Image credits: b1: Schauff, et al. (1997).

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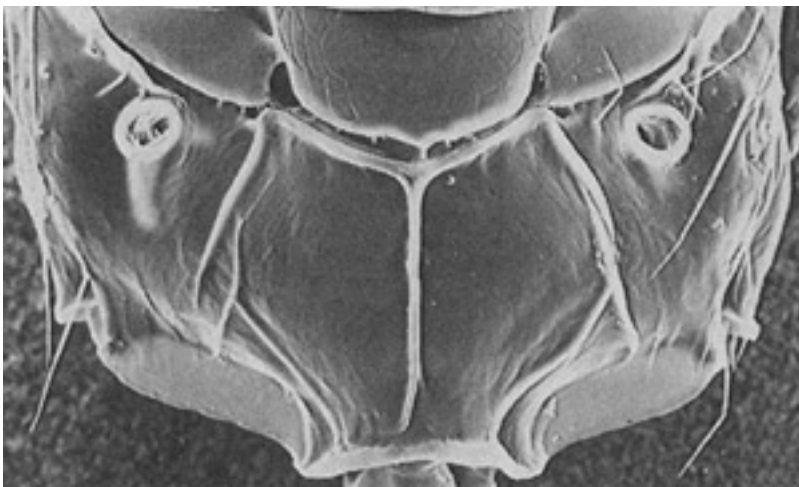
29. Propodeum ([a1](#)) shiny and smooth **and** with plicae and median carina. Mesoscutal midlobe ([b1](#)) with numerous unpaired setae.

**[Pnigalio Schrank, 1802](#)** (a few species and reduced forms without costula)

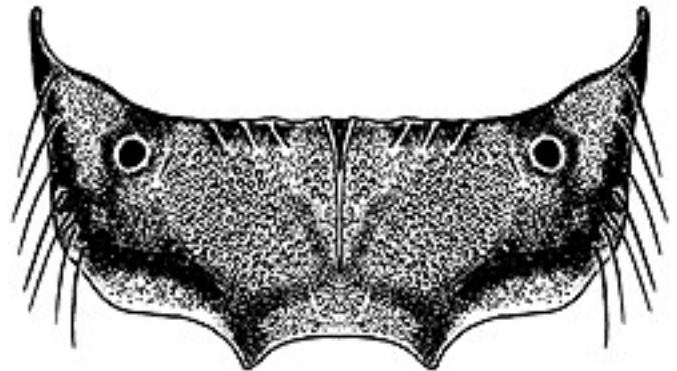
29'. Propodeum well-sculpted ([aa1](#)), or transversely convex and weakly sculpted, median panels usually not smooth and shiny (**if so** then plicae and/or median carina lacking). Mesoscutal midlobe variable, sometimes with 2 parallel longitudinal rows of setae ([bb1](#)), sometimes with numerous unpaired setae.

[couplet 30](#)

**a1**

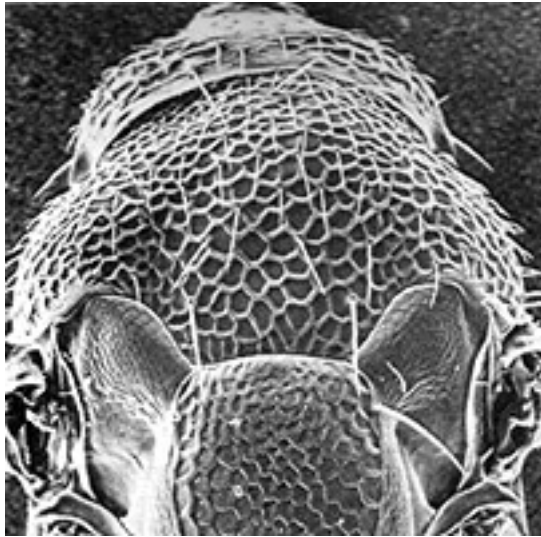


**aa1**



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**b1**



**bb1**



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Image credits: a1, b1: Yoshimoto (1983). aa1: Miller (1970). bb1: Boucek (1988).

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30. Flagellum with 4 funicular segments in males and females. Postmarginal vein 2x or more stigmal vein length ([aa1](#)).

[Sympiesis Förster, 1856](#)

30'. Flagellum with 3 funicular segments in females. Most species (exceptions are some female *Dicladocerus*) with postmarginal vein  $<1.7\times$  stigmal vein length.

[couplet 31](#)

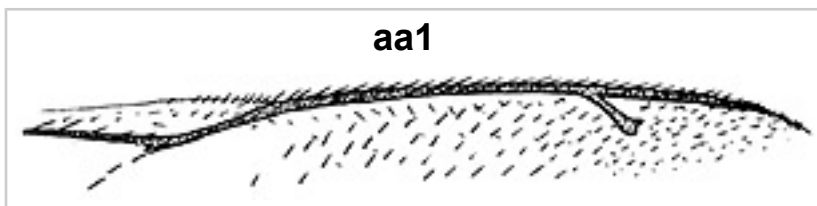


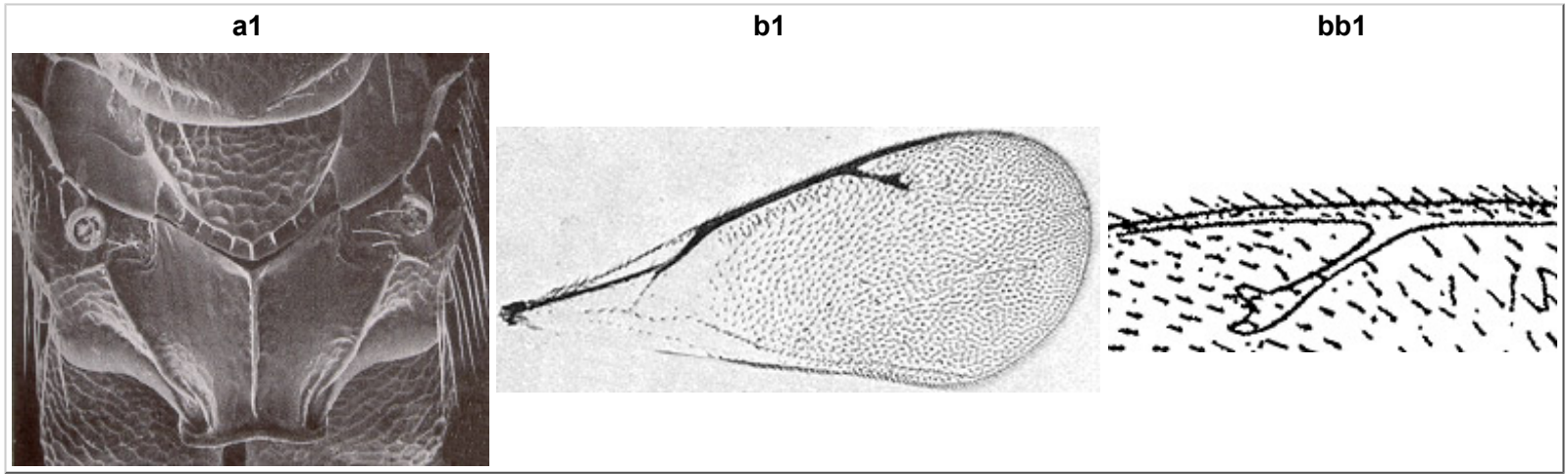
Image credits: Boucek (1988).

31. (Females only) Propodeum ([a1](#)) with plicae or plical ridges delimiting median panels raised sharply above areas lateral to the plicae (ie: step-like plicae) **and** uncus arising more than its own length from stigmal apex ([b1](#)).

a few female [Dycladocerus Westwood, 1832](#)

31'. Propodeum often without plicae or plical ridges. Uncus ([bb1](#)) usually arising its own length or less from stigmal apex.  
[complete separation of females of these two genera not possible]

[Necremnus Thomson, 1878](#) and some female [Dycladocerus Westwood, 1832](#)



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Image credits: a1, b1: Yoshimoto (1976). bb1: Boucek (1959a).

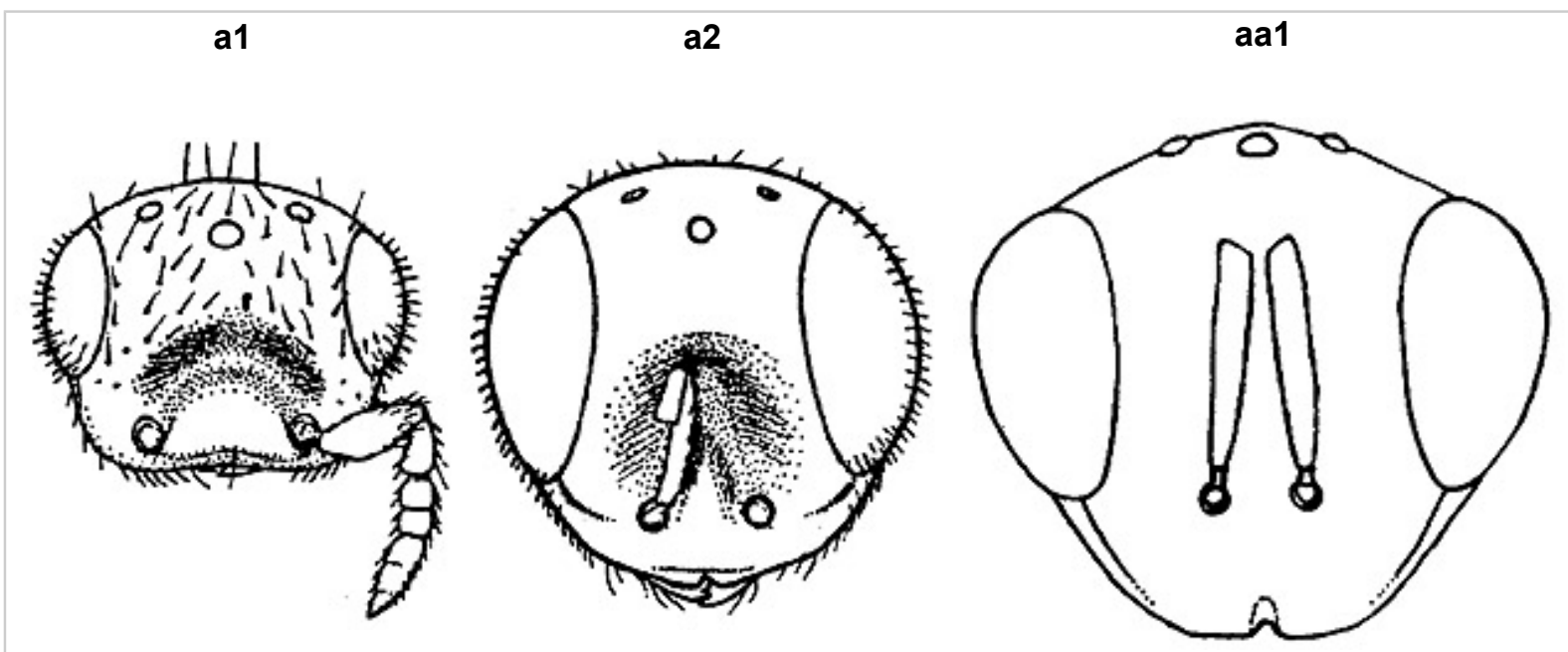
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1. Toruli unusually low ([a1](#), [a2](#)), near mouth margin. Forewing ([b1](#)) with patches of dark or thickened setae, especially near parastigma and base of marginal vein (sometimes represented only by conspicuously darkened spot in venation). Notauli complete; scutellum without submedian grooves.

*[Trichospilus Ferrière, 1930](#)*

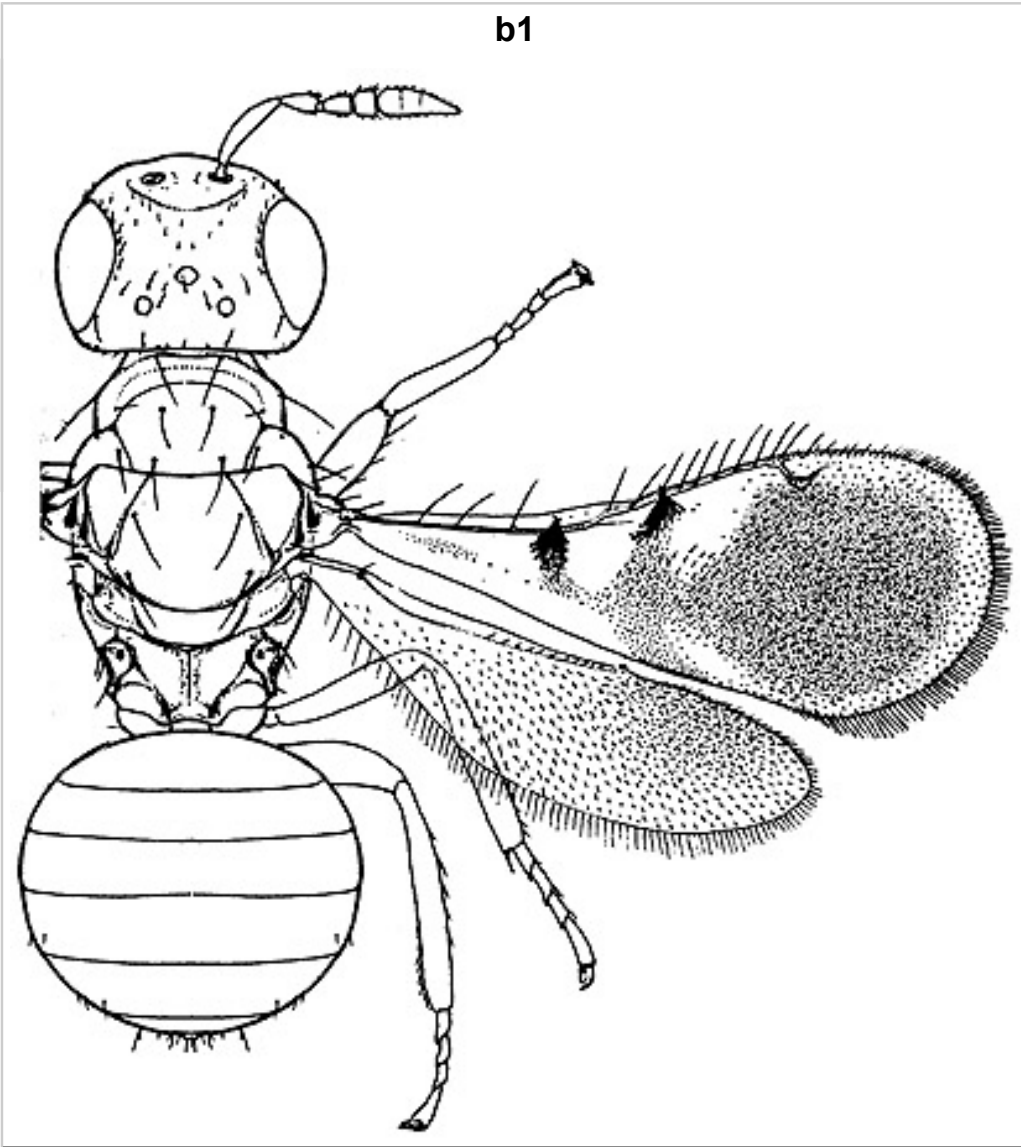
1'. Toruli near or above lower eye margin ([aa1](#)). Forewing without patches of especially thickened setae (though often with fuscate patches on forewing disc). Notauli often incomplete; scutellum usually with submedian grooves.

[couplet 2](#)



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b1



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Image credits: a1, a2, b1: Boucek (1976). aa1: Askew (1968).

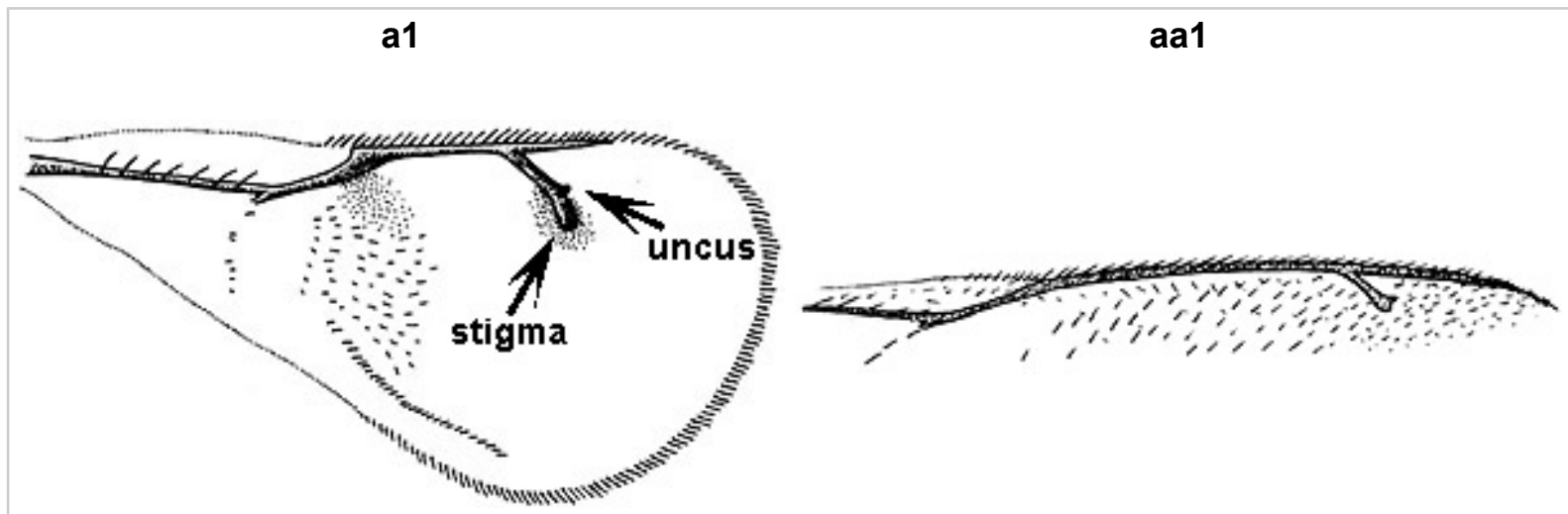
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2. Stigma ([a1](#), a2) elongate, with uncus arising much more than its own length from stigmal apex **and** notauli ([b1](#)) complete, reaching scutellar margin. Less than half dorsal surface of axillae advanced anteriorad of scutellar margin.

[\*Aulogymnus\* Förster, 1851](#)

2'. Stigma (as in aa1) usually not elongate and uncus not arising more than its own length from stigmal apex, but if so then notauli incomplete ([bb1](#)) or ending in anterior half of strongly advanced axillae if complete ([bb2](#)).

[couplet 3](#)

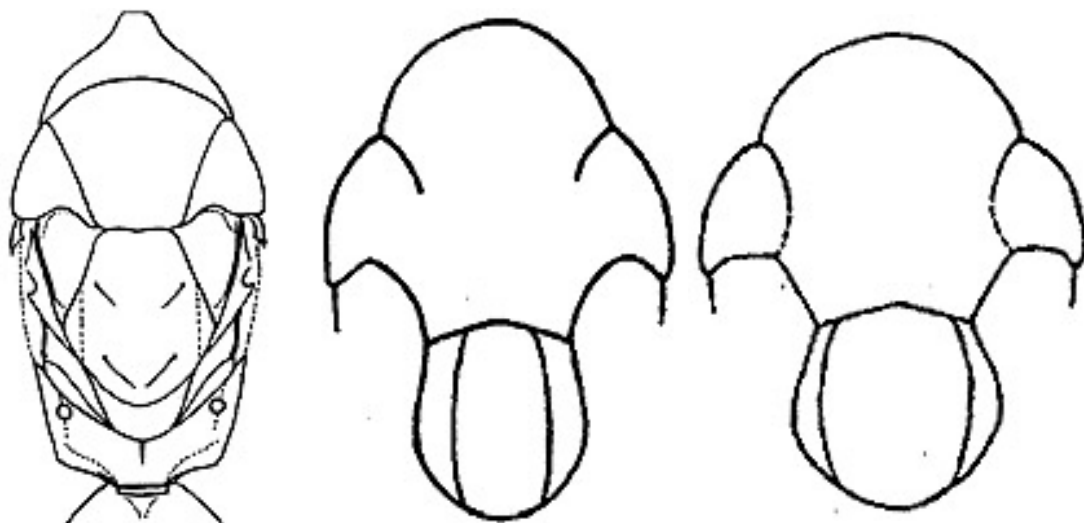


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**b1**

**bb1**

**bb2**



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Image credits: a1: modified from Pujade i Villar (1991). aa1: Boucek (1988). b1, bb1-bb2: Askew (1968).

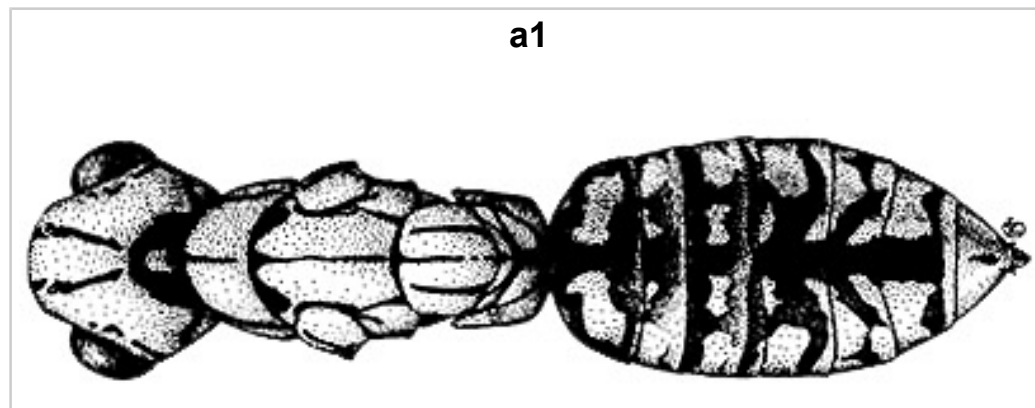
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3. Notauli ([a1](#), [a2](#)) complete but ending in anterior half of axillae **and** vertex protruding far above upper eye margin. Scutellum with parallel submedian grooves (though these sometimes indistinct). Color black and yellow. Forewing ([b1](#)) almost always with distinct fuscate areas.

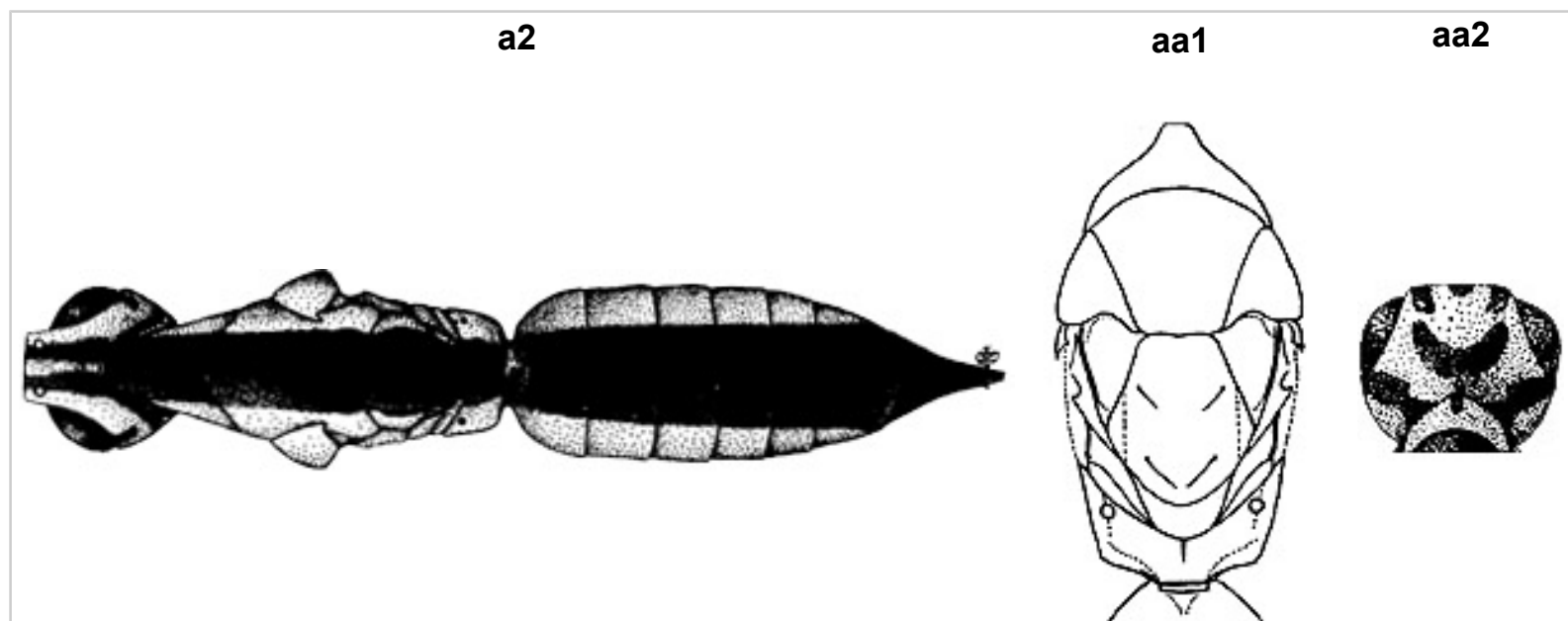
**Zagrammosoma Ashmead, 1904**

3. **If** notauli complete **then** they end at or near the scutellar margin ([aa1](#)) **and/or** vertex not protruding far above upper eye margin ([aa2](#)). Scutellum often without submedian grooves. Color variable, but often dark brown without yellow areas. Forewing often without fuscate areas.

couplet 4

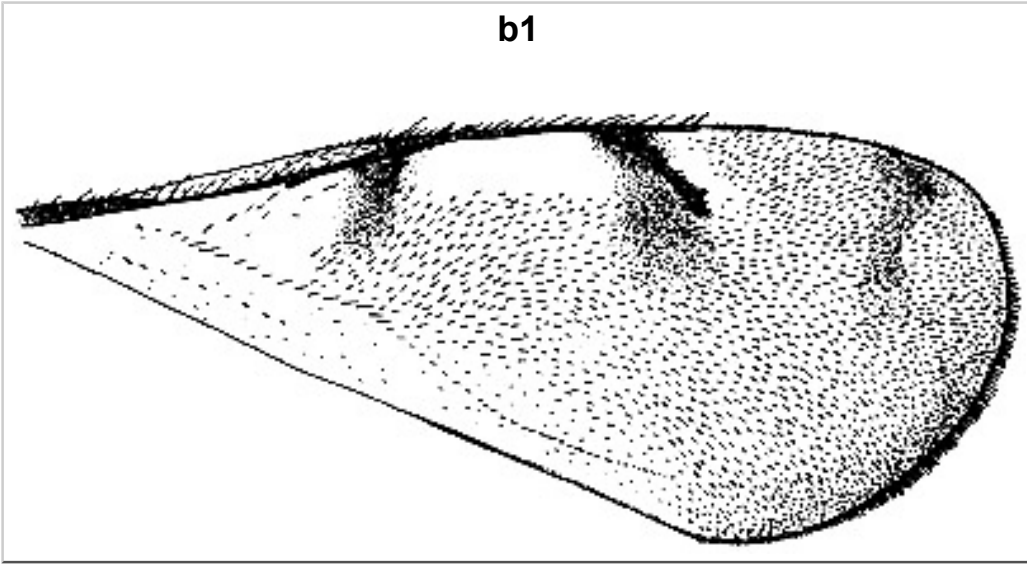


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**b1**



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Image credits: a1, aa2, b1: Gordh (1978). aa1: Askew (1968).

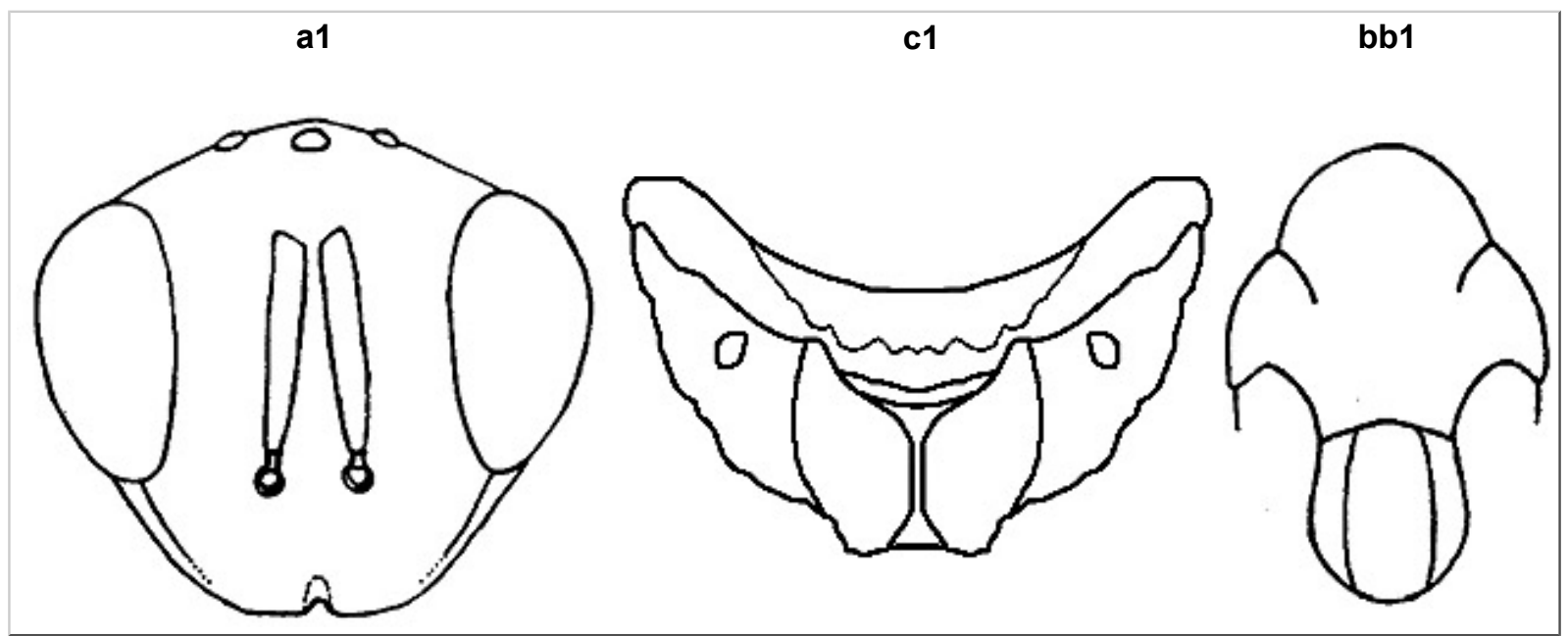
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4. [Females only, males with 3 funicular segments.] **Clypeal margin (a1) sharply incised** (head large and well-sclerotized, so that this is usually easy to determine). Notauli incomplete (or ending in anterior half of axillae if faintly complete--seen in extralimital forms); scutellum without submedian grooves. **Metanotum strongly sculpted, and dorsellum crenulate/multidentate (c1)**. Propodeum with strong median carina and plicae. Relatively stout bodied.

[\*Colpoclypeus\* Lucchese, 1941](#)

4'. [Both sexes.] Clypeal margin truncate to smoothly convex or concave. Notauli complete or incomplete; scutellum (bb1) with submedian grooves. Metanotum smooth or weakly sculpted, dorsellum not crenulate. Propodeum without plicae, with at most only a weak median carina.

[couplet 5](#)



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Image credits: a1, bb1: Askew (1968)

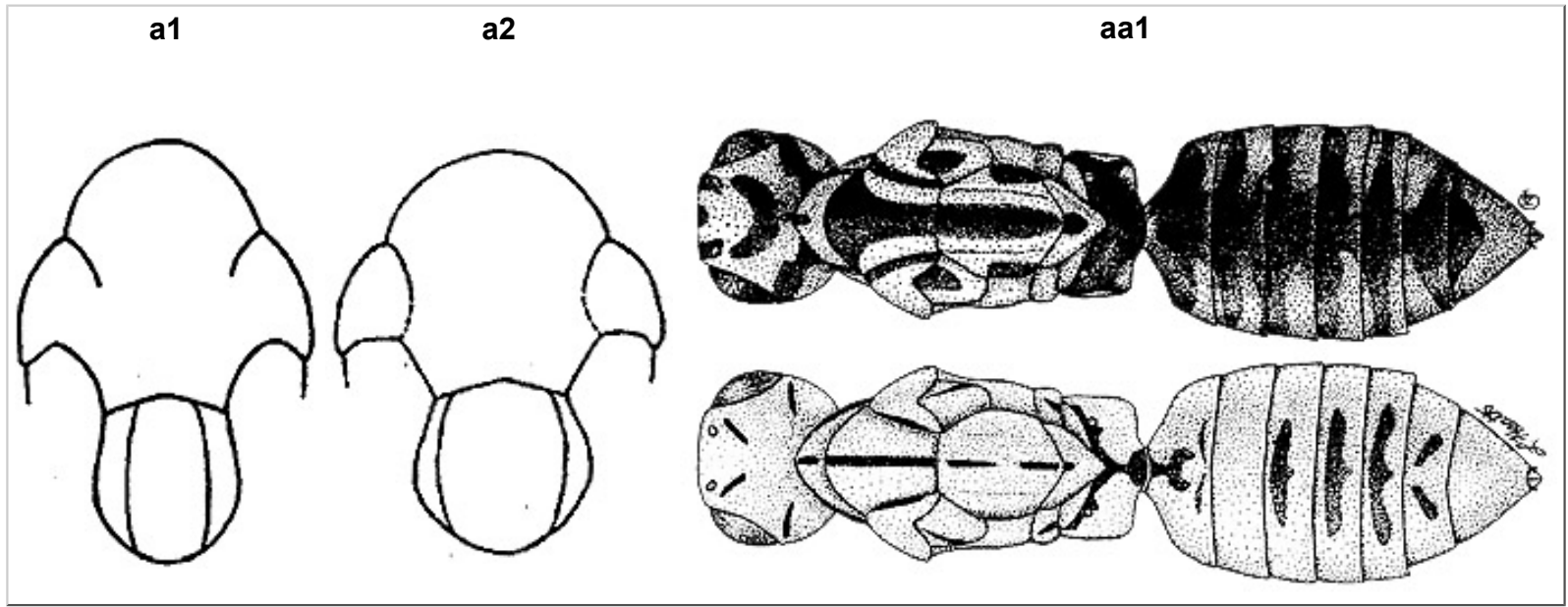
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5. Notauli incomplete (a1), or if faintly complete, ending in anterior half of the strongly advanced axillae (a2).

[Diglyphus Walker, 1844](#)

5'. Notauli complete (aa1), ending at or near scutellar margin.

[couplet 6](#)



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Image credits: a1-a2: Askew (1968). aa1: Gordh (1978).

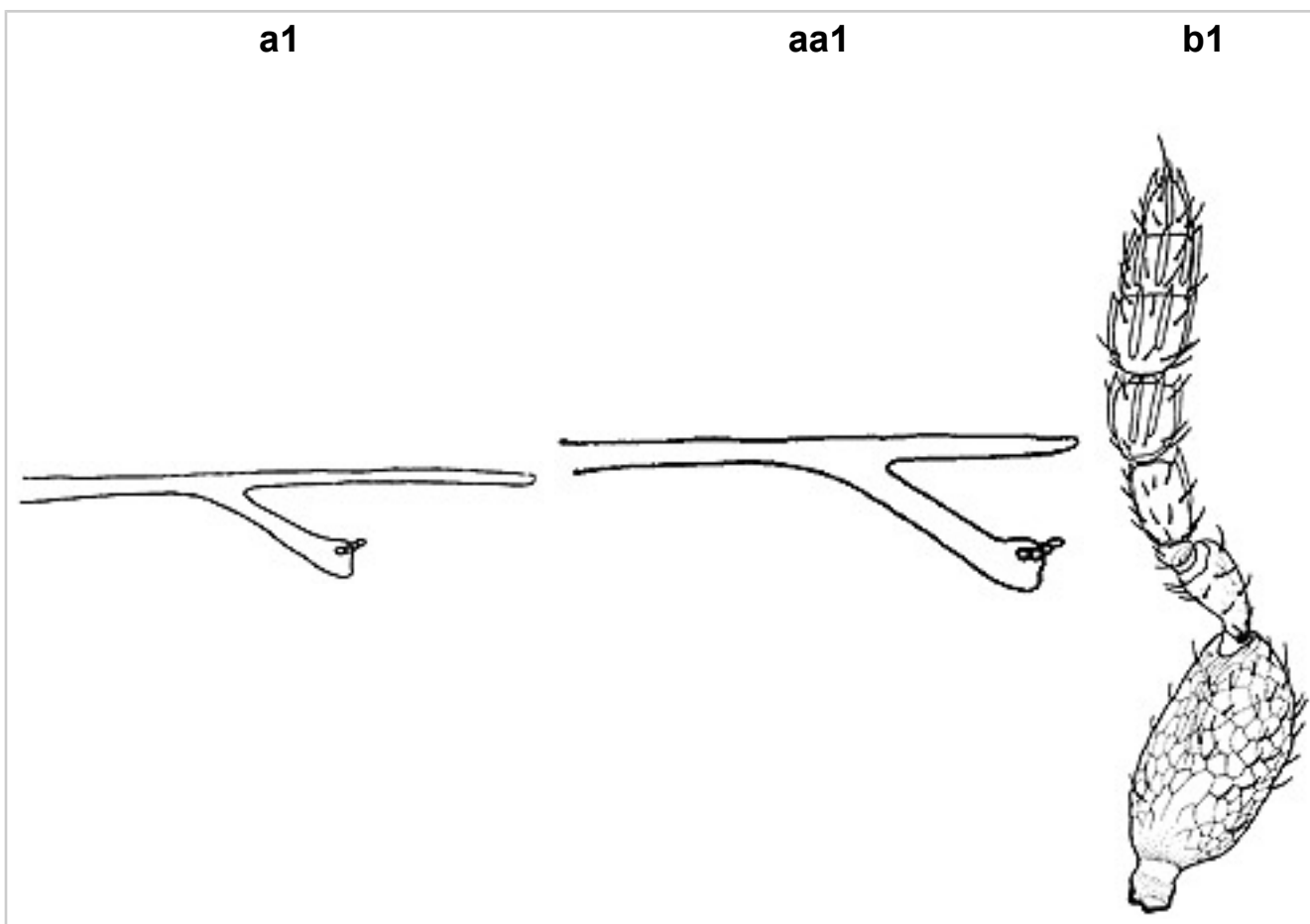
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6. Postmarginal vein (a1) 2x or more stigmal vein length. Males with scape (b1) grossly swollen.

[\*Diaulinopsis\* Crawford, 1912](#)

6'. Postmarginal vein (aa1) about as long as stigmal vein. Scape not swollen.

[\*Cirrospilus\* Westwood, 1832](#)

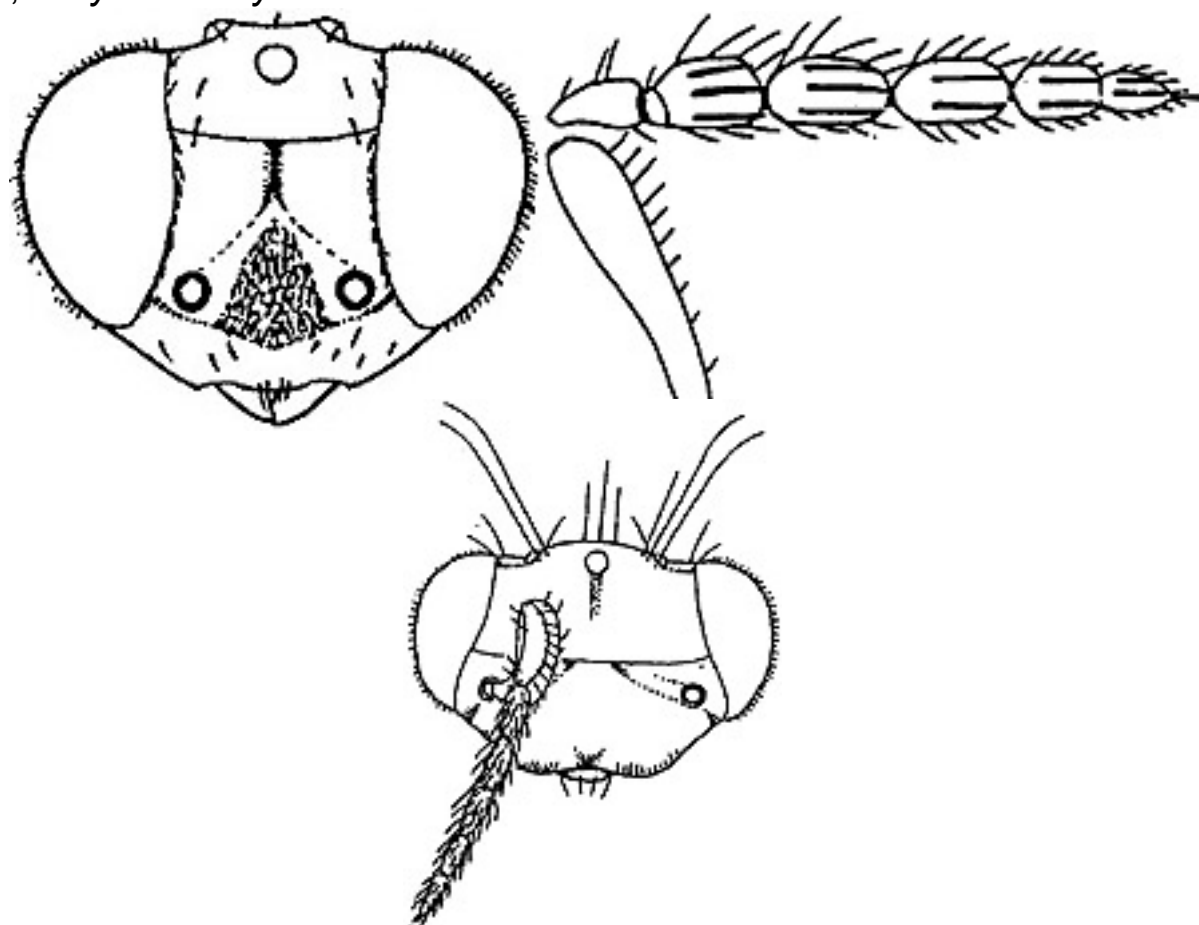


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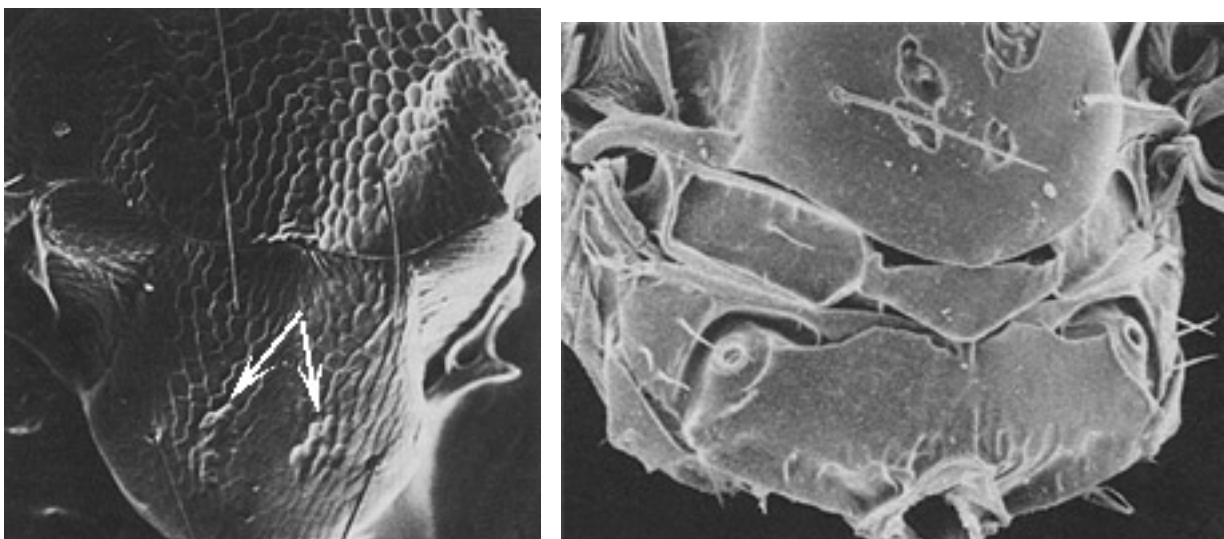
Image credits: a1-a2: Schauff, et al. (1997). b1: Gordh & Hendrickson (1979).

***Achrysocharoides* Girault, 1913** [comparative info](#) return to: [prev](#) [home](#)

**Eyes densely setose.** Mandibles with 3 or more denticles. **Transverse frontal groove always straight**, not v-shaped (but can bend medially if face is collapsed); scrobal depressions reaching transverse groove separately or uniting before reaching groove, always broadly separated ventrally and never extending below toruli. Occiput sometimes sharply margined, usually without longitudinal groove. Clypeus not delimited by sutures. Flagellar formula usually 3,3,2, sometimes 3,4,1 in males; apical anellus usually much broader than long, rarely subquadrate; heads of peg sensilla of flagellum rounded, symmetrical; **postanellar flagellomeres generally longer than broad**, rarely about as long as broad; club with apical spicule. **Lateral panel of pronotum with a semicircular ridge; mesoscutum and especially scutellum often with distinct groups of pits or longitudinal foveae**; mesoscutal midlobe with 2 pairs of setae; notauli bent sharply laterad anteriorly. Postmarginal vein usually about 1x stigmal vein length, rarely up to 1.4x stigmal vein length (in which case scutellum has groups of pits); no setal tracks radiating from stigma; stalk of stigmal vein long, such that stigma appears petiolate [as opposed to that of *Horismenus*, etc.]. Propodeum smooth or with 1 or 2 median carinae; very rarely with plicae (in *A. littoralis* Kamijo), or paraspiracular carina (a few species); with distinct spiracular groove. Petiole hardly or not longer than broad (at most 1.5x longer than broad), weakly sculpted at most. Compare with: ***Chrysocharis*, *Grahamia*, *Closterocerus*, *Pediobius*, *Chrysonotomyia*.**



1a-c: *Achrysocharoides clypeatus* (Miller) female face (top left), female antenna (top right), and *A. arienascapus* male face (bottom)



2a-b: *Achrysocharoides* mesoscutum and scutellum with pits indicated (left), and posterior part of mesosoma (right)

**Biology:** Parasitoids of leaf-mining Lepidoptera, mainly *Phyllonorycter* [Gracillariidae].

**Comments:** Some species of this genus are very difficult to distinguish from *Chrysocharis*, although the criteria given here will serve to separate all specimens of confirmable identity that I have examined. This genus is also difficult to separate from *Kratoysma* on an absolute basis, although in most cases they are easily separated by sculpture and the fact that *Achrysocharoides* species seldom have propodeal plicae and a carinate pronotal collar. *Achrysocharoides littoralis* Kamijo has both of these states, but has a median propodeal channel rather than the single carina present in *Kratoysma*. Gumovsky (2001) discovered that the semicircular ridge on the lateral panel of the pronotum is apparently a generic character. I have not focused on this character in the cases where it would be useful (ie: distinction from *Chrysocharis*) because I have found several species of *Chrysocharis* that possess this ridge as well. Its presence throughout the subfamily is poorly known, and it is a difficult character to accurately assess.

**Comparative information:** No other genus has any species with pits on the scutellum or mesoscutum. Characters below serve to separate *Achrysocharoides* without such pits from similar genera.

***Chrysocharis*:** Combination of characters defining *Achrysocharoides* not completely present: Transverse frontal groove usually v-shaped. Petiole often more than 1.5x longer than broad (never more than 1.5x longer than broad in *Achrysocharoides*). Eyes often not visibly setose under normal magnification (10-50x). Postmarginal vein usually >1.4x stigmal vein length. Problematic species of *Chrysocharis*, those with a straight transverse frontal groove, are disqualified from being *Achrysocharoides* by having one or more of the characters that *Achrysocharoides* cannot have. This situation is unfortunate, and may mean that some species of one genus may be more closely related to the type species of the other.

**Grahamia**: Flagellar formula strictly 1,4,1 [anellus very tiny, could easily be interpreted as absent]; scape relatively long and narrow: about 5x longer than broad, strongly flattened laterally. Postmarginal vein about 2x stigmal vein length.

**Closterocerus**: Interscrobal ridge always meeting transverse groove, which is near the median ocellus when straight; scrobal grooves extending slightly below toruli. Transverse frontal groove straight only in the subgenus *Achrysocharis*, most species of which have only 1 pair of setae (always the posterior pair) on the mesoscutal midlobe. Funicular segments transverse in some species. **Heads of peg sensilla of flagellum always slanting, asymmetrical; sensory pores of scape in a cluster near apex of scape in males.**

**Pediobius**: Confusable with those *Achrysocharoides* that have a pair of submedian carinae. **Petiole always densely punctate or rugose**, over 1/3 propodeal width and with a dorsal anterior carina. Pronotal collar and vertex carinate in most species. Stigmal vein very short, stigma generally not appearing petiolate.

**Chrysonotomyia**: **Clypeus set off by distinct sutures.** Transverse frontal groove near median ocellus, defined by scrobal grooves that are very close-together throughout their length. **Mesoscutal midlobe with 1 pair of setae** (the posterior pair). **2 setal tracks radiating from stigma.**

## References

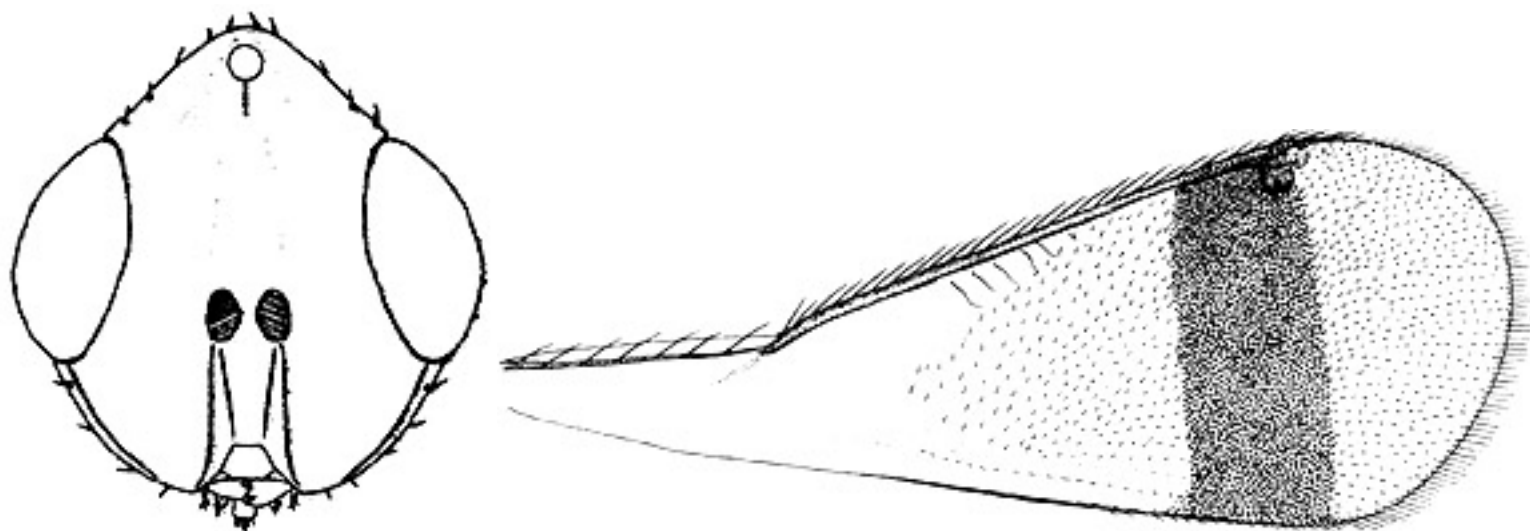
- Askew, R.R. & Ruse, J.M. 1974. Biology and taxonomy of the species of the genus *Enaysma* Delucchi (Hym., Eulophidae, Entedoninae) with special reference to the British fauna. *Transactions of the Royal Entomological Society of London*. **125**: 257-294.
- Bryan, G. 1980. The British species of *Achrysocharoides* (Hymenoptera, Eulophidae). *Systematic Entomology*. **5**: 245-262.
- Gumovsky, A.V. 2001. The status of some genera allied to *Chrysonotomyia* and *Closterocerus* (Hymenoptera: Eulophidae, Entedoninae), with description of a new species from Dominican Amber. *Phegea* 29(4): 125-141.
- Hansson, C. 1983. Taxonomic notes on the genus *Achrysocharoides* Girault, 1913 (Hymenoptera: Eulophidae), with a redescription and a description of a new species. *Entomologica Scandinavica*. **14**: 281-291.
- Hansson, C. 1985. The entedonine genera *Achrysocharoides* Girault, *Chrysocharis* Förster and *Kratoysma* Boucek (Hymenoptera: Eulophidae) in the Oriental region. *Entomologica Scandinavica*. **16**: 217-226.
- Kamijo, K. 1990. Five new species of *Achrysocharoides* (Hymenoptera, Eulophidae) associated with Leguminosae in Japan. *Japanese Journal of Entomology*. **58**(2): 293-302.
- Kamijo, K. 1991. Revision of North American *Achrysocharoides* (Hymenoptera: Eulophidae). *Akitu (new series)*. **124**: 1-34.
- Schauff, M.E. 1991. The Holarctic genera of Entedoninae (Hymenoptera: Eulophidae). *Contributions of the American Entomological Institute* **26**.
- Yoshimoto, C. 1977. The North American species of the genus *Achrysocharoides* (Hymenoptera: Eulophidae). *Canadian Entomologist*. **109**: 907-930.
- Image credits: 1a-c: Kamijo (1991). 2a: Hansson (1983). 2b: Schauff (1991).

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***Acrias* Walker, 1847** return to: [prev](#) [home](#)

**Vertex strongly arched, protruding high above eye level. 1 or 2 grooves extending from each torulus to mouth margin.** Males with nodose flagellomeres. **Stigma often enlarged; discal area often with fuscate regions. Apical gastral tergite elongate in females**, as long or longer than preceding tergite, covering most of the unusually long ovipositor sheaths.



1a-b: *Acrias* face (left), and forewing (right)

**Biology:** Parasitoids of Lepidoptera.

**Comments:** 10 described species. One of the more easily recognized genera of Eulophidae.

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Askew, R.R. 1968. Hymenoptera 2. Chalcidoidea section (b). *Handbooks for the Identification of British Insects*. **8**(2)b.

Boucek, Z. 1963. Studien über europäische Eulophidae, III: Euderinae (Hymenoptera: Chalcidoidea). *Beiträge zur Entomologie*. **13**: 257-281.

Boucek, Z. 1988. Australasian Chalcidoidea (Hymenoptera). A biosystematic revision of genera of fourteen families, with a reclassification of species. CAB International, Wallingford, UK.

Coote, L.D. 1994. Review of Nearctic genera of Euderinae (Hymenoptera: Eulophidae), with descriptions of two new species of *Allocerastichus* Masi, and redescription of *Carlyleia marilandica* Girault. *Canadian Journal of Zoology*. **72**: 1044-1054.

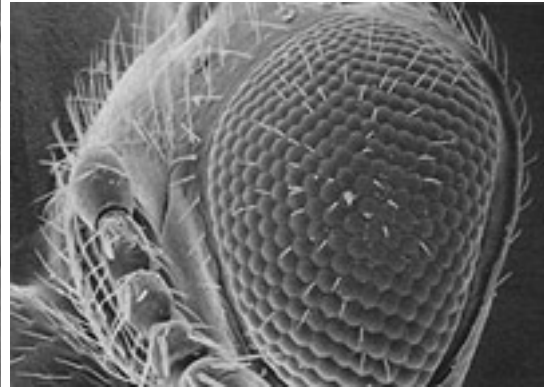
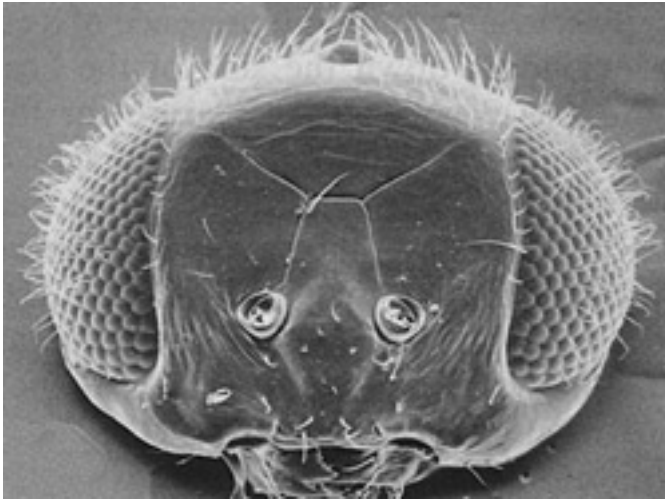
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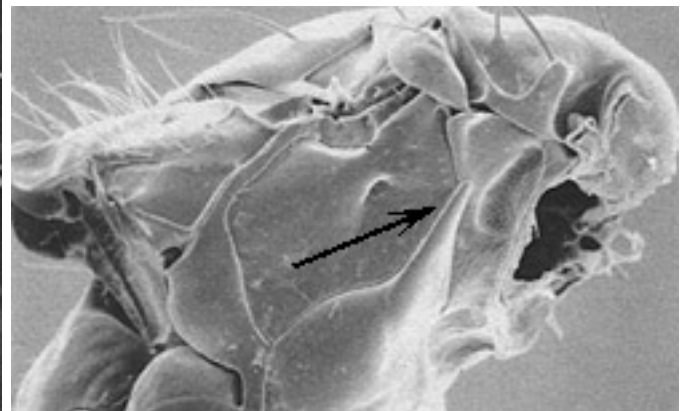
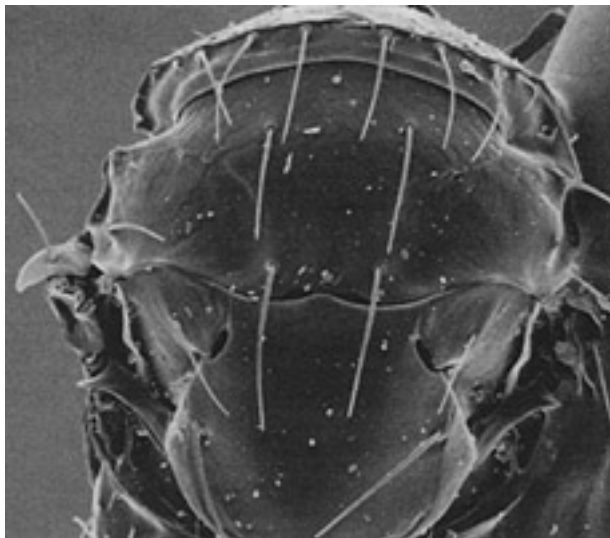
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*Alachua* Schauff & Boucek, 1987 return to: [prev](#) [home](#)

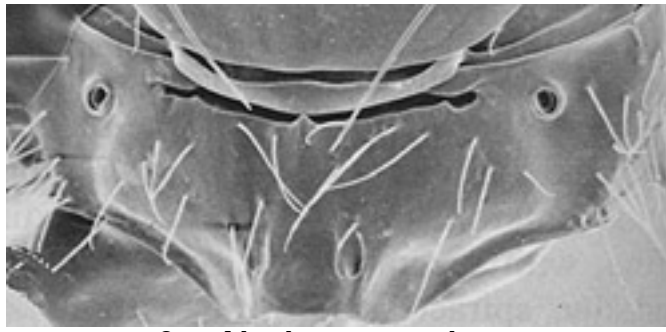
Upper face and vertex densely setose; posterior margin of eye bordered by carinate rim. Face and mesosomal dorsum smooth. Transverse frontal groove \\_/\_ shaped; scrobal grooves reaching transverse groove before meeting. Flagellar formula 1,3,2. Mesoscutal midlobe with 2 pairs of setae; axillar-scutellar border with anterior pit; posterior edge of prepectus partially overlapped by an extension of mesepisternum set off dorsally by a sulcus; epicnemial carina absent. Postmarginal and stigmal veins subequal in length. Propodeum nearly featureless except for long setae and anterior tooth extending towards metanotum.



1a-b: *Alachua* face (left), and profile (right)



2a-b: *Alachua* mesosomal dorsum (left), and pleuron (right), with mesepisternal projection indicated



3a: *Alachua propodeum*

**Biology:** Gregarious pupal parasitoid of *Camponotus abdominalis* (F.) [Formicidae].

**Comments:** 1 described species: *A. floridensis* Schauff & Boucek. In a clade with *Horismenus* and *Edovum*, but easily distinguished from them by the lack of reticulate sculpturing and paucity of carinae and grooves.

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## References

Schauff, M.E. 1991. The Holarctic genera of Entedoninae (Hymenoptera: Eulophidae). *Contributions of the American Entomological Institute* **26**.

Schauff, M.E. & Z. Boucek. 1987. *Alachua floridensis*, a new genus and species of Entedoninae (Hymenoptera: Eulophidae) parasitic on the Florida carpenter ant, *Camponotus abdominalis* (Formicidae). *Proceedings of the Entomological Society of Washington*. **89**: 660-664.

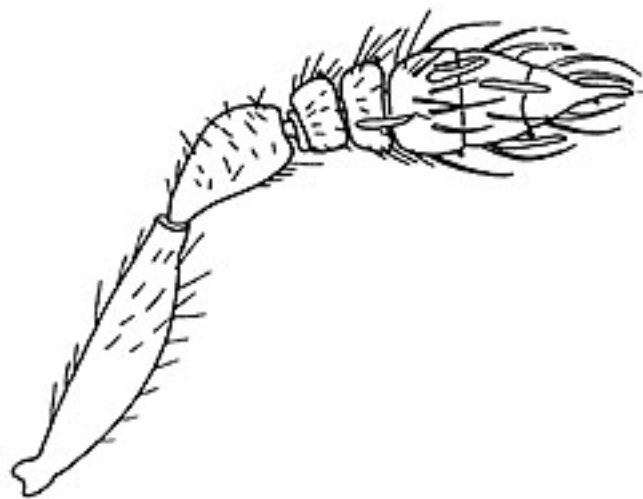
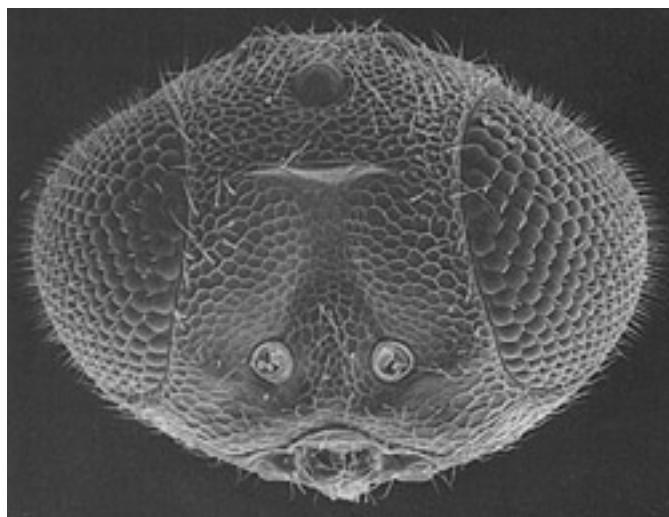
Image credits: 1a-b, 2a, 3a: Schauff & Boucek (1987). 2b: Schauff (1991).

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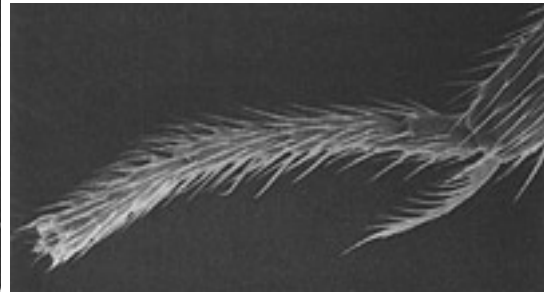
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***Aleuroctonus*** LaSalle & Schauff, 1994 [comparative info](#) return to: [prev](#) [home](#)

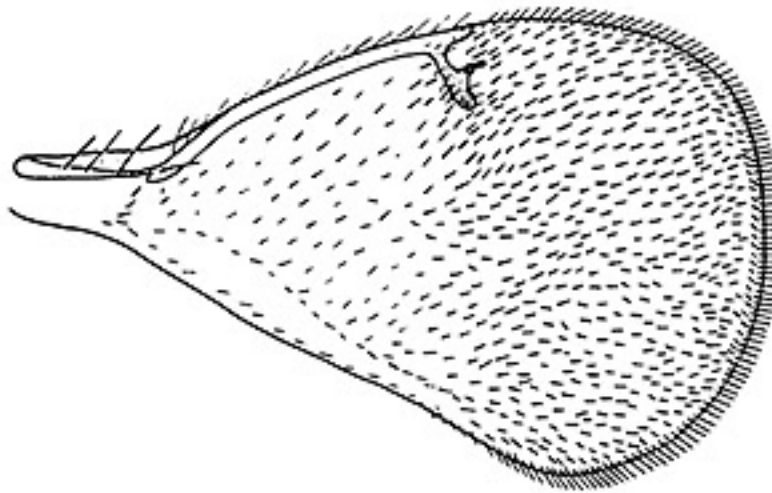
Eyes densely setose. Transverse frontal ridge rounded dorsally and only indicated medially, about 1 ocellar diameter below median ocellus; scrobal depressions not present as sulci, uniting before reaching transverse ridge. Clypeus delimited by dorsal suture. Malar sulcus absent. Flagellum with 3 claval segments and 3 preclaval segments; 3rd flagellomere broader than long in females, similar to 2nd flagellomere; 3rd flagellomere longer than broad in males, longer than 2nd flagellomere. Mesosoma with raised-reticulate sculpture; pronotal collar not formed; **mesoscutum with many short setae**; notauli only indicated anteriorly; axillae advanced entirely anterior of scuto-scutellar margin, dorsal surface about 2x longer than broad; **scutellum with many unpaired dorsal setae**, transverse, shorter than mesoscutum; prepectus not fused with mesopleuron. Postmarginal vein shorter than stigmal vein; stigma petiolate; **submarginal vein with 3 or more setae**. Propodeum extremely short; median carina meeting nuchal carina; paraspiracular groove present but not sharply defined. Gaster unsculpted, not metallic, **with pale markings basally** or throughout its length. **Mesotibial spur long and pectinate**. Head and mesosoma sometimes with slight metallic luster. Compare with: *Entedononecremnus*.



1a-b: *Aleuroctonus* face (left), and female antenna (right)



2a-b: *Aleuroctonus* mesosomal dorsum (left), and mesotibial spur (right)



3a: *Aleuroctonus* forewing

**Biology:** Parasitoids of Aleyrodidae.

**Comments:** 4 described species. Neotropical, Nearctic.

**Comparative information:**

*Entedononecremnus*: Eyes not setose. Gaster strongly sclerotized, not tending to collapse, with metallic luster; gt1 smooth and shiny. Mesotibial spur short, usually not pectinate.

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## References

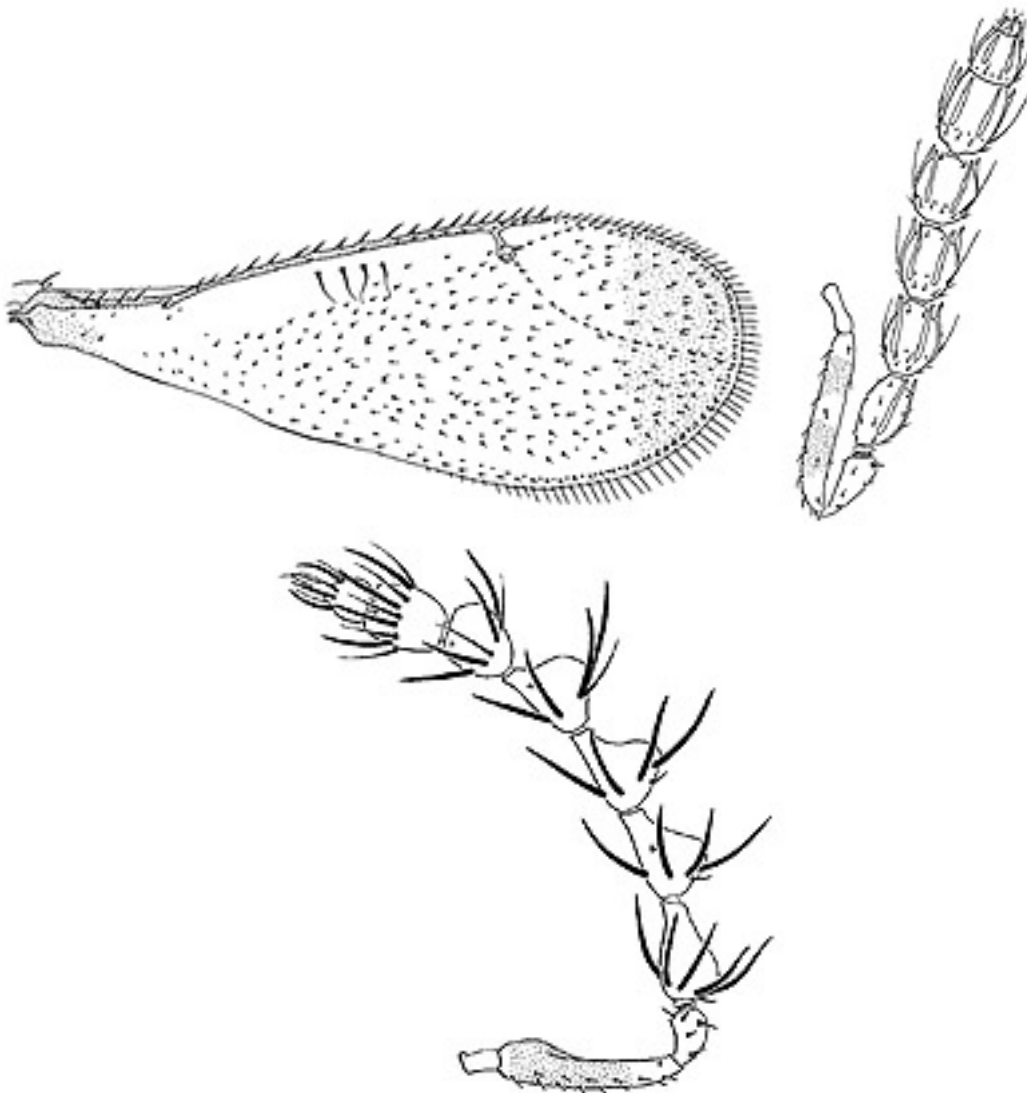
- Hansson, C. & J. LaSalle. 2002. Revision of the Neotropical species of the tribe Euderomphalini (Hymenoptera: Eulophidae). *Journal of Natural History*. **37**(6): 697-778.
- LaSalle, J. & M.E. Schauff. 1994. Systematics of the tribe Euderomphalini (Hymenoptera: Eulophidae): parasitoids of whiteflies (Homoptera: Aleyrodidae). *Systematic Entomology*. **19**: 235-258.
- Image credits: 1a-b, 2a-b, 3a: LaSalle & Schauff (1994).

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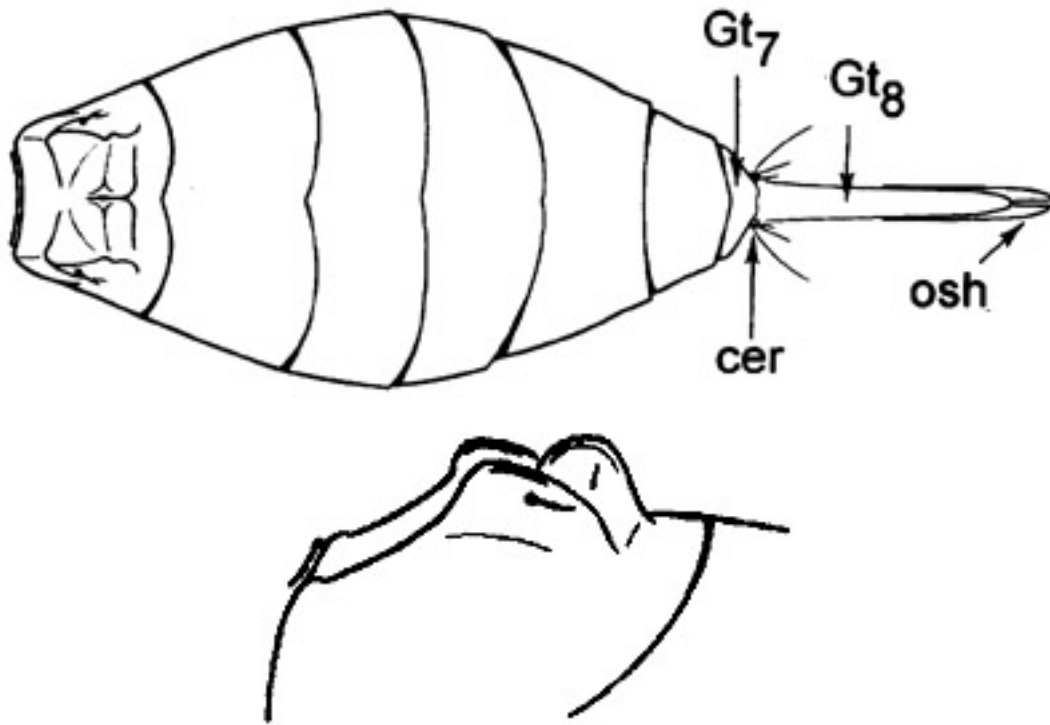
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*Allocerastichus* Masi, 1924 [comparative info](#) return to: [prev](#) [home](#)

**Antennal radicle elongate, nearly as long as pedicel**; males with nodose flagellomeres. Forewing without fuscate bands, except sometimes apex fuscate; **2 rows of setae radiating from stigmal apex** (sometimes a 3rd faint setal track is discernable). **Propodeum without median carina. Gt1 with 2 or 3 dorsal carinae in females, 1 in males**; last gastral tergite much longer than preceding tergite in females. Compare with: *Carlyleia*, *Euderus*.



1a-c: *Allocerastichus* forewing (top left), female and male antennae (top right, bottom)



2a-b: *Allocerastichus* dorsal view of gaster (top), and lateral view of gt1 (bottom)

**Biology:** Probably parasitoids of Ciid beetles.

**Comments:** 9 described species. Females are easily recognized by the modifications of the first gastral tergite.

**Comparative information:**

***Carlyleia*:** Antennal radicle not nearly as long as pedicel. **No rows of setae radiating from stigma.** Gt1 without carinae.

***Euderus*:** Antennal radicle not nearly as long as pedicel. Most species with median propodeal carina (if absent then the propodeum is extremely short medially). Gt1 without carinae. Last gastral tergite usually shorter than preceding tergite in females.

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## References

Boucek, Z. 1963. Studien über europäische Eulophidae, III: Euderinae (Hymenoptera: Chalcidoidea). *Beiträge zur Entomologie*. **13**: 257-281.

Coote, L.D. 1994. Review of Nearctic genera of Euderinae (Hymenoptera: Eulophidae), with descriptions of two new species of *Allocerastichus* Masi, and redescription of *Carlyleia*

*marilandica* Girault. *Canadian Journal of Zoology*. **72**: 1044-1054.

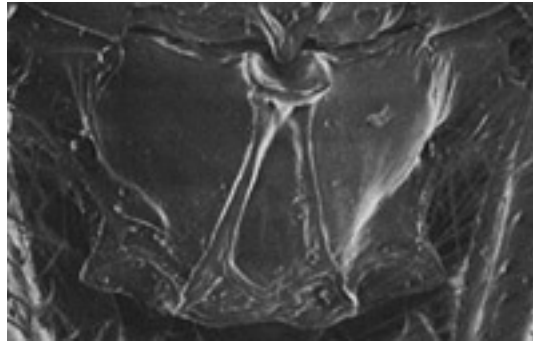
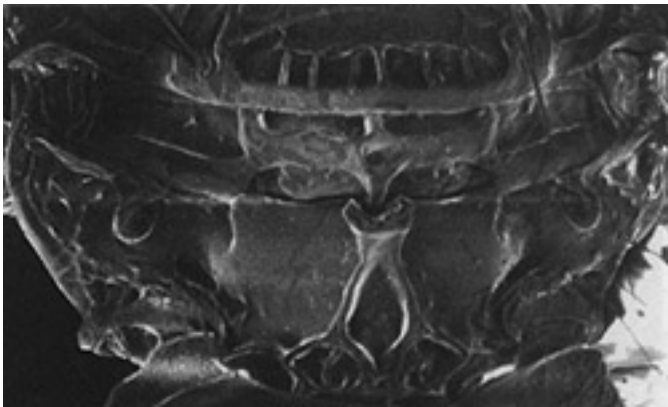
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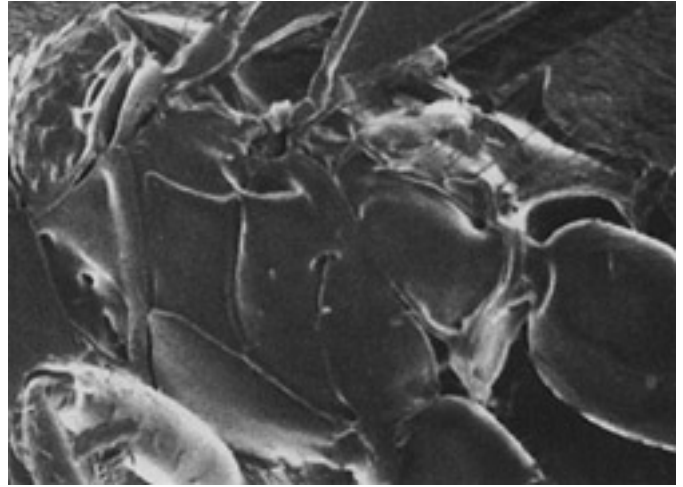
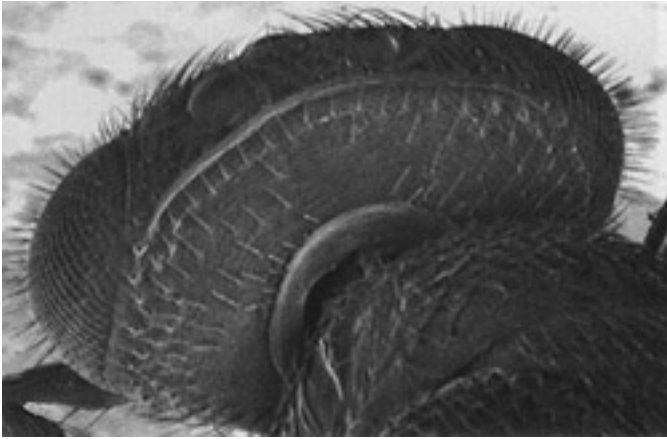
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***Alveoplectrus* Wijesekara & Schauff, 1997** [comparative info](#) return to: [prev](#) [home](#)

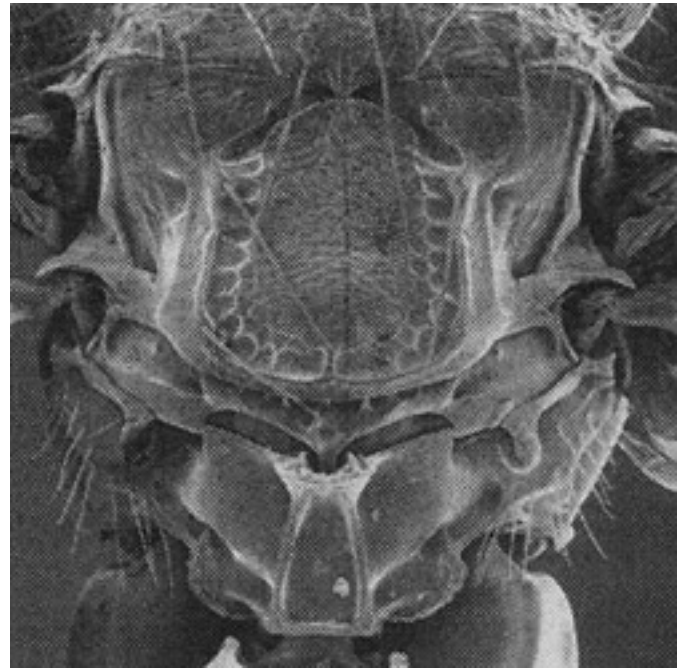
Eyes setose. Vertex, occiput, pronotum, and mesoscutum uniformly setose. Mandibles not capable of meeting medially. Face with distinct tentorial depressions near clypeus; occipital carina present or absent; postoccipital carina present; malar sulcus present. Flagellum with 4 funicular segments and a united club. Pronotal collar not carinate; pronotum and mesoscutum uniformly setose; **scutellum with sublateral grooves** that meet posteriorly; **dorsellum with medial pit** (where the longitudinal and transverse carinae meet), and tiny posterior projection into basal cup of propodeum. **Propodeum with 2 submedian carinae** meeting anteriorly. Petiole much broader than long. **Basal protarsal segment with strigil**; metatibial apex projecting slightly beyond tarsal base; **1 metatibial spur**, reaching apex of 2nd metatarsal segment. Compare with: *Euplectromorpha*.



1a-c: *Alveoplectrus* propodea (left, center), and basal protarsal segment (right)



**2a-c: *Alveoplectrus* back of head (top left), mesopleuron (top right), and metatibial apex plus metatarsus (right)**



3a-b: *Alveoplectrus* profile (left), and scutellum plus propodeum (right)

**Biology:** Parasitoids of Lepidoptera.

**Comments:** 3 described species.

**Comparative information:**

**Euplectromorpha:** Pronotal collar carinate; scutellum with nearly parallel sublateral grooves that do not meet posteriorly. Occipital carina [and postoccipital carina] absent. Basal protarsal segment without strigil. Dorsellum without median pit. Usually with 2 metatibial spurs, rarely with 1.

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Schauff, M.E., J. LaSalle, & L.D. Coote. 1997. Chapter 10. Eulophidae. in "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.

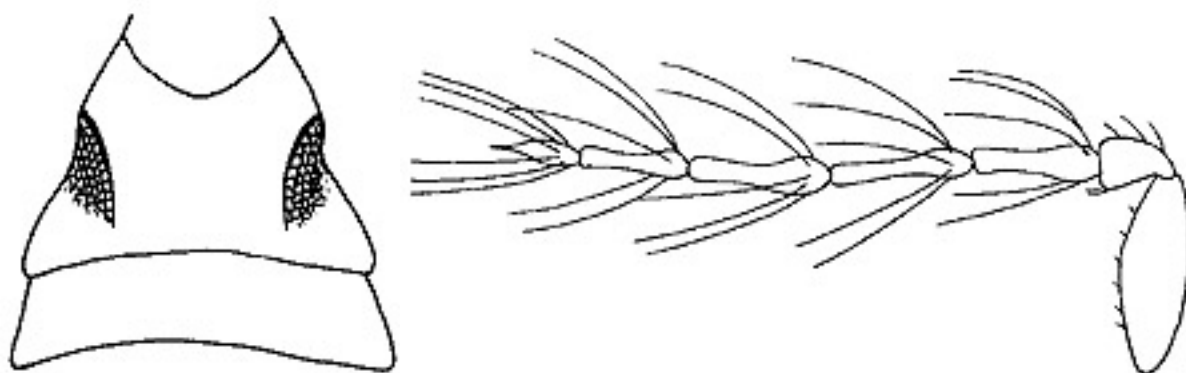
Wijesekara, G.A.W. & M.E. Schauff. 1997. Two new genera and three new species of Euplectrini (Hymenoptera: Eulophidae) from the New World. *Proceedings of the Entomological Society of Washington*. **99**(1): 101-109.

Image credits: 1a-c, 2a-c, 3a: Wijesekara & Schauff (1997). 3b: Schauff, et al. (1997).

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**Ametallon** Ashmead, 1904 [comparative info](#) return to: [prev](#) [home](#)

**Clypeus distinctly outlined by sulci**; upper frons (above transverse frontal groove) smooth and shiny; occiput sharply margined near ocellar triangle. Flagellum with 4 funicular segments and 1 claval segment; flagellomeres with whorls of erect setae in males; postmarginal vein equal or very slightly longer than stigmal vein. **Mesoscutal midlobe with 1 pair of setae** (the posterior pair). Forewing with 2 setal tracks radiating from stigmal apex, but these sometimes obscured by discal setae (in some Neotropical species). Petiole much broader than long. **Gt1 in females with lateral indented, distinctly sculpted areas**. Head, body, and legs pale yellow to whitish (parts of antennae, 4th tarsomeres, parts of gastral tergites in males, and ovipositor darker). Compare with: ***Chrysonotomyia*, *Omphale***.



1a-b: *Ametallon* female gastral base (left) and male antenna (right)

**Biology:** Egg parasitoids of Odonata.

**Comments:** 3 described species. Poorly known genus. Very similar to *Chrysonotomyia*, possibly rendering it paraphyletic. Mostly Neotropical, known only from Florida in the Nearctic.

**Comparative information:**

***Chrysonotomyia*:** Head and body with at least some metallic coloration. Gt1 in females without special lateral indented areas. Upper frons with distinct sculpture.

***Omphale*:** Forewing with at most 1 setal track radiating from stigmal apex. Gt1 in females without special lateral indented areas. Body usually darker, at least in part.

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## References

Hansson, C. 1996. Taxonomic revision of the Nearctic species of *Omphale* Haliday (Hymenoptera: Eulophidae). *Entomologica Scandinavica supplement* **49**.

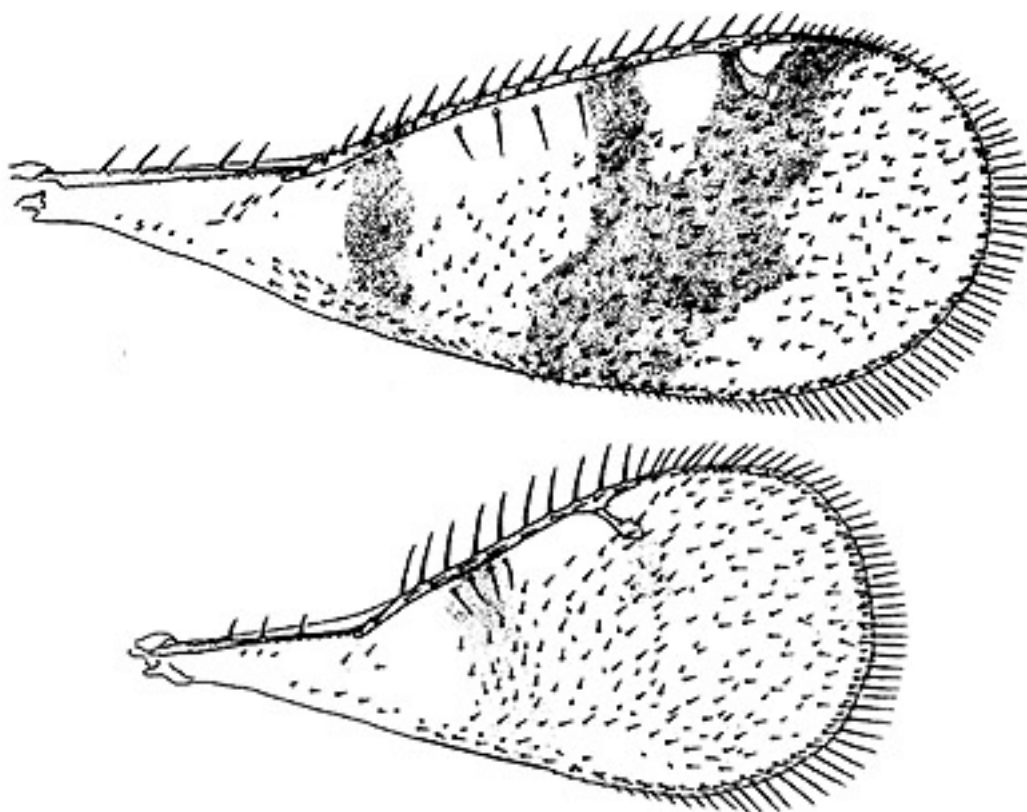
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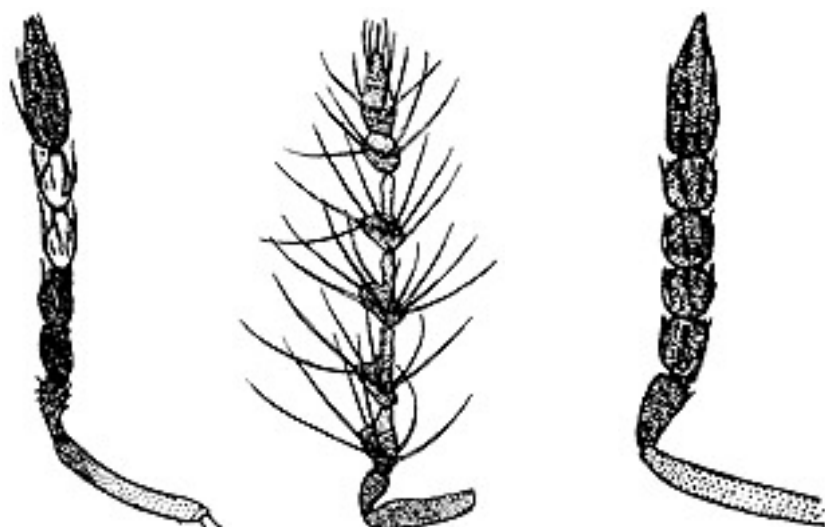
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***Astichus* Förster, 1856** return to: [prev](#) [home](#)

Females usually with 1 or 2 white funicular segments in contrast to the other segments; males with nodose flagellomeres each bearing a whorl of erect setae. **Forewing with fuscate regions**, usually transverse bands; **without rows of setae radiating from stigmal apex** (except 1 possible row radiating from uncus). **Propodeum without median carina**. Head and mesosoma usually metallic striped, rarely partly yellowish.



1a-b: *Astichus* forewings



2a-c: *Astichus arithmeticus* (Förster) female (left), and male (center) antennae, and *A. tauricus* Boucek female antenna (right, atypical of genus)

**Biology:** Parasitoids of Ciids and Tenebrionids.

**Comments:** 26 described species. Usually easily recognized by forewing markings, but body often small and shriveled.

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## References

Boucek, Z. 1963. Studien über europäische Eulophidae, III: Euderinae (Hymenoptera: Chalcidoidea). *Beiträge zur Entomologie*. **13**: 257-281.

Coote, L.D. 1994. Review of Nearctic genera of Euderinae (Hymenoptera: Eulophidae), with descriptions of two new species of *Allocerastichus* Masi, and redescription of *Carlyleia marilandica* Girault. *Canadian Journal of Zoology*. **72**: 1044-1054.

Schauff, M.E., J. LaSalle, & L.D. Coote. 1997. Chapter 10. Eulophidae. *in* "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.

Yoshimoto, C. 1970. A new species of *Astichus* (Hymenoptera: Eulophidae) associated with the birch bracket fungus *Polyporus betulinus* and woody fungus *Ganoderma applanatum* in eastern Canada. *Canadian Entomologist*. **102**: 656-659.

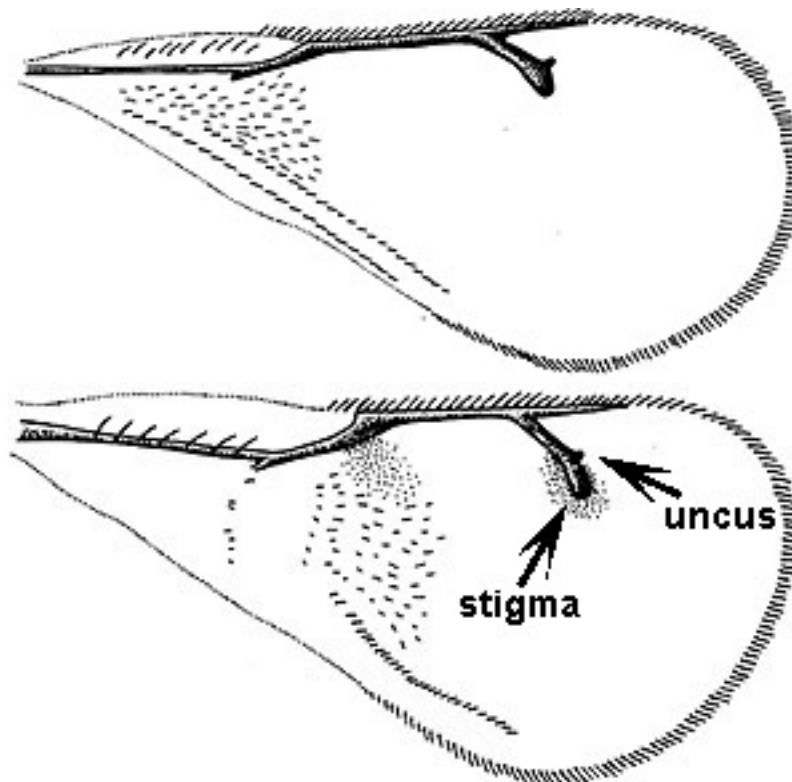
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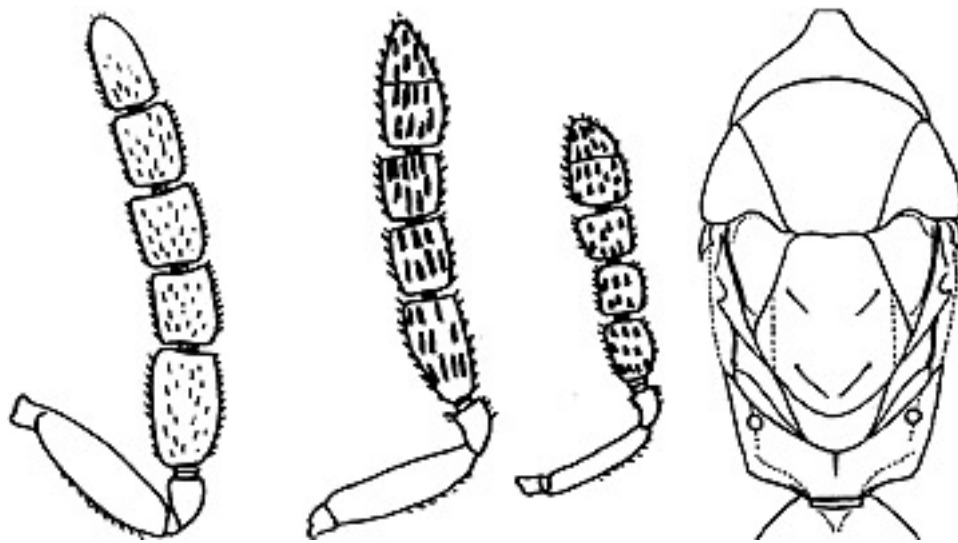
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**Aulogymnus** Förster, 1851 [comparative info](#) return to: [prev\(Eul 13\)](#) [prev\(cir 2\)](#) [prev\(eul 10\)](#) [home](#)

(Includes *Olynx* Förster, *Pseudolynx* Girault, and *Scotolinx* Ashmead) Flagellar formula 2,3,2 or 2,4,1 in most species, but a few with 2 funicular segments; most species with the same formula in both sexes, but sometimes with 4 funicular segments in males and 3 in females. Mesosoma stout and arched in profile in most species; notauli complete, proceeding as nearly straight lines to end at or near scutellar margin, leaving a distinct scapular flange that reaches or nearly reaches the scutellar margin; **axillae only slightly advanced**; scutellum convex, parallel submedian grooves absent or present and very close together. **Stigma elongate, with uncus arising more than its own length from stigmal apex** [look at both wings to determine for sure, as this is distinctive but variable]. Compare with: *Cirrospilus*, *Paraolinx*.



1a-b: *Aulogymnus arsames* (Walker) forewing (top), and *A. trilineatus* (Mayr) forewing (bottom)



2a-d: *Aulogymnus gallarum* (L.) antenna (left), and *A. skianeuros* (Ratzeburg) male and female antennae (center), and *Aulogymnus mesosomatic* dorsum (right)

**Biology:** Parasitoids of gall-makers.

**Comments:** 27 described species. This genus is not as distinct as it may appear at first assessment, as an elongate stigma occurs in several other groups of Eulophinae, such as *Di cladocerus*, *Dahlbominus*, some *Necremnus*, and others. The character does appear to distinguish it from forms with complete notauli that lack submedian scutellar grooves or only have parallel ones, but it is a difficult character to rely upon in some cases, as it is difficult to determine whether the stigma is elongate or not and in some series the stigma can range from distinctly elongate to small like in *Cirrospilus*. I have used the uncus length as a determinant, but it should be noted that a few *Aulogymnus* lack a distinct uncus, and that this does not work every time, regardless. It is interesting that nearly all *Aulogymnus* have a similar distinctive bodily sculpture and shape, being very finely sculpted and stout-bodied, arched in profile, but these characters are not easily related in print and require experience to be reliable. While the notauli are sometimes weakly complete in the other genera with an elongate stigma, such as *Di cladocerus*, in these cases the notauli are strongly curved and usually end in the anterior half of the dorsal surface of the axillae, which are strongly advanced. In *Aulogymnus*, I am aware of no species with indistinctly complete notauli, and the notauli are straight and extending to the scutellar border or ending very near it in the axillar border. While this distinction may seem complex in print, it is very useful and can be easily ascertained by comparing figures.

**Comparative information:**

***Cirrospilus*:** Flagellum always with 2 funicular segments. Uncus subapical, separated by about its own length from stigmal apex [look at both wings]. Body flattened in most species (stout and arched in most *Aulogymnus*). About half dorsal surface of axillae advanced anteriorly of scutellar margin. Scutellar grooves often very far apart. A few problematic species appear to lie between *Cirrospilus* and *Aulogymnus*, and no satisfactory characters exist for their placement at this

time.

***Paraolinx***: Stigma not elongate. **Females with transverse white stripe present on face at level of toruli, bordered above and below by dark stripes**, although this pattern is sometimes reduced to a simple white spot near each eye. **Mandibles long, with many tiny denticles**. Flagellar formula 2,4,3 in females, 1,4,2 in males; flagellar segments expanded in males. Head much broader relative to body.

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## References

Askew, R.R. 1968. Hymenoptera 2. Chalcidoidea section (b). *Handbooks for the Identification of British Insects*. **8**(2)b.

Gordh, G. 1977. A new species of North American *Scotolinx* with taxonomic notes on the genus. *Pan-Pacific Entomologist*. **53**: 205-210.

Pujade i Villar, J. 1991. Nuevas aportaciones al conocimiento de *Aulogymnus* Förster, 1851 (Hym., Chal., Eulophidae) para la Peninsula Iberica, con la descripcion de una especie nueva, *Aulogymnus balani* sp. n. *Graellsia*. **47**: 139-154.

Schauff, M.E. & J. LaSalle. 1993. Nomenclatural notes on genera of North American Eulophidae (Hymenoptera: Chalcidoidea). *Proceedings of the Entomological Society of Washington*. **95**(3): 488-503.

Image credits: 1a-b, 2a-c: Pujade i Villar (1991), 1b modified. 2d: Askew (1968).

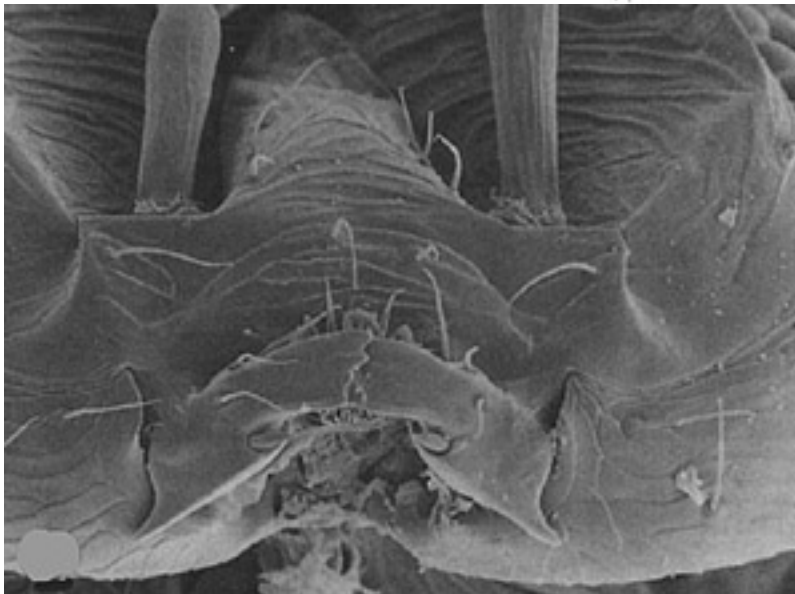
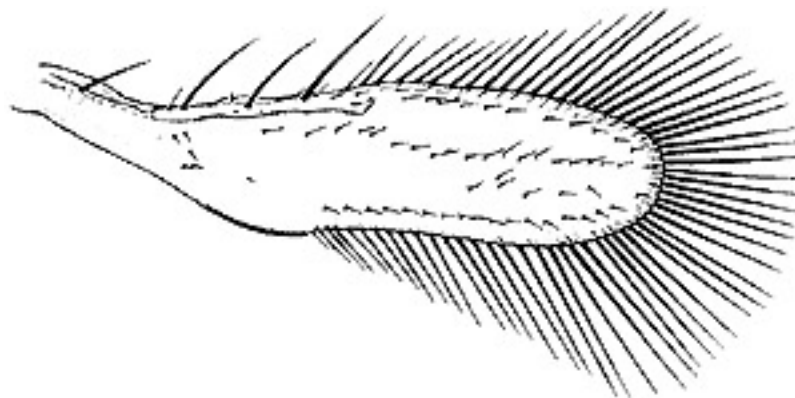
This page corrected by Olivier Plantard, effective September 21, 2002 (re: spelling of *Aulogymnus arsames*).

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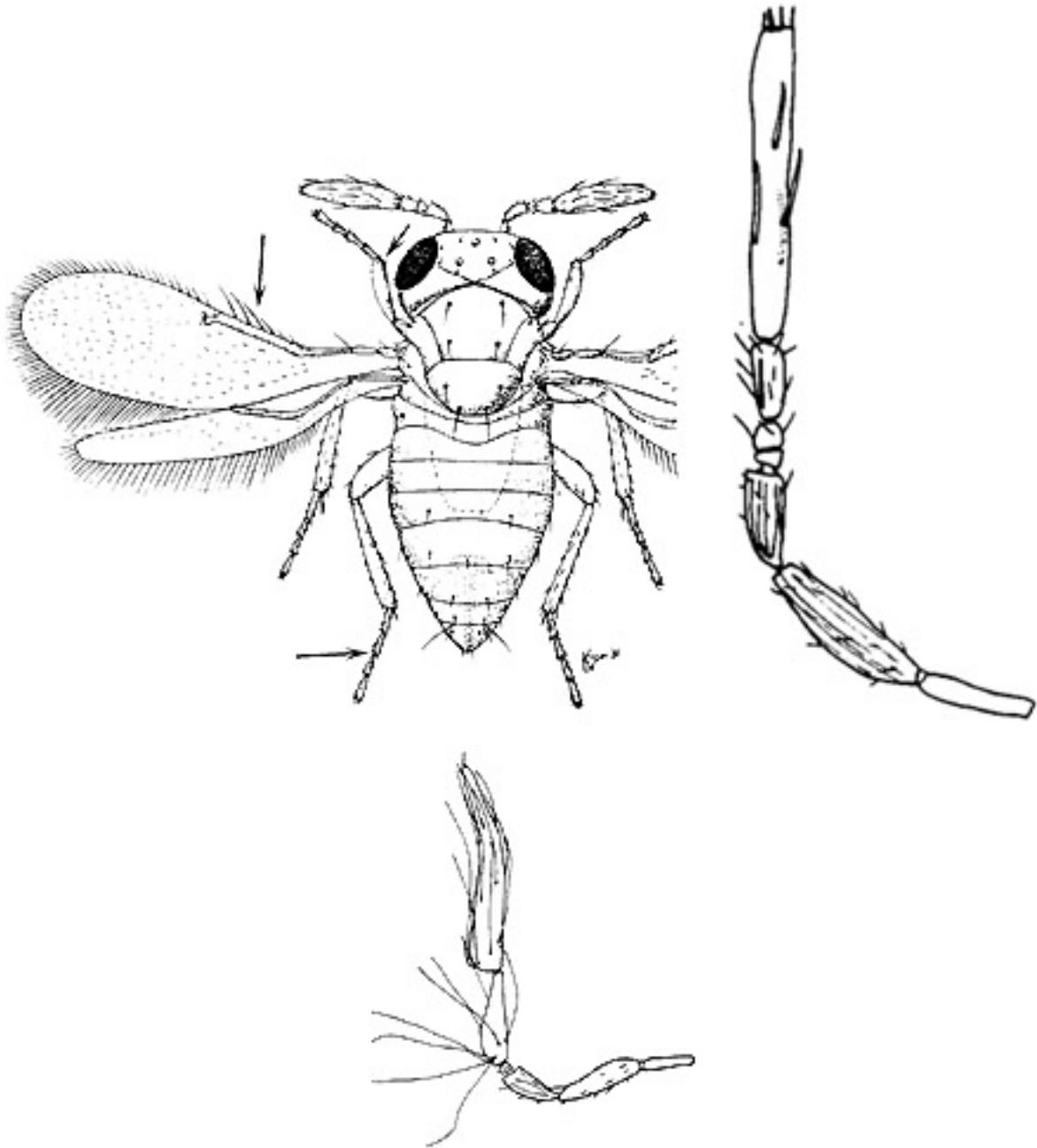
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**Cales** Howard, 1907 [comparative info](#) return to: [prev](#) [home](#)

Flagellar formula 1,1,1 or 2,1,1; club very long; flagellar setae very long in males. Toruli slightly above lower eye margin. Transverse frontal groove near ocellar triangle. Mandible long and flat, with a specialized socketed accessory tooth ventrally, and with 3 (sometimes appearing to be 4) normal denticles. Maxillary palp 1-segmented. Mesoscutal midlobe and scutellum may each have 1 or 2 pairs of strong dorsal setae (varying by species); notauli complete; mesophragma dimpled medially. Marginal vein several times longer than the short stigmal vein (which is usually not well-differentiated from the marginal vein); postmarginal vein absent; **forewing characteristically oar-shaped in *C. noacki* (the most common species by far), with 3 discal setal tracks**; forewing broader and more evenly setose in at least 1 of the other two species. **Tarsal formula 4-4-4. Protibial spur short and straight.** Compare with: Trichogrammatidae, Aphelinidae, Eulophidae (especially *Goetheana*).



1a-b: *Cales noacki* forewing (left), and mandibles (right)



2a-c: *Cales orchamoplati* (left), *Cales noacki* female antenna (center), and male antenna (right)

## Biology:

**Comments:** Unplaced to family, but most recently placed in Aphelinidae. 3 described species.

## Comparative information:

**Trichogrammatidae:** Tarsal formula 3-3-3. Mandible without socketed accessory tooth. Antenna never exactly the same in form (never with elongate terminal claval segment and distinct funicular segments at the same time).

**Aphelinidae:** Protibial spur stout and curved. Most species with tarsal formula 5-5-5.

**Eulophidae:** Petiole much narrower than gaster and propodeum, metasoma not appearing broadly attached to propodeum. Funicle and club not reduced to 1 segment each. Mandible without accessory tooth (but this is typically hard to discern). Only *Goetheana* and some Tetrastichinae with only 1 dorsal seta on submarginal vein.

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## References

Hayat, M. 1983. The genera of Aphelinidae (Hymenoptera) of the world. *Systematic Entomology*. **8**: 63-102.

Heraty, J.M. & M.E. Schauff. 1998. Mandibular teeth in Chalcidoidea: Function and phylogeny. *Journal of Natural History*. **32**(8): 1227-1244.

Viggiani, G. & M. Carver. 1988. *Cales orchamoplatis* sp. n. (Hymenoptera: Aphelinidae) from Australia. *Journal of the Australian Entomological Society*. **27**(1): 43-45.

Woolley, J.B. 1997. Chapter 5. Aphelinidae. in "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera). G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.

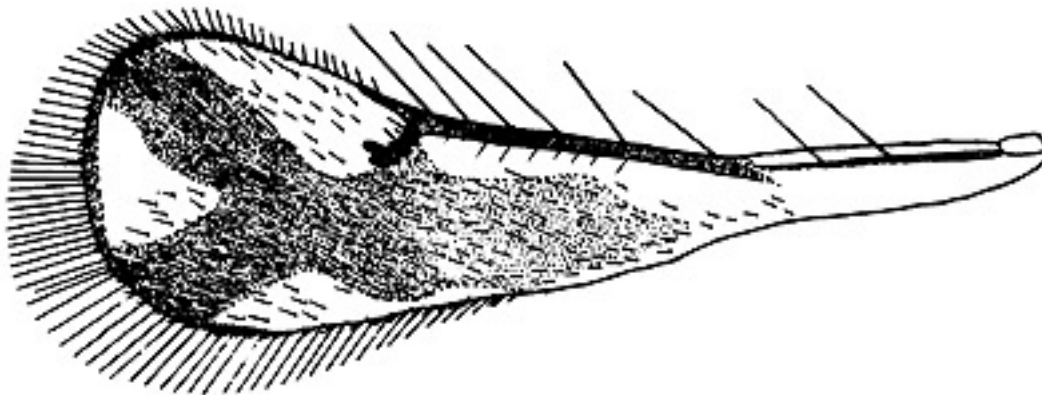
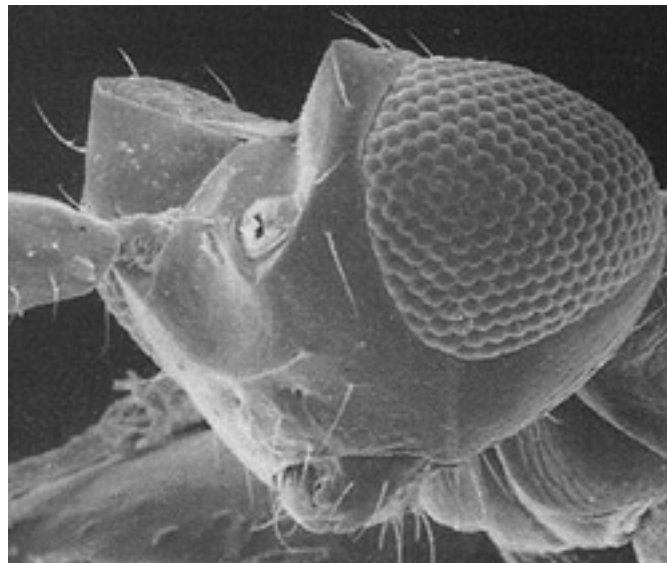
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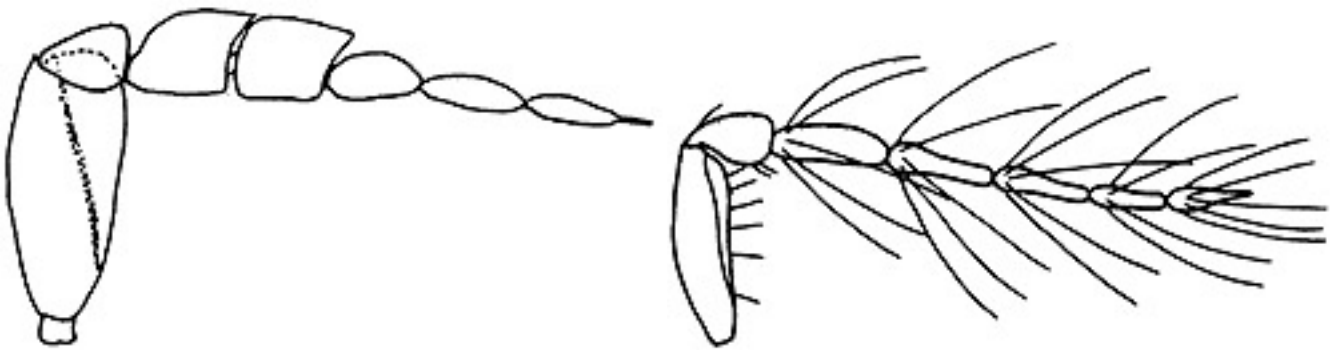
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***Callifrons*** Schauff, Yoshimoto, & Hansson, 1994 [comparative info](#) ret. to: [prev](#) [home](#)

Mandibular formula 3:3. **Upper portion of frons strongly projecting anteriad, dorsal surface of head very long; occiput very strongly concave, sharply margined. Clypeus set off by distinct sulci. Scape and 2 basal flagellomeres strongly flattened in females;** flagellar formula apparently 0,2,3 in females, 0,4,1 in males, which have a whorl of long setae at the base of each flagellomere; **flagellar peg sensilla elongate, spear-shaped.** Pronotum very short dorsally; mesoscutum smooth, **mesoscutal midlobe with 1 pair of tiny setae** (posterior pair). **Forewing distinctive in shape: submarginal vein only slightly shorter than marginal vein and disc distinctly expanded beyond venation; disc with distinct longitudinal fuscate band branching apically** (but sometimes fuscate area reduced to traces near venation in males); postmarginal vein subequal stigmal vein length. Propodeum smooth, without median carina; petiolar foramen very large. Petiole much broader than long. Compare with: ***Closterocerus*, *Omphale*.**



1a-b: *Callifrons* face (top), and forewing (bottom)



2a-b: *Callifrons* female antenna (left), and male antenna (right)

## Biology:

**Comments:** 1 described species: *C. maculata* Schauff, Yoshimoto, & Hansson. Certainly related to *Omphale* and *Closterocerus*, but it is not clear to which it is most closely linked by synapomorphies.

## Comparative information:

**Closterocerus:** Head not as elongate, without hornlike projections. Shape and fuscate pattern of forewing never the same, though somewhat similar in *Closterocerus tau* Girault.

**Omphale:** Head not as elongate, without hornlike projections. Flagellum not flattened. Forewing not similarly shaped or patterned.

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## References

Schauff, M.E., J. LaSalle, & L.D. Coote. 1997. Chapter 10. Eulophidae. *in* "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.

Schauff, M.E., C.M. Yoshimoto, & C. Hansson. 1994. A new genus and species of Entedoninae (Hymenoptera: Eulophidae) from North and Central America. *Proceedings of the Entomological Society of Washington*. **96**: 607-611.

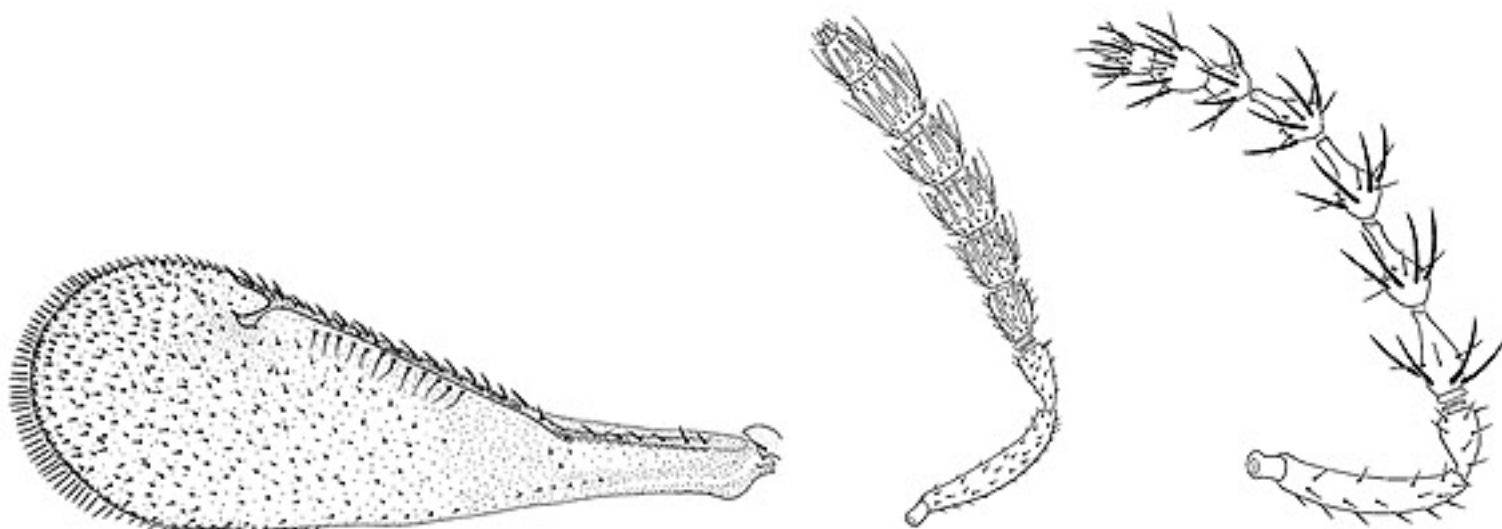
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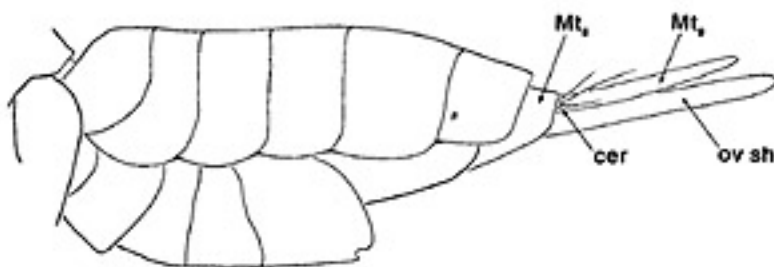
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**Carlyleia** Girault, 1916 [comparative info](#) return to: [prev](#) [home](#)

Males with nodose flagellomeres. Forewing without fuscate regions; **no rows of setae radiating from stigma**. **Propodeum without median carina**. Gt1 without carinae; last gastral tergite much longer than preceding tergite in females. Compare with: ***Allocerastichus***, ***Parasecodella***, ***Euderus***.



1a-c: *Carlyleia* forewing (left), female and male antennae (center and right)



2a: *Carlyleia* gaster

## Biology:

**Comments:** 1 described species: *C. marilandica* Girault. A very unusual Euderine species in that there are no setal tracks radiating from the stigmal apex.

## Comparative information:

***Allocerastichus*:** Gt1 with 2-3 dorsal carinae in females. Forewing with 2 rows of setae radiating from stigmal apex. Antennal radicle elongate, nearly as long as pedicel.

***Parasecodella*:** Propodeum with median carina. Apical gastral tergite shorter than preceding

tergite in females.

***Euderus***: Apical gastral tergite shorter than preceding tergite in females. Males of most species with flagellomeres not nodose, similar to those in females. Most species with 2-3 rows of setae radiating from stigmal apex. Propodeum with median carina in most species.

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## References

Coote, L.D. 1994. Review of Nearctic genera of Euderinae (Hymenoptera: Eulophidae), with descriptions of two new species of *Allocerastichus* Masi, and redescription of *Carlyleia marilandica* Girault. *Canadian Journal of Zoology*. **72**: 1044-1054.

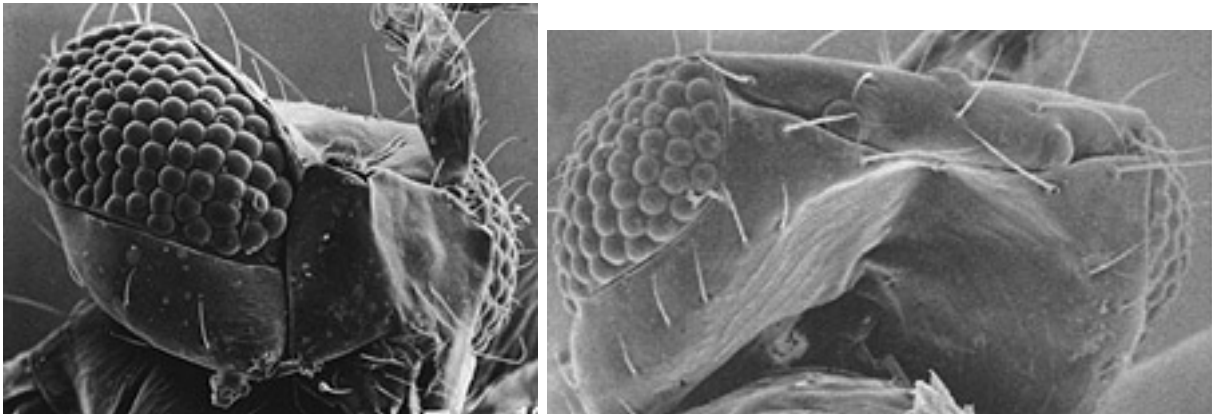
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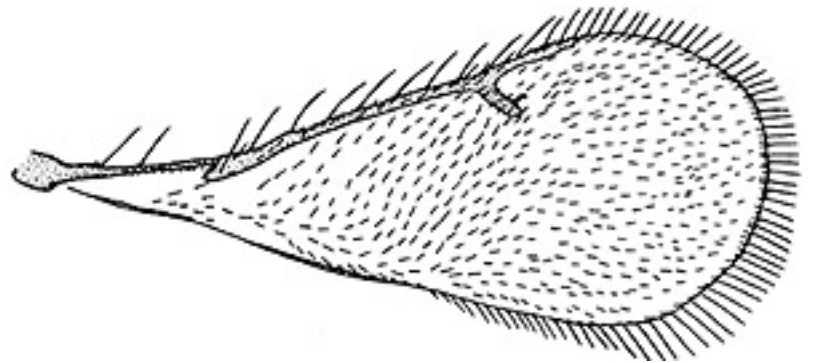
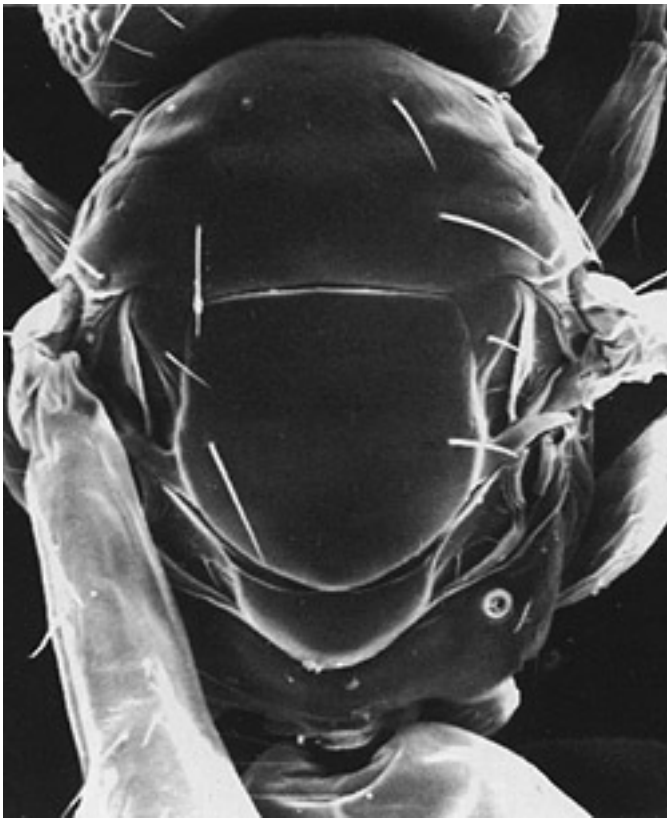
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***Ceranisus* Walker, 1842** [comparative info](#) return to: [prev](#) [home](#)

**Complete sulcus present across vertex behind lateral ocelli.** frontal grooves v-shaped, reaching eyes at level of median ocellus; scrobal grooves reaching transverse groove separately (but rarely discernable because of facial collapse). Malar sulcus not branched. Flagellum with 1 anellus and 5 additional flagellomeres, in which 1-3 of them form the club; males of some species with swollen scape; flagellum with L-shaped (type 2) or elongate (type 3) peg sensilla (so far, I have found only *Ceranisus menes* (Walker) to have type 3 sensilla). Notauli sharply bent laterad at their anterior ends. Definitely included species do not have raised sculpture (S. Trjapitsyn, personal comm.). Fringe setae of forewing shorter than transverse width of wing (though usually long relative to other Entedoninae); hind wing pointed apically. Petiole very small and unsculpted. Compare with: ***Thripobius***, ***Closterocerus***.



1a-b: *Ceranisus* lower face (left), and vertex (right, dorso-posterior view)



2a-b: *Ceraninus* mesosomal dorsum (left), and forewing (right)

**Biology:** Larval parasitoids of Thripidae.

**Comments:** 18 described species. This genus, along with *Thripobius*, is very difficult to distinguish from other small Entedoninae because the only consistent difference is the presence of the vertex sulcus, which is often obscured if the head is collapsed. These genera appear to be closely related to *Closterocerus*, *Asecodes*, and *Omphale*.

**Comparative information:**

***Thripobius*:** frontal grooves reaching eyes above level of median ocellus, sometimes reaching vertexal sulcus. Malar sulcus, when visible, forked ventrally.

***Closterocerus*:** Head without sulcus across vertex.

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## References

Schauff, M.E. 1991. The Holarctic genera of Entedoninae (Hymenoptera: Eulophidae). *Contributions of the American Entomological Institute* **26**.

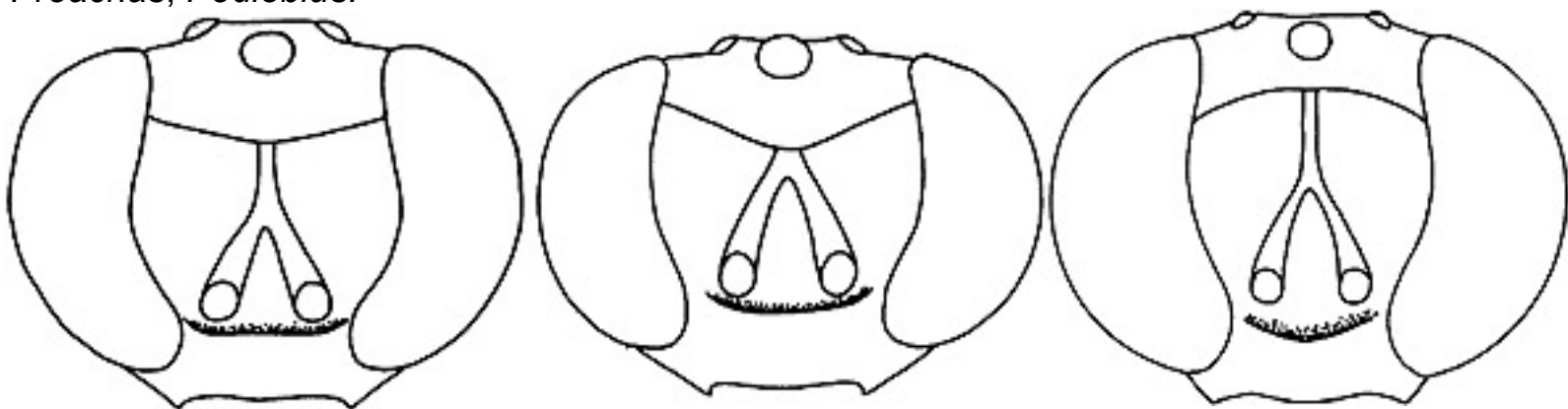
Trjapitsyn, S.V. & D.H. Headrick. 1995. A revision of the Nearctic species of the thrips-attacking genus *Ceranisus* Walker (Hymenoptera: Eulophidae). *Transactions of the American Entomological Society*. **121**: 227-248.

Image credits: 1a, 2a: Trjapitsyn & Headrick (1995). 1b, 2b: Schauff (1991).

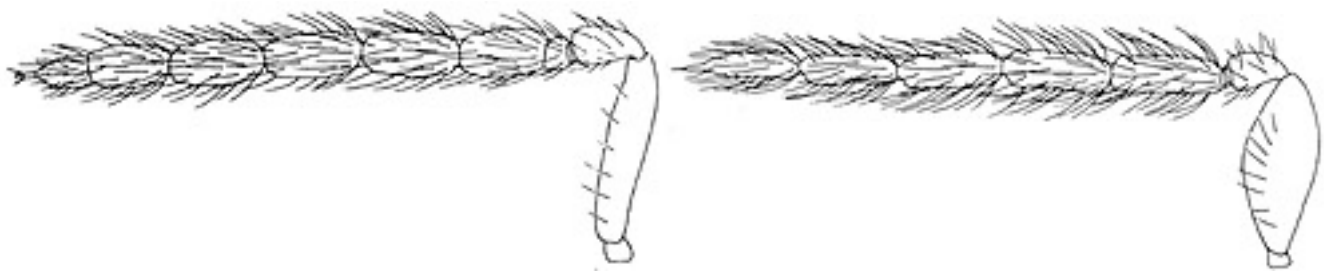
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**Chrysocharis** Förster, 1856 [comparative info](#) return to: [prev\(ent24\)](#) [prev\(ent25\)](#) [home](#)

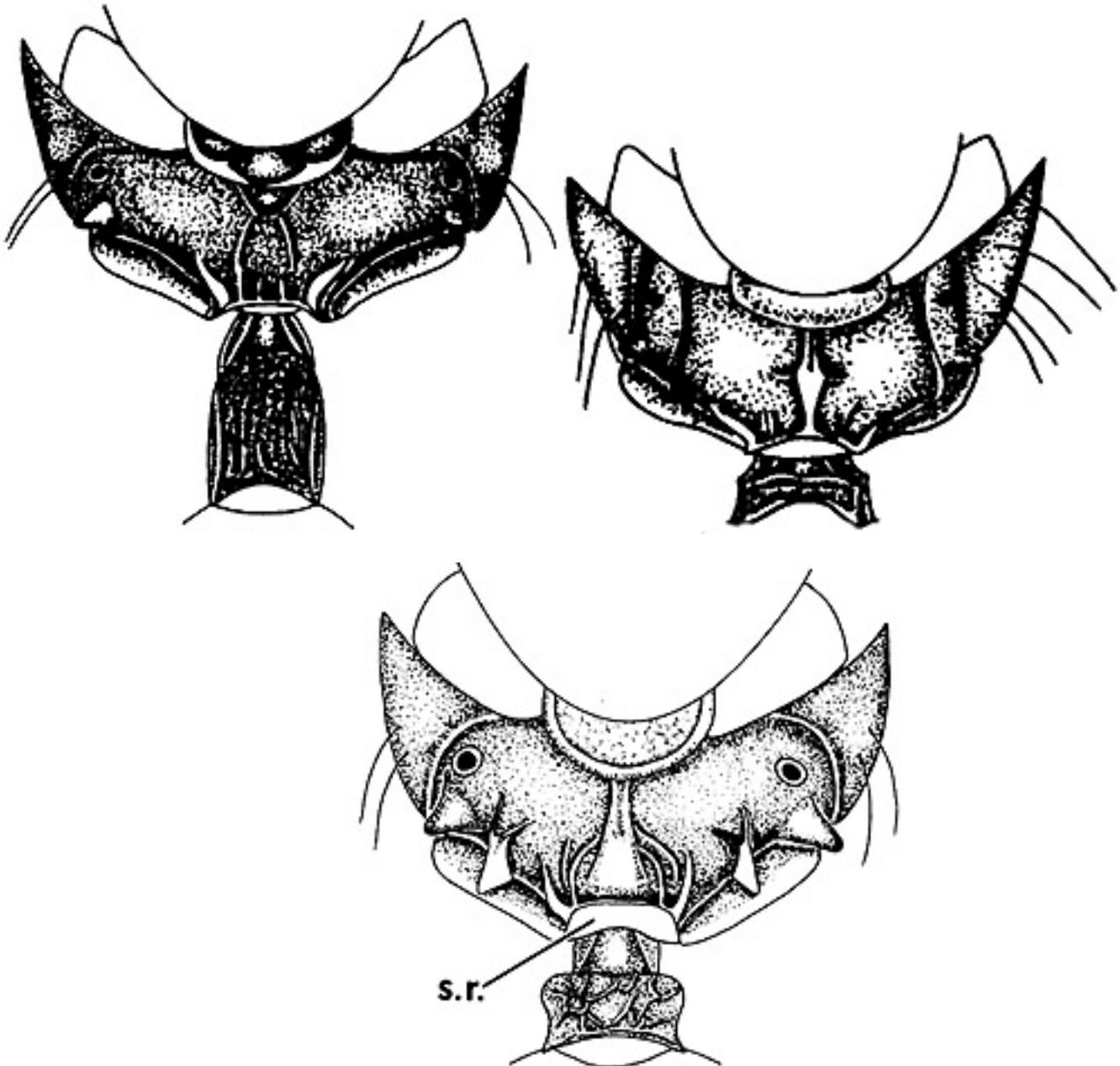
**subgenus Chrysocharis:** Mandibles with 2 or more denticles. Clypeus not set off by sutures, but sometimes different in color from rest of face (always small and not much broader than long). Transverse frontal groove almost always weakly to strongly v-shaped; scrobal grooves/depressions almost always uniting before reaching transverse groove, but rarely meeting at groove, especially in males or when the head is collapsed in air-dried specimens; scrobal grooves not extending ventrally below toruli; **interscrobal ridge not meeting transverse groove**. Flagellar formula 3,3,2 or 3,4,1, very rarely with 3 claval segments (in *C. chlorus* Graham and *C. imbratus* (Walker)) and almost always with all postanellar flagellomeres longer than broad; **apical anellus enlarged in females**, up to 0.33x 1st funicular segment length; heads of flagellar peg sensilla rounded, symmetrical (type 1). Pronotal collar carinate or not; mesoscutal midlobe with 2 or more pairs of setae; transepimeral sulcus weakly to strongly curved. Forewing always strongly wedge-shaped: about 4x longer [anterior to posterior] beyond venation than at parastigma; apical fringe setae always relatively short; postmarginal vein almost always more than 1.5x stigmal vein length, rarely as little as 1x stigmal vein length; stigma distinctly petiolate; no setal tracks radiating from stigma; forewing rarely with fuscate areas, without transverse fuscate bands. Propodeum variable: with or without carinae, rarely with plicae, but **generally with an anterior triangular fovea or rounded pit if carinae are reduced or absent**; callus with 2 to many setae. Petiole variable, often conspicuously longer than broad. Body color metallic, at least partially. Compare with: **Achrysocharoides**, **Grahamia**, **Closterocerus**, **Holcopelte**, **Chrysonotomyia**, **Omphale**, **Proacrias**, **Pediobius**.



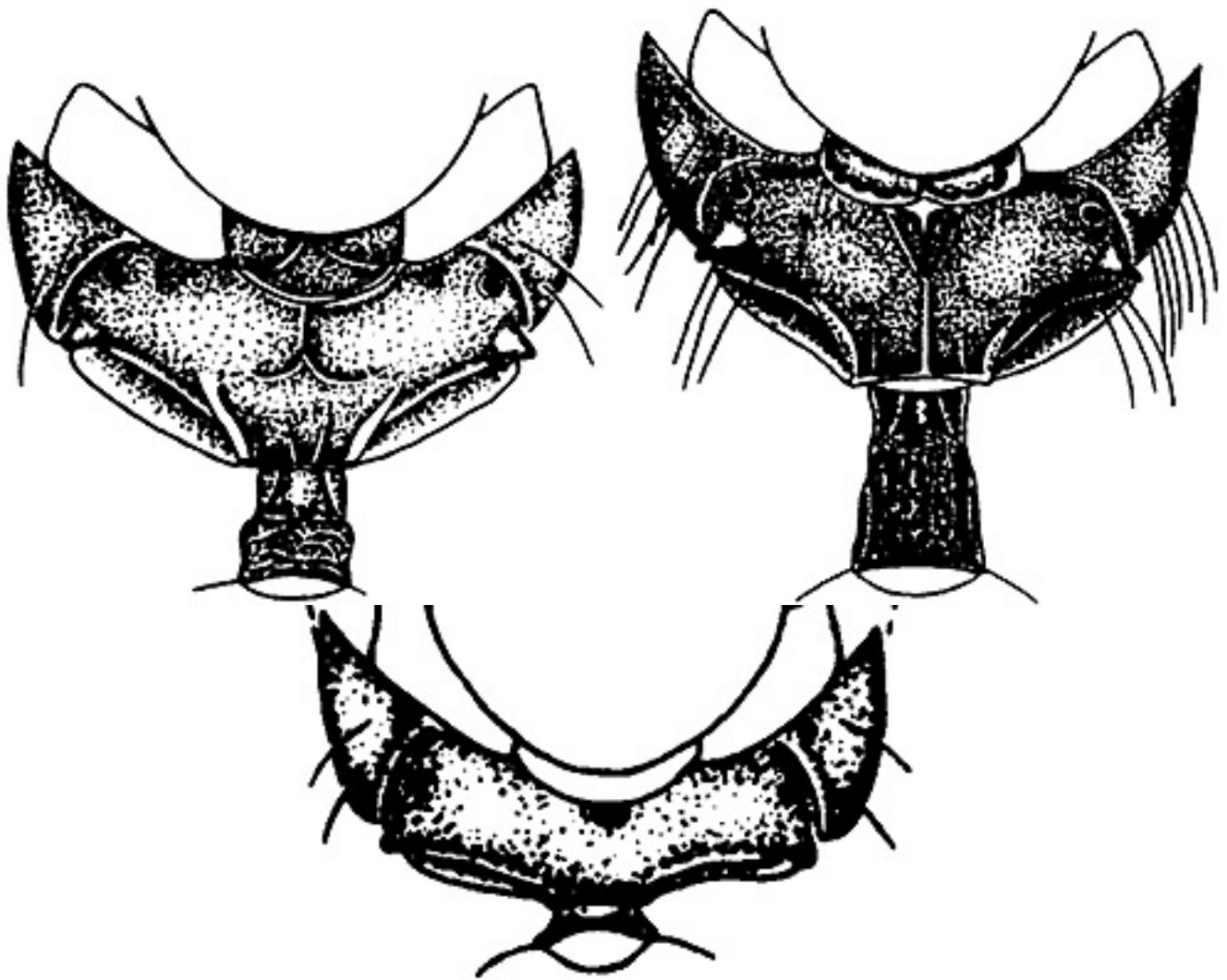
1a-c: *Chrysocharis* faces: *C. crassiscapus* (Thomson) (left), *C. clarkae* Yoshimoto (center), and *C. tristis* Hansson (right)



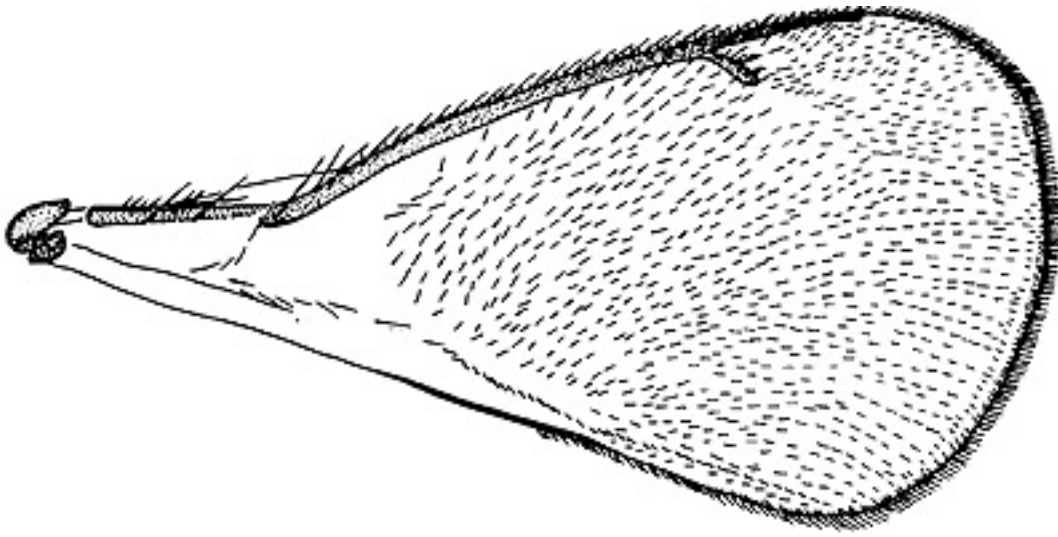
2a-b: *Chrysocharis viridis* (Nees) female antenna (left), and male antenna (right)



3a-c: *Chrysocharis* propodea with petioles: *C. acoris* (Walker) (top left), *C. walleyi* Yoshimoto (top right), and *C. albipes* (Ashmead) (bottom) [s.r. = "sloping roof" of nucha]



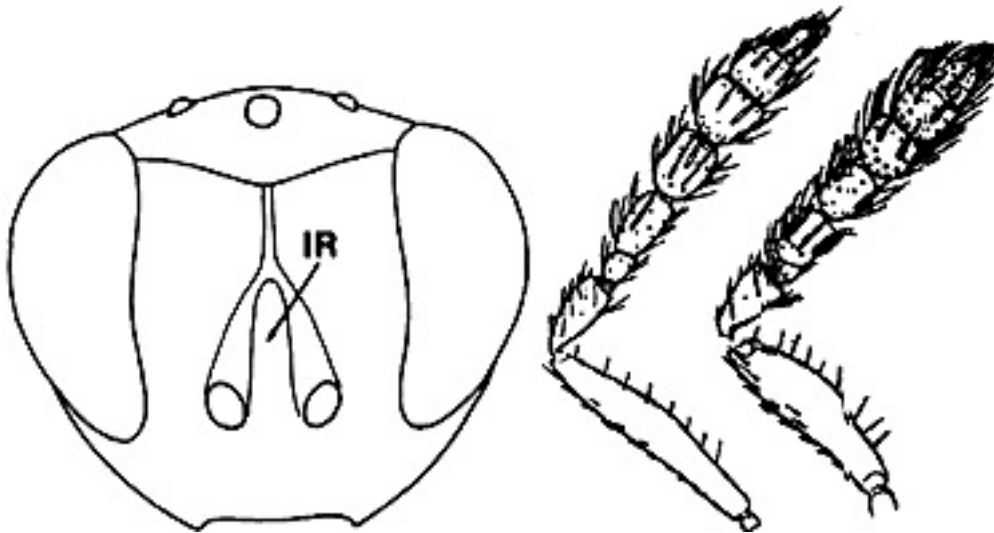
4a-c: *Chrysocharis* propodea with petioles: *C. crassiscapus* (top left), *C. entedonoides* (Walker) top right), and *C. occidentalis* (Girault) bottom)



5a: *Chrysocharis* forewing

***Chrysocharis chlorus* Graham and *C. imbrusus* (Walker) [prev](#)**

Two very similar species, possible synonyms, intermediate with *Neochrysocharis*. Mandibular formula 3:3. **Flagellar formula 3,2,3** in both sexes. Postmarginal vein 1.5x stigmal vein length. Propodeum with vague median carina formed by rugae. Petiole subquadrate to slightly longer than broad. Separable from *Neochrysocharis* mainly in that the interscrobal ridge is very short in females (typical in *Chrysocharis*) and does not reach or come near reaching transverse frontal groove.



6a-b: *Chrysocharis chlorus* Graham face (left) [IR = interscrobal ridge], female antenna (center), and male antenna (right)

**Biology:** Mostly primary parasitoids of leaf-mining Lepidoptera and Diptera, rarely of Cecidomyiids or secondary parasitoids of Hymenoptera in leaf-miners.

**Comments:** Very large genus. The major genus in a group including *Achrysocharoides* and *Neochrysocharis*, and perhaps some other genera such as *Grahamia*, *Chrysonotomyia*, and *Derostenus*. Various species of this genus approach or overlap those of most others listed,

such that monophyly of *Chrysocharis* is dubious. I am not aware of any unique apomorphies of *Chrysocharis*. Simply providing an exclusive definition of the genus is extremely difficult. The subgenus *Zaommomyia* Ashmead is distinct from the nominal subgenus, and as it may belong in another clade of the subfamily; it is discussed separately except in comparison with the nominal subgenus. Some species have a very weak posterior longitudinal groove on the mesoscutum sometimes accompanied by a weak anterior scutellar groove, which may indicate a phylogenetic link with certain genera of Entedoninae that have more distinct median thoracic grooves.

### Comparative information:

***Chrysocharis* ([\*Zaommomyia\*](#)):** Scrobal grooves reaching transverse groove separately, extending below toruli as distinct grooves, close-together throughout their length; triangular area present on upper frons immediately above transverse ridge, below median ocellus, different color and/or sculpture from rest of frons, sometimes sharply angled and set off by an arched dorsal ridge. **Males with a basal whorl of erect setae on each funicular segment.** Each of these characters can be difficult to assess, especially in females with a collapsed head or males missing antennae, but in every case I have been able to confirm placement of specimens of known identity using at least one of the characters given above. *Chrysocharis* s.s. lack all of the above characters, but the interscrobal ridge/upper scrobal depression state is variable in regard to facial collapse, and should not be the only criteria for identification of *Zaommomyia* specimens when the face is collapsed or otherwise difficult to assess. The color of the area above the transverse frontal groove is usually difficult to assess without strong doubt. My preferred characters for identification of this group are the extension of the scrobal depressions below the toruli as distinct grooves, and the characteristic whorls of setae on the male flagellum.

**[\*Achrysocharoides\*](#):** Distinguished only through using a combination of characters: **Eyes densely setose. Transverse frontal groove always straight**, not v-shaped (but may be bent medially if face is collapsed). Scrobal grooves sometimes ending far apart at transverse groove. Apical anellus usually much broader than long, rarely subquadrate. **Mesoscutum and especially scutellum often with distinct groups of pits or longitudinal foveae.** Postmarginal vein usually about 1x stigmal vein length, rarely up to 1.4x stigmal vein length (in which case the scutellum has groups of pits). Petiole at most 1.4x longer than broad, weakly sculpted. This genus can be the most difficult to distinguish from *Chrysocharis*. When the scutellar pits are not apparent, it is best identified using a combination of the other characters, especially the transverse frontal groove, densely setose eyes, and short postmarginal vein. As always, frontal groove characters are difficult to accurately assess when the face is collapsed. Certain *Chrysocharis* have one or more of each of the characters used to define *Achrysocharoides*, except for the scutellar pits, but can be disqualified from being *Achrysocharoides* by having an elongate postmarginal vein or petiole. The best means of identification is through attempting to exclude *Achrysocharoides* or identifying the specimen to

species or species-group.

**Grahamia**: Transverse frontal groove nearly straight (but may be bent medially if face is collapsed). **Flagellar formula strictly 1,4,1**; scape relatively long and narrow: about 5x longer than broad, strongly flattened laterally. Postmarginal vein about 2x stigmal vein length. Propodeum without median carina, with transverse anterior fovea; callus with 2 setae. Sometimes difficult to distinguish, best done using flagellar formula and the tiny anellus, attempting to exclude *Grahamia*.

**Closterocerus**: **Scrobal grooves reaching transverse groove separately, extending slightly below toruli ventrally**. Mesoscutal midlobe sometimes with 1 pair of setae. Forewing sometimes with concentric transverse fuscate bands.

**Chrysonotomyia**: **Clypeus set off by distinct sutures. Transverse frontal groove straight, not v-shaped (but may be bent medially if face is collapsed); scrobal depressions reaching transverse groove separately**, very close together throughout their length. **Mesoscutal midlobe with 1 pair of setae** (the posterior pair). Postmarginal vein shorter than stigmal vein; **2 setal tracks radiating from stigma**; radial cell bare. Petiole tiny and unsculpted. Only superficially resembling *Chrysocharis*.

**Holcopelte**: **Face, frons, and vertex completely smooth and shiny. Clypeus set off by distinct sutures**. Scrobal depressions meeting at transverse groove or reaching groove separately; **interscrobal process sharply raised above surrounding area, encircled by complete sulcus. Median furrow extending from posterior part of mesoscutum to anterior part of scutellum** (rarely faint: *H. huggerti* Hansson). Antenna with distinctly elongate peg sensilla (type 3), that are visible under 50x magnification. Confusable with a few species of *Chrysocharis* that have a similar furrow across the mesoscutal-scutellar border, in which case the facial features of *Holcopelte* distinguish them easily.

**Omphale**: **Clypeus usually set off by distinct sutures** (dorsal suture rarely missing), **often much broader than long or protruding from face**. Face in most species with a strong transverse ridge between toruli and clypeus (may be apparently present in some small *Chrysocharis* if the face is collapsed). Scrobal grooves almost always reaching transverse groove separately, rarely meeting at or before groove. Mandibles exodont in a few species. Apical anellus not enlarged in females; **heads of flagellar peg sensilla always slanting, asymmetrical** (type 2 or 3), **sometimes large and elongate**. Propodeum usually very short, smooth, without median carina or anterior fovea; callus with 2 setae; petiolar foramen often large, rendering propodeum strongly emarginate posteriorly (a character not to be dismissed!). Mesoscutal midlobe with only 1 pair of setae (the posterior pair) in a few species. Petiole always much broader than long and unsculpted. **Male genitalia with enlarged volsellar setae in nearly all species**. Seldom easily confused, except in *Omphale* with an indistinct clypeus,

which are usually easily distinguishable by the scrobal grooves. Nevertheless, slide-mounting is sometimes the best way to identify *Omphale*, using genitalic and flagellar characters, although this is most likely to be needed for distinguishing it from *Perditorulus*, *Neochrysocharis*, and *Closterocerus*, not from *Chrysocharis*.

***Proacrias***: Scrobal grooves reaching transverse groove separately.

***Pediobius***: Propodeum with plicae formed by carinae in nearly all species (greatly elongate if not). **Petiole with dorsal and ventral extensions**. Scrobal grooves reaching transverse groove separately in nearly all species. Stigma very small, not apparing petiolate, postmarginal vein at most 1.5x its length.

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## References

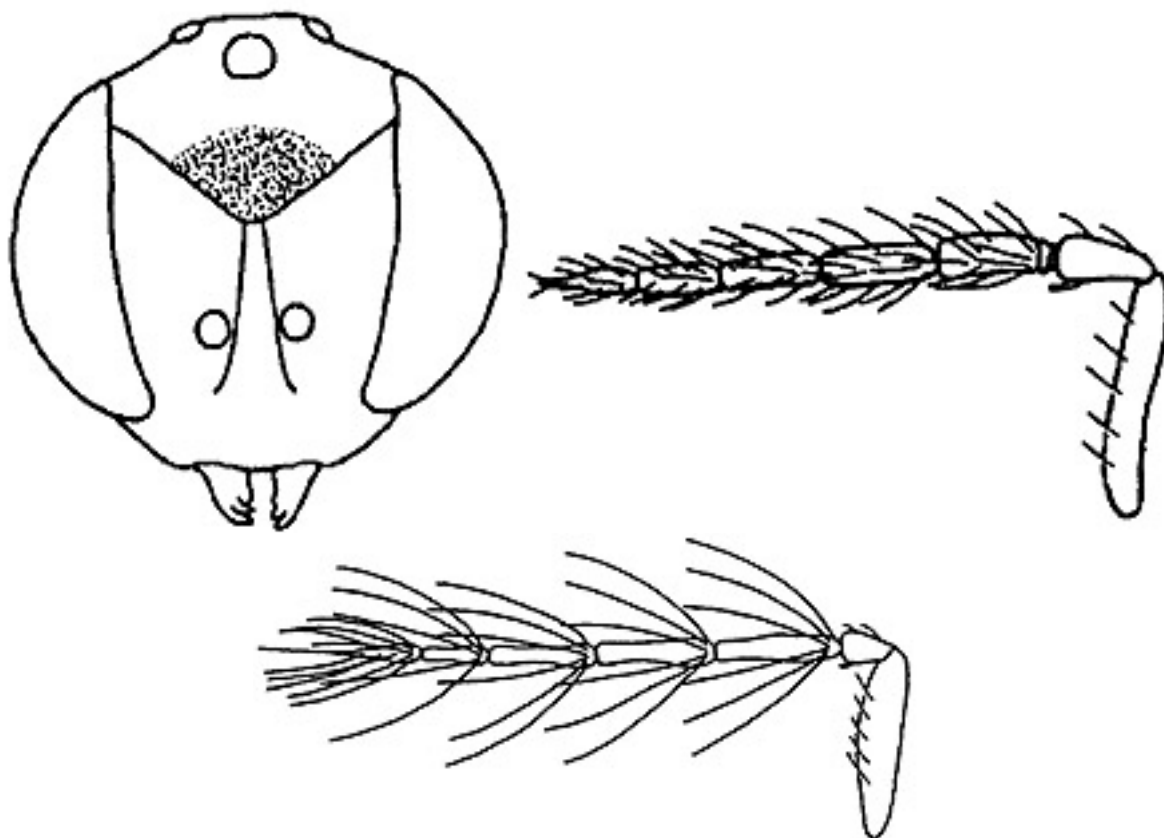
- Graham, M.W.R. de V. 1963. Additions and corrections to the British list of Eulophidae (Hym., Chalcidoidea). *Transactions of the Society for British Entomology*. **15**(9): 167-275.
- Hansson, C. 1985. Taxonomy and biology of the Palearctic species of *Chrysocharis* Förster, 1856 (Hymenoptera: Eulophidae). *Entomologica Scandinavica supplement* **26**.
- Hansson, C. 1987. Revision of the New World *Chrysocharis* Förster (Hymenoptera: Eulophidae). *Entomologica Scandinavica supplement* **31**.
- Hansson, C. 1990. A taxonomic study on the Palearctic species of *Chrysonotomyia* Ashmead and *Neochrysocharis* Kurdjumov (Hymenoptera: Eulophidae). *Entomologica Scandinavica*. **20**: 29-52.
- Hansson, C. 1995. Revised key to the Nearctic species of *Chrysocharis* Förster (Hymenoptera: Eulophidae), including three new species. *Journal of Hymenoptera Research*. **4**: 80-98.
- Hansson, C. 1997. Survey of *Chrysocharis* Förster and *Neochrysocharis* Kurdjumov (Hymenoptera, Eulophidae) from Mexico, including eight new species. *Miscellania Zoologica (Barcelona)*. **20**(1): 81-95.
- Schauff, M.E., J. LaSalle, & L.D. Coote. 1997. Chapter 10. Eulophidae. in "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.
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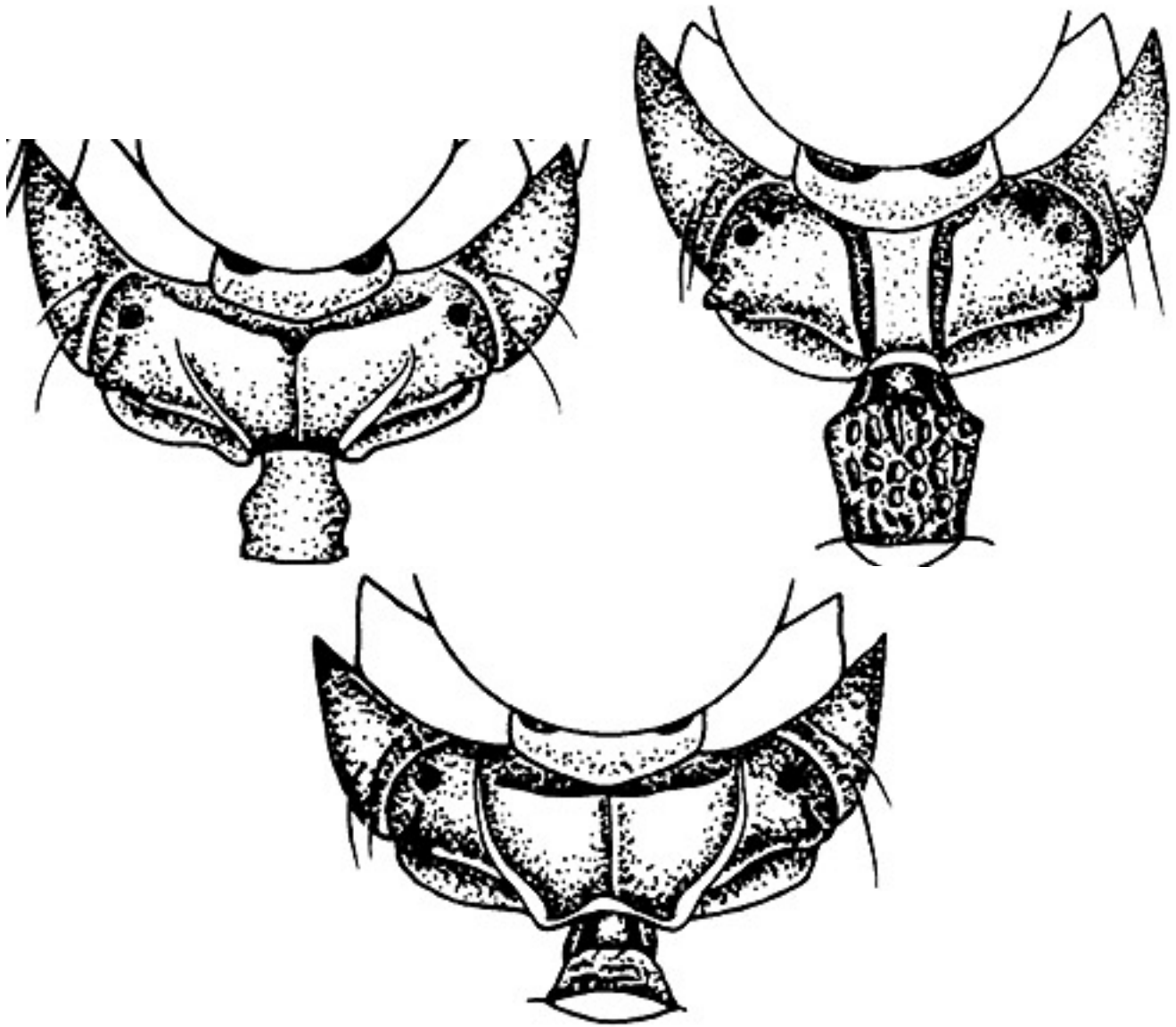
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*Chrysocharis*, subgenus *Zaommomyia* Ashmead, 1904 [comparative info](#) ret. to: [prev](#)  
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Transverse frontal groove strongly v-shaped; scrobal grooves reaching transverse groove separately, **very close-together throughout their length, extending below toruli as distinct grooves**; interscrobal ridge always meeting transverse groove in females; triangular area present immediately above transverse suture different color and/or sculpture from rest of frons, sometimes sharply angled and set off by an arched dorsal ridge. **Males with a basal whorl of erect setae on each funicular segment**; peg sensilla of flagellum symmetrical (type 1) (C. Hansson, personal comm.). Postmarginal vein 1.6-2.3x stigmal vein length. Propodeum variable, at least usually with median carina or submedian carinae, some species with plicae. Compare with: *Proacrias*, *Closterocerus*, *Chrysocharis sensu strictu*, *Ionympha*, *Omphale*.



1a-c: *Chrysocharis* (*Zaommomyia*) *maya* Hansson face (top left), female antenna (top right), and male antenna (bottom)



2a-c: *Chrysocharis* (*Zaommomyia*) propodea with petioles: *C. (Z.) beckeri* Yoshimoto (top left), *C. (Z.) sulcata* (top right), and *C. (Z.) vonones* (Walker) (bottom)

## Biology:

**Comments:** Schauff (1991) synonymized this group with *Chrysocharis*, based in part on the assumption that *Omphale varia* (Hansson) and *O. gracilicornis* (Hansson) were true *Chrysocharis* as Hansson (1987) had indicated at the time. Hansson (1997) reinstated *Zaommomyia* as a subgenus based on the characters given above. The final placement of this group awaits further study, including exploration of its relationship to *Closterocerus*, *Ionympha*, and the *Omphale* group. Air-dried specimens are usually strongly collapsed, and difficult to identify. The specially colored and/or sculpted area of the upper frons is difficult to distinguish with any strong certainty, and should not be relied upon too heavily.

## Comparative information:

**Proacrias:** Propodeum with median carina modified: **either** broadened and flattened, **or**

posteriorly split.

**Closterocerus**: Postmarginal vein in nearly all species <1.5x stigmal vein length. Other differences by subgenus or species group: subgenus *Closterocerus* with pedicel carinate dorsally and ventrally, subgenus *Achrysocharis* with straight transverse frontal suture, former *Neochrysocharis* either with some transverse flagellomeres and without distinct triangular area above the transverse frontal suture, former *Asecodes* either with a short stigmal vein, with 2 setal tracks extending from stigmal apex, or with broadly flattened flagellum.

**Chrysocharis sensu strictu**: Interscrobal ridge not meeting transverse groove in females (and nearly all males). **Scrobal grooves not extending ventrally below toruli**. Male flagellum without whorls of erect setae. The differences between females of these groups are subtle, especially if the head is collapsed, but in all cases I have been able to successfully use these characters in distinguishing specimens of known identity in these two subgenera.

**Ionympha**: Mandibles very long and narrow, with several tiny dorsal teeth and 2 large apical ones. Occiput with median furrow. Gena with strong incision for base of mandible to fit into when open. Scape with sensory pores present only at apex in males.

**Omphale**: Clypeus usually set off by distinct sutures (dorsal suture rarely missing), often different color from frons, usually transverse ridge also present separating lower face from center of face. Heads of flagellar peg sensilla always slanting, asymmetrical, sometimes strongly asymmetrical. Petiole always broader than long. Propodeum without median carina, submedian carinae, or channels.

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## References

- Hansson, C. 1986. A revision of the Nearctic species of the genus *Zaommomyia* Ashmead (Hymenoptera, Eulophidae). *Proceedings of the Entomological Society of Washington*. **88**(2): 244-252.
- Hansson, C. 1987. Revision of the New World *Chrysocharis* Förster (Hymenoptera: Eulophidae). *Entomologica Scandinavica supplement* **31**.
- Hansson, C. 1996. Taxonomic revision of the Nearctic species of *Omphale* Haliday (Hymenoptera: Eulophidae). *Entomologica Scandinavica supplement* **49**.
- Hansson, C. 1997. Survey of *Chrysocharis* Förster and *Neochrysocharis* Kurdjumov (Hymenoptera, Eulophidae) from Mexico, including eight new species. *Miscellanea Zoologica*

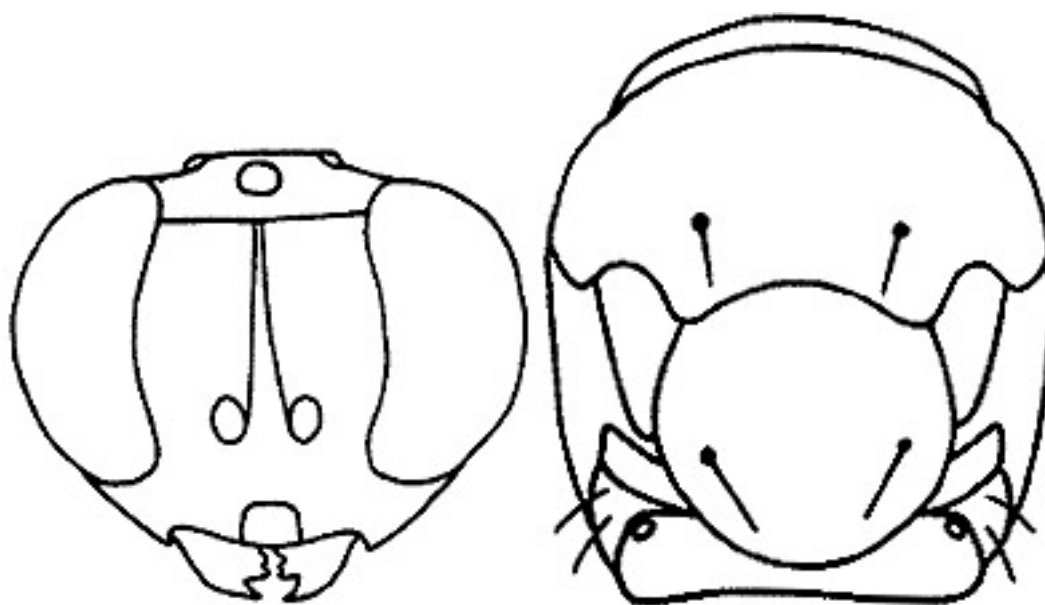
(*Barcelona*). **20**(1): 81-95.

Schauff, M.E. 1991. The Holarctic genera of Entedoninae (Hymenoptera: Eulophidae). *Contributions of the American Entomological Institute* **26**.

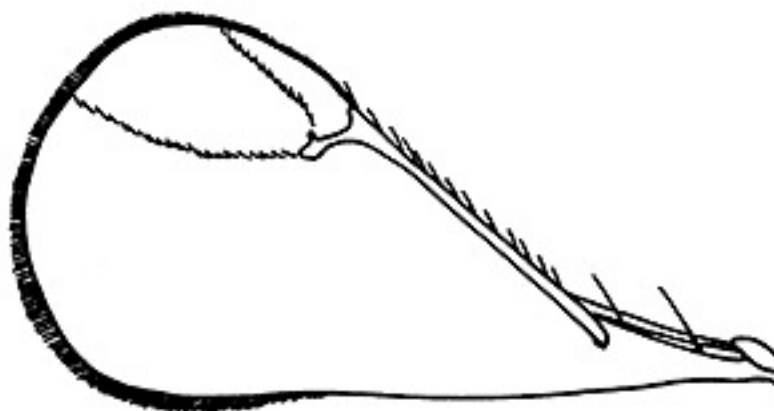
Image credits: 1a-c: Hansson (1997). 2a-c: Hansson (1986).

***Chrysonotomyia* Ashmead, 1904** [comparative info](#) return to: [prev](#) [home](#)

Mandibular formula 3:3. **Clypeus set off by distinct sutures**, but small, not much broader than long. **Transverse frontal groove straight**, not v-shaped; scrobal grooves very close together throughout their length, reaching transverse groove separately, extending ventrally below toruli; interscrobal ridge reaching transverse groove. Flagellum with L-shaped (type 2) peg sensilla; all postanellar flagellomeres narrow and longer than broad. **Mesoscutal midlobe with 1 pair of setae** (the posterior pair). Postmarginal vein subequal or shorter than stigmal vein; **2 setal tracks radiating from stigma**; radial cell bare; forewing with vague fuscate spot near stigma, without transverse fuscate bands. Propodeum smooth, without median carina. Petiole small and unsculpted. Compare with: ***Ametallon*, *Omphale*, *Closterocerus*, *Achrysocharoides***.



1a-b: *Chrysonotomyia* face (left), and mesosoma (right)



2a: *Chrysonotomyia* forewing [most discal setae not shown]

**Biology:** Parasitoids of Cecidomyiids.

**Comments:** 23 described species. A controversial genus formerly encompassing most Nearctic species now placed in *Closterocerus*. Placement of many of these species, particularly to the subgenus *Closterocerus* (*Achrysocharis*), was based upon the number of setal tracks radiating from the stigmal apex (Hansson 1994a, 1994b), and reassessment based on a stronger suite of characters may result in further rearrangement. So far, no better generic definition hypotheses have appeared, and the controversy is likely to be settled only when an appropriate combined molecular-morphological study of the species groups involved is done.

### **Comparative information:**

**Ametallon:** Head, body, and legs pale yellow to whitish. **Gt1 in females with lateral indented, distinctly sculpted areas.** Upper frons (above transverse frontal groove) smooth and shiny. Very similar to *Chrysonotomyia*, likely rendering it paraphyletic. Although the characters for separating them may appear to be unsatisfactory, they are all that I can offer.

**Omphale:** Transverse frontal groove weakly to strongly v-shaped. Clypeus much broader than long or protruding from face in many species. Face in most species with a transverse ridge between the toruli and clypeus. Mesoscutal midlobe with 2 pairs of setae in most species.

**Closterocerus:** Forewing with at most 1 setal track radiating from stigmal apex. Transverse frontal groove v-shaped in the subgenus *Closterocerus*. Mesoscutal midlobe with 2 or more pairs of setae in most species. Most species of the subgenus *Achrysocharis* are distinguished only by the number of setal tracks radiating from the stigma.

**Achrysocharoides:** **Eyes densely setose. Mesoscutal midlobe with 2 pairs of setae.** Clypeus not set off by sutures. Transverse frontal groove often very far below the median ocellus (not often near it as in *Chrysonotomyia*). Forewing without setal tracks radiating from stigma. Toruli often very broadly separated, scrobal depressions meeting before reaching transverse groove or ending far apart at transverse groove. Flagellar formula usually 3,3,2, sometimes 3,4,1 in males. **Mesoscutum and especially scutellum often with distinct groups of pits or longitudinal foveae.**

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### **References**

Gumovsky, A.V. 2001. The status of some genera allied to *Chrysonotomyia* and *Closterocerus* (Hymenoptera: Eulophidae, Entedoninae), with description of a new species from Dominican Amber. *Phegea* 29(4): 125-141.

Hansson, C. 1990. A taxonomic study on the Palearctic species of *Chrysonotomyia* Ashmead

and *Neochrysocharis* Kurdjumov (Hymenoptera: Eulophidae). *Entomologica Scandinavica*. **20**: 29-52.

Hansson, C. 1994a. Re-evaluation of the genus *Closterocerus* Westwood (Hymenoptera: Eulophidae), with a revision of the Nearctic species. *Entomologica Scandinavica*. **25**: 1-25.

Hansson, C. 1994b. The classification of *Chrysonotomyia* Ashmead and *Teleopterus* Silvestri (Hymenoptera: Eulophidae), with a review of species in the Nearctic region. *Proceedings of the Entomological Society of Washington*. **96**: 665-673.

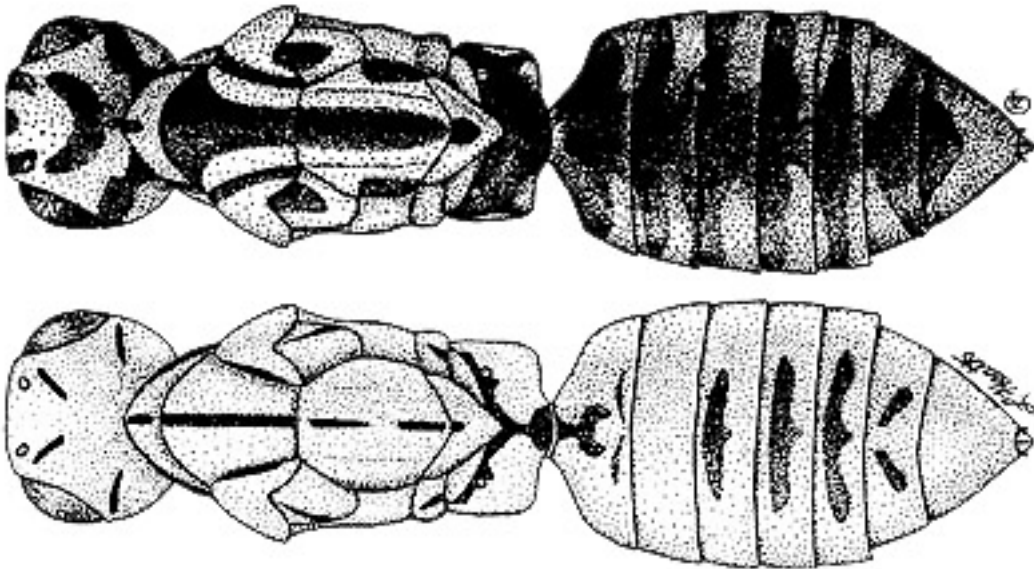
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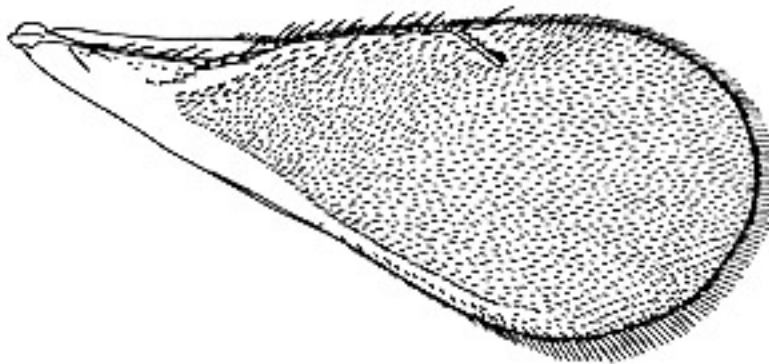
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***Cirrospilus* Westwood, 1832** [comparative info](#) return to: [prev](#) [home](#)

Face with transverse groove at mid-height (can be difficult to discern). Vertex usually not distinctly arched above upper eye margin (exceptions include *C. coachellae* Gates). 2 funicular segments, 3 claval segments. Notauli complete and straight or weakly curved, **reaching scutellar margin** or ending in axillae very near scutellar margin; sidelobes with narrow scapular flange reaching or nearly reaching scutellar margin; half or less of dorsal surface of axillae anterior of scutellar margin; scutellum flat, with parallel submedian grooves that may be difficult to discern. **Postmarginal vein equal to or shorter than stigmal vein length**; stigma round, with uncus about its own length from stigmal apex; forewing usually without fuscate markings (many exceptions). Compare with: ***Aulogymnus*, *Diaulinopsis*, *Zagrammosoma*, *Diglyphus*.**



1a: *Cirrospilus vittatus* Walker color variants (dark markings represent dark or metallic green color)



2a: *Cirrospilus vittatus* forewing

**Biology:** Primary or secondary parasitoids leaf-miners, leaf-rollers, and gall-makers.

**Comments:** Very large genus.

## **Comparative information:**

**Aulogymnus**: Uncus separated by more than its own length from stigmal apex (typically much more), or rarely absent (check both wings, because the character may vary in an individual or series). Stigma distinctly elongate. Scutellar grooves, when distinguishable, very close together. Flagellum often with 3 or more funicular segments. Body generally arched and stout (flattened in most *Cirrospilus*). Some species are problematic because of a general similarity to *Aulogymnus* and a medium-length stigma, and it is not clear at this time where these species should be placed without host information.

**Diaulinopsis**: Postmarginal vein 2x stigmal vein length or more. Males with greatly expanded scape. Color of dorsum uniform metallic or dark except near wing base, while *Cirrospilus* are usually extensively yellow.

**Zagrammosoma**: Notauli incomplete or ending in anterior half of axillae, the dorsal surface of which are advanced almost entirely anterior of scutellar margin. The notauli are very short and curve sharply towards the axilla, where in *Cirrospilus* they are nearly straight, ending in the scutellar margin or nearly so. Also, the scapular flange of each mesoscutal sidelobe in *Cirrospilus* extends as a narrow projection to the scutellar border or near it, while in *Zagrammosoma* the scapular flange is a very tiny extension ending near the axillar apex. Vertex always extending high above upper eye margin (occurs in a few *Cirrospilus* as well). Forewing always with fuscate markings.

**Diglyphus**: Notauli incomplete or ending in anterior half of axillae, color usually almost entirely metallic or dark.

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## **References**

Askew, R.R. 1968. Hymenoptera 2. Chalcidoidea section (b). *Handbooks for the Identification of British Insects*. 8(2)b.

Boucek, Z. 1959. A study of central European Eulophidae, II: *Diaulinopsis* and *Cirrospilus* (Hymenoptera). *Acta Entomologica Musei Nationalis Pragae*. 33: 171-194.

Gates, M.W. 2000. A new species of *Cirrospilus* Westwood (Hymenoptera: Eulophidae) from the southwestern United States and Mexico. *Proceedings of the Entomological Society of Washington*. 102(1): 58-61.

Gordh, G. 1978. Taxonomic notes on *Zagrammosoma*, a key to the Nearctic species and descriptions of new species from California (Hymenoptera: Eulophidae). *Proceedings of the Entomological Society of Washington*. **80**: 344-359.

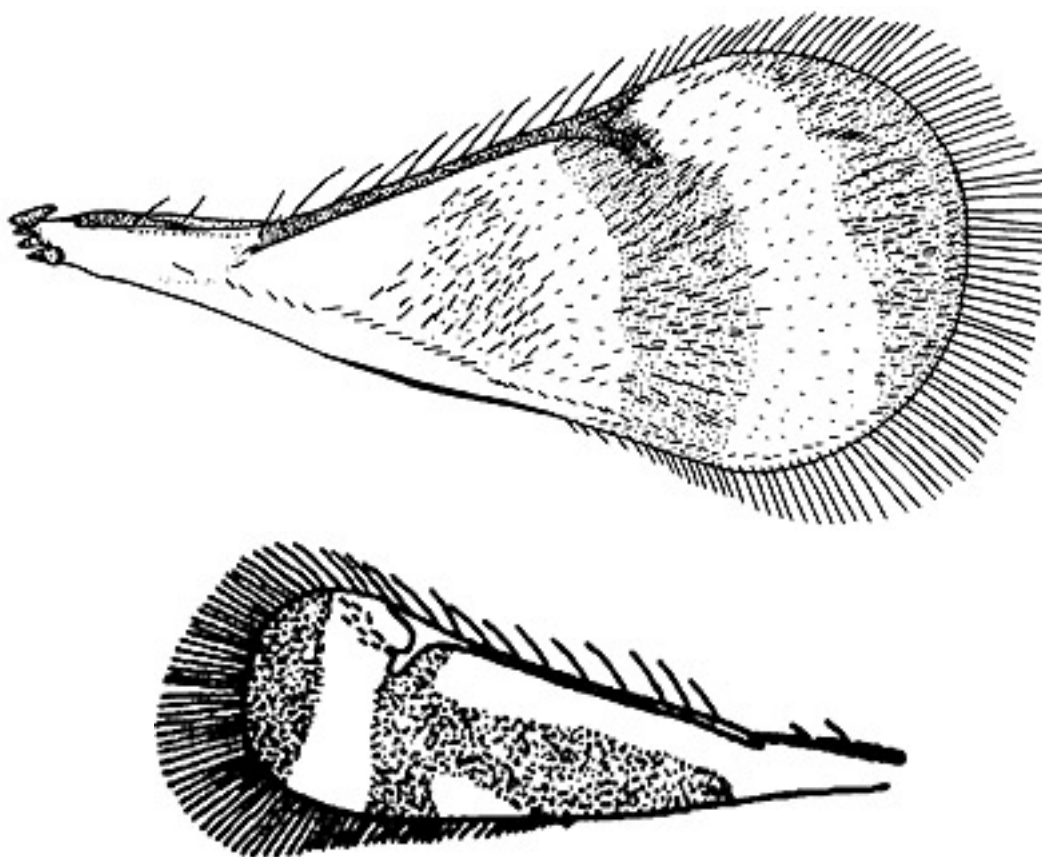
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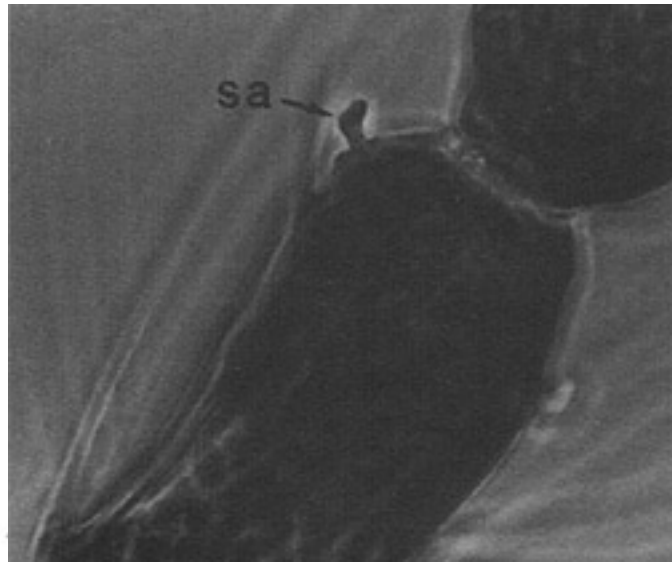
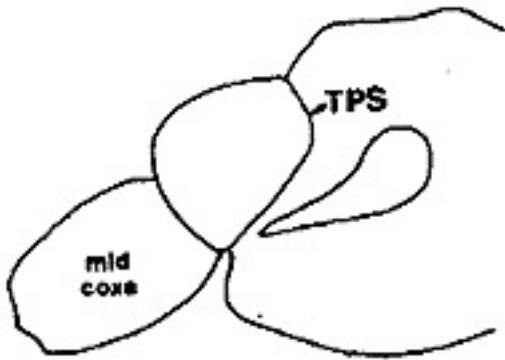
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***Closterocerus* Westwood, 1833** [comparative info](#) return to: [prev\(ent20\)](#) [prev\(ent27\)](#)  
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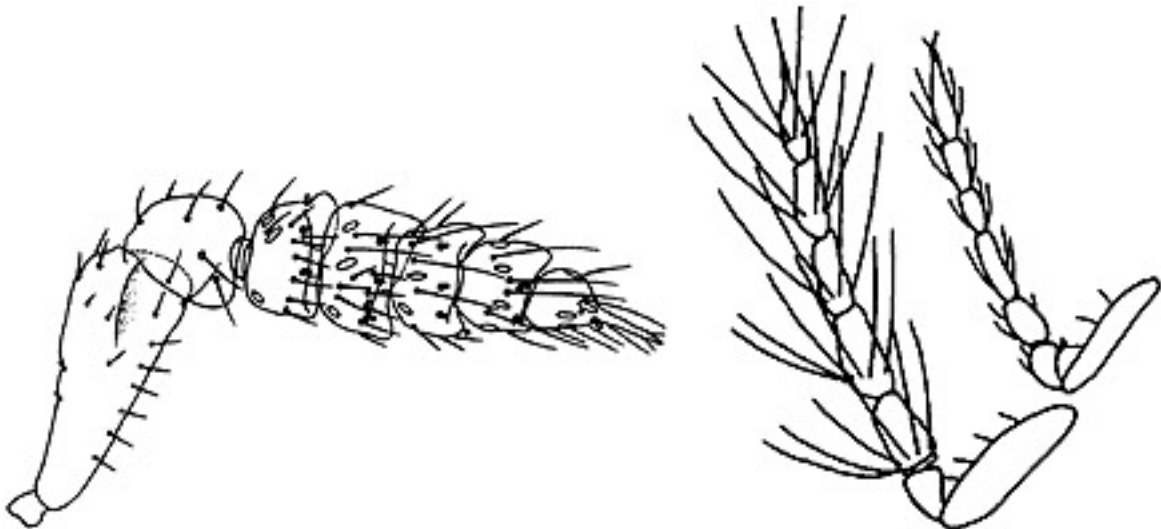
Mandibular formula 3:3. Clypeus sometimes faintly defined by sutures, but always only slightly broader than long and not protruding from face, apex not convex. Transverse frontal groove straight or v-shaped (usually straight and very near the median ocellus in subgenus *Achrysocharis* Girault); scrobal grooves almost always meeting at transverse frontal groove or reaching groove separately, extending slightly below toruli ventrally; interscrobal process meeting transverse groove. Occiput sometimes with longitudinal groove (especially apparent in air-dried specimens). Flagellum 6-segmented, anellus very small, often appearing to be absent; flagellum with L-shaped (type 2) or mushroom-shaped (type 1) peg sensilla. Mesoscutal midlobe with 1-4 pairs of setae; anterior portion of notauli curving sharply laterad. Forewing shape variable; postmarginal vein subequal or shorter than stigmal vein, at most 1x stigmal vein length; 1 or no setal tracks extending from stigma (curving antero-apically from uncus when present); forewing sometimes with concentric transverse fuscate bands. Compare with: ***Omphale*, *Proacrias*, *Chrysonotomyia*, *Achrysocharoides*, *Ceranisus*, *Thripobius*, *Chrysocharis*.**



1a-b: *Closterocerus* forewing (top), and *C. tau* Girault forewing (bottom)



2a-b: *Closterocerus* mesopleuron (left, TPS=transepimeral sulcus), and *Omphale* flagellomere, with asymmetrical peg sensilla [sa] as in *Closterocerus* (right)



3a-b: *Closterocerus* female antenna (left), and *C. texanus* Hansson male (center) and female (right) antennae



4a-b: *Closterocerus sensu strictu* face (left), and subgenus *Achrysocharis* face (right)

**Biology:** Host range very broad, if reliable: Primary parasitoids of leaf-miners and gall-formers, also reported from Symphyta eggs [Argidae, Diprionidae], armored scales, and psyllids.

**Comments:** Controversial in placement and scope. Gumovsky (2001) has recently expanded the limits of the genus to include a number of formerly recognized genera. In total, this genus contains several synonyms that are nevertheless usually or always identifiable morphologically, including *Neochrysocharis*, *Asecodes*, and *Achrysocharis*. Slide-mounting may be desirable for a 100% accurate identification. This genus is probably closely related to the *Ceranisuus*-group, and shares with that group, *Ionympha*, and *Chrysocharis* (*Zaommomyia*) the subtorular grooves. Unfortunately, the subtorular grooves are frequently difficult to properly assess, and may appear to be present when they should be interpreted as absent, or indeed the difference between true and false subtorular grooves may be entirely illusory. Under the current system, *Closterocerus* is likely paraphyletic because there is no apomorphy possessed by *Closterocerus* that is not possessed by the *Ceranisuus* group, *Ionympha*, and *Chrysocharis* (*Zaommomyia*). It overlaps *Chrysocharis* (*Zaommomyia*) such that some Neotropical species cannot be placed to genus. Another closely related group is the *Omphale*-group, some species of which are nearly identical with *Closterocerus* species aside from the presence of enlarged volsellar setae and sometimes differences in the clypeus. *Callifrons* seems to be intermediate between these two groups. Finally, the subgenus *Achrysocharis* is very similar to the genus *Chrysonotomyia*, separated only by the number of setal tracks radiating from the stigmal apex. Reports that *Achrysocharis* species do not have a delimited clypeus are generally erroneous: the clypeus may or may not appear delimited based on the size and condition of the specimen.

**Comparative information:**

***Omphale***: Subtorular grooves absent in many species. **Clypeus usually set off by distinct sutures** (dorsal suture rarely missing), much broader than long in many species, or with semicircular dorsal margin or protruding ventral margin. Mandibles exodont in a few species. **Male genitalia usually with enlarged volsellar setae.**

***Proacrias***: Propodeum with a modified median carina: **either** broadened and dorsally flattened, **or** posteriorly split.

***Chrysonotomyia***: **2 setal tracks radiating from stigma. Clypeus set off by distinct sutures.** Mainly confusable with the subgenus *Achrysocharis*, which have 1 pair of mesoscutal setae, distinguished by having only 1 setal track radiating from the stigma. Further study may reveal intermediates requiring reassessment of the limits of these two groups.

***Achrysocharoides***: **Subtorular grooves absent. Transverse frontal groove always straight**, not v-shaped, and usually distant from median ocellus (close to median ocellus in *Closterocerus* with 1 pair of scutellar setae). **Mesoscutum and especially scutellum often with distinct groups of pits or longitudinal foveae**; mesoscutal midlobe with 2 pairs of setae. Usually easily distinguished.

***Ceranisus*, *Thripobius***: Head with a complete sulcus across vertex; frontal grooves reaching above ocellus in *Thripobius*. Entire body very weakly sculpted or smooth, almost always brownish with a light-beige or yellowish antenna (*Closterocerus* nearly always dark, metallic, or yellowish). Parasitoids only of larval thrips.

***Chrysocharis***: Subtorular grooves absent. Scrobal depressions usually meeting before reaching transverse groove, but rarely meeting at groove or reaching groove before meeting, especially in males; **interscrobal ridge not meeting transverse groove in females**. Flagellar formula 3,3,2 or 3,4,1, very rarely with 3 claval segments (in *C. chlorus* Graham and *C. imbratus* (Walker)); **apical anellus enlarged in females**, up to 0.33x basal funicular segment length. Postmarginal vein almost always more than 1.5x stigmal vein length, rarely as little as 1x stigmal vein length.

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## References

Gumovsky, A.V. 2001. The status of some genera allied to *Chrysonotomyia* and *Closterocerus* (Hymenoptera: Eulophidae, Entedoninae), with description of a new species from Dominican Amber. *Phegea* 29(4): 125-141.

Hansson, C. 1990. A taxonomic study on the Palearctic species of *Chrysonotomyia* Ashmead

and *Neochrysocharis* Kurdjumov (Hymenoptera: Eulophidae). *Entomologica Scandinavica*. **21**: 29-52.

Hansson, C. 1994. Re-evaluation of the genus *Closterocerus* Westwood (Hymenoptera: Eulophidae), with a revision of the Nearctic species. *Entomologica Scandinavica*. **25**: 1-25.

Hansson, C. 1996. Taxonomic revision of the Nearctic species of *Omphale* Haliday (Hymenoptera: Eulophidae). *Entomologica Scandinavica supplement* **49**.

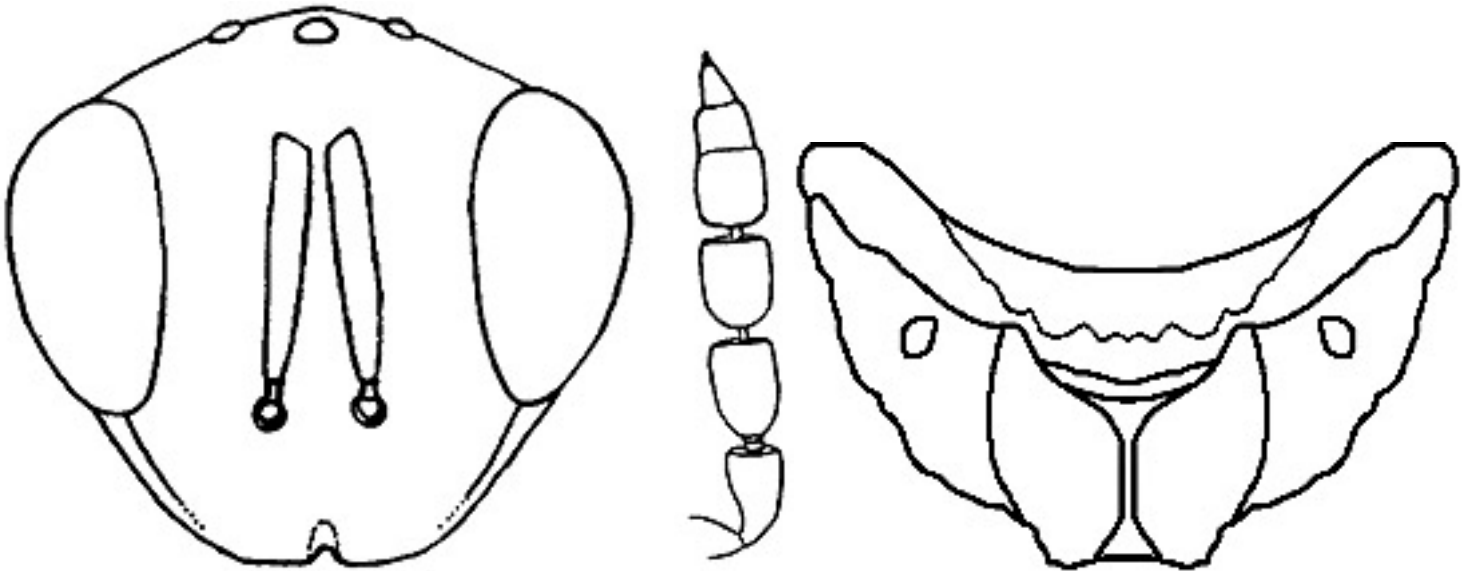
Schauff, M.E. 1991. The Holarctic genera of Entedoninae (Hymenoptera: Eulophidae). *Contributions of the American Entomological Institute* **26**.

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***Colpoclypeus* Lucchese, 1941** [comparative info](#) return to: [prev\(cir 4\)](#) [prev\(eul 19\)](#) [home](#)

**Clypeal margin sharply incised. Female with only 2 funicular segments, males with 3; flagellar segments unbranched in males.** Notauli usually incomplete, but sometimes complete and ending in anterior half of axillae (seen in extralimital forms--Egyptian specimens), far anterior of scutellar margin; scutellum without submedian grooves; metanotum large, strongly sculpted, **dorsellum crenulate/multidentate**. Propodeum with strong median carina and plicae. Compare with: *Necremnus*, *Eulophus*.



1a-c: *Colpoclypeus* face (left), female antenna (center), and propodeum plus metanotum (right)

**Biology:** Parasitoids of leaf-mining Tortricids.

**Comments:** This genus is easily recognized by its sharply notched clypeal margin and the unique dorsellum. It may be closely related to *Eulophus* and *Necremnus*, but no definable apomorphy for such a grouping is known to me, other than reduction characters. It does not have the transverse facial groove of the Cirrospilini.

**Comparative information:** *Colpoclypeus* specimens are normally easily identified if the clypeal margin is visible. Beginners may have some difficulty determining what specimens are **not** *Colpoclypeus* when they are unable to see the clypeal margin of smaller Eulophines such as *Diglyphus*. No comparable genus has a similar dorsellum or propodeum, although certain Eulophines near *Eulophus* and *Dicladocerus* have a reticulate dorsellum. *Colpoclypeus* is also much stouter-bodied than most Cirrospilini, excluding some *Diglyphus* and *Danuviella*.

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## References

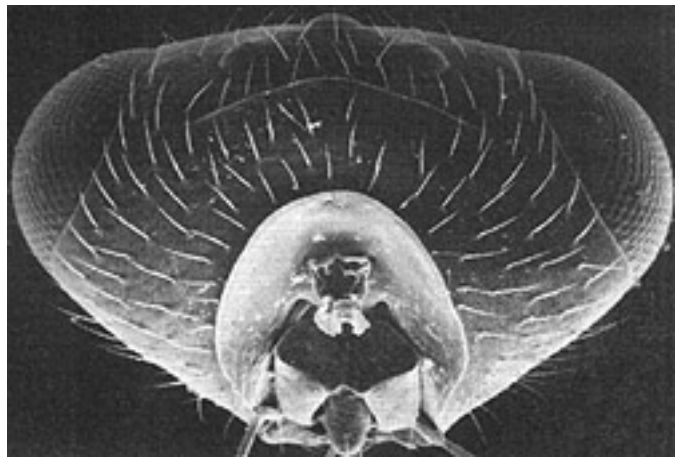
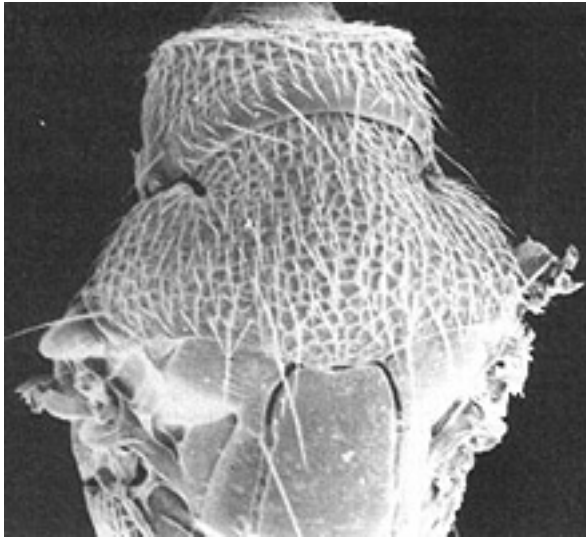
Askew, R.R. 1968. Hymenoptera 2. Chalcidoidea section (b). *Handbooks for the Identification of British Insects*. **8**(2)b.

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**Cristelacher** Schauff & LaSalle, 1993 [comparative info](#) return to: [prev](#) [home](#)

**2 occipital carinae**, one faintly present near ocelli, the other strongly defined near occipital foramen. Clypeal margin slightly convex. 4 funicular segments, 3 claval segments. **Pronotum subquadrate** and strongly defined, strongly sculpted, sometimes carinate anteriorly; mesoscutum reticulate, densely setose; mesoscutum strongly sculpted and densely setose, notauli faintly complete; scutellum smooth and with sublateral grooves meeting posteriorly. Postmarginal vein longer than stigmal vein. Propodeum with strong median carina, expanded anteriorly into cup-shaped structure. Petiole subequal metacoxal length. Cerci on short stalks. Compare with: ***Elachertus***, Euplectrini.



1a-b: *Cristelacher mesosoma* (left), and back of head (right)

## Biology:

**Comments:** 1 described species: *C. levana* (Walker).

## Comparative information:

***Elachertus*:** Pair of occipital carinae absent. Pronotal collar not carinate and not strongly sculpted. With at most 1 occipital carina.

Euplectrini: Metatibial spur(s) elongate, longer than basal metatarsal segment. Mandibles reduced, not capable of meeting when closed.

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## References

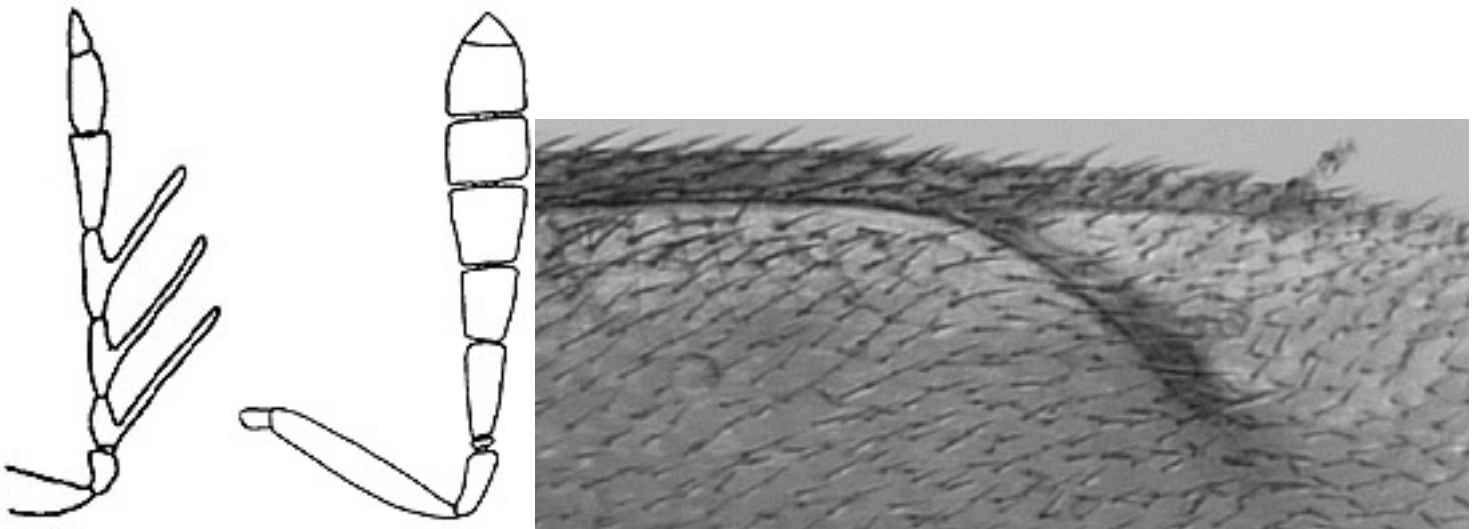
- Schauff, M.E. & J. LaSalle. 1993. Nomenclatural notes on genera of North American Eulophidae (Hymenoptera: Chalcidoidea). *Proceedings of the Entomological Society of Washington*. **95**(3): 488-503.
- Schauff, M.E., J. LaSalle, & L.D. Coote. 1997. Chapter 10. Eulophidae. *in* "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.

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***Dahlbominus* Hincks, 1945** [comparative info](#) return to: [prev](#) [home](#)

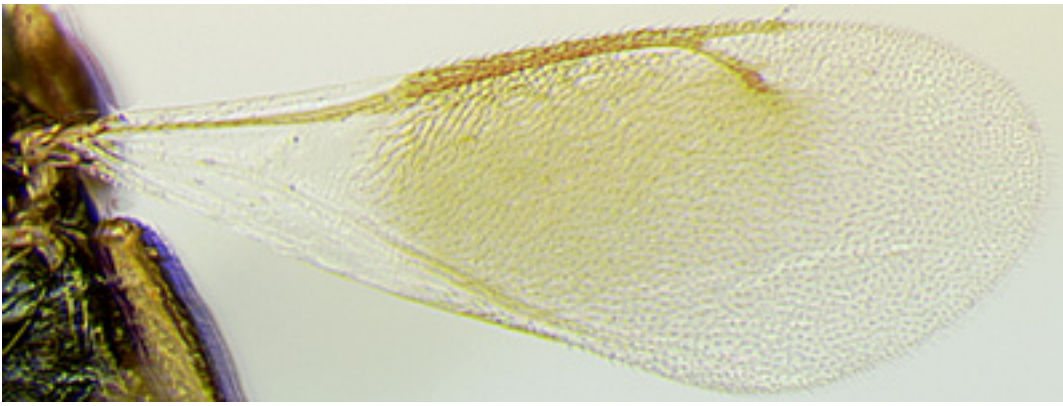
Eyes minutely setose. Mandibles barely meeting medially. Clypeal margin truncate to very weakly bilobed. Flagellar formula 1,4,2 or 1,3,3 in both sexes; flagellum strongly compressed and broadening apically in females; basal 3 funicular segments with branches in males. Notauli incomplete; half of dorsal axillar surface advanced beyond scutellar margin. **Postmarginal vein at most 1.7x stigmal vein length; forewing disc almost always with large, uniform fuscate area** posterior to marginal and postmarginal veins [lost in some specimens]; **uncus usually separated by more than its own length from stigmal apex** [some specimens have a reduced stigma]. Propodeum with complete, though weak, median carina, without plicae. Scape, mesocoxa, and metacoxa usually light tan to white [sometimes light brown, especially in males]. Compare with: ***Sympiesis*, *Necremnus*, *Dicladocerus*.**



1a-c: *Dahlbominus* male antenna (left), female antenna (center), and forewing venation (right)



2a: *Dahlbominus* female, lateral view



3a: *Dahlbominus* forewing



4a: *Dahlbominus* dorsal view of mesosoma

**Biology:** Pupal ectoparasitoids of Diprionids.

**Comments:** *Dahlbominus fuscipennis* (Zetterstedt), the single described species of *Dahlbominus*, is an interesting species phylogenetically, as it may give clues to the relationships of *Necremnus* and *Sympiesis*. It is actually easily recognized using a reference collection, but potentially confusing to workers who have not seen it before, due to the lack of accurate taxonomic literature regarding it. I have seen some southern African specimens that may represent undescribed species of this genus.

**Comparative information:**

**Sympiesis:** Postmarginal vein 2x stigmal vein length or longer. Propodeum often without median carina, sometimes with plicae. Some species are similarly colored to *D. fuscipennis* (white coxae), but the postmarginal vein and propodeum distinguish them easily. Certain other species, especially some known from Florida, are very difficult to distinguish from *D.*

*fuscipennis* because of their short postmarginal vein and similar body form. They differ mainly by the short stigma, coloration, and lack of fuscate cloud on the forewing.

**Necremnus**: Females always with 3 funicular segments. Scape, mesocoxae, and metacoxae not whitish, forewing rarely with a similar fuscate cloud, uncus in some species separated from stigmal apex by less than its own length (unfortunately the best characters, other than association with females, for distinguishing males). *Necremnus californicus* (Girault) is very similar to *D. fuscipennis* in body shape and forewing features, but differs in the other characters listed above.

**Dicladocerus**: Females always with 3 funicular segments. Males with only 2 flagellar branches. Most species with parallel scutellar grooves. Coloration never similar. Body more elongate as a rule. Forewing without large fuscate cloud.

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## References

Askew, R.R. 1968. Hymenoptera 2. Chalcidoidea section (b). *Handbooks for the Identification of British Insects*. 8(2)b.

Boucek, Z. 1959. A study of central European Eulophidae, 1: Eulophinae (Hymenoptera). *Acta Entomologica Musei Nationalis Pragae*. 33: 117-170.

Erdös, J. 1951. Eulophidae novae. *Acta Biologica Academiae Scientiarum Hungaricae*. 2: 169-237.

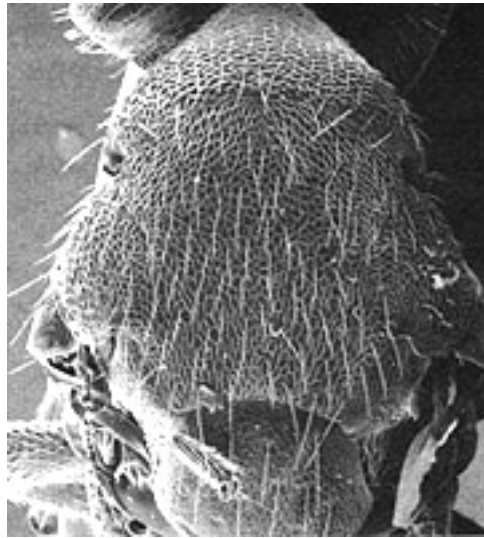
Schauff, M.E., J. LaSalle, & L.D. Coote. 1997. Chapter 10. Eulophidae. in "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.

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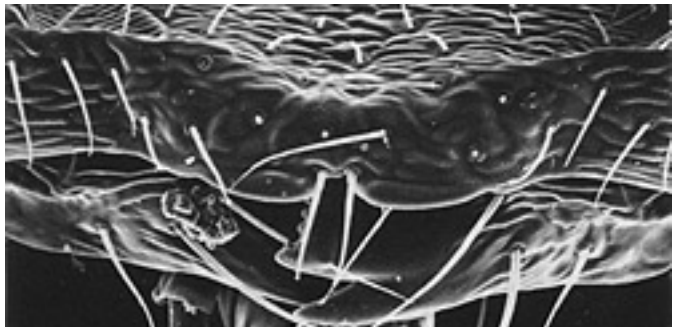
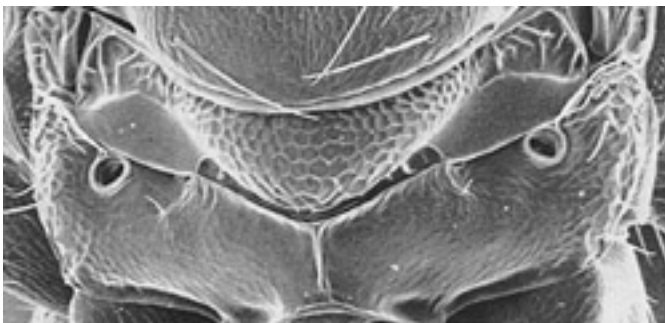
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***Dasyeulophus*** Schauff & LaSalle, 1993 [comparative info](#) return to: [prev](#) [home](#)

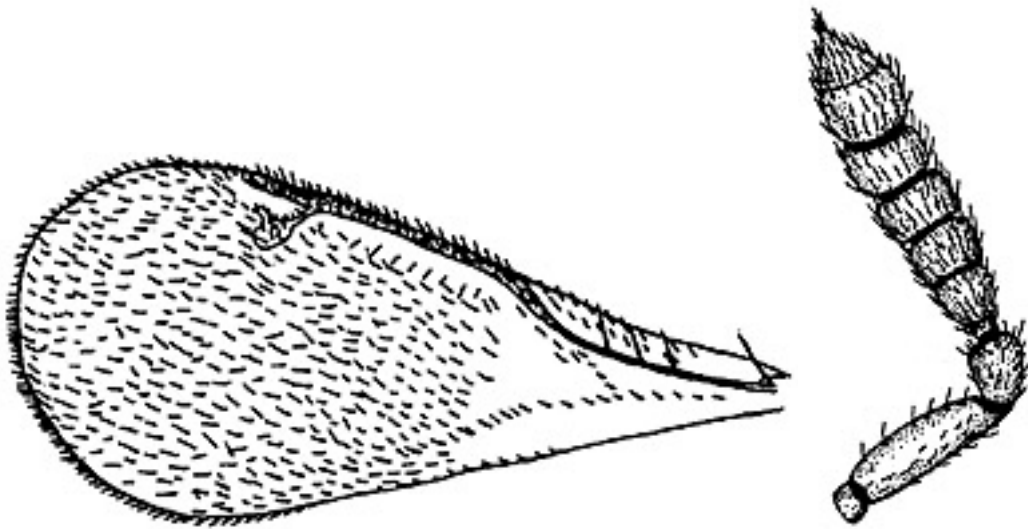
Eyes setose. **Clypeal margin bilobed**. Flagellum with 4 funicular and 2 claval segments, all funicular segments quadrate to broader than long. **Stigma large**, subequal postmarginal vein length. Notauli incomplete or ending in axillae far anterior to scutellar margin; **scutellum and mesoscutum with numerous irregularly distributed setae** (but scutellum often with as few as 2 pairs of distinct setae); dorsellum large and convex: propodeum only slightly longer than dorsellum medially. Compare with: *Dimmockia*, *Microlycus*.



1a-b: *Dasyeulophus* mesoscutum (top), and dorsal habitus (bottom)



2a-b: *Dasyeulophus* propodeum (left), and clypeal margin (right)



3a-b: *Dasyeulophus* forewing (left), and female antenna (right)

**Biology:** Parasitoids of Gelechiidae.

**Comments:** 1 described species: *D. gelechiae* (Miller). The number of scutellar setae is especially variable, being as few as 2 pairs in a few specimens. The genus remains easily recognizable using a combination of its other listed characters. There are few Nearctic Eulophines with a similar body form, but bodily collapse is very frequent in specimens of this genus, and may render them difficult to identify by beginners. It is similar in habitus to certain extralimital genera, such as *Eulophinusia*, but differs in several characters stated above.

**Comparative information:**

***Dimmockia*:** Mesoscutum with paired, regularly placed, setae. Propodeum with strong plicae and median carina. Stigma not enlarged. Similar mainly in clypeal form.

***Microlycus*:** Stigma not enlarged. Clypeus not bilobed. 3 funicular segments in females and some males. Scutellum never with more than 2 pairs of setae.

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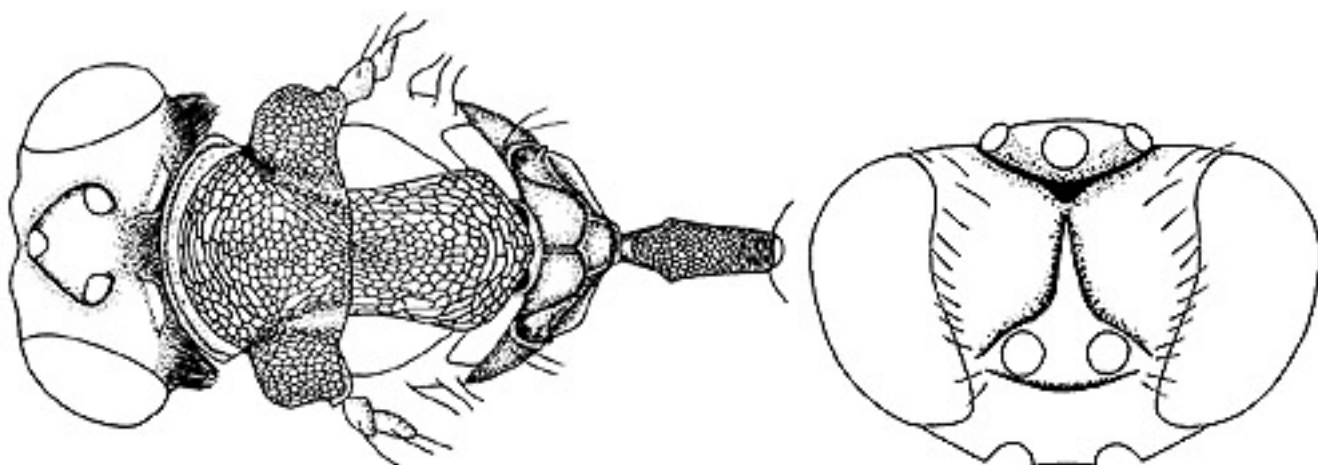
## References

Schauff, M.E. & J. LaSalle. 1993. Nomenclatural notes on genera of North American Eulophidae (Hymenoptera: Chalcidoidea). *Proceedings of the Entomological Society of Washington*. **95**(3): 488-503.

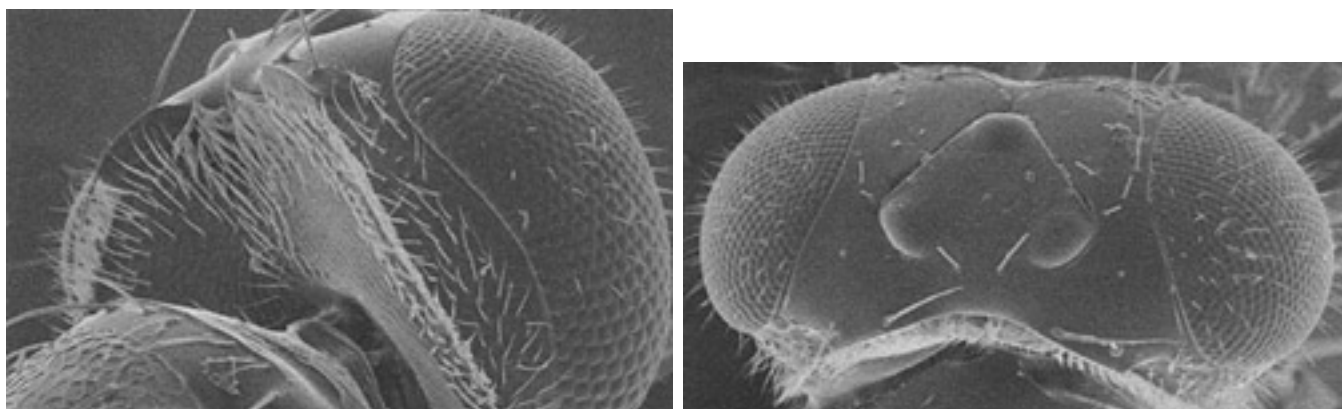
Image credits: 1a, 2a-b, 3a-b: Schauff & LaSalle (1993).

***Derostenus* Westwood, 1833** return to: [prev](#) [home](#)

Mandibles with many (>3) small denticles. **Clypeal margin with median truncate projection flanked by deep concavities**; clypeus not set off by sutures. Transverse frontal groove reduced or absent, not strongly v-shaped if present; longitudinal frontal groove along with scrobal depressions often forming a strong channel, or dorsally acute depression accompanied by a deep pit in front of median ocellus. **Ocellar triangle surrounded by sulci** (rarely posterior sulcus absent); occiput strongly concave medially, but without distinct longitudinal groove, **concave area flanked by short carinate ridges in occipital rim on each side** (some species with a medially interrupted occipital carina in addition); **temples and periphery of occiput densely covered in whitish setae**. Flagellar formula 2,4,2 or 3,3,2 (with 3rd anellus subquadrate); flagellum with symmetrical (type 1) peg sensilla. Mesoscutal midlobe with 2 pairs of setae; notauli distinctly broadening and very vaguely defined posteriorly; *D. sulciscuta* Hansson species group with a posterior median groove on the mesoscutum; posterior border of prepectus not overlapped by mesepisternum; metapleuron without projections, weakly convex. Propodeum smooth or with median carina. **Petiole at least 2x longer than broad**. Gaster with large pale subbasal area in males.



1a-b: *Derostenus* dorsal view (left), and face (right)



2a-b: *Derostenus* occiput and vertex (left), and ocellar triangle (right)

**Biology:** Larval parasitoids of Lepidoptera.

**Comments:** 9 described species.

**Comparative information:** No other Nearctic genera have any species similar to *Derostenus* in its defining characters, but at first glance it may be confused with *Chrysocharis* because of similarities in body shape. They differ distinctly in the characters given above.

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## References

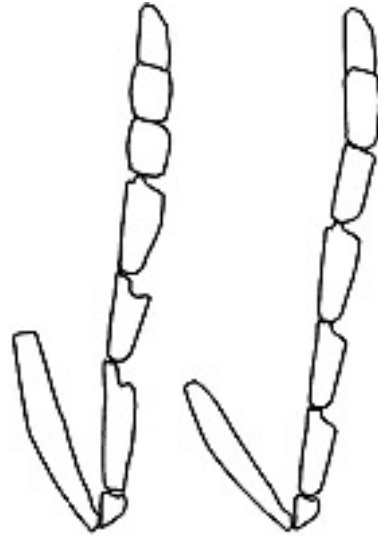
Hansson, 1986. Revision of the Asiatic, European and North American species of *Derostenus* Westwood (Hymenoptera: Eulophidae). *Entomologica Scandinavica*. **17**: 313-322.

Schauff, M.E. 1991. The Holarctic genera of Entedoninae (Hymenoptera: Eulophidae). *Contributions of the American Entomological Institute* **26**.

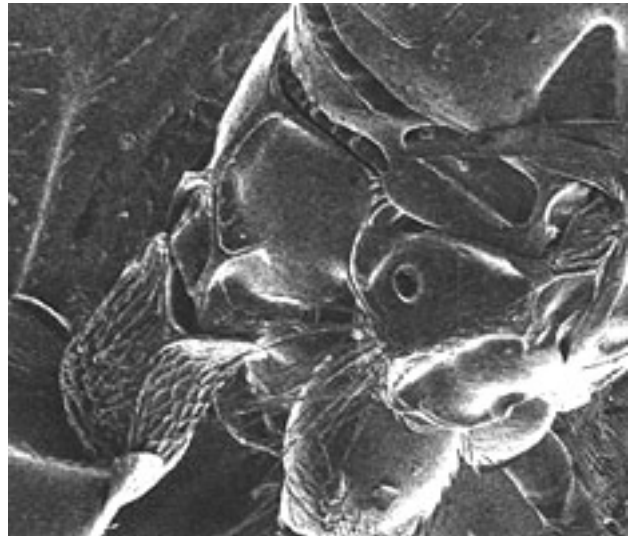
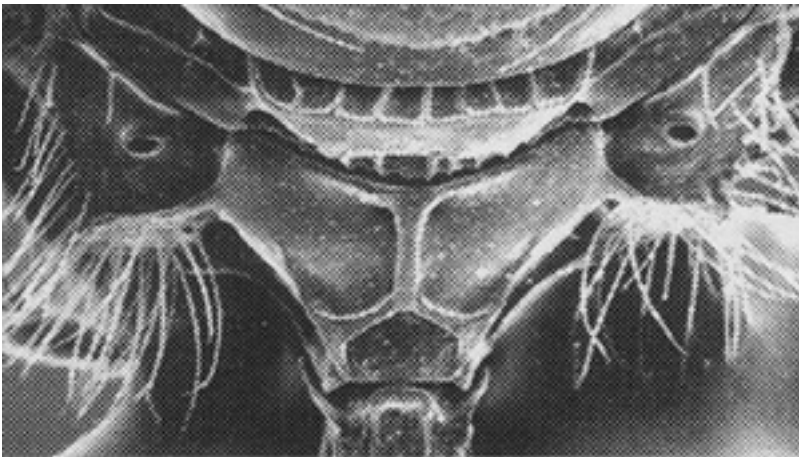
Image credits: 1a-b: Hansson (1986). 2a-b: Schauff (1991).

***Deutereulophus* Schulz, 1906** [comparative info](#) return to: [prev](#) [home](#)

Eyes setose. **Occiput strongly concave, vertex carinate**, eye reaching posterior margin of head in dorsal half (all these characters as in *Hoplocrepis*). Flagellar formula vaguely 1,3,3 or 1,4,2, described as 1,4,2 in males and 1,3,3 in females (Schauff 2000); **basal flagellomeres in males and females serrate to mildly pedunculate**. Pronotal collar relatively long and broader than anterior portion of mesoscutum; notauli complete; mesoscutal midlobe with up to 3 pairs of setae (taking care to include those near the notauli); **sublateral scutellar grooves present, concave laterally and converging medially** (this form not unique). Postmarginal vein subequal or slightly longer than stigmal vein. **Median carina of propodeum forked at nucha, forming large areole enclosing nucha**; plicae incomplete, **projecting from anterior corners of nuchal areole**; **carina present posterior to spiracle, patch of setae usually present posterior to carina**, usually separate from callar setae. **Petiole with dorsal and lateral flanges**. Compare with: *Elachertus*, *Hyssopus*.



1a-c: *Deutereulophus* mesosomatic dorsum (left), female antenna (center), and male antenna (right)



2a-b: *Deutereulophus* propodeum, dorsal view (left), and lateral view (right)

## Biology:

**Comments:** 17 described species. Similar in many respects to some *Elachertus*, and may eventually prove to be simply a distinctive species group of *Elachertus*, or, more preferably, one of many genera retained after splitting *Elachertus* into manageable monophyletic genera. I have seen several Nearctic, Oriental, and Neotropical specimens that in one or more ways blur the distinction between these two genera, especially in that they frequently have the group of setae posterior to the propodeal spiracle joining the group on the propodeal callus, or lack these setae entirely while possessing most other characters of *Deutereulophus*.

## Comparative information:

***Elachertus*:** Mesoscutal midlobe with at least the first two pairs near the center of the midlobe (all but one pair near the notauli and scutellar border in *Deutereulophus*). Propodeum without special patch of setae separate from callus setae. Some species of *Elachertus* have a similarly areolate median propodeal carina and body form, but differ in the characters given here.

***Hyssopus*:** Mesoscutal midlobe with 2 pairs of setae, Median carina of propodeum not areolate. Propodeum without special patch of setae separate from callus setae. Pronotum smoothly arched in profile, without differentiated collar.

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## References

Schauff, M.E. 2000. Review of the species of *Deutereulophus* (Hymenoptera: Chalcidoidea: Eulophidae) of North America. *Journal of Hymenoptera Research*. **9**(2): 416-426.

Schauff, M.E., J. LaSalle, & L.D. Coote. 1997. Chapter 10. Eulophidae. *in* "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.

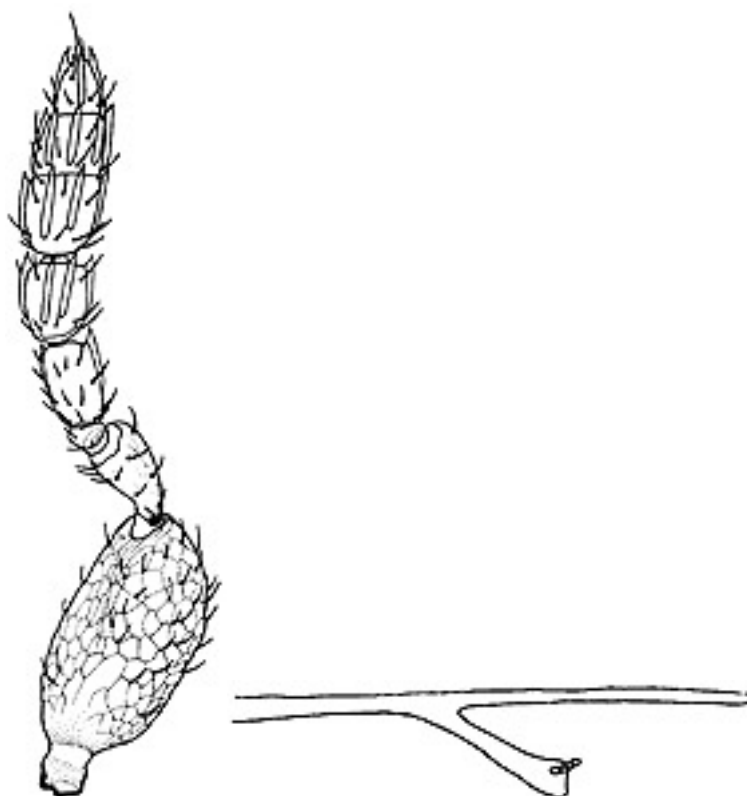
Image credits: 1a-c, 2b: Schauff (2000). 2a: Schauff, et al. (1997).

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***Diaulinopsis* Crawford, 1912** [comparative info](#) return to: [prev home](#)

2 funicular segments, 3 claval segments; **scape enlarged in males**. Face with transverse sulcus at mid-height. Notauli nearly straight, deep and complete, reaching scutellar margin or ending in axillae very near it; each mesoscutal sidelobe with narrow scapular flange that reaches scutellar margin. **Postmarginal vein about 2x stigmal vein length**. Compare with: ***Cirrospilus*, *Diglyphus***.



1a-b: *Diaulinopsis* male antenna (left), and forewing venation (right)

**Biology:** Parasitoids of leaf-mining Diptera.

**Comments:** 4 described species.

**Comparative information:**

***Cirrospilus*:** Postmarginal vein about 1x stigmal vein length. Scape not swollen in males. Color in most specimens largely yellowish (metallic green in *Diaulinopsis*).

***Diglyphus*:** Notauli incomplete or ending in anterior half of axillae, far from scutellar margin. Scape rarely swollen in males. Postmarginal vein <2x stigmal vein length in most species.

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## References

- Boucek, Z. 1959. A study of central European Eulophidae, II: *Diaulinopsis* and *Cirrospilus* (Hymenoptera). *Acta Entomologica Musei Nationalis Pragae*. **33**: 171-194.
- Gordh, G. & R. Hendrickson. 1979. New species of *Diglyphus*, a world list of the species, taxonomic notes and a key to New World species of *Diglyphus* and *Diaulinopsis* (Hymenoptera: Eulophidae). *Proceedings of the Entomological Society of Washington*. **81**: 666-684.
- Schauff, M.E., J. LaSalle, & L.D. Coote. 1997. Chapter 10. Eulophidae. *in* "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.

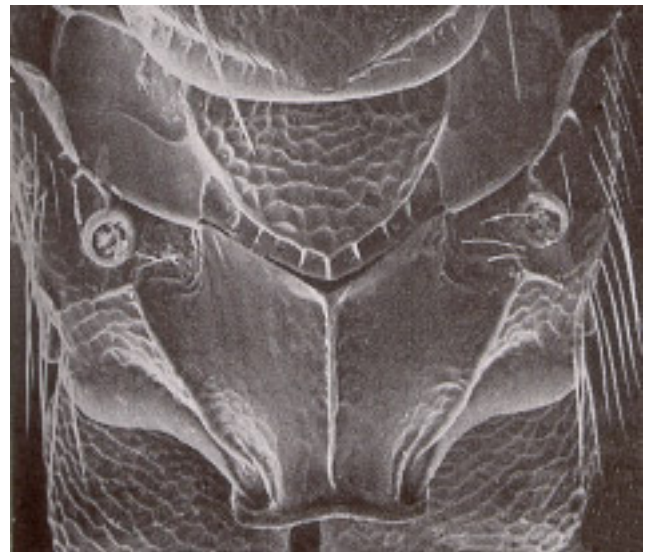
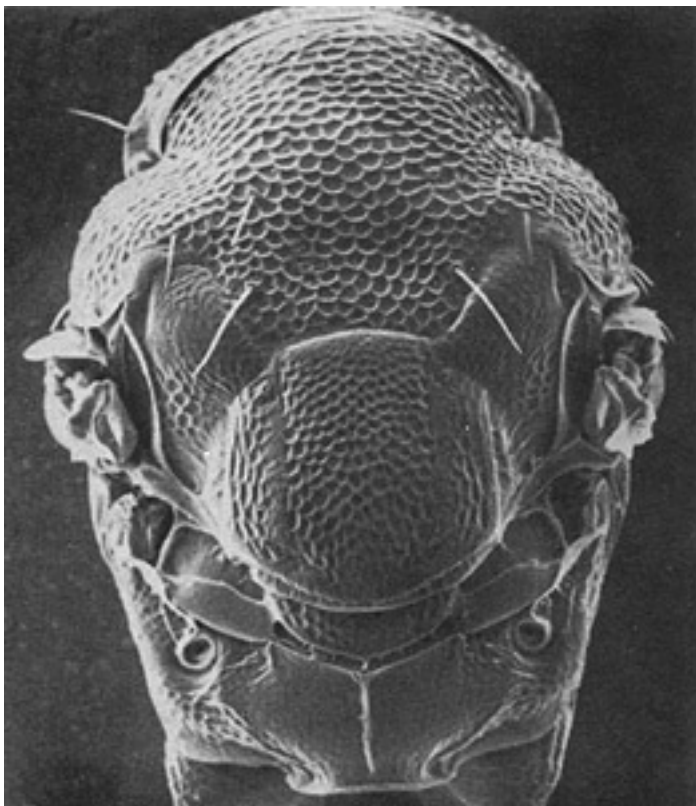
Image credits: 1a: Gordh & Hendrickson (1979). 1b: Schauff, et al. (1997).

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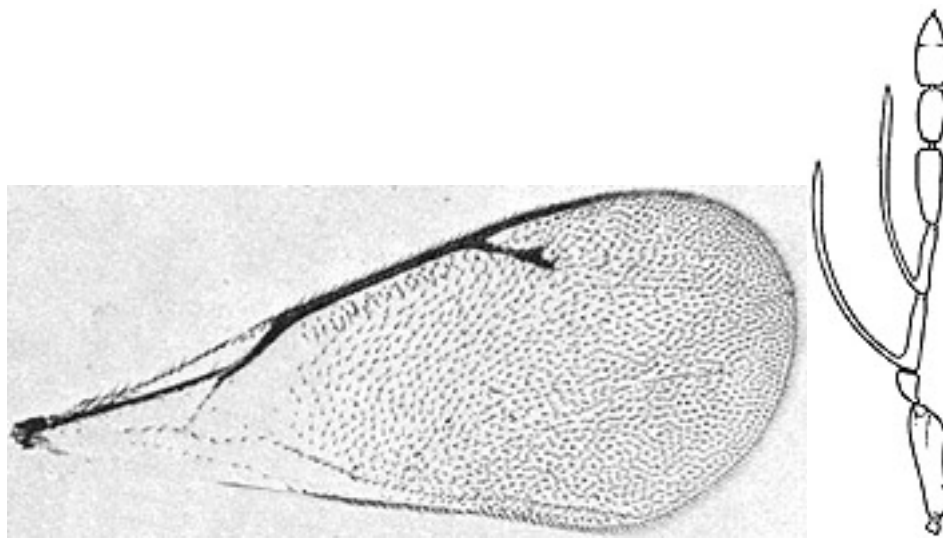
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***Dicladocerus* Westwood, 1832** [comparative info](#) return to: [prev\(eul 21\)](#) [prev\(eul 31\)](#) [home](#)

Flagellar formula 2,3,3 in females, 1,4,2 in males; **flagellum with 2 branches in males** (on basal pair of postanellar flagellomeres). Notauli incomplete or ending in anterior half of axilla far from scutellar margin; mesoscutal midlobe setae paired or indistinct; **scutellum almost always with straight, parallel submedian grooves** indicated by change in sculpture, sometimes indistinct. Postmarginal vein longer than stigmal vein, sometimes >2x stigmal vein length, shorter than marginal vein; **uncus arising more than its own length from apex of stigmal vein**. Propodeum with median carina and complete or incomplete plicae that are frequently raised, 'step-like' in that they separate raised median panels from the sunken paraspiracular area of the propodeum. Compare with: ***Necremnus***, *Notanisomorphella*.



1a-b: *Dicladocerus epinotiae* Yoshimoto mesosoma (left), and *D. nearcticus* Yoshimoto propodeum (right)



2a-b: *Dicladocerus* forewing (left), and male antenna (right)

**Biology:** Parasitoids of Lepidoptera.

**Comments:** 19 described species. Males not confusable with any other genus if the antennae are present and undamaged. Females may be very difficult to identify to genus if the submedian scutellar grooves are not apparent, and can resemble a *Necremnus* with a too-long, too-developed propodeum and elongate stigma.

**Comparative information:**

***Necremnus*** (females): Scutellum without submedian grooves. Propodeum usually without plicae. Postmarginal vein at most 1.7x stigmal vein length, uncus rarely arising distinctly more than its own length from apex of stigmal vein [known exceptions: *N. metalarus* (Walker)]. All female *Dicladocerus* that I am aware of with faint submedian scutellar grooves have plicae or plical ridges delimiting median panels that are slightly to sharply raised above the lateral areas of the propodeum, and in nearly all species of *Dicladocerus* the uncus is separated from the stigmal apex by more than its own length. *Necremnus propodealis* Boucek is notable as a species of *Necremnus* with a strong median carina and step-like plicae, but in that species the uncus is separated by its own length from the stigmal apex. This still leaves a few species of *Dicladocerus* in which females cannot be separated from *Necremnus* females. This problem is compounded by the fact that some *Necremnus* specimens have very faint submedian scutellar grooves. Separation of these two poorly known genera is problematic, and cannot be fully accomplished at this time.

***Notanisomorphella***: Flagellum with 4 funicular segments. Males with 3 antennal branches. Never with longitudinal scutellar grooves. Uncus arising about its own length from stigmal apex.

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## References

Graham, M.W.R. de V. 1963. Additions and corrections to the British list of Eulophidae (Hym., Chalcidoidea). *Transactions of the Society for British Entomology*. **15**(9): 167-275.

Yoshimoto, C. 1976. Revision of the genus *Dicladocerus* (Eulophidae: Chalcidoidea) of America north of Mexico, with particular reference to species attacking larch casebearer (Lepidoptera: Coleophoridae). *Canadian Entomologist*. **108**: 1173-1206.

Image credits: 1a-b, 2a: Yoshimoto (1976). 2b: Graham (1963).

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***Diglyphomorpha* Ashmead, 1904** [comparative info](#) return to: [prev](#) [home](#)

4 funicular segments. Notauli complete though sometimes partially obscured by mesoscutal sculpture; **scutellum with a sometimes faint median groove**; with complete sublateral grooves converging, but not quite meeting, meeting posteriorly, their margins relatively sharp. **Propodeum with irregular transverse rugae**; plicae and median carina present. Compare with: *Miotropis*.



1a-b: *Diglyphomorpha* propodeum (left), and dorsal view of head+mesosoma, with faint median scutellar groove indicated by break in glare (right)

### Biology:

**Comments:** 1 described species: *D. aurea* (Howard). Part of a distinct group of Eulophines with complete notauli and a rugulose propodeum, specimens of this genus have been mischaracterized as having a more regular set of rugae than they really do.

### Comparative information:

***Miotropis*:** Certain species, formerly classified in *Cirrospiloideus*, with faint propodeal rugae, but these have very faint scutellar grooves that are not traceable past the posterior pair of setal

sockets without very careful observation through high-resolution microscopes, and never have plicae. Scutellum never with a median longitudinal groove.

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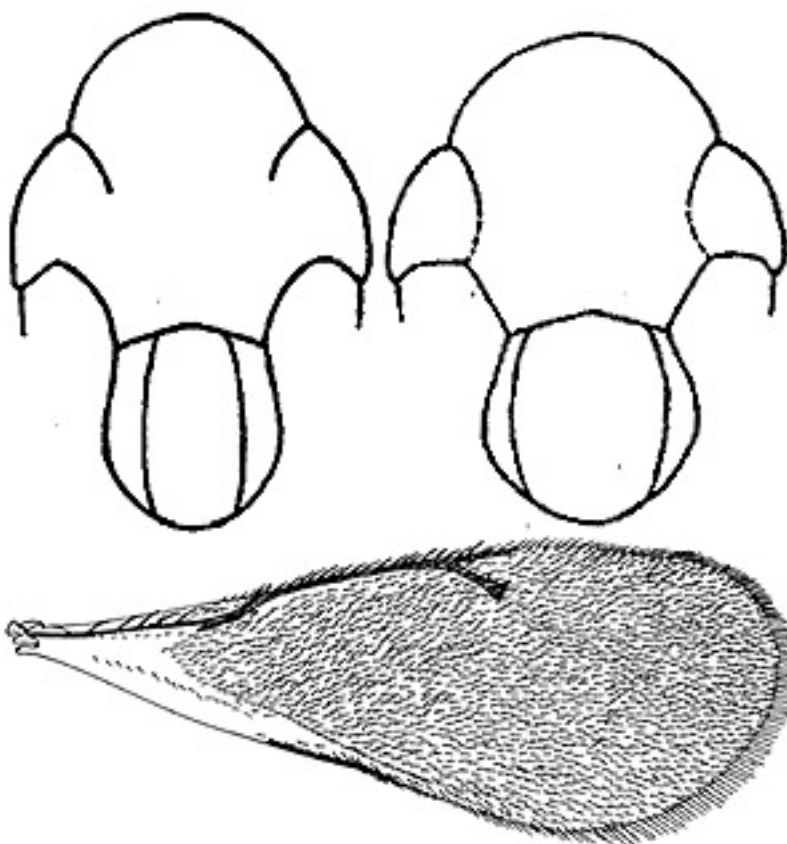
## References

- Boucek, Z. 1977. Descriptions of two new species of Neotropical Eulophidae (Hymenoptera) of economic interest, with taxonomic notes on related species and genera. *Bulletin of Entomological Research*. **67**(1): 1-15.
- LaSalle, J. & M.E. Schauff. 1992. Preliminary studies on Neotropical Eulophidae (Hymenoptera: Chalcidoidea): Ashmead, Cameron, Howard, and Walker species. *Contributions of the American Entomological Institute* **27**.
- Schauff, M.E. & J. LaSalle. 1993. Nomenclatural notes on genera of North American Eulophidae (Hymenoptera: Chalcidoidea). *Proceedings of the Entomological Society of Washington*. **95**(3): 488-503.
- Schauff, M.E., J. LaSalle, & L.D. Coote. 1997. Chapter 10. Eulophidae. *in* "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.
- Image credits: 1a: Schauff, et al. (1997).

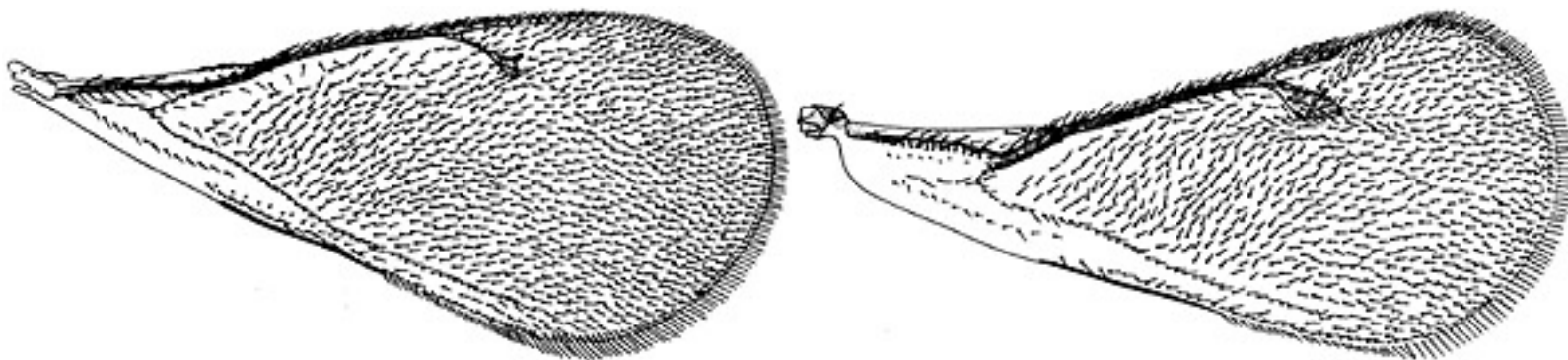
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***Diglyphus* Walker, 1844** [comparative info](#) return to: [prev](#) [home](#)

2 funicular segments, 3 claval segments; scape rarely swollen, if so (in *D. pedicellus* Gordh & Hendrickson males) then pedicel also swollen and almost as long as scape. **Notauli almost always incomplete**, sometimes faintly complete but divergent posteriorly, **ending in anterior half of the strongly advanced axillae**; scutellum with parallel submedian grooves. Postmarginal vein 1-2x stigmal vein length. Compare with: ***Diaulinopsis***, *Cirrospilus*.



1a-c: Typical *Diglyphus* mesosoma (top left), *D. minoeus* (Walker) mesosoma (top right), and *D. intermedius* (Girault) forewing (bottom)



2a-b: *D. begini* (Ashmead) forewing (left), and *D. pulchripes* (Crawford) male forewing



3a: *D. pedicellus* male antenna

**Biology:** Parasitoids of leaf-mining Diptera.

**Comments:** Many described species.

**Comparative information:**

***Diaulinopsis*:** Notauli complete and nearly straight, reaching scutellar margin or ending in axillae narrowly separated from scutellar margin. Scape always strongly swollen in males. Postmarginal vein at least 2x stigmal vein length.

***Cirrospilus*:** Notauli straight (or nearly so) and complete, reaching scutellar margin or ending in axillae narrowly separated from scutellar margin.

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## **References**

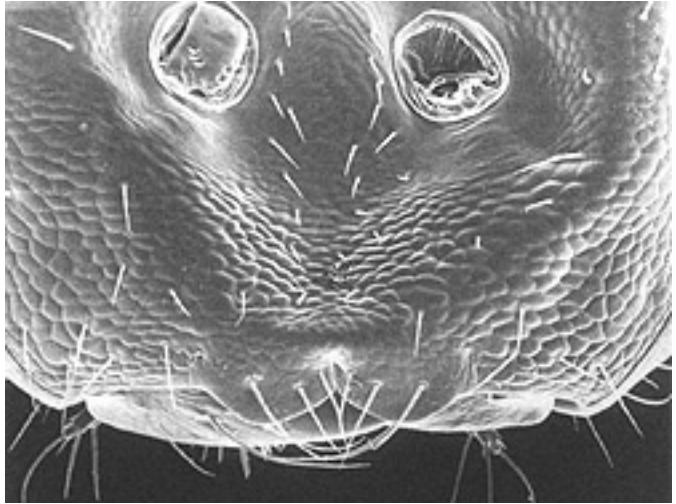
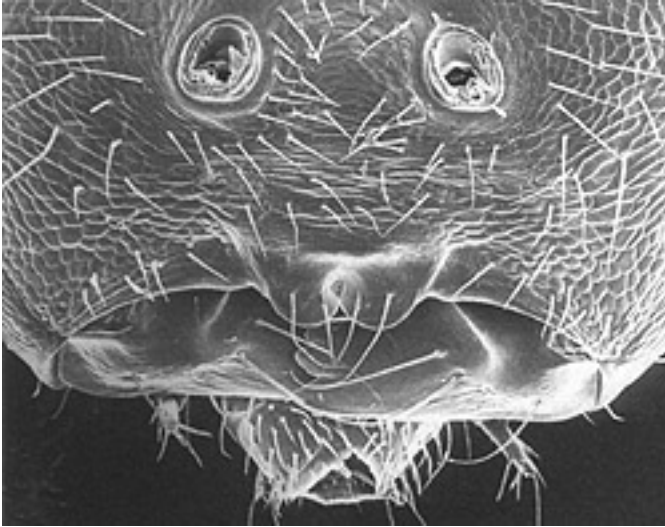
Askew, R.R. 1968. Hymenoptera 2. Chalcidoidea section (b). *Handbooks for the Identification of British Insects*. **8**(2)b.

Gordh, G. & R. Hendrickson. 1979. New species of *Diglyphus*, a world list of the species, taxonomic notes and a key to New World species of *Diglyphus* and *Diaulinopsis* (Hymenoptera: Eulophidae). *Proceedings of the Entomological Society of Washington*. **81**: 666-684.

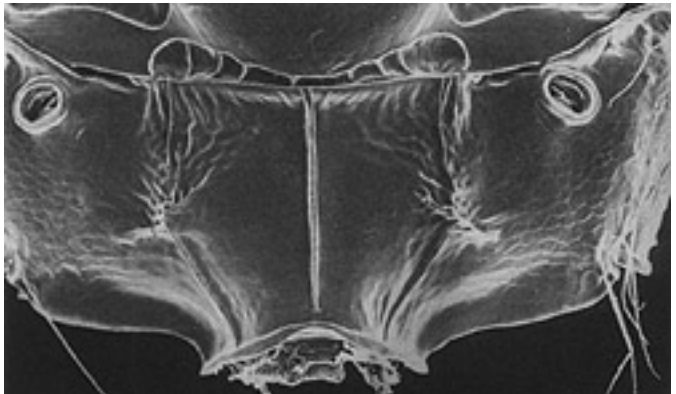
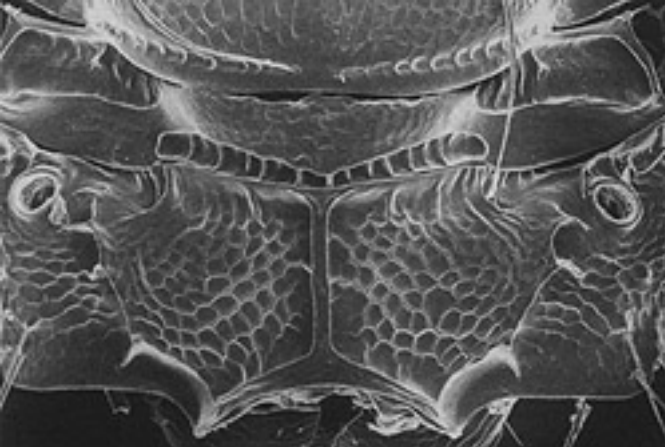
Image credits: 1a-b: Askew (1968). 1c, 2a-b, 3a: Gordh & Hendrickson (1979).

***Dimmockia* Ashmead, 1904** [comparative info](#) return to: [prev](#) [home](#)

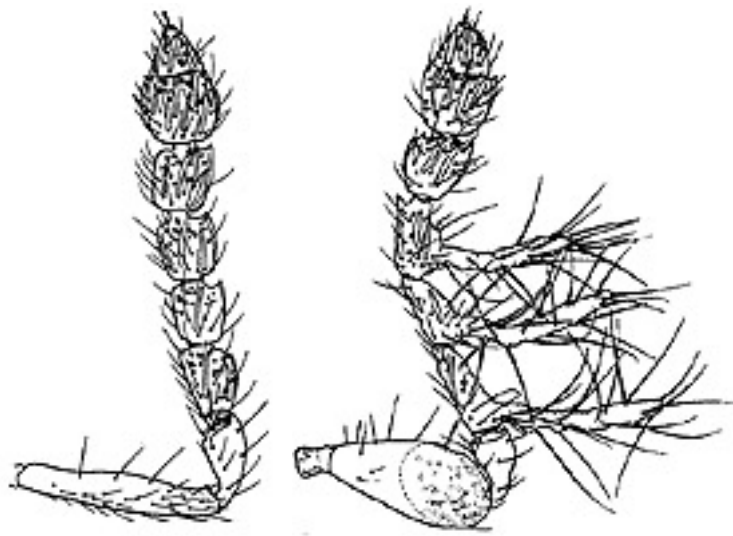
Funicle 4-segmented; flagellum with 3 branches in males; 4th funicular segment not longer than 3rd in males. **Clypeal margin bilobed**, lobes thin and flange-like. Notauli incomplete or ending in anterior half of axillae far from scutellar margin; mesoscutal midlobe with paired setae; scutellum without submedian or sublateral grooves. Propodeum with median carina and plicae. Compare with: ***Notanisomorphella*, *Dasyeulophus*, *Sympiesis***.



1a-b: *Dimmockia* lower faces: *D. incongrua* (Ashmead) (left), and *D. brevicornis* (Erdös) (right)



2a-c: *Dimmockia* propodea: *D. incongrua* (top left), *D. brevicornis* (top right), and *D. secunda* Crawford (bottom)



3a-b: *Dimmockia* female antenna (left), and male antenna (right)

**Biology:** Usually secondary parasites of Lepidoptera through Hymenoptera, some primary parasites of Lepidoptera.

**Comments:** 6 described species. A very distinctive genus in the Nearctic fauna. Propodeal form is very similar to that of *Notanisomorphella*.

**Comparative information:**

*Notanisomorphella*: Clypeal margin not bilobed.

*Dasyeulophus*: Scutellum and midlobe of mesoscutum with numerous evenly or irregularly distributed setae (but scutellum often with as few as 2 pairs of distinct setae). Propodeum without plicae, and median carina weak.

*Sympiesis*: Clypeal margin not bilobed. Propodeum very seldom with strong median carina and plicae.

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## References

Ikeda, E. & J.T. Huber. 1996. Review of the world species of *Dimmockia* Ashmead (Hymenoptera: Eulophidae). *Canadian Entomologist*. **128**: 743-746.

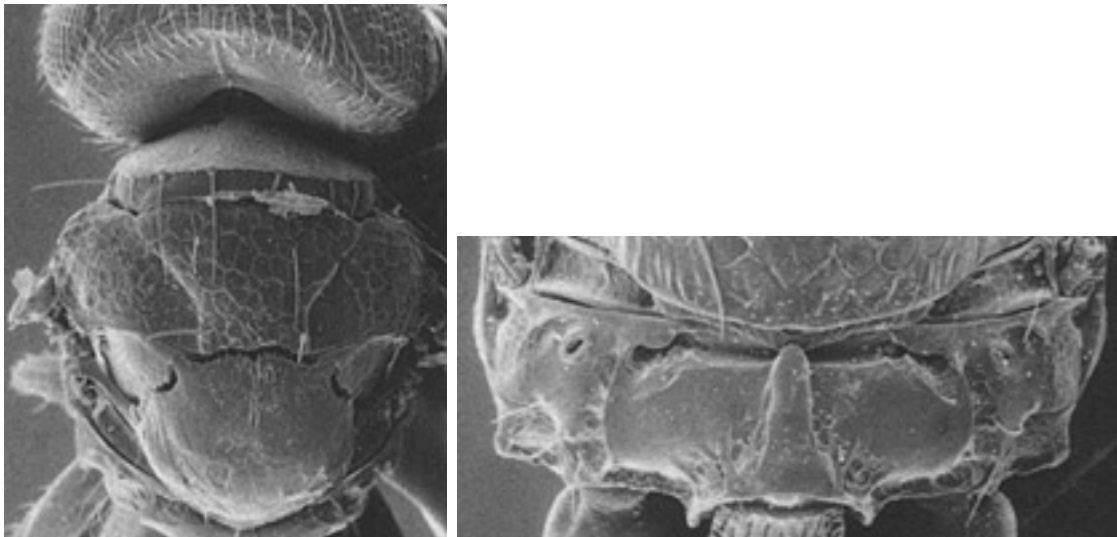
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***Edovum*** Grissell, 1981 [comparative info](#) return to: [prev](#) [home](#)

Transverse frontal groove indistinct or absent; scrobal depressions/grooves short, meeting at center of face. Flagellar formula 1,3,2 in females and 1,4,1 in males. Scutellum with median longitudinal groove, extending no more than half scutellar length; **scutellar-axillar border with a large dorsal pit** (separate from scutellar-axillular border); posterior edge of prepectus partially overlapped by narrow extension of mesepisternum; epicnemial carina present, extending from posterior edge of mesepisternal extension; metapleuron with a strong, sharply pointed projection. Propodeum with broad, smooth, raised median strip extending anteriorad to partially overlap metanotum, the strip not flanked by sunken channels. **Petiole longer than broad, with longitudinal ribs**. Gaster covered almost entirely by gt1. Compare with: *Horismenus*, *Paracrias*, *Pediobius*.



1a-b: *Edovum* mesosomal dorsum (left), and propodeum (right)



2a: *Edovum* mesosomal pleuron, with epicnemial carina indicated

**Biology:** Egg parasitoid of Colorado potato beetle [*Leptinotarsa undecemlineata*, Chrysomelidae], and other species of *Leptinotarsa*; mostly Neotropical, but released in United States for biological control.

**Comments:** 1 described species: *E. puttleri* Grissell. Part of a clade including *Horismenus* and *Alachua*.

### **Comparative information:**

**Horismenus:** Petiole without longitudinal ribs. Epicnemial carina absent (ie: posterior border of mesepisternal projection different in extent and shape). Median scutellar groove usually extending more than halfway scutellar length.

**Paracrias:** Scutellum without longitudinal groove; scutellar-axillar border without pit. Nucha frequently long and conspicuous, if not, then posterior half of propodeum rugulose.

**Pediobius:** Petiole without longitudinal ribs, with dorsal flange embracing nucha, and with ventrally-projecting tooth. Scutellum without longitudinal groove (but often with broad smooth area). Propodeum of most species without median raised area, with diverging submedian carina or split median carina.

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### **References**

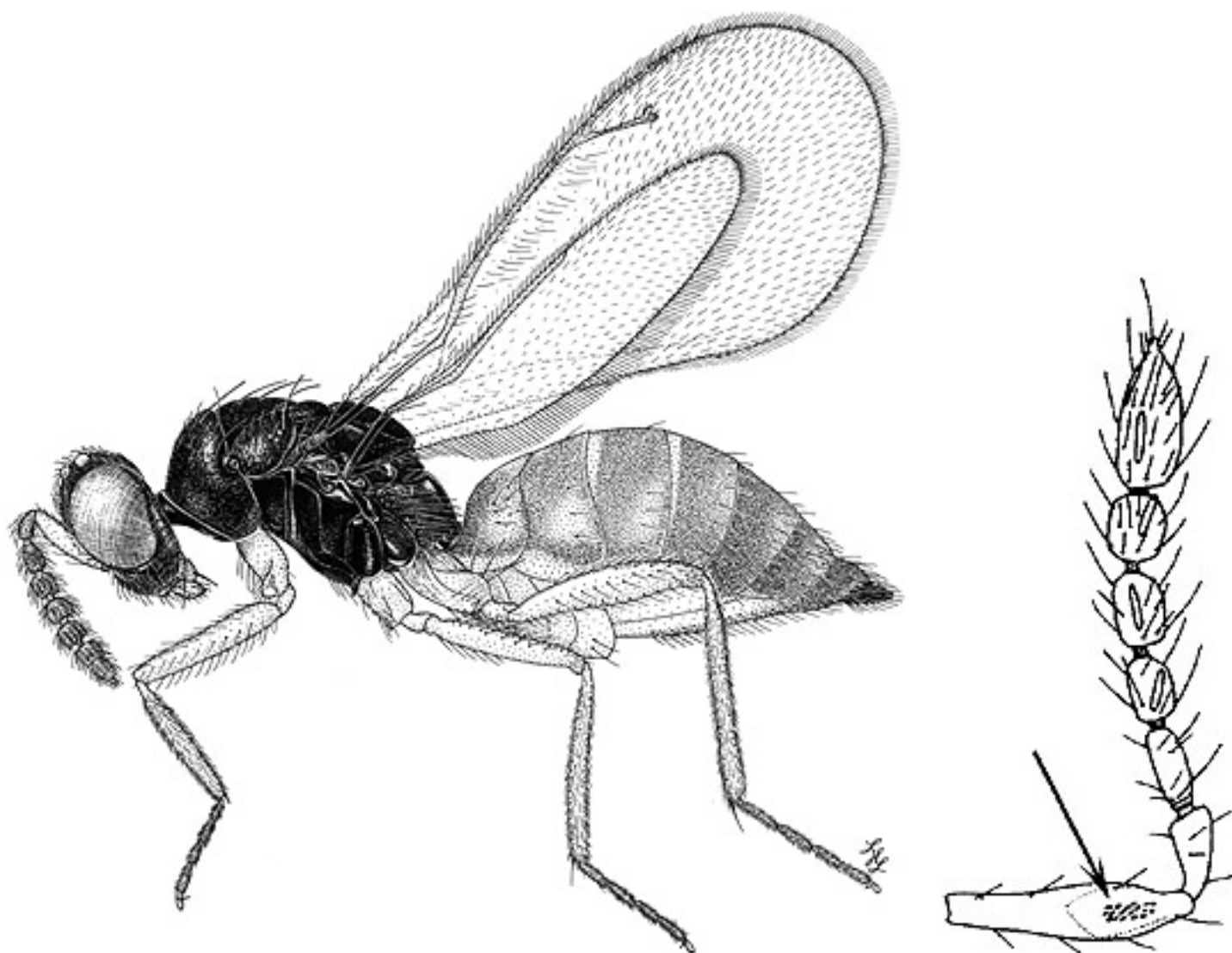
Grissell, E.E. 1981. *Edovum puttleri*, n.g., n.sp. (Hymenoptera: Eulophidae), an egg parasite of the Colorado Potato Beetle (Chrysomelidae). *Proceedings of the Entomological Society of Washington*. **83**: 790-796.

Schauff, M.E. 1991. The Holarctic genera of Entedoninae (Hymenoptera: Eulophidae). *Contributions of the American Entomological Institute* **26**.

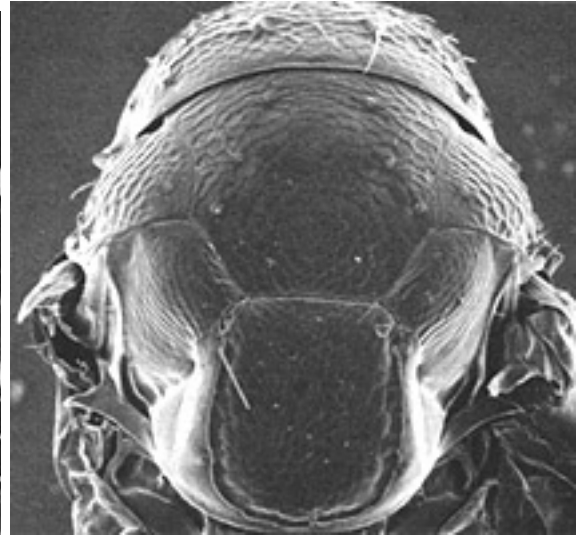
Image credits: Schauff (1991).

***Elachertus* Spinola, 1811** [comparative info](#) return to: [prev](#) [home](#)

Flagellar formula 1,4,2; males without funicular branches; **in males, lateral surface of scape with area of sensory pits restricted to its apical third, the pits forming tight group, frequently touching each other** (usually requires slide mounting of scape). Notauli complete (but sometimes faint, especially in *E. louisiana* (Girault), curving to meet axillae well anterior of scutellar margin in some species. Mesoscutal midlobe with 3 or more pairs of setae, sometimes with irregularly placed setae; if with only 3 pairs of setae, then the median pair is smallest (Boucek, 1988). Scutellum with faint submedian grooves that meet posteriorly to form a U-shaped groove (grooves sometimes sinuate, like in *Deutereulophus*, in some undescribed species tentatively assigned here), scutellum without a median groove, sculpture absent or very weak and sunken. Postmarginal vein longer than stigmal vein. Propodeum without plicae or costula; median carina usually simple, often slightly Y-shaped anteriorly; median panels smooth, not rugulose. Compare with: ***Xanthellum*** (males only), ***Hyssopus***, ***Miotropis***, ***Deutereulophus***, ***Diglyphomorpha***.



1a-b: *Elachertus loh* Schauff habitus (left), and *E. atus* Schauff male antenna (right)



2a-b: *Elachertus fenestratus* Nees mesosoma (left), and *E. louisiana* (Girault) mesosoma



3a-b: *E. cacoeciae* (Howard) scutellum (left), and propodeum (right)

**Biology:** Parastioids of Lepidoptera larvae in concealed situations.

**Comments:** Large genus typical of an easily recognized morphotype in the Eulophidae. *Elachertus* may prove strongly paraphyletic, with elements belonging in several related genera.

**Comparative information:**

**Xanthellum:** (Males only) Not distinguishable using generic characters. Females are brachypterous and easily distinguishable, and males are best identified by association with the females. The males that I have seen are small and brown, with a very thin, laminar supracoxal flange, strongly defined antennal scrobes, distinctly setose eyes, and flattened flagellum. Unfortunately, some *Elachertus* males have one or all of these characters as well.

**Hyssopus**: Mesoscutal midlobe with only 2 pairs of setae. Pronotal shape is of little use in distinguishing this genus from *Elachertus*, as most species of *Elachertus* have exactly the same form of pronotum.

**Miotropis**: Sublateral grooves of scutellum incomplete or absent under normal (up to 50x) magnification, extending as distinct grooves at most to sockets of posterior pair of scutellar setae. Unfortunately, there are still some North American "*Elachertus*" that have exactly the same form of scutellum. Some species of *Miotropis* have irregular rugae on the median propodeal panels, often highlighted by a different color from the rest of the propodeum, which is a state never found in *Elachertus* in its current interpretation. There are other *Miotropis* which are not distinguishable from these *Elachertus* with incomplete scutellar grooves using any generic characters. This should be kept in mind if correct specific identification of such specimens is important.

**Deutereulophus**: Sublateral scutellar grooves present, sinuate and converging medially (not unique). **Median carina of propodeum forked at nucha, forming large areole enclosing nucha**; plicae incomplete, **projecting from anterior corners of nuchal areole**; **carina present posterior to spiracle, patch of setae usually present posterior to carina**, usually distinct from callar setae. **Petiole with dorsal and lateral flanges**. Should be distinguished using a complete combination of characters, as some *Elachertus* have a similarly shaped pronotum and propodeum, with an areolate median carina, but do not possess any of the other characters.

**Diglyphomorpha**: Scutellum with a sometimes faint median groove. **Propodeum with irregular transverse rugae**. Not easily confused with most *Elachertus*.

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## References:

Boucek, Z. 1988. Australasian Chalcidoidea (Hymenoptera). A biosystematic revision of genera of fourteen families, with a reclassification of species. CAB International, Wallingford, UK.

Schauff, M.E. 1985. Taxonomic study of the Nearctic species of *Elachertus* Spinola (Hymenoptera: Eulophidae). *Proceedings of the Entomological Society of Washington*. **87**: 843-858.

Schauff, M.E. & J. LaSalle. 1993. Nomenclatural notes on genera of North American Eulophidae (Hymenoptera: Chalcidoidea). *Proceedings of the Entomological Society of Washington*. **95**(3): 488-503.

Image credits: Schauff (1985).

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***Elasmus* Westwood, 1833** [comparative info](#) return to: [prev](#) [home](#)

Funicle 3-segmented in females, in males 4-segmented and with three branches. Notauli incomplete or ending in axillae far anterior of scutellar margin; scutellum with triangular, laminate posterior projection, without dorsal grooves. **Metacoxa grossly swollen and laterally flattened**, tightly aligned with body throughout its length. Metatibiae with short, stout setae arranged brush-like in either diamond-shaped patterns or parallel rows. Forewing elongate and narrow, with marginal vein approaching submarginal vein length, many times longer than the very short stigmal vein. Body wedge-shaped. Compare with: Eriaporinae: *Euryischia* (extralimital).



1a-b: *Elasmus polistis* B.D. Burks habitus (left), and dorsal view of mesosoma (right), with laminar scutellar projection indicated

**Biology:** Most species are gregarious primary or secondary larval or pupal ectoparasitoids of Lepidoptera. *Elasmus polistis* B. Burks is an ectoparasitoid of *Polistes* Latreille.

**Comments:** Large genus. Very distinctive member of Eulophinae, and its placement there was confirmed only recently by molecular data (Gauthier, et al. 2000).

### **Comparative information:**

**Eriaporinae: *Euryischia*** [extralimital]: **Protibial spur stout and curved. Tarsal formula 5-5-5.** Marginal vein shorter in relation to stigmal and postmarginal veins. Base of forewing bare except for stout setae. Flagellum never branched.

### **References**

Burks, B.D. 1965. The North American species of *Elasmus* Westwood (Hymenoptera, Eulophidae). *Proceedings of the Biological Society of Washington*. **78**: 201-208.

Burks, B.D. 1971. A North American *Elasmus* parasitic on *Polistes* (Hymenoptera: Eulophidae). *Journal of the Washington Academy of Science*. **61**(3): 194-196.

Compere, H. 1947. A new genus and species, *Eurymyiocnema aphelinoides* (Hymenoptera, Aphelinidae), and a history of the genera *Euryischia* Riley and *Myiocnema* Ashmead. *Bulletin of Entomological Research*. **38**: 381-388.

Coote, L.D. 1997. Chapter 7. Elasmidae. in "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.

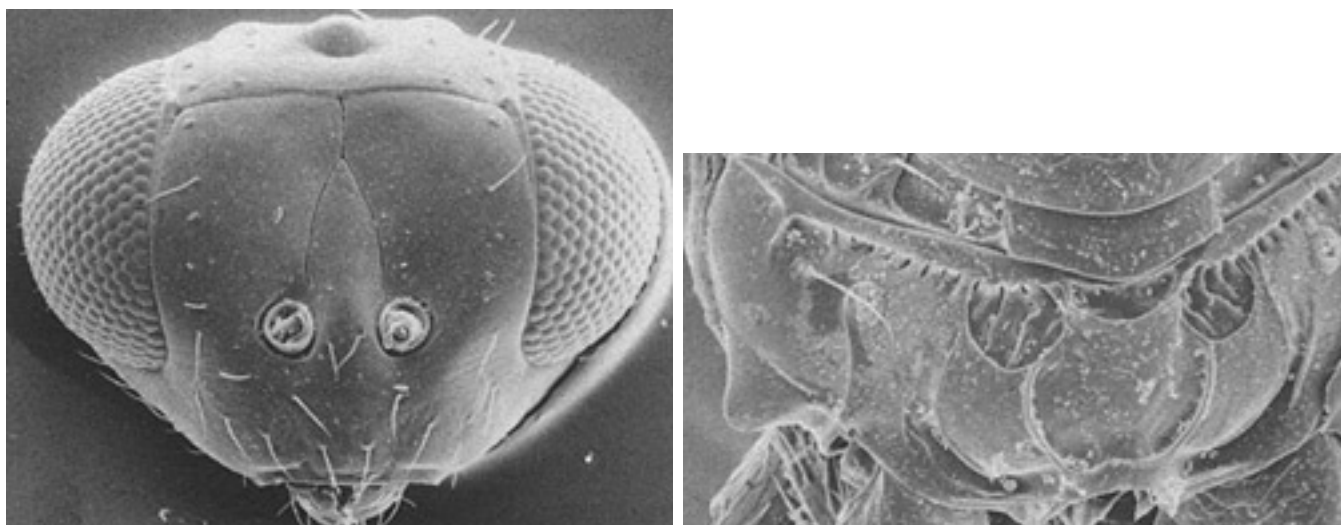
Gauthier, N., J. La Salle, D.L.J. Quicke & H.C.J. Godfray. 2000. Phylogeny of Eulophidae (Hymenoptera: Chalcidoidea), with a reclassification of Eulophinae and the recognition that Elasmidae are derived eulophids. *Systematic Entomology*. **25**(4): 521-539.

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***Emersonella* Girault, 1916** [comparative info](#) return to: [prev](#) [home](#)

**Face entirely smooth.** Mandibles usually with many small denticles (>3). **Transverse frontal groove nearly straight**; scrobal grooves present as distinct sulci and uniting before reaching transverse groove. Flagellar formula 1,4,1 in males and females. Pronotum very short dorsally; metapleuron with a strong, sharply pointed projection. **Propodeum with semicircular submedian carinae, most broadly separated in middle of propodeum, anterior ends of carinae arising from broad cavities or sunken areas exposing short longitudinal costulae.** Petiole braced by ventral flange from gs1. Compare with: *Pediobius*.



1a-b: *Emersonella* face (left), and propodeum (right)

**Biology:** Egg parasitoids of Chrysomelidae.

**Comments:** 9 described species. Not very similar to any other Nearctic genus.

**Comparative information:**

***Pediobius*:** Submedian propodeal carinae divergent throughout their length, furthest apart posteriorly. Transverse frontal groove V-shaped, scrobal grooves reaching it before meeting. Face sculptured. Petiole with anterior flange embracing propodeal nucha, with ventral tooth. Generally not similar in body form.

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## References

Boucek, Z. 1977. Descriptions of two new species of Neotropical Eulophidae (Hymenoptera) of economic interest, with taxonomic notes on related species and genera. *Bulletin of*

*Entomological Research*. **67**(1): 1-15.

Hansson, C. 2002. Eulophidae of Costa Rica (Hymenoptera: Chalcidoidea), 1. *Memoirs of the American Entomological Institute* **67**.

Schauff, M.E. 1991. The Holarctic genera of Entedoninae (Hymenoptera: Eulophidae). *Contributions of the American Entomological Institute* **26**.

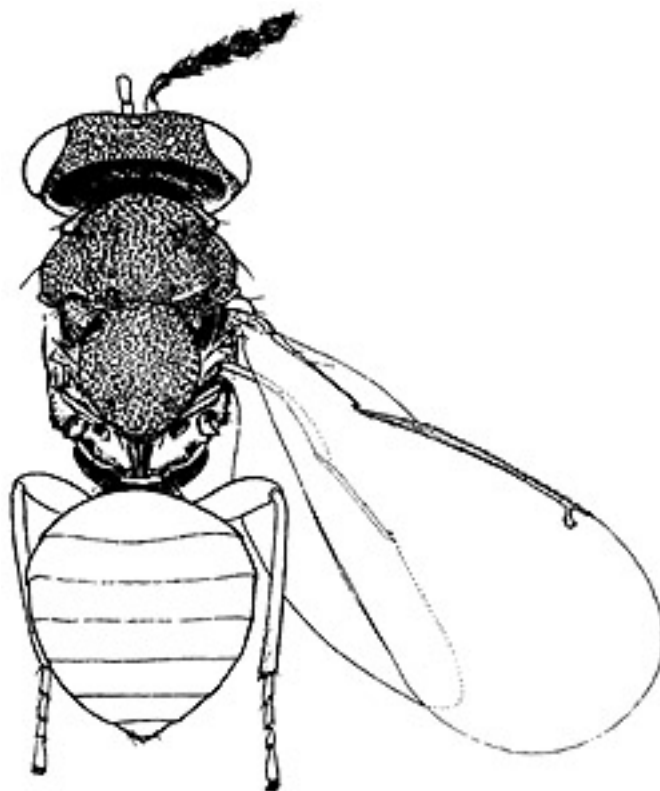
Image credits: 1a-b: Schauff (1991).

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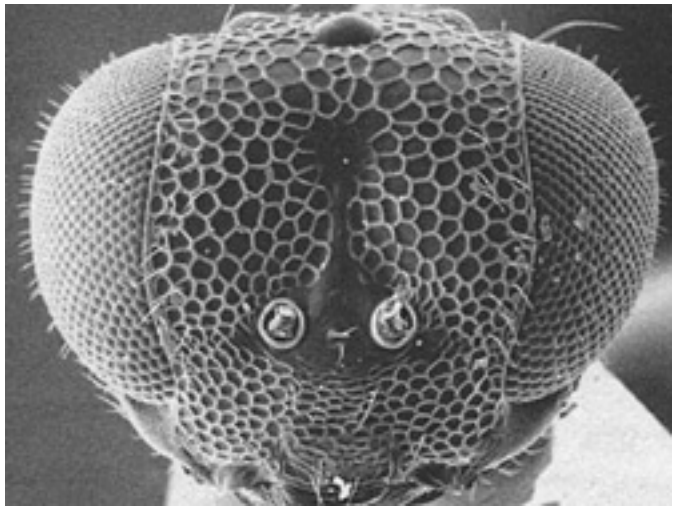
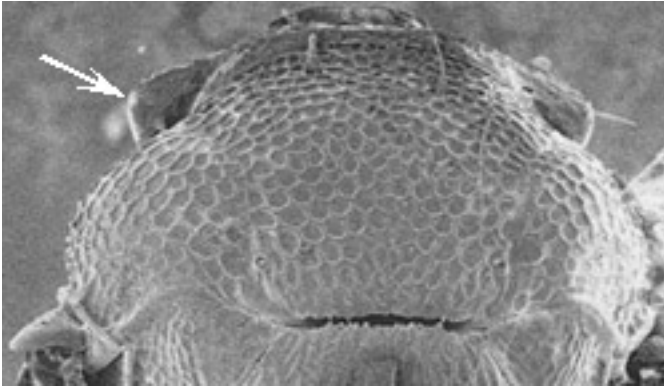
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**Entedon** Dalman, 1820 [comparative info](#) return to: [prev](#) [home](#)

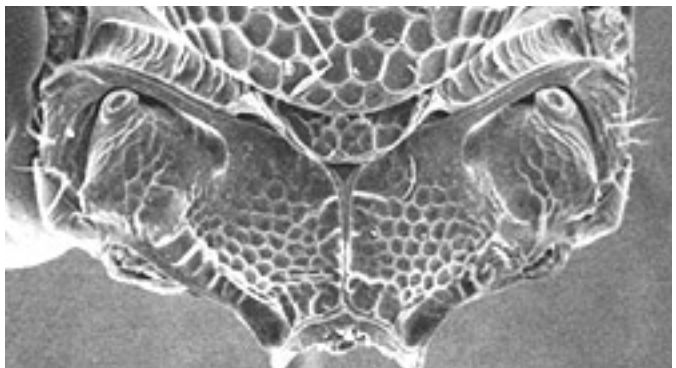
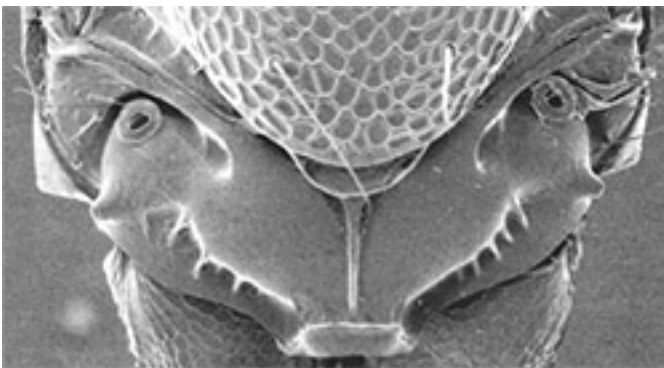
Body relatively large, strongly raised-reticulate. Mandibular formula 2:2. Facial grooves often greatly reduced or absent, not forming lines of collapse, transverse frontal groove V-shaped when present (traceable as such even when absent); scrobal grooves uniting before reaching transverse groove. Antenna with 5 postanellar flagellomeres, with at least 2 as funicular segments and at least 1 as a claval segment. Pronotum usually with lateral lobe present postero-dorsal to pronotal scrobe [not unique], bearing 1 bristle; dorsal surface of collar comprised mostly of a shiny strip in most species, carinate in some; mesoscutal midlobe with 2 pairs of tiny setae; scutellar pair of setae tiny, scutellum very large, often with a distinct transverse constriction anterior to setae; scutellar-axillar border without large pit (sometimes with a vague pit associated with the axillular border); posterior border of prepectus slightly overlapped by broad extension of mesepisternum in some species; metapleuron weakly to strongly convex, with or without pointed projections. Postmarginal vein and stigmal vein very short, subequal in length; speculum present, open posteriorly. **Propodeum with single narrow median carina placed in a sunken channel; plicae absent**; median panels smooth to reticulate; **channel between median panels and supracoxal flange always crossed by distinct costulae**. Petiole subquadrate to broader than long in females, sometimes distinctly longer than broad in males. Compare with: *Chrysocharis*, *Pediobius*, *Paracrias*.



1a: *Entedon* dorsal view



2a-b: *Entedon* anterior part of mesosoma with lateral pronotal lobe indicated (left), and face (right)



3a-b: *Entedon* propodea

Biology: Primary parasitoids of Coleoptera.

Comments: Very large genus, easily recognized by propodeal features and general body form. The longitudinal groove that the median carina is placed in may be weak, but recognizable by an experienced observer. The median carina placed in a sunken channel is remotely reminiscent of the raised median strip flanked by sunken channels in *Horismenus*, *Paracrias*, and similar genera.

### Comparative information:

***Chrysocharis*:** Propodeum usually without a distinct median carina, seldom with a straight and regular one, and never with one placed in a longitudinal groove; median panels never separated from supracoxal flange by costulate channel; plicae present in some species.

***Pediobius*:** Propodeum in most species with 1 median carina splitting posteriorly or with 2 submedian carinae diverging posteriorly, anterior portion of median carina without cup-shaped structure, but sometimes with tooth-like extension (which becomes diverging carinae posteriorly); some species with raised median strip instead of median or submedian carinae; plicae present. Petiole stout, with dorsal flange embracing propodeal nucha, with

**ventrally-projecting tooth.** Gt1 usually covering 0.5x or more of gaster. Usually easily distinguished based on propodeal features. The median propodeal carina of *Pediobius* branches posteriorly, while that of *Entedon* may branch anteriorly (very rarely forming a mildly Y-shaped carina), if at all.

**Paracrias:** Propodeum without median carina, with broad, smooth, raised median strip flanked by sunken channels; nucha roughly sculpted and elongate or posterior half of propodeum rugulose. Seldom confusable with *Entedon*, in all cases clearly distinguishable by propodeal features.

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## References

Boucek, Z. 1988. Australasian Chalcidoidea (Hymenoptera). A biosystematic revision of genera of fourteen families, with a reclassification of species. CAB International, Wallingford, UK.

Schauff, M.E. 1988. The species of *Entedon* (Hymenoptera: Eulophidae) in America North of Mexico. *Journal of the New York Entomological Society*. **96**: 30-62.

Schauff, M.E. 1991. The Holarctic genera of Entedoninae (Hymenoptera: Eulophidae). *Contributions of the American Entomological Institute* **26**.

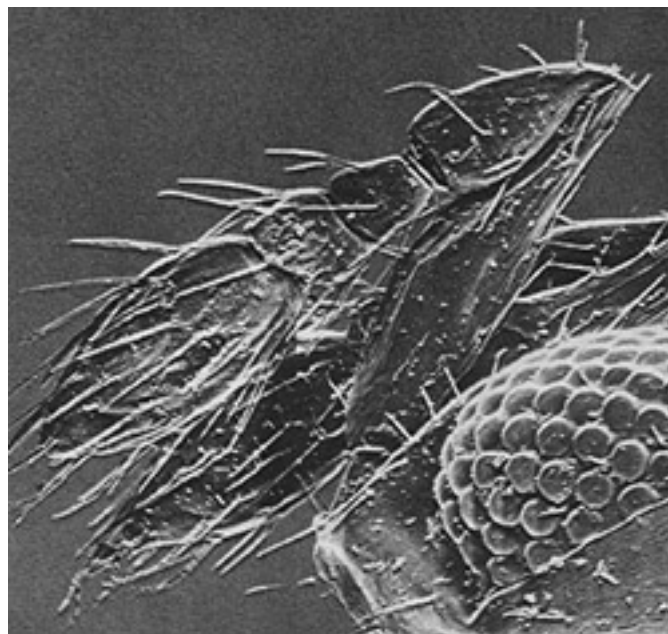
Image credits: 1a: Boucek (1988). 2a: Schauff (1991). 2b, 3a-b: Schauff (1988).

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***Entedonastichus*** Girault, 1920 [comparative info](#) return to: [prev](#) [home](#)

**Complete suture present across vertex.** Head and mesosoma smooth or weakly sculpted. **frontal grooves extending above median ocellus, to top of eye; malar sulcus split ventrally**, but often very difficult to see. The only known North American species has **brachypterous females**; macropterous specimens with forewing fringe setae very long, about 0.5x transverse width of wing. **Petiole quadrate to longer than broad, conspicuous.** Compare with: *Thripobius*.



1a-b: *Entedonastichus* head and mesosoma (left), and female antenna (right)

**Biology:** Parasitoids of thrips.

**Comments:** 6 described species. Synapomorphies (split malar sulcus, frontal groove extending above lateral ocellus) indicate a close relationship with *Thripobius*.

**Comparative information:**

[Thripobius](#): Petiole much broader than long.

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## References

Schauff, M.E. 1991. The Holarctic genera of Entedoninae (Hymenoptera: Eulophidae). *Contributions of the American Entomological Institute* **26**.

Yoshimoto, C. 1981. First record of *Thripoctenoides* from North America, with description of a new species (Hymenoptera: Eulophidae). *Canadian Entomologist*. **113**: 723-725.

Image credits: 1a-b: Yoshimoto (1981).

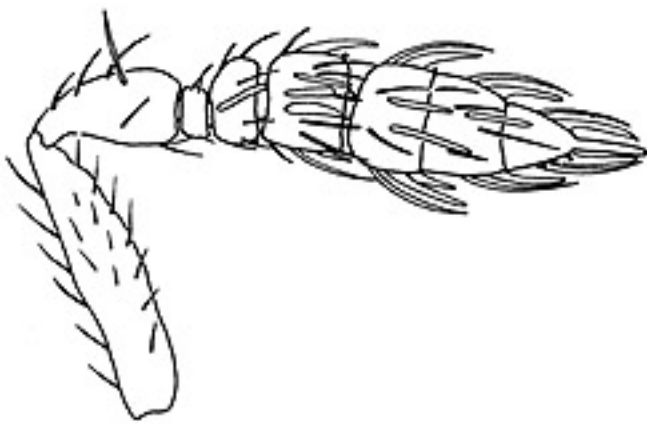
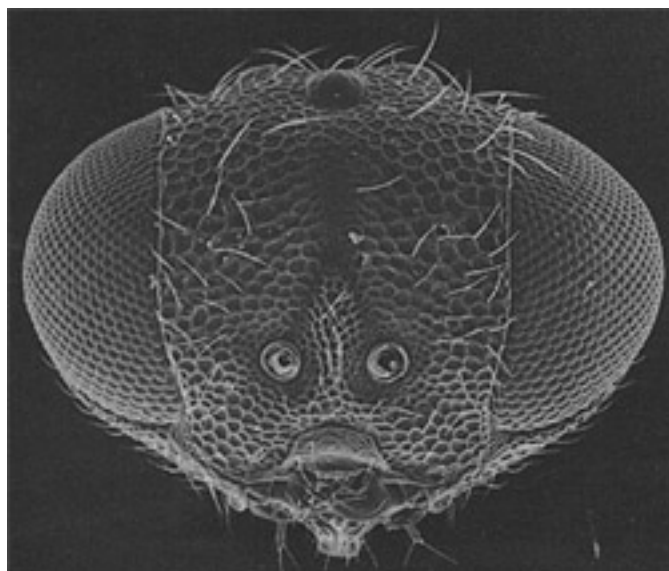
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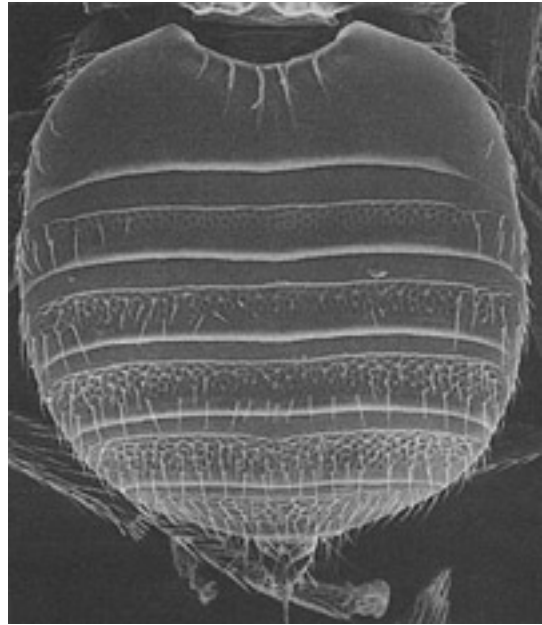
***Entedononecremnus* Girault, 1915** [comparative info](#) return to: [prev](#) [home](#)

**Eyes not setose.** Transverse frontal groove not indicated, but presumably should be located about 1 ocellar diameter below the median ocellus; scrobal depressions not present as sulci, about as broad as scape, uniting near center of face, the longitudinal depression extending to end near median ocellus. Clypeus delimited by dorsal suture. Flagellum with 3 claval segments and 3 preclaval segments; 3rd flagellomere quadrate to longer than broad, much longer than 1st and 2nd flagellomeres. Mesosoma with raised reticulate sculpture; pronotal collar not formed; **mesoscutal midlobe with several irregularly placed setae**; about half dorsal axillar surface advanced beyond scutellar margin; **scutellum with many dorsal setae** (unpaired, or in 3 or more pairs), about as long as mesoscutum; prepectus not fused with mesopleuron.

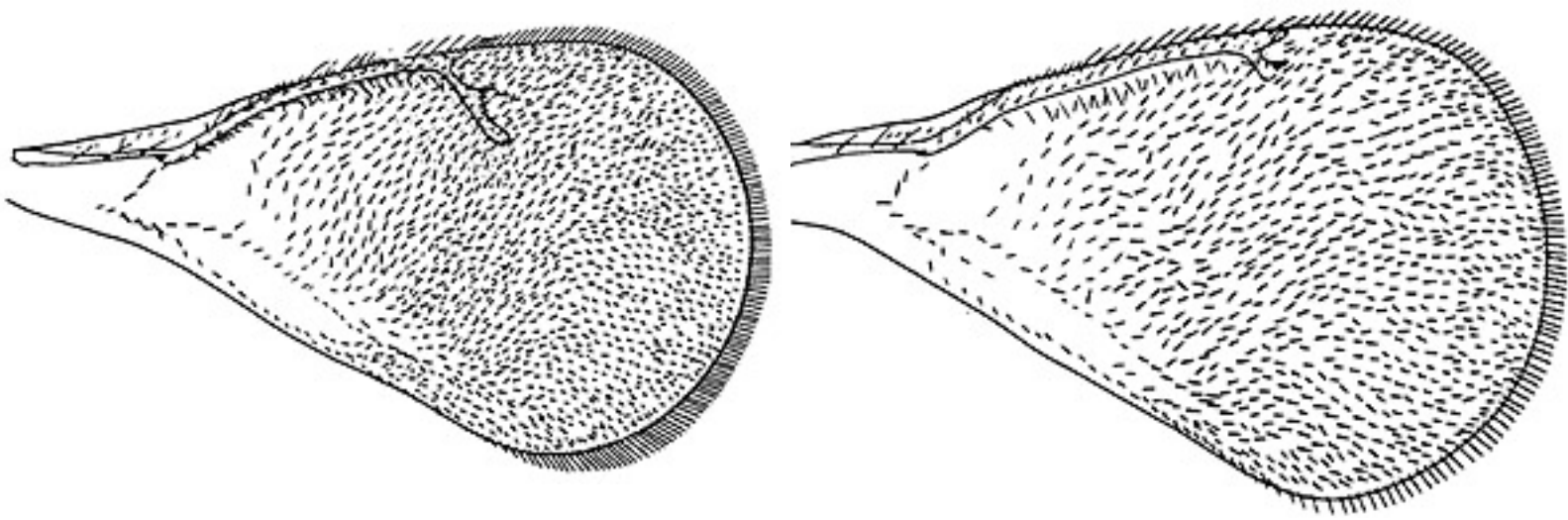
**Submarginal vein with 3-5 dorsal setae**; speculum present. Postmarginal vein as long as or shorter than stigmal vein; stigma petiolate or not; marginal vein slightly longer than costal cell; **submarginal vein with 3-5 setae**. Propodeum with strong sculpture, including a very distinct paraspiracular fovea that curves posteriad to unite with the supracoxal flange; median carina meeting nuchal carina posteriorly; callus with sharp posterior corners (2 pairs: dorsal and ventral). Gaster with metallic luster; gt1 usually smooth, shiny, but **with carinate adpetiolar margin**, brightly metallic, while other tergites sculpted and more dull; hypopygium <0.25x gastral length; ovipositor sheaths greatly enlarged. Mesotibial spur short, usually not pectinate. Compare with: ***Aleuroctonus***.



1a-b: *Entedononecremnus* face (left), and female antenna (right)



**2a-c: *Entedononecremnus* mesosomal dorsum (top left), dorsal view of gaster (top right), and oblique ventral view of gaster (right)**



3a-b: *Entedononecremnus* forewings

**Biology:** Parasitoids of Aleyrodidae.

**Comments:** 14 described species. Neotropical, Nearctic.

**Comparative information:**

***Aleuroctonus*:** Eyes densely setose. Gaster not strongly sclerotized, tending to collapse, unsculpted, not metallic, with pale markings basally or throughout its length. Mesotibial spur long and pectinate.

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## References

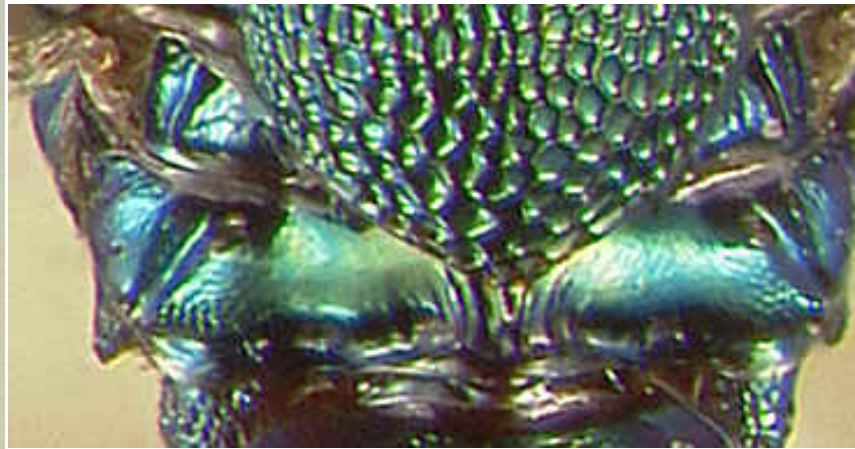
- Hansson, C. & J. LaSalle. 2002. Revision of the Neotropical species of the tribe Euderomphalini (Hymenoptera: Eulophidae). *Journal of Natural History*. **37**(6): 697-778.
- LaSalle, J. & M.E. Schauff. 1994. Systematics of the tribe Euderomphalini (Hymenoptera: Eulophidae): parasitoids of whiteflies (Homoptera: Aleyrodidae). *Systematic Entomology*. **19**: 235-258.

Image credits: LaSalle & Schauff (1994).

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***Eprhopalotus* Girault, 1916** [comparative info](#) return to: [prev](#) [home](#)

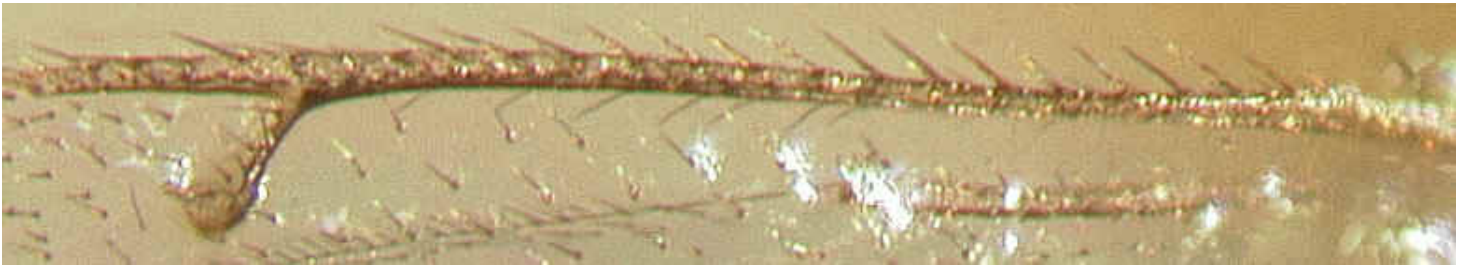
Head very large. Transverse frontal groove faint or absent; scrobal depressions meeting below center of face, interscrobal process very short. Flagellar formula 2,4,1. **Pronotum not visible dorsally, very short and hardly visible laterally; notauli distinctly complete** as deep, narrow grooves throughout their length; scutellum overhanging metanotum and part of propodeum. Postmarginal vein subequal stigmal vein length. Propodeum very short, about 4x broader than long; small median carina present, flanked by channels and submedian carinae. Petiole very short, much broader than long.



1a-b: *Eprhopalotus* face (left), and propodeum (right)



2: *Eprhopalotus* from dorsal view



3: *Ephopalotus* forewing venation

**Biology:** Reared from Cynipid leaf gall on oak.

**Comments:** 2 described species.

**Comparative information:** Similar to *Entedon* and some other large-bodied Entedoninae, but easily distinguished from them by propodeal features and the extremely large mesoscutal midlobe and scutellum. The form of the face, forewing venation, and the propodeum suggests a strongly modified *Entedon*. Although the shape of the propodeum is different, many of the same features that make *Entedon* distinct are recognizable here as well, such as the median carina flanked by grooves, the supracoxal flange, and the form of the spiracular cavity.

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## References

Schauff, M.E. 1991. The Holarctic genera of Entedoninae (Hymenoptera: Eulophidae). *Contributions of the American Entomological Institute* **26**.

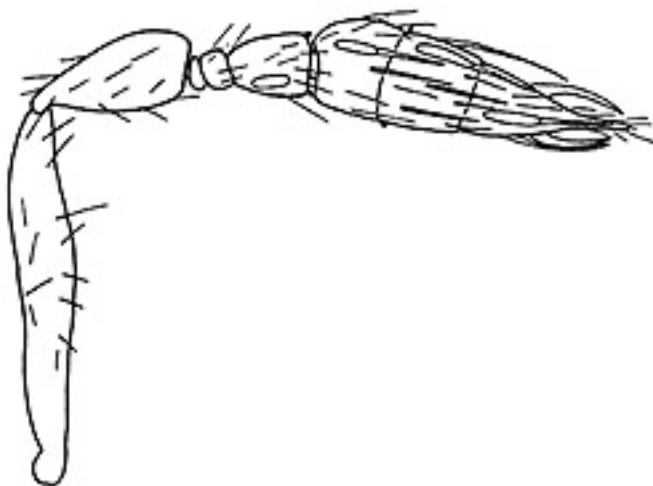
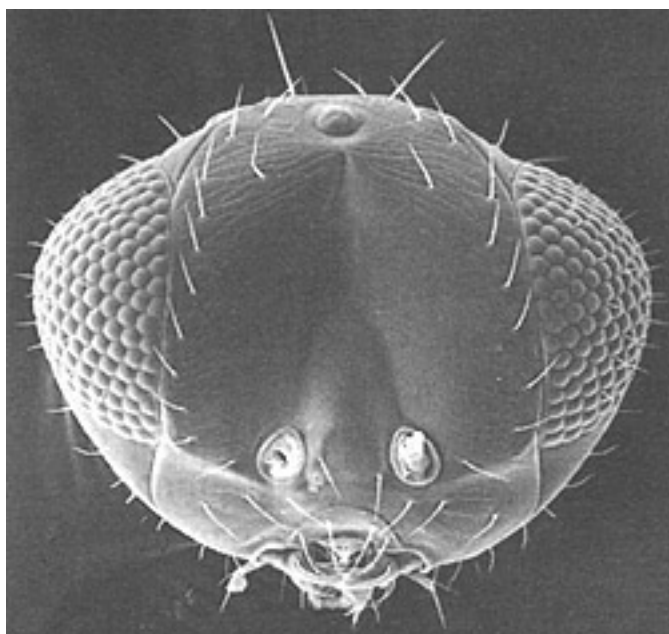
Schauff, M.E. & J. LaSalle. 1993. Nomenclatural notes on genera of North American Eulophidae (Hymenoptera: Chalcidoidea). *Proceedings of the Entomological Society of Washington*. **95**(3): 488-503.

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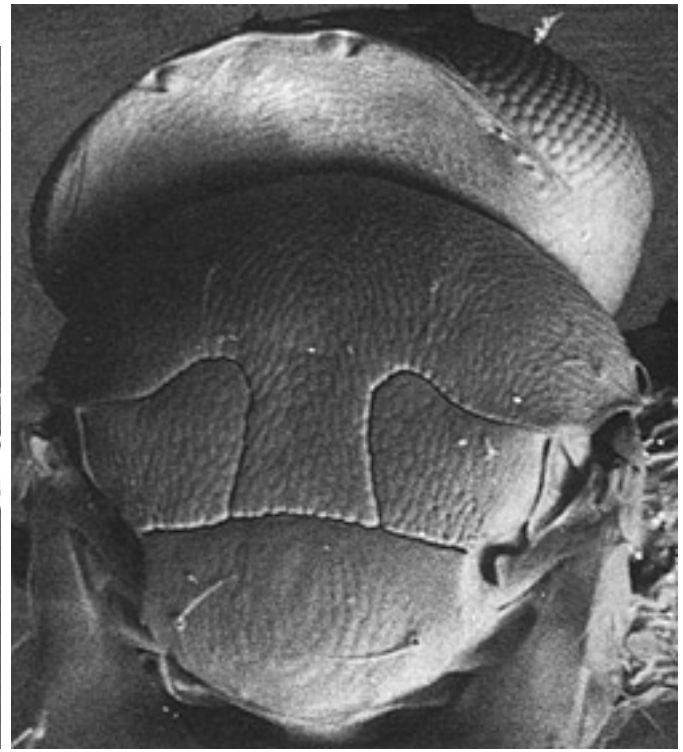
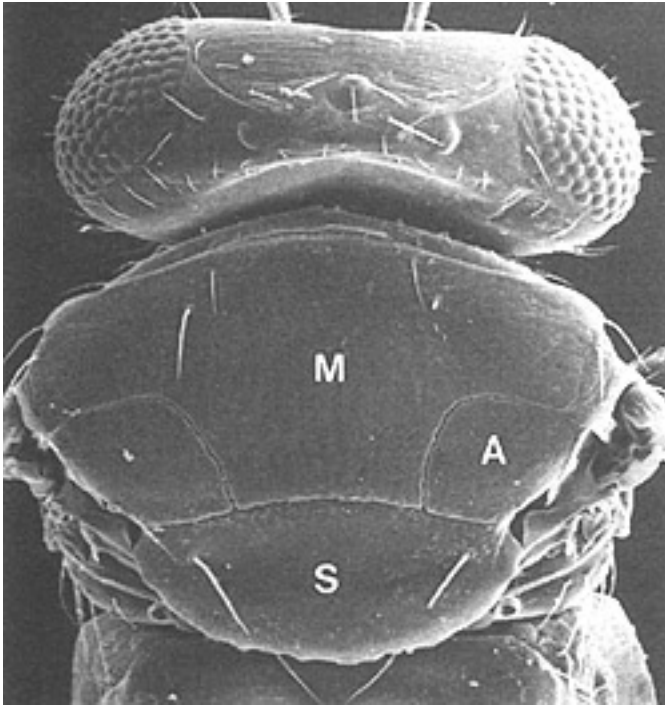
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***Euderomphale* Girault, 1916** [comparative info](#) return to: [prev](#) [home](#)

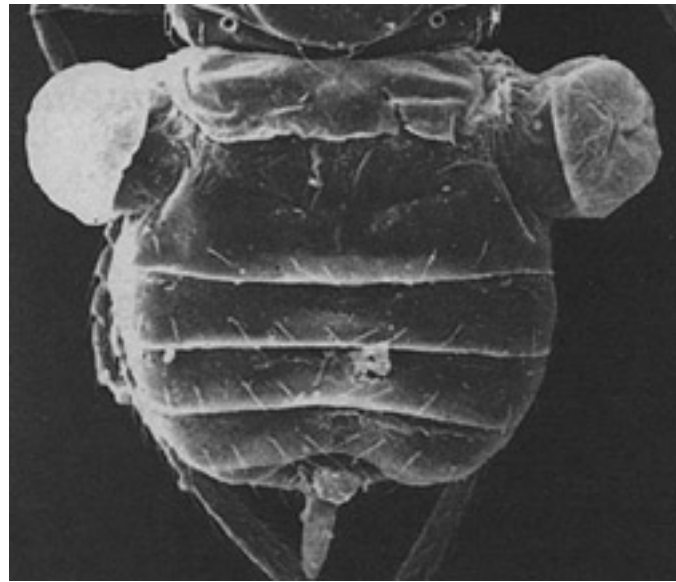
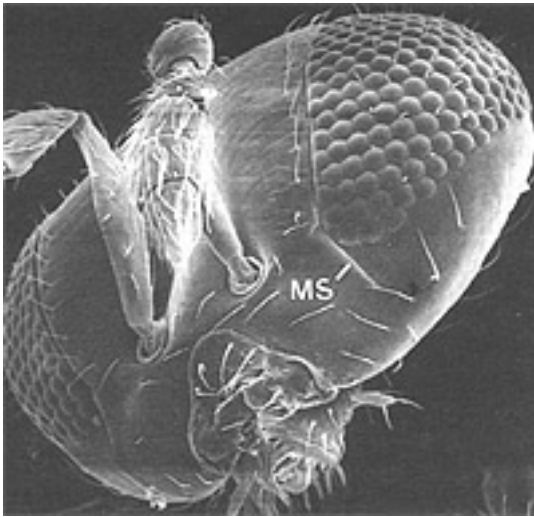
Eyes setose. Transverse frontal groove absent, but presumably should be located near median ocellus as a straight line; scrobal depressions not present as grooves, uniting near center of face, the longitudinal depression ending at the median ocellus. Clypeus defined dorsally by a semicircular sulcus. **Malar sulcus incomplete, directed posteriad. Vertex with transverse groove extending between median ocellus and lateral ocelli**; occiput with longitudinal and transverse grooves. Flagellum 6-segmented; first pair of flagellomeres tiny and anelliform, 3rd flagellomere longer than broad; 3-segmented club much longer than rest of flagellum, with apical spicule. Pronotal collar not formed; mesoscutal midlobe with 2 pairs of setae; **axillae advanced entirely anteriad of scutellar margin, defined by complete sulcus curving at right angle** (sinuate in *E. sinuata* LaSalle group), **dorsal surface of axilla about as long as broad**; scutellum much broader than long, shorter than mesoscutum, with 2 pairs of tiny setae. Postmarginal vein subequal to stigmal vein in length; marginal vein much longer than costal cell; submarginal vein with 2 dorsal setae; females of *E. sinuata* brachypterous. Propodeum extremely short. Petiole transverse. Gaster unsculpted, not metallic; males and females known to have antero-lateral abdominal glands. Color never metallic. Compare with: ***Neopomphale***.



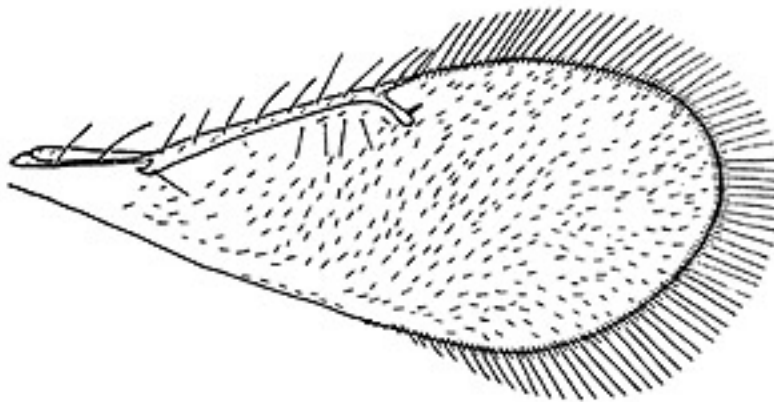
1a-b: *Euderomphale* face (left), and female antenna (right)



2a-b: Typical *Euderomphale* mesosomal dorsum (M=mesoscutum, A=axilla, S=scutellum) (left), and that of the *E. sinuata* group (right)



3a-b: *Euderomphale* malar sulcus (= MS) (left), and gaster showing antero-lateral abdominal glands (right)



4a: *Euderomphale* forewing

**Biology:** Parasitoids of Aleyrodidae.

**Comments:** 15 described species. Nearctic, Neotropical, Palearctic, Afrotropical.

**Comparative information:**

***Neopomphale*:** Axillar sutures absent (mesoscutum without visible sutures). Malar sulcus complete, not directed posteriad.

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## References

- Hansson, C. & J. LaSalle. 2002. Revision of the Neotropical species of the tribe Euderomphalini (Hymenoptera: Eulophidae). *Journal of Natural History*. **37**(6): 697-778.
- LaSalle, J. 1999. A new species group and two new species of *Euderomphale* Girault (Hymenoptera: Eulophidae) from North America. *Journal of Hymenoptera Research*. **8**(1): 116-119.
- LaSalle, J. & M.E. Schauff. 1994. Systematics of the tribe Euderomphalini (Hymenoptera: Eulophidae): parasitoids of whiteflies (Homoptera: Aleyrodidae). *Systematic Entomology*. **19**: 235-258.
- LaSalle, J. & A. Polaszek. 2000. The presence of antero-lateral abdominal glands in *Euderomphale* (Hymenoptera: Chalcidoidea: Eulophidae). *Journal of Hymenoptera Research*. **9**(2): 427-429.

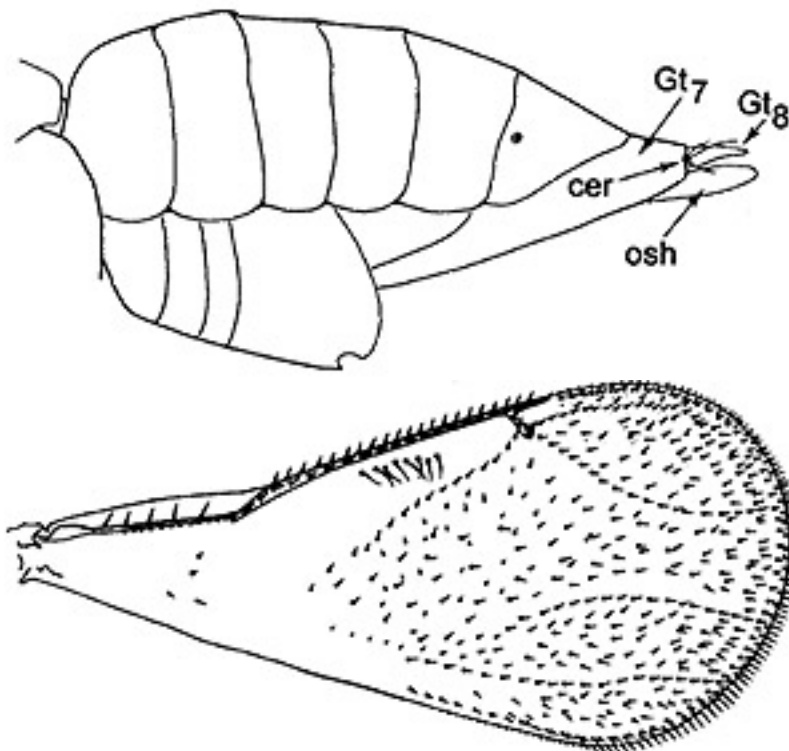
Image credits: 1a-b, 2a, 3a, 4a: LaSalle & Schauff (1994). 2b: LaSalle (1999). 3b: LaSalle & Polaszek (2000).

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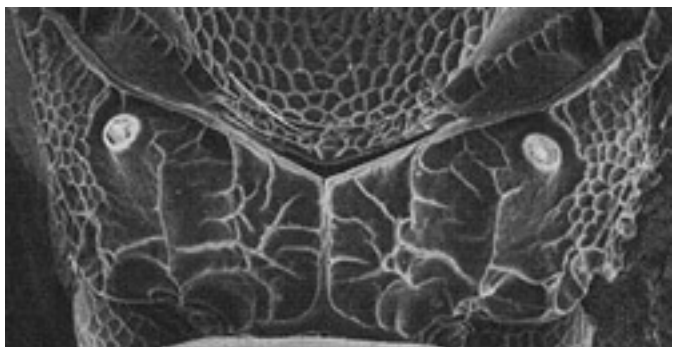
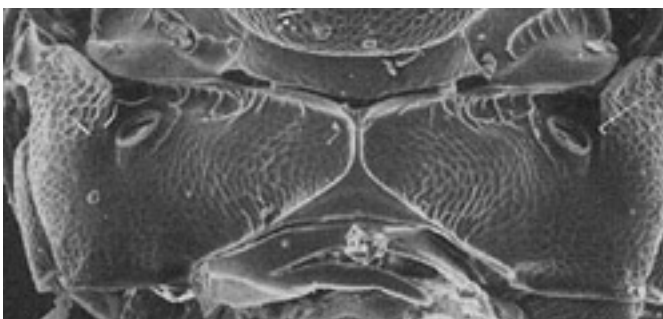
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***Euderus*** Haliday, 1844 [comparative info](#) return to: [prev](#) [home](#)

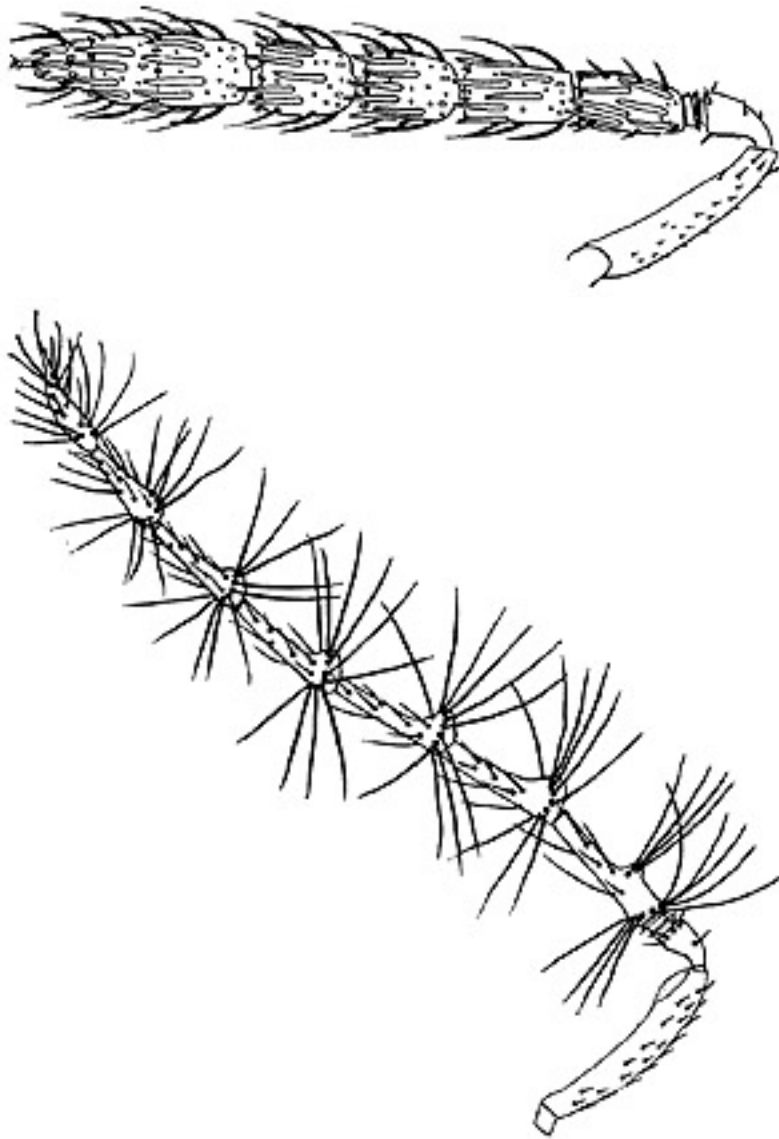
**Flagellomeres in males of most species similar to those of females**, but pedicellate with whorls of setae in some species; some species with pedicellate flagellomeres have an incomplete second whorl of setae on the basal funicular segment. Scutellum slightly overhanging dorsellum. Forewing almost never with fuscate regions; almost always with 2-3 setal tracks radiating from stigmal apex, rarely with tracks not discernable; postmarginal vein 1.1-1.75x stigmal vein length. **Propodeum almost always with median carina** (absent in some species where the propodeum is very short or with strong rugae); subgenus *Secodelloidea* Girault with strongly rugose propodeum. Apical gastral tergite much shorter than preceding tergite in most species (many exceptions, but these are extralimital). Compare with: ***Parasecodella*, *Allocerastichus*, *Carlyleia*.**



1a-b: Typical *Euderus* gaster (top ), and forewing (bottom)



2a-b: Typical *Euderus* propodeum (left), and *Euderus* (*Secodelloidea*) propodeum (right)



3a-b: *Euderus* female antenna (top), and *E. viridilineatus* Yoshimoto male antenna (bottom, atypical of genus)

**Biology:** Primary or secondary (through Ichneumonoids) parasitoids of larvae in concealed situations (Lepidoptera, Coleoptera, Cynipidae).

**Comments:** Large genus, and difficult to define with universally applicable characters. Many exceptional forms are locally common in certain areas, especially forms that would seem to approach or overlap *Parasecodella*.

**Comparative information:**

**Parasecodella:** Forewing with indistinct or no setal tracks radiating from stigma, and: females with both pedicel and 1st funicular segment 2x longer than broad, apical funicular segments much shorter than basal ones; males with nodose flagellomeres and 1st funicular segment with two complete whorls of erect setae. All characters must be present in combination, as any of them may occur in *Euderus*. The character most infrequently found in

*Euderus* is the lack of setal tracks radiating from the stigma.

***Allocerastichus***: Antennal radicle elongate, nearly as long as pedicel. Propodeum without median carina. Gt1 with 2 or 3 dorsal carinae in females, 1 in males; last gastral tergite much longer than preceding tergite in females of all species.

***Carlyleia***: No rows of setae radiating from stigma. Propodeum without median carina. Last gastral tergite much longer than preceding tergite in all females.

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## References

Boucek, Z. 1963. Studien über europäische Eulophidae, III: Euderinae (Hymenoptera: Chalcidoidea). *Beiträge zur Entomologie*. **13**: 257-281.

Coote, L.D. 1994. Review of Nearctic genera of Euderinae (Hymenoptera: Eulophidae), with descriptions of two new species of *Allocerastichus* Masi, and redescription of *Carlyleia marilandica* Girault. *Canadian Journal of Zoology*. **72**: 1044-1054.

Schauff, M.E., J. LaSalle, & L.D. Coote. 1997. Chapter 10. Eulophidae. in "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.

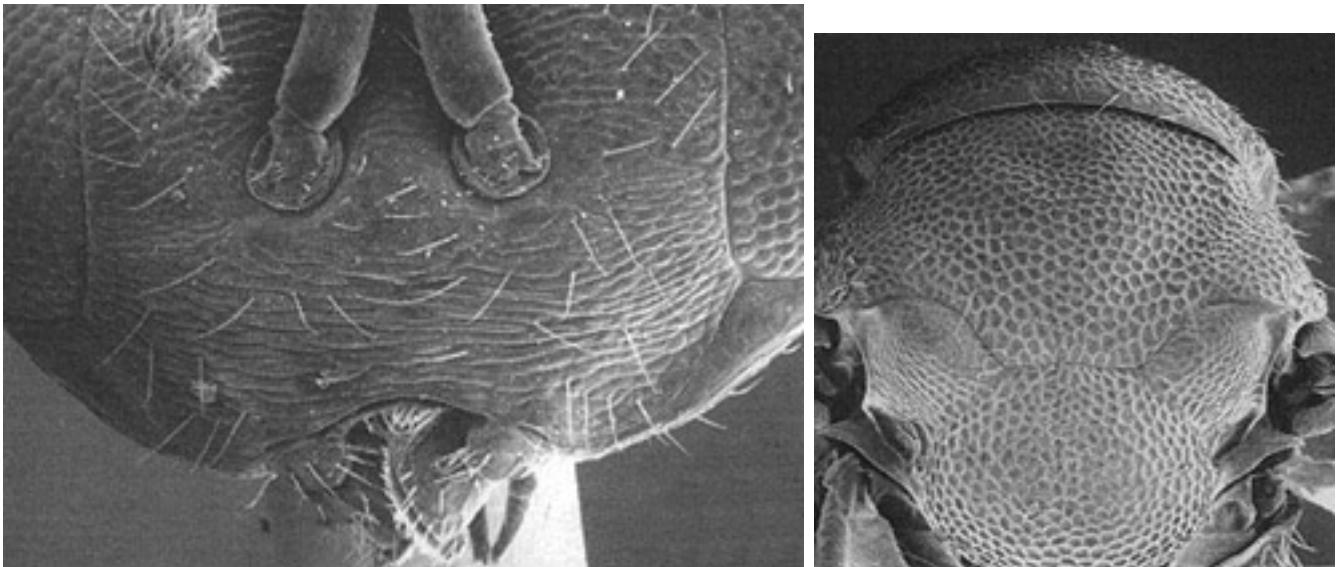
Yoshimoto, C. 1971. Revision of the genus *Euderus* of America north of Mexico (Hymenoptera: Eulophidae). *Canadian Entomologist*. **103**: 541-578.

Image credits: 1a-b, 3a-b: Coote (1994). 2a-b: Schauff, et al. (1997).

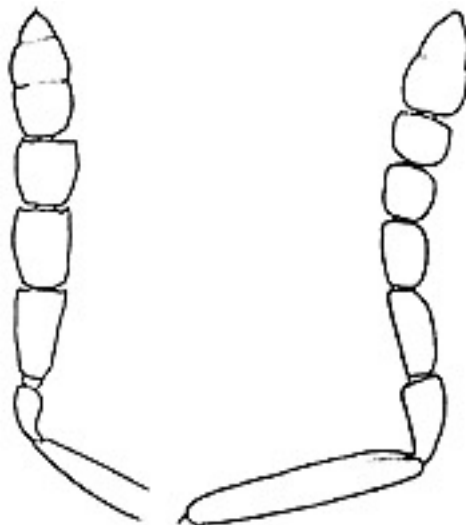
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***Eulophus* Geoffroy, 1762** [comparative info](#) return to: [prev](#) [home](#)

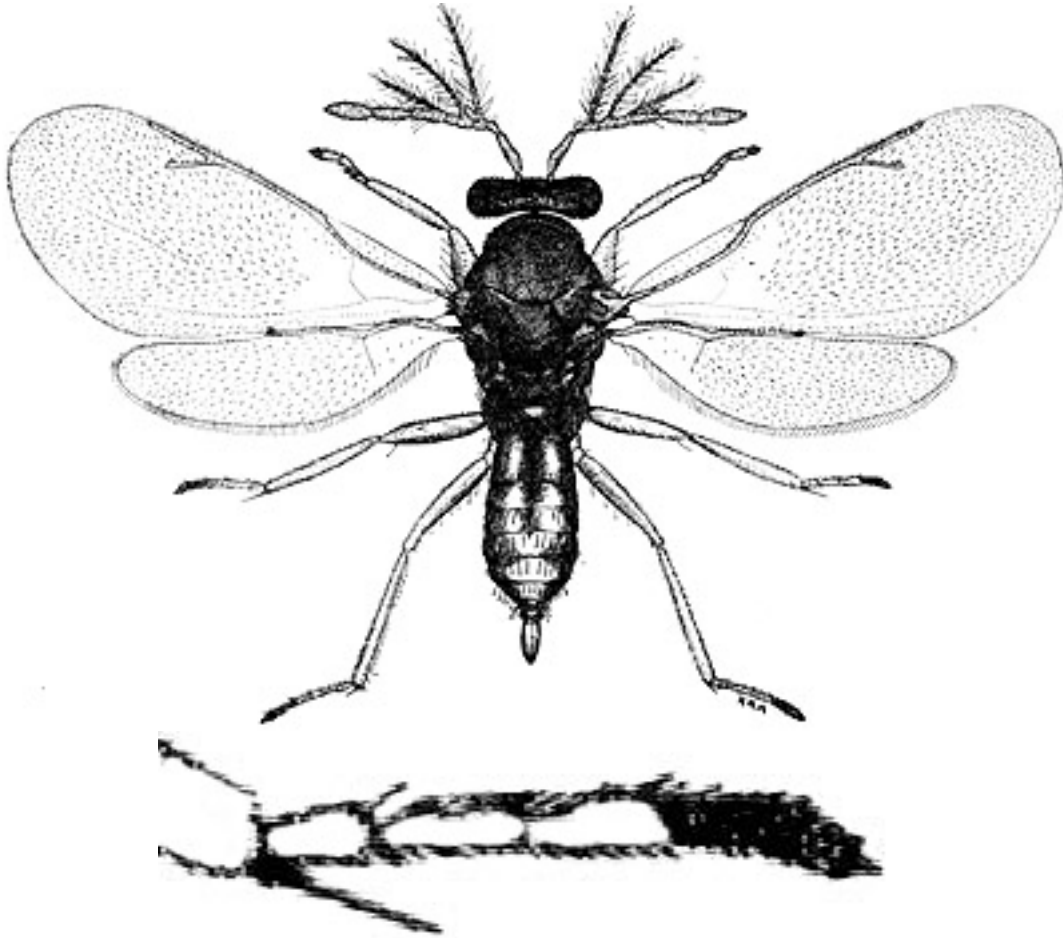
Body large and stout. **Mandibles reduced, not capable of meeting medially.** Flagellar formula 1,3,3 or 1,4,2, always with 4 funicular segments in males; funicular segments with 3 long branches in males of most species, but unbranched in some; scape sometimes slightly exceeding vertex. Notauli incomplete or ending in axillae far from scutellar margin; scutellum without submedian grooves; scutellar setae paired. Postmarginal vein subequal or slightly longer than stigmal vein (at most 1.7x stigmal vein length). 2 metatibial spurs, neither longer than 1st metatarsal segment; **basal mesotarsal segment (sometimes also basal metatarsal segment) shorter than 2nd segment, subequal or shorter than mesotibial spur.** At least some species with seasonal color morphs. Compare with: *Necremnus*, *Microlycus*, *Dahlbominus*, *Colpoclypeus*.



1a-b: *Eulophus* face (left), and mesosomatic dorsum (right)



2a-b: *Eulophus* typical female antenna (left), and *E. thespius* Walker male antenna (right, atypical of this genus)



3a-b: *Eulophus larvarum* (L.) male (top), and mesotarsus (bottom)

**Biology:** Gregarious parasitoids of Lepidoptera, pupation occurring outside host.

**Comments:** Large genus, probable relative of *Necremnus* and *Microlycus*. Specimens are generally large bodied, although this feature can be very misleading if treated as a primary diagnostic character. This is one of the easier genera to identify in the North American fauna.

#### **Comparative information:**

Generally similar to *Necremnus*, *Microlycus*, *Dahlbominus*, and *Colpoclypeus*, but easily distinguished from them all in having mandibles that are not capable of meeting medially, and basal mesotarsomere that is much shorter than the next tarsomere. A few other Eulophines, such as Euplectrini, *Hoplocrepis*, and *Ogmoelachertus*, have mandibles incapable of meeting, but these are much different from *Eulophus* and not easily confused with it.

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## References

Askew, R.R. 1968. Hymenoptera 2. Chalcidoidea section (b). *Handbooks for the Identification of British Insects*. **8**(2)b.

Boucek, Z. 1959. A study of central European Eulophidae, 1: Eulophinae (Hymenoptera). *Acta Entomologica Musei Nationalis Pragae*. **33**: 117-170.

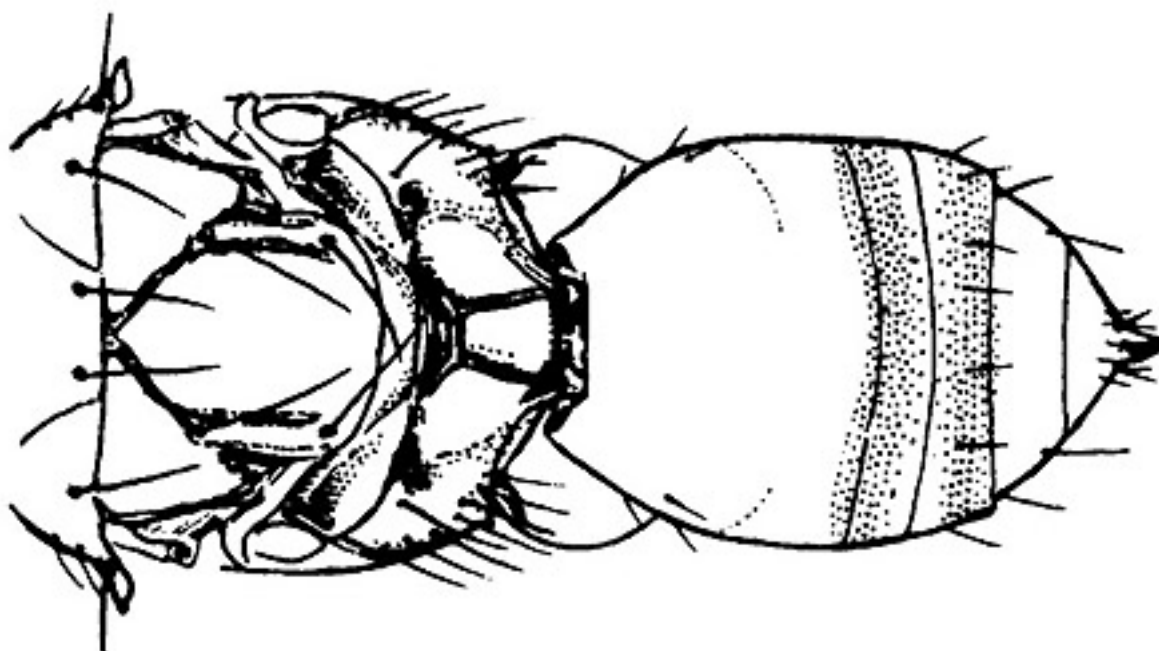
Image credits: 1a-b: Schauff, et al. (1997). 2a-b: Boucek (1959). 3a-b: Askew (1968).

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***Euplectromorpha*** Girault, 1913 [comparative info](#) return to: [prev](#) [home](#)

Occipital and postoccipital carinae absent. **Pronotal collar carinate**; notauli complete; **scutellum with nearly parallel sublateral grooves that do not meet posteriorly** under normal (up to 50x) magnification. **Propodeum with 2 submedian carinae** that meet anteriorly form an H-shaped, X-shaped, or inverse U-shaped structure. Petiole much broader than long. Longest metatibial spur reaching halfway point of 2nd metatarsal segment; usually with 2 metatibial spurs, rarely with 1. Compare with: ***Alveoplectrus***.



1a: *Euplectromorpha* posterior portion of body

**Biology:** Parasitoids of Lepidoptera.

**Comments:** Many described species.

**Comparative information:**

***Alveoplectrus***: Pronotal collar not carinate; scutellum with sublateral grooves that meet posteriorly; dorsellum with medial pit (where the longitudinal carina and transverse carina meet), and tiny posterior projection into basal cup of propodeum. Postoccipital carina present; occipital carina present or absent. **Basal protarsal segment with strigil**; 1 metatibial spur.

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## References

Boucek, Z. 1988. Australasian Chalcidoidea (Hymenoptera). A biosystematic revision of genera of fourteen families, with a reclassification of species. CAB International, Wallingford, UK.

Wijesekara, G.A.W. & M.E. Schauff. 1994. Revision of the tribe Euplectrini of Sri Lanka (Hymenoptera: Eulophidae). *Oriental Insects*. **28**: 1-48.

Wijesekara, G.A.W. & M.E. Schauff. 1997. Two new genera and three new species of Euplectrini (Hymenoptera: Eulophidae) from the New World. *Proceedings of the Entomological Society of Washington*. **99**(1): 101-109.

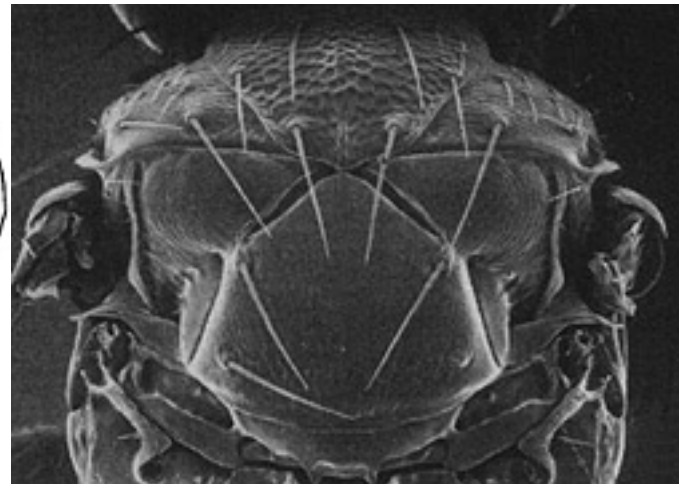
Zhu, C.D. & D.W. Huang. 2001. Revision of Chinese *Euplectromorpha* Girault (Hymenoptera: Eulophidae). *Insect Systematics & Evolution*. 31: 401-410.

Image credits: 1a: Boucek (1988).

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***Euplectrus* Westwood, 1832** [comparative info](#) return to: [prev](#) [home](#)

**Eyes not setose** under normal (up to 50x) magnification. Upper face with strong, erect setae; malar sulcus absent. **Pronotal collar carinate** [except in some small males], at least 3x broader than long in dorsal view; notauli complete; mesoscutal midlobe with 4 pairs of strong setae; notauli complete; scutellum smooth or with at most some faint impressed sculpture, without submedian or sublateral grooves/carinae. Propodeum with median carina that may have an anterior split or cup. Petiole quadrate to longer than broad. 2 greatly elongate metatibial spurs. Head and mesosoma largely black, with legs and antennae light-colored (yellowish to whitish). Compare with: ***Platyplectrus***.



1a-b: *Euplectrus* dorsal view (left), and scutellum (right)

**Biology:** Parasitoids of Lepidoptera; larvae spin cocoons.

**Comments:** Large genus.

**Comparative information:**

***Platyplectrus***: Pronotum without differentiated collar, or if faint carina present then it is weak

and in the anterior half of the always gradually sloping propodeum, so that the "collar" is always much less than 3x broader than long in dorsal view. **Scutellum usually with sublateral grooves or carinae; strongly sculpted**, typically rugulose.

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## References

Boucek, Z. 1988. Australasian Chalcidoidea (Hymenoptera). A biosystematic revision of genera of fourteen families, with a reclassification of species. CAB International, Wallingford, UK.

Schauff, M.E., D.H. Janzen. 2001. Taxonomy and ecology of Costa Rican *Euplectrus* (Hymenoptera: Eulophidae), parasitoids of caterpillars (Lepidoptera). *Journal of Hymenoptera Research*. **10**(2): 181-230.

Schauff, M.E., J. LaSalle, & L.D. Coote. 1997. Chapter 10. Eulophidae. *in* "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.

Wijesekara, G.A.W. & M.E. Schauff. 1994. Revision of the tribe Euplectrini of Sri Lanka (Hymenoptera: Eulophidae). *Oriental Insects*. **28**: 1-48.

Wijesekara, G.A.W. & M.E. Schauff. 1997. Two new genera and three new species of Euplectrini (Hymenoptera: Eulophidae) from the New World. *Proceedings of the Entomological Society of Washington*. **99**(1): 101-109.

Image credits: 1a: Boucek (1988). 1b: Schauff, et al. (1997).

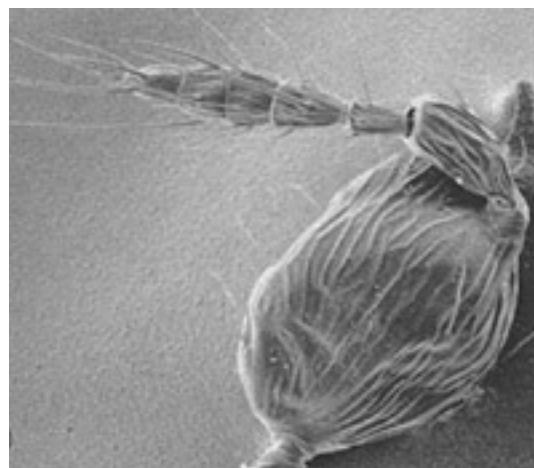
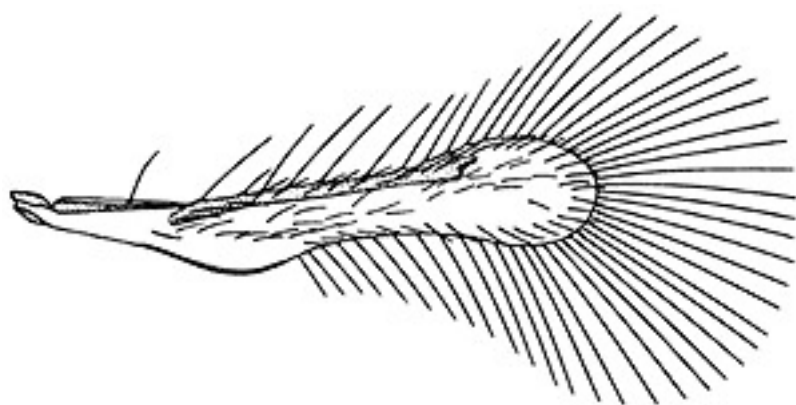
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**Goetheana** Girault, 1920 [comparative info](#) return to: [prev](#) [home](#)

**Complete suture present across vertex.** Scape strongly swollen in males of *G. shakespearei* Girault (the only species known from the Nearctic), but not so in other species; flagellum with elongate, asymmetrical but rod-shaped peg sensilla (apparently unique). **Forewing very narrow, posterior margin strongly sinuate, fringe setae much longer than transverse wing width.** Protibial spur split at base, with branches of equal length, shaped like a tuning fork.

Information on this page corrected by Serguei V. Triapitsyn (June 14, 2002).



1a-b: *Goetheana* forewing (left), and *G. shakespearei* Girault male antenna (right)

**Biology:** Solitary endoparasitoids of immature thrips.

**Comments:** 2 described species. Probably included in a monophyletic grouping with *Ceranisus*, *Thripobius*, and *Entedonastichus*, but differing strongly from all, except that some *Ceranisus* males have an expanded scape.

### Comparative information:

**Cales:** Scape not swollen in males. Mandible with ventral socketed accessory tooth. Flagellum with 2 anelli, 1 funicular segment, and 1 elongate claval segment. Tarsal formula 4-4-4.

**Ceranisus:** Posterior margin of forewing not sinuate; fringe setae not longer than forewing width.

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## References

Boucek, Z. 1977. Taxonomic studies on some Eulophidae (Hym.) of economic interest mainly from Africa. *Entomophaga*. **21**(4): 401-414.

Schauff, M.E. 1991. The Holarctic genera of Entedoninae (Hymenoptera: Eulophidae). *Contributions of the American Entomological Institute* **26**.

Image credits: Schauff (1991).

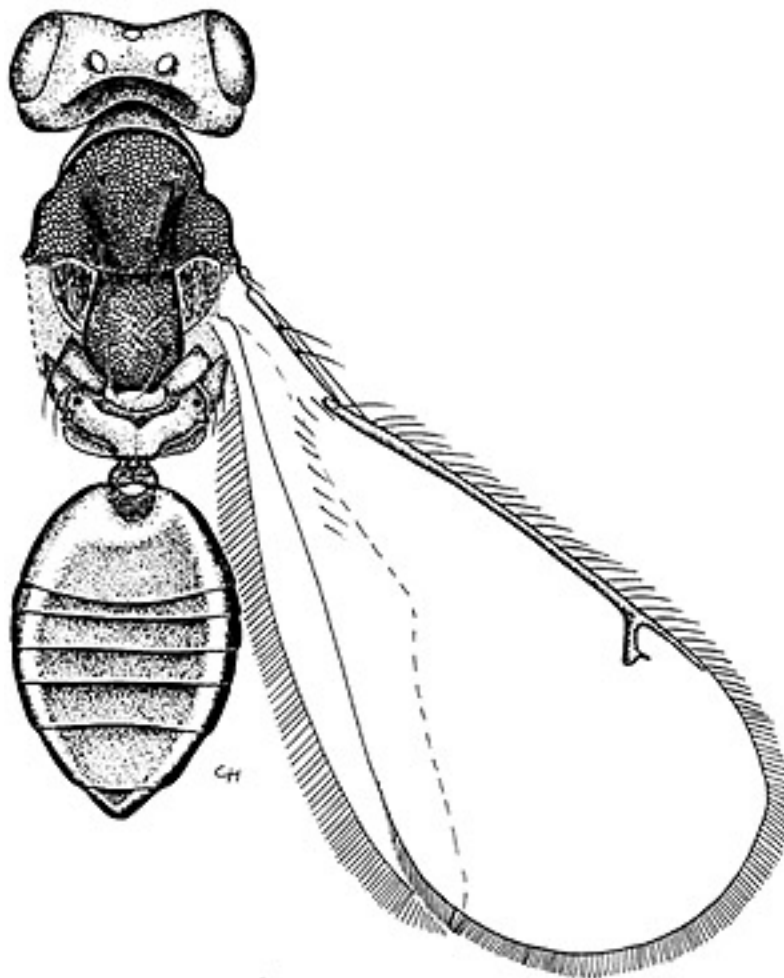
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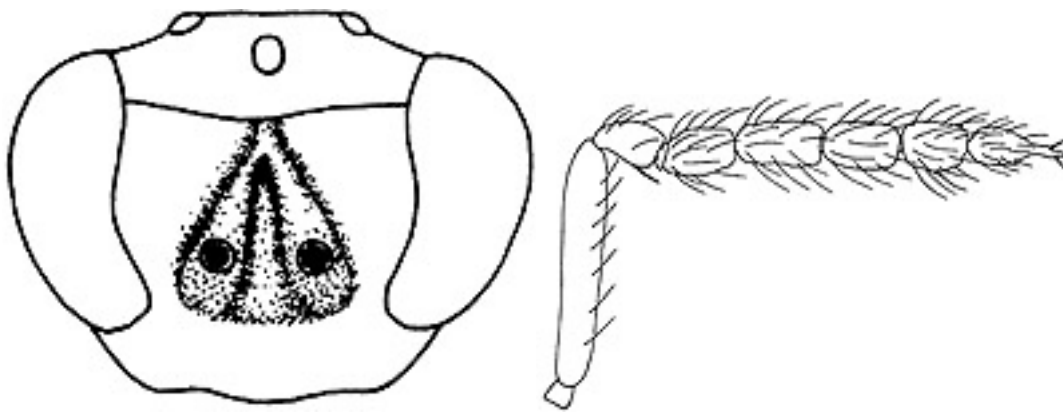
**Grahamia** Erdös, 1966 [comparative info](#) return to: [prev](#) [home](#)

Mandibular formula 3:3. Clypeus not set off by sutures. Transverse frontal groove nearly straight; scrobal depressions uniting shortly before reaching transverse groove, interscrobal process not reaching groove. **Flagellar formula strictly 1,4,1** [anellus very tiny, could easily be interpreted as absent]; scape relatively long and narrow: about 5x longer than broad, strongly flattened laterally; flagellum with symmetrical (type 1) peg sensilla. Mesoscutal midlobe with 2 pairs of setae. Forewing always strongly wedge-shaped: nearly 4x longer beyond venation than at parastigma; apical fringe setae short; postmarginal vein about 2x stigmal vein length; no setal tracks radiating from stigma; forewing without fuscate areas. Propodeum without median carina; callus with 2 setae. Petiole distinct, slightly broader than long. Compare with:

**Chrysocharis**, *Achrysocharoides*.



1a: *Grahamia*



2a-b: *Grahamia* face (left), and female antenna (right)

**Biology:** *Grahamia clinius* (Walker) is a parasitoid of *Haplodiplosis equestris* [Cecidomyiidae].

**Comments:** 2 described species, nearly identical with one another. Very similar to *Chrysocharis*, but possibly not rendering it paraphyletic.

### Comparative information:

***Chrysocharis*:** Always with three anelli, the 3rd large in females: about 0.33x first funicular segment length, but all three anelli disclike in most males, sometimes hard to distinguish. Many species with 2 (rarely 3) claval segments. Transverse frontal groove usually distinctly v-shaped.

***Achrysocharoides*:** **Eyes very strongly setose.** Flagellar formula usually 3,3,2, sometimes 3,4,1 in males. **Mesoscutum and especially scutellum often with distinct groups of pits or longitudinal foveae.** Postmarginal vein usually about 1x stigmal vein length, rarely up to 1.4x stigmal vein length (in which case the scutellum has groups of pits). Usually not confusable.

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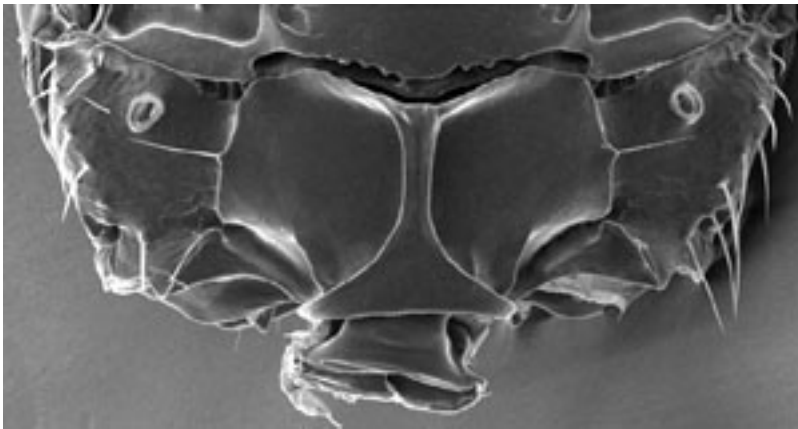
### References

Hansson, 1988. A revision of the genus *Mestocharis* and a review of the genus *Grahamia* (Hymenoptera: Eulophidae). *Proceedings of the Entomological Society of Washington*. **90**: 28-36.

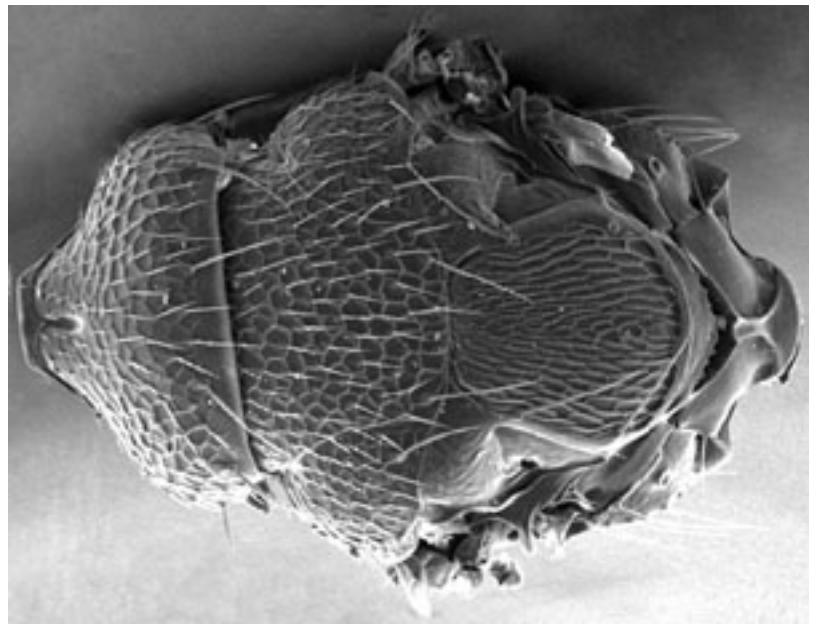
Image credits: Hansson (1988).

*Grotiusomyia* Girault, 1917 [comparative info](#) return to: [prev\(eul 8\)](#) [prev\(eul 18\)](#) [home](#)

Clypeal margin distinctly **convex**, with tiny flange-like ventral margin. 4 funicular segments, **all funicular segments**, except 1st funicular segment in some species, **quadrate or broader than long**; males with asymmetrical funicular segments similar to those in *Paraolinx*. Faint occipital carina present near ocelli. Notauli faintly complete, sometimes obscured by the strong mesoscutal sculpture; **scutellum strongly reticulate**, **sublateral grooves absent anteriorly**, present posteriorly, curving to meet near scutellar apex. Median carina of propodeum strong; **median panels sharply raised above supracoxal flange and lateral areas of propodeum**; **lateral edge of raised area with 1 seta on each side** (distinct from callar setae). Compare with: *Paraolinx*.



*Grotiusomyia* propodeum (left), and face (right)



*Grotiusomyia* female antennae (left), and mesosoma (right)

**Biology:** Parasitoids of pyralids on *Quercus* and *Populus*.

**Comments:** 2 described species. Widespread but very rarely collected genus.

**Comparative information:**

***Paraolinx*:** Scutellar grooves completely absent. Median panels of propodeum not raised above lateral and posterior areas, often undifferentiated. Mandibles relatively elongate, with numerous tiny denticles.

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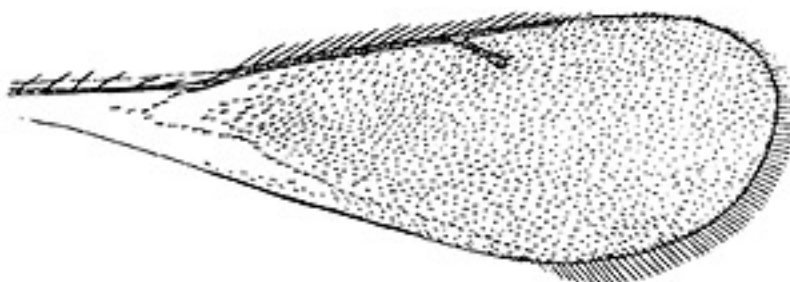
## References

- Boucek, Z. 1977. Descriptions of two new species of Neotropical Eulophidae (Hymenoptera) of economic interest, with taxonomic notes on related species and genera. *Bulletin of Entomological Research*. **67**(1): 1-15.
- LaSalle, J. & M.E. Schauff. 1992. Preliminary studies on Neotropical Eulophidae (Hymenoptera: Chalcidoidea): Ashmead, Cameron, Howard, and Walker species. *Contributions of the American Entomological Institute* **27**.

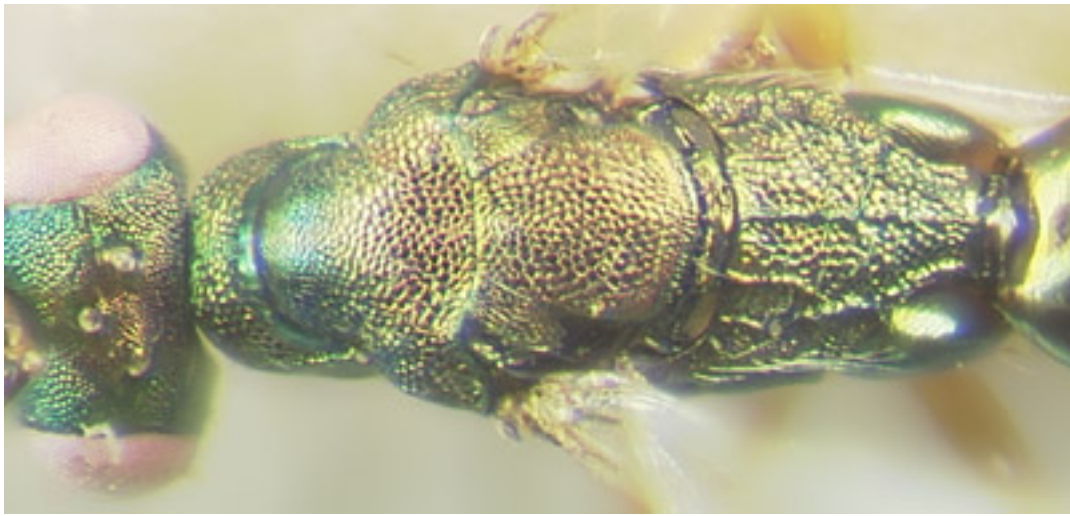
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***Hemiptarsenus* Westwood, 1833** [comparative info](#) return to: [prev\(eul 23\)](#) [prev\(eul 24\)](#)  
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Body elongate. Clypeal margin truncate. **Toruli very high on face, at or above center of face; scape exceeding vertex** at least slightly (scape slightly exceeds vertex in some other genera). Flagellum with 4 or 5 funicular segments; basal 3 flagellomeres branched in males. Notauli incomplete; mesosoma elongate and dorsoventrally flattened; axillae only slightly advanced anteriorly of scutellar margin. **Forewing and costal cell unusually long and narrow:** forewing at least 2.6x longer than broad and costal cell 7-15x longer than broad; some females brachypterous. Scutellum without submedian or sublateral grooves. Propodeum of two distinct types: long and flat, slightly longer than broad in some species, but in others 2x or more broader than long; median carina and plicae present or absent; sometimes with raised median panels, especially in forms where propodeum is <3x broader than long. Legs elongate. Compare with: ***Sympiesis*, *Notanisomorphella*, *Pnigalio*.**



1a-b: *Hemiptarsenus* forewing (top), and profile of female (bottom)



**2a: *Hemiptarsenus* dorsal view of species with long propodeum**



**3a: *Hemiptarsenus* habitus of species with short propodeum**

**Biology:** Parasitoids of leaf-miners (mostly Diptera).

**Comments:** 23 described species. Simply defined (scape exceeding vertex, body and forewing elongate), this genus is problematic in that many of its most common species are easily confused with certain species of *Sympiesis*. It seems likely that it renders *Sympiesis* paraphyletic in one or more ways, and may itself be polyphyletic. In this light, the synonymy of *Notanisomorpha* with *Hemiptarsenus* may prove to be a bad move. Many *Prigalio* species also have an elongate scape, and may be confused with *Hemiptarsenus* at first glance.

### Comparative information:

***Sympiesis*, *Notanisomorphella*:** Scape not exceeding vertex by  $>1.5\times$  its own width. **If** scape slightly exceeding vertex **then** propodeum  $>2\times$  broader than long. Forewing usually  $<2.6\times$  longer than broad, costal cell usually  $<7\times$  longer than broad.

***Prigalio*:** Propodeum almost always with carinate costula. If not, then forewing  $<2.6\times$  longer than broad and costal cell  $<7\times$  longer than broad.

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### References

Boucek, Z. 1959. A study of central European Eulophidae, 1: Eulophinae (Hymenoptera). *Acta Entomologica Musei Nationalis Pragae*. **33**: 117-170.

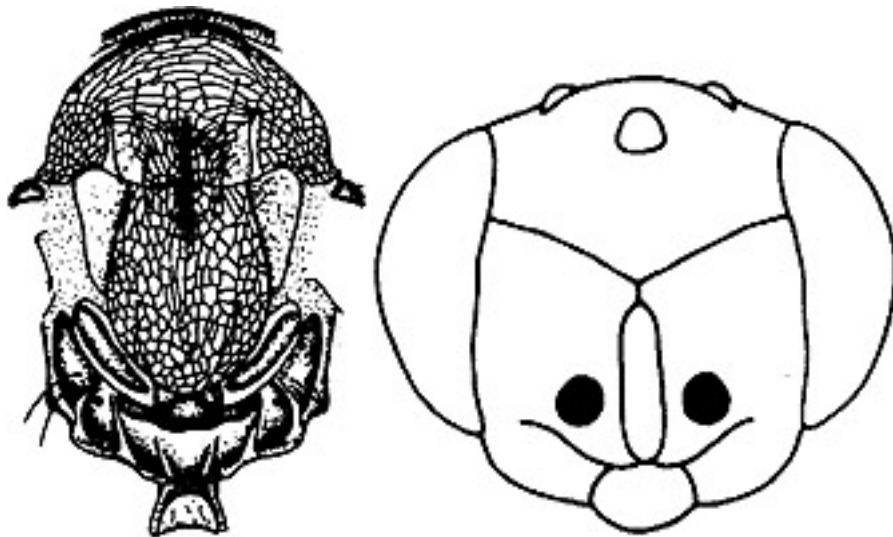
Boucek, Z. 1988. Australasian Chalcidoidea (Hymenoptera). A biosystematic revision of genera of fourteen families, with a reclassification of species. CAB International, Wallingford, UK.

Schauff, M.E. & J. LaSalle. 1993. Nomenclatural notes on genera of North American Eulophidae (Hymenoptera: Chalcidoidea). *Proceedings of the Entomological Society of Washington*. **95**(3): 488-503.

Image credits: 1a: Boucek (1988).

***Holcopelte* Förster, 1856** [comparative info](#) return to: [prev](#) [home](#)

Mandibular formula 4:4. **Face, frons, and occiput completely smooth and glossy.** **Clypeus set off by distinct sutures**, transverse ridge separating toruli from clypeus. Transverse frontal groove v-shaped; scrobal depressions uniting at or below transverse groove; **interscrobal process sharply raised above surrounding area**. Flagellar formula 2,4,1; funicular segments in males each with a basal whorl of long setae; flagellum with spear-shaped (type 3) peg sensilla. **Median furrow extending from posterior part of mesoscutum to anterior part of scutellum** (rarely faint: *H. huggerti* Hansson); **notauli deep posteriorly but absent or very shallow anteriorly**. Postmarginal vein shorter than stigmal vein. Petiole distinct, subquadrate. Compare with: *Omphale*, *Chrysocharis*.



1a-b: *Holcopelte* mesosoma (left), and face (right)



2a-b: *Holcopelte* female antenna (left), and male antenna (right)

**Biology:** Parasitoids of gall-forming Cecidomyiids.

**Comments:** 9 described species. There are few Nearctic genera approaching *Holcopelte* morphologically, but some Oriental and Australasian genera, such as *Parzaommomyia* Girault, have the same characters that are otherwise so distinctive for *Holcopelte*. *Parzaommomyia* differs from *Holcopelte* in characters of purely continuous variation, such as the enlarged eyes and correspondingly tiny malar space, and in the elongate forewing.

### **Comparative information:**

**Omphale:** Interscrobal process not raised above surrounding area. Never with furrow across mesoscutal-scutellar suture. Face sculptured in most species. Some species, especially in the Neotropical region, strongly resemble *Holcopelte*, especially in that the face is smooth and with a vaguely raised interscrobal process, and in the elongate (type 3) flagellar peg sensilla. These species have no sign of a longitudinal groove across the scutellar suture, but this is lacking or weakly defined in some species of *Holcopelte* as well, although when lacking it is usually replaced by a section of rough, narrowed and lengthened, sculpture, they also have shallow notauli. More study is needed to clarify the distinction between these two genera.

**Chrysocharis:** Interscrobal process not raised above surrounding area. Face never smooth and shiny. Almost never with furrow across mesoscutal-scutellar suture.

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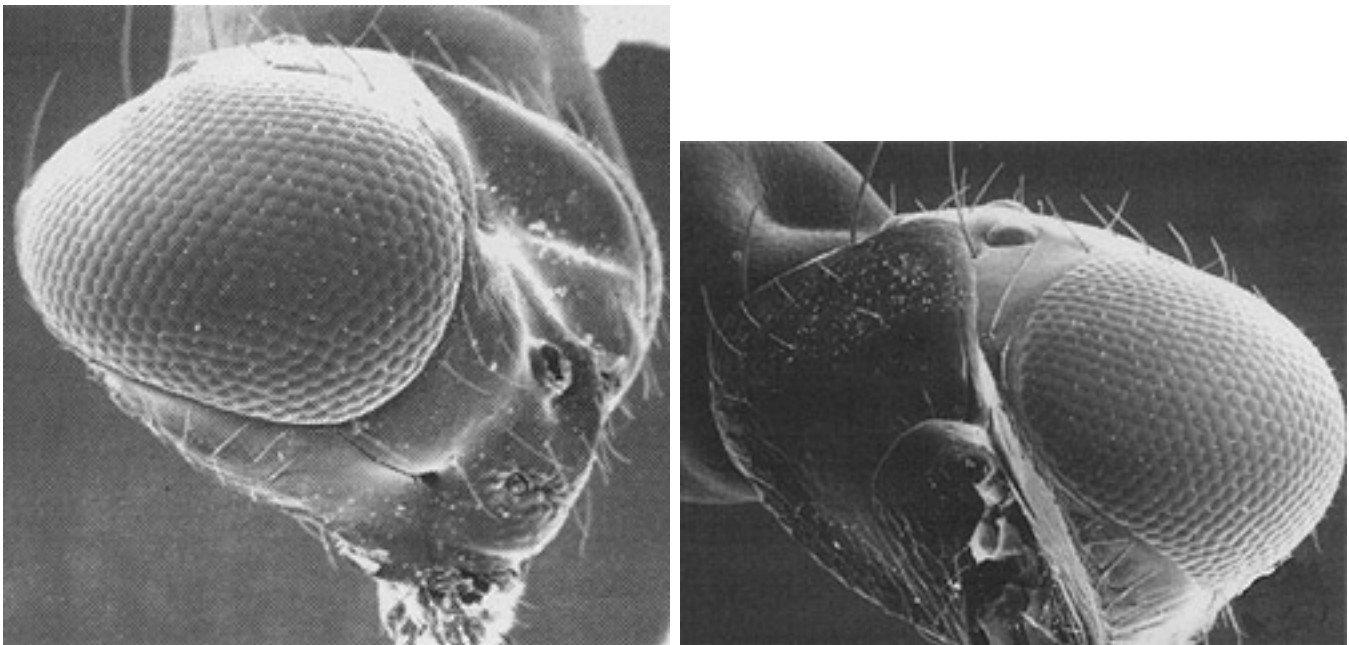
### **References**

Hansson, C. 1988. New World species of *Holcopelte* and *Ionympha* (Hymenoptera: Eulophidae), with descriptions of two new species. *Proceedings of the Entomological Society of Washington*. **91**: 59-65.

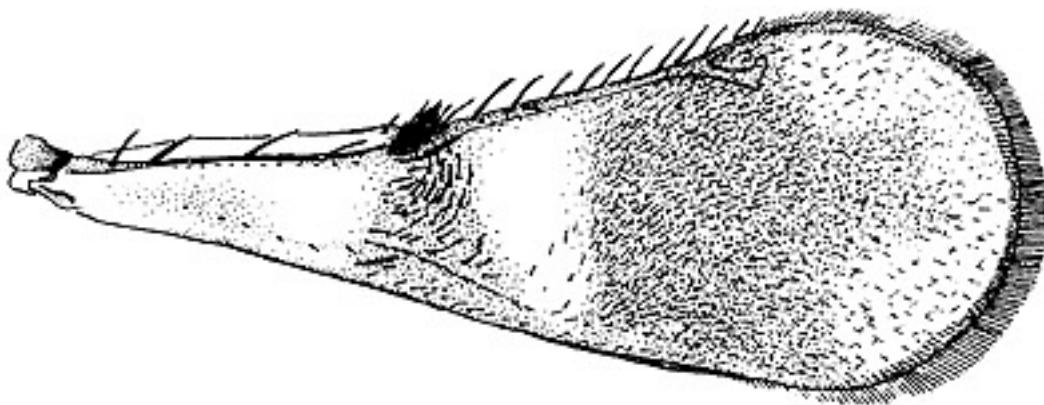
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***Hoplocrepis* Ashmead, 1890** [comparative info](#) return to: [prev](#) [home](#)

Head broad, with face strongly narrowed in ventral half. **Mandibles reduced, not capable of meeting medially, without denticles.** Occipital carina (often a sharp ledge) present near occipital foramen, vertex usually sharply margined as well. 4 funicular segments; male flagellomeres pedunculate, each funicular segment nodose and slightly asymmetrical, encircled by whorl(s) of erect setae. Notauli complete. **Forewing with distinct tuft of enlarged, dark setae near parastigma** (sometimes replaced by strong dark spot); usually with fuscate transverse stripe(s). Petiole longer than broad. Color typically semi-transparent brown to tan or amber. Sulci, carinae, and sutures usually with conspicuously sharp edges. Compare with: *Trichospilus*.



1a-b: *Hoplocrepis* face (left), and oblique view of posterior surface of head (right)



2a: *Hoplocrepis* forewing

**Biology:**

**Comments:** 4 described species.

**Comparative information:**

[Trichospilus](#): Flagellum with 2 funicular segments. Mandibles capable of meeting medially.

Similar in general appearance to *Hoplocrepis*, these genera are surprisingly easy to confuse at first glance.

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**References**

LaSalle, J. & M.E. Schauff. 1992. Preliminary studies on Neotropical Eulophidae (Hymenoptera: Chalcidoidea): Ashmead, Cameron, Howard, and Walker species. *Contributions of the American Entomological Institute* **27**.

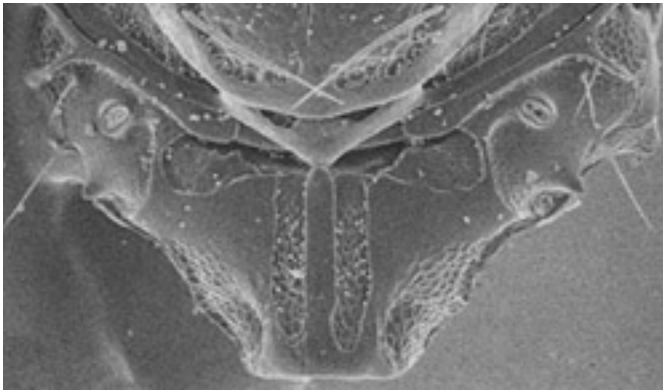
Schauff, M.E., J. LaSalle, & L.D. Coote. 1997. Chapter 10. Eulophidae. *in* "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.

Image credits: Schauff, et al. (1997).

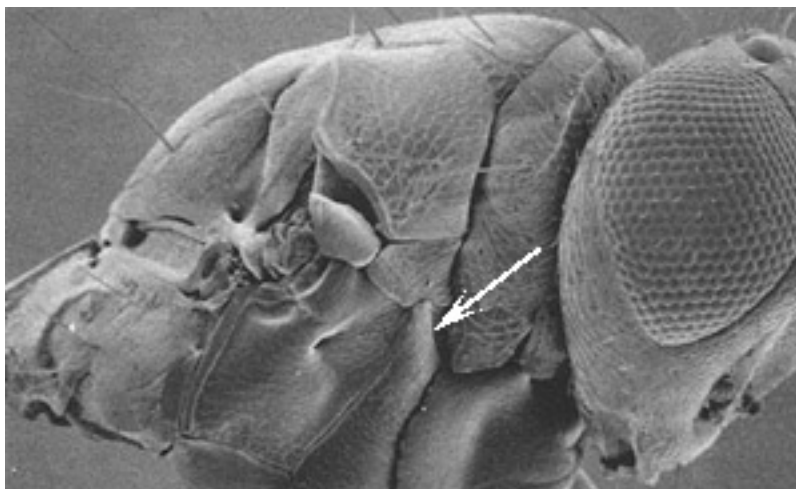
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***Horismenus* Walker, 1843** [comparative info](#) return to: [prev](#) [home](#)

Occipital margin smoothly rounded, never sharply margined but rarely with a tiny carina discernable at the top of the vertex. Flagellum with 5 postanellar flagellomeres, with at least 2 as funicular segments and at least 1 as a claval segment. Pronotal collar carinate (at least slightly so); mesoscutal midlobe with 2 pairs of setae; **scutellum in most species with longitudinal groove, extending over half scutellar length; scutellar-axillar border with large dorsal pit** (separate from pit sometimes present on axillular border); **posterior edge of prepectus partially overlapped by narrow extension of mesepisternum**; epicnemial carina absent; metapleuron with a strong, sharply pointed projection. **Propodeum with broad, smooth, raised median strip flanked by sunken channels, this strip with an anterior projection slightly overlapping metanotum**; plicae present near spiracles, formed partially or completely by ledge of median panels. Compare with: ***Paracrias*, *Edovum*, *Pediobius*, *Alachua*.**



1a-b: *Horismenus* propodeum (left), and scutellum and propodeum of another species (right)



2a: *Horismenus* mesosomal pleuron, with episternal projection indicated

Biology: Primary larval or pupal parasitoids of Coleoptera (including Psephenidae), Diptera, and

Lepidoptera or secondary parasitoids mainly of Braconids and Chalcidoids (some reared from spider egg sacs, probably as secondary parasitoids).

Comments: Many common species. Certainly in a clade with *Edovum* and *Alachua*, and probably with *Pediobius* and *Paracrias* as well. Differentiation from these genera is possible in the cases I have seen, but *Horismenus* body form and superficial features approach them in some cases, and misidentification is likely if gestalt is relied upon instead of careful assessment of the characters.

### Comparative information:

***Paracrias***: Scutellum without longitudinal groove; **scutellar-axillar border without dorsal pit** (though rarely with a small pit at the corner of the axillula, on lateral face of scutellum). **Occipital margin sharp or carinate, very near ocellar triangle**. Pronotal collar not carinate, usually rounded anteriorly.

***Edovum***: **Petiole longer than broad, with longitudinal ribs**. Median longitudinal groove of scutellum extending no more than half scutellar length (usually longer in *Horismenus*); **epicnemial carina present, extending from posterior edge of mesepisternal extension** (more extensive and differently shaped than in *Horismenus*).

***Pediobius***: Scutellum without longitudinal groove (but often with broad smooth area). **Vertex carinate or sharply margined posteriorly**. Petiole usually with dorsal flange embracing propodeal nucha, and with ventrally-projecting tooth. Propodeum in most species with 1 median carina or strip splitting posteriorly or with 2 submedian carinae diverging posteriorly. Surprisingly difficult to distinguish from *Horismenus* in some cases. The posteriorly split median carina often forms part of a raised area, especially apparent in *Pediobius alcaeus* (Walker) and related species, but these are distinguishable, though sometimes with some difficulty, by the carinate or sharply margined vertex. The scutellum in *Pediobius* is usually without a median sulcus, but most species have a broad smooth strip. I regard the ventrally-projecting petiolar tooth to be an unrewarding character to rely upon, as it is often difficult to assess when the petiole and nucha are short.

***Alachua***: Upper face and vertex densely setose; **posterior margin of eye bordered by carinate rim**. Face and mesosomal dorsum smooth. Propodeum nearly featureless except for long setae and anterior tooth extending towards metanotum. Easily distinguishable, but similar in a few important ways.

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## References

Burks, B.D. 1971. The Nearctic species of *Horismenus* Walker. *Proceedings of the Entomological Society of Washington*. **73**: 68-83.

Schauff, M.E. 1987. Taxonomy and identification of the egg parasites (Hymenoptera: Platygasteridae, Trichogrammatidae, Mymaridae and Eulophidae) of citrus weevils (Coleoptera: Curculionidae). *Proceedings of the Entomological Society of Washington*. **89**(1): 31-42.

Schauff, M.E. 1989. A new species of *Horismenus* (Hymenoptera: Eulophidae) parasitic on the lesser cornstalk borer, *Elasmopalpus lignosellus* (Lepidoptera: Pyralidae). *Proceedings of the Entomological Society of Washington*. **91**(4): 534-537.

Schauff, M.E. 1991. The Holarctic genera of Entedoninae (Hymenoptera: Eulophidae). *Contributions of the American Entomological Institute* **26**.

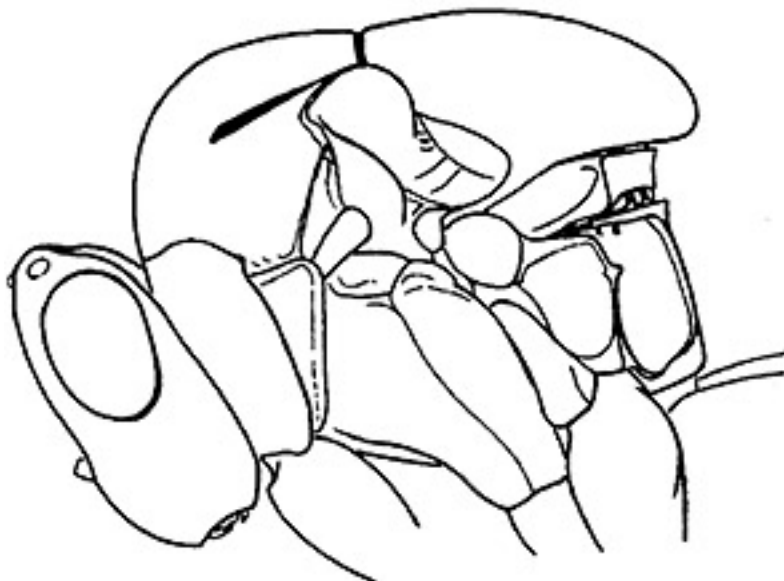
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**Hubbardiella** Ashmead, 1904 return to: [prev\(Eul8\)](#) [prev\(eud1\)](#) [home](#)

Males with nodose flagellomeres. **Mesosoma strongly resembling that of a Eucharitid**: pronotum, propodeum, and dorsellum nearly vertical, hidden from dorsal view, scutellum overhanging dorsellum and propodeum; **notauli incomplete, present only posteriorly**. 2 faint rows of setae radiating from stigma. **Propodeum with distinct median carina. Only 7 distinct gastral tergites (epipygium absent)** in both sexes--this confirmed by the author (unpublished data) from a specimen collected in Guatemala.



1a: *Hubbardiella* head and mesosoma

## Biology:

**Comments:** 1 described species: *H. arizonensis* Ashmead. Not easily confused with other Nearctic Eulophids. This genus is unique among Euderines in that females have only 7 gastral tergites, lacking an epipygium.

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## References

Coote, L.D. 1994. Review of Nearctic genera of Euderinae (Hymenoptera: Eulophidae), with descriptions of two new species of *Allocerastichus* Masi, and redescription of *Carlyleia marilandica* Girault. *Canadian Journal of Zoology*. **72**: 1044-1054.

Schauff, M.E., J. LaSalle, & L.D. Coote. 1997. Chapter 10. Eulophidae. in "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC

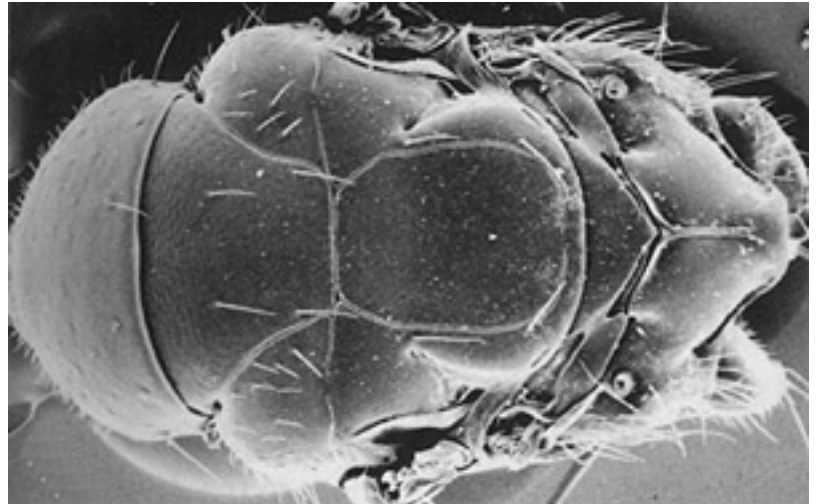
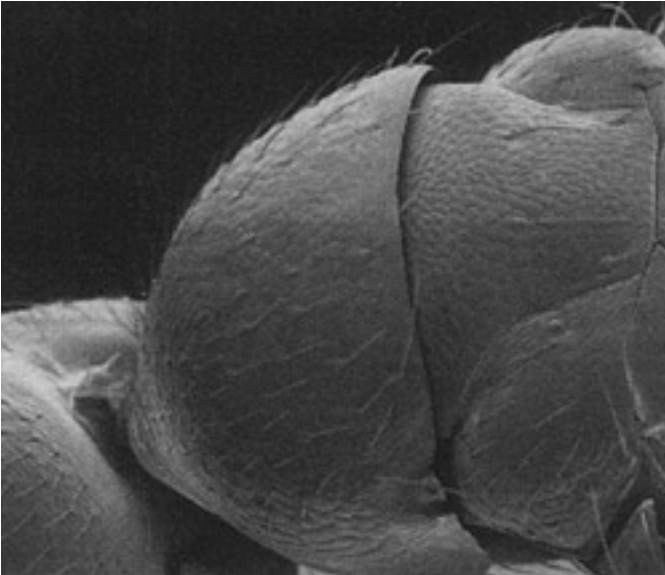
Research Press, Ottawa.

Image credits: 1a: Schauff, et al. (1997).

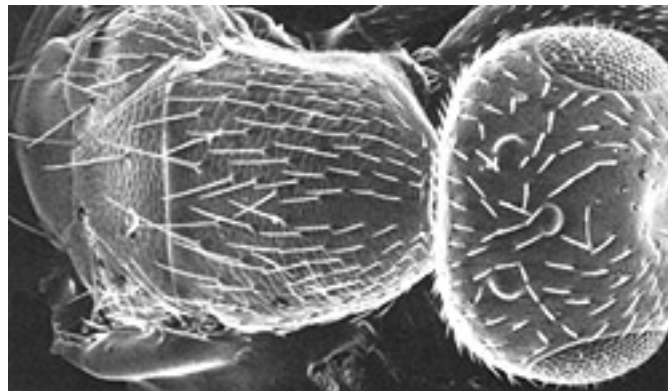
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***Hyssopus* Girault, 1916** [comparative info](#) return to: [prev](#) [home](#)

4 funicular segments. Pronotum long, smoothly rounded anteriorly, semiglobose; notauli complete; **mesoscutal midlobe with only 2 pairs of setae**; scutellum with complete sublateral grooves curving to meet near scutellar apex. Propodeum with a simple median carina, without plicae or costula. Compare with: *Elachertus*, *Deutereulophus*.



1a-b: *Hyssopus* pronotum (left), and *H. johannseni* (Crawford) mesosoma (right)



2a: *Hyssopus rhyacioniae* Gahan head and pronotum

**Biology:** Parasitoids of Lepidoptera larvae in concealed situations.

**Comments:** 15 described species.

**Comparative information:**

***Elachertus*:** Mesoscutal midlobe with at least 3 pairs of setae. Many or most species of *Elachertus* have the same type of pronotum found in *Hyssopus*, so that pronotal form is of very

little value in distinguishing these genera.

***Deutereulophus***: Propodeum with special patch of setae apart from callus setae, in area defined by offshoots from plicae. Median carina of propodeum areolate posteriorly. Pronotum with distinct horizontal collar, not smoothly rounded in profile.

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## References

Schauff, M.E. 1985. Revision of the Nearctic species of *Hyssopus* Girault (Hymenoptera: Eulophidae). *Journal of the New York Entomological Society*. **93**: 1096-1108.

Schauff, M.E., J. LaSalle, & L.D. Coote. 1997. Chapter 10. Eulophidae. *in* "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.

Image credits: 1a: Schauff, et al. (1997). 1b, 2a: Schauff (1985).

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*Ionympha* Graham, 1959 [comparative info](#) return to: [prev](#) [home](#)

**Mandibles very long and narrow, with several tiny dorsal teeth and 2 large apical ones** [not unique]. Face shiny and smooth; transverse frontal groove v-shaped; scrobal grooves reaching transverse groove separately, **extending below toruli**; interscrobal ridge meeting transverse groove; occiput with median channel, as in *Asecodes* and similar genera. Clypeus not set off by sutures; **gena with strong incision that base of mandibles fit into when open**. **Scape with sensory pores present only at apex in males**; flagellum with slightly asymmetrical (type 2) peg sensilla. Males with subbasal pale spot on gaster. **Ovipositor very short**, its base very far posteriad. Compare with: *Asecodes*, *Chrysocharis* (*Zaommomyia*), *Closterocerus*, *Proacrias*.



1a-c: *Ionympha* face (left), profile (center), and mandible (right)

## Biology:

**Comments:** 2 described species. Identification is subtle and often very difficult if the face is collapsed. The mandibles are not unique in form, and variation of the gena at mandible base is unknown in other genera. This genus appears to be closely related to *Asecodes*.

**Comparative information:** Separation from all other genera based on essentially the same criteria: Mandibles not the same, shorter and without numerous tiny denticles. Gena not incised at mandible base. Ovipositor subequal gastral length. The most similar genera are: *Asecodes*, *Chrysocharis* (*Zaommomyia*), and *Closterocerus*.

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## References

Hansson, C. 1988. New World species of *Holcopelte* and *Ionympha* (Hymenoptera: Eulophidae), with descriptions of two new species. *Proceedings of the Entomological Society of Washington*. **91**: 59-65.

Hansson, C. 1996. The status of the genera *Asecodes* Förster, *Ionympha* Graham and *Teleopterus* Silvestri (Hymenoptera: Eulophidae) with a review of Nearctic species. *Entomologica Scandinavica*. **27**: 159-167.

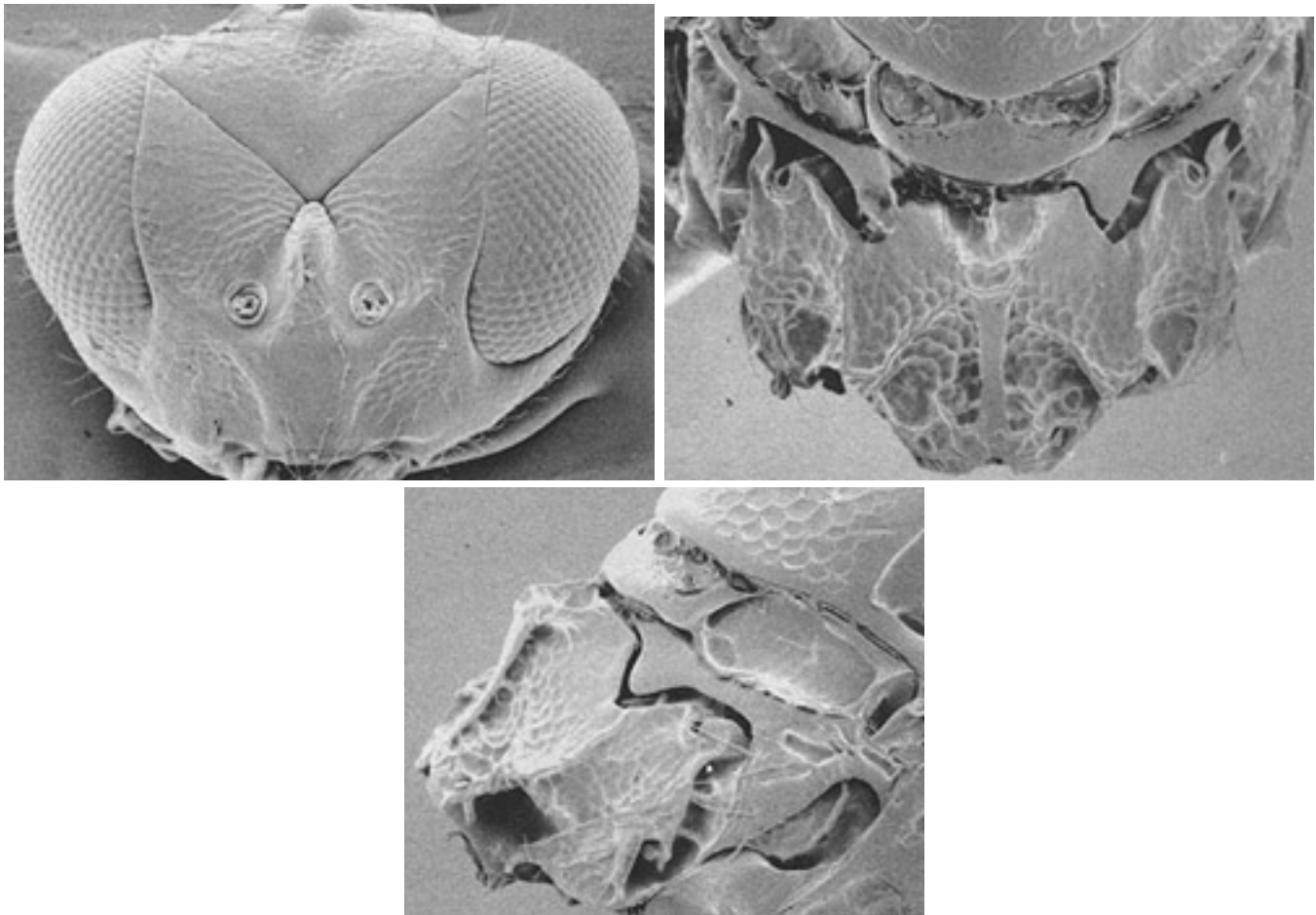
Image credits: 1a-c: Hansson (1996).

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***Mestocharis* Förster, 1878** [comparative info](#) return to: [prev](#) [home](#)

Mandibular formula 3:3. Transverse frontal groove v-shaped; scrobal grooves/depressions very short, reaching transverse groove separately; interscrobal ridge reaching transverse groove. Flagellar formula 2,4,1 in males and females. Mesoscutal midlobe with 2 pairs of setae. Postmarginal vein subequal stigmal vein length. Metapleuron with a strong, sharply pointed projection. **Propodeum with median carina expanded into cup-like structure anteriorly; anterior margin of propodeum with triangular emargination on each side that metanotum projects into.**



1a-c: *Mestocharis* face (top left), propodeum (top right), and propodeum from lateral view (bottom)

## Biology:

**Comments:** 3 described species.

**Comparative information:** Not easily confused with other genera if the propodeum is visible.

## References

Hansson, 1988. A revision of the genus *Mestocharis* and a review of the genus *Grahamia* (Hymenoptera: Eulophidae). *Proceedings of the Entomological Society of Washington*. **90**: 28-36.

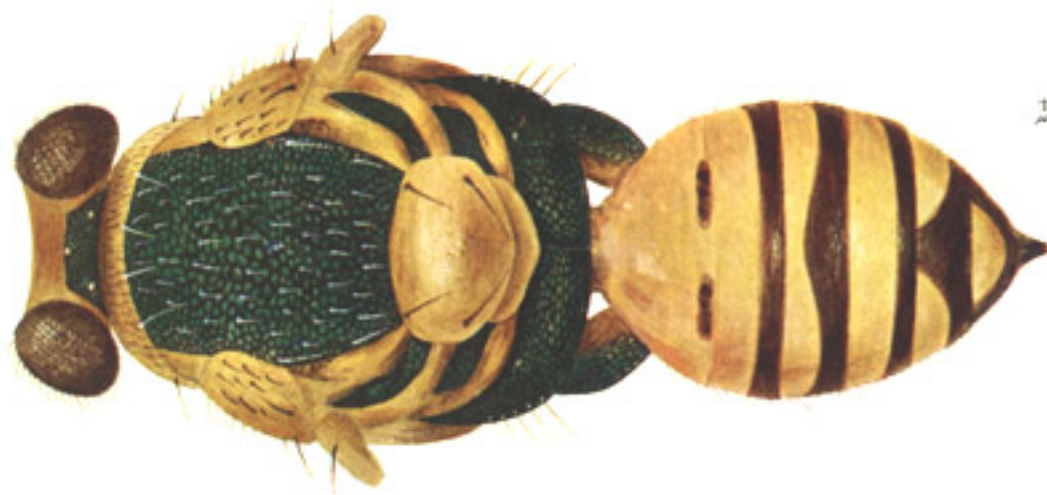
Schauff, M.E. 1991. The Holarctic genera of Entedoninae (Hymenoptera: Eulophidae). *Contributions of the American Entomological Institute* **26**.

Image credits: 1a-c: Schauff (1991).

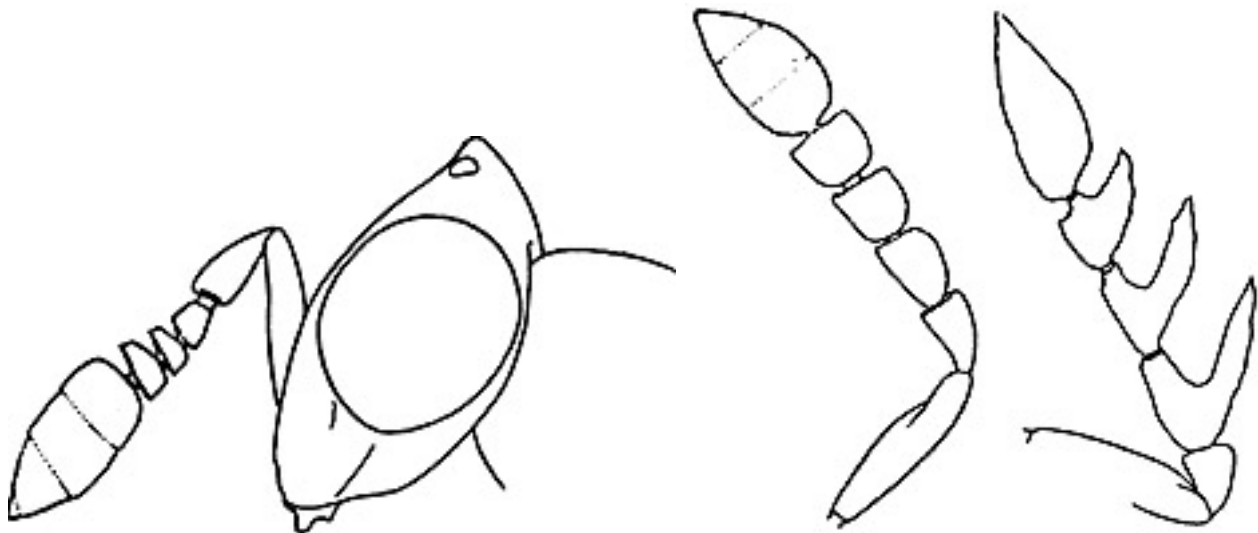
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***Microlycus* Thomson, 1878** [comparative info](#) return to: [prev](#) [home](#)

Body short and stout: 0.9-1.9mm in length. Flagellar formula 1,3,3 in females, 1,4,2 or (rarely) 1,3,3 in males; scape length subequal distance between lateral ocelli; lateral ocelli near eye margin; **apical pair of funicular segments subquadrate to much broader than long in females**; males with 3 short funicular branches. Notauli incomplete; **mesoscutal midlobe with many irregularly placed setae**; scutellum without submedian or sublateral grooves, **distinctly broader than long**. Postmarginal vein not more than 1.7x stigmal vein length. Color dark or mixed yellow-green. Compare with: ***Necremnus***, ***Eulophus***, ***Dasyeulophus***.



1a: *Microlycus pulcherrimus* Kerrich



2a-c: *Microlycus heterocerus* Thomson profile (left), *M. erdoesi* Boucek female antenna (center), and male antenna (right)

**Biology:** 1 species parasitoid of *Perileucoptera coffeella* (Guérin-Mén. & Perrottet) (Lepidoptera: Lyonetiidae), leaf-miner of coffee plants.

**Comments:** 9 described species; poorly known genus. Apparently close to *Necremnus*.

### **Comparative information:**

**Necremnus**: Scape length much longer than distance between lateral ocelli **and/or** lateral ocelli 2x or more their own diameter distant from eye margin **and/or** scutellum as long or longer than broad. Apical pair of funicular segments usually each longer than broad. Very difficult to separate in some cases using generic characters, the characters representing entirely continuous variation and subject to intermediacy in a few cases.

**Eulophus**: Mandibles not capable of meeting medially. Basal mesotarsal segment shorter than next segment.

**Dasyeulophus**: Clypeus bilobed apically. Scutellum usually with many irregularly placed setae in addition to the 2 pairs normally present. Stigma relatively large. 4 funicular segments.

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### **References**

Boucek, Z. 1959. A study of central European Eulophidae, 1: Eulophinae (Hymenoptera). *Acta Entomologica Musei Nationalis Pragae*. **33**: 117-170.

Kerrich, G.J. 1969. Systematic studies on eulophid parasites (Hym., Chalcidoidea) mostly of coffee leaf-miners in Africa. *Bulletin of Entomological Research*. **59**(2): 195-228.

Image credits: 1a: Kerrich (1969). 2a-c: Boucek (1959).

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***Miotropis* Thomson, 1878** [comparative info](#) return to: [prev](#) [home](#)

4 funicular segments. Notauli complete to scutellar margin or ending in axillae near the scutellar margin; **sublateral grooves of scutellum apparently incomplete or absent** under normal (up to 50x) magnification, extending as distinct grooves no further than sockets of posterior pair of scutellar setae [but can be seen to be complete under high magnification with careful observation]. **Propodeum in some species with irregular rugae**; median carina present, simple or with a short anterior split; plicae absent; costula absent. Compare with: ***Elachertus***, *Diglyphomorpha*.



***Miotropis mesosoma***

**Biology:** Parasitoids of Lepidoptera.

**Comments:** 15 described species. Very similar to *Elachertus*, and difficult to separate from it in some cases. It is often difficult to determine degrees of "faintness" of the sublateral scutellar grooves, and in reality there is no specimen of either genus with truly incomplete grooves. Careful examination with a high-resolution microscope or electron microscope can show signs of the groove along the posterior scutellar margin and the lateral margins immediately posterior to the setal sockets. There are also some species of Nearctic *Elachertus* with legitimately "incomplete" sublateral grooves. These species may more rightly be placed in *Miotropis*, but transferring the species is difficult to recommend due to the confused state of the taxonomy of genera near *Elachertus*. I strongly doubt that faint sublateral grooves are homologous in all occurrences in this group. It is likely that the genus is polyphyletic and that each monophyletic portion of it renders *Elachertus* paraphyletic in turn. Nearctic species identifiable as *Miotropis* using this key may be currently placed in either genus, and this should be kept in mind by researchers needing a correct identification of such specimens.

**Comparative information:**

**Elachertus**: Scutellar grooves in most species distinctly complete, meeting at posterior margin of scutellum. Some species of *Miotropis*, formerly in *Cirrospiloideus*, have a propodeum with rugulose median panels (the rugulose areas often marked by a different color from the rest of the propodeum), which never occurs in *Elachertus*.

**Diglyphomorpha**: Scutellar grooves complete, meeting posteriorly. Plicae present and complete. Scutellum with a sometimes faint median groove.

## References

Askew, R.R. 1968. Hymenoptera 2. Chalcidoidea section (b). *Handbooks for the Identification of British Insects*. **8**(2)b.

Boucek, Z. 1959. A study of central European Eulophidae, 1: Eulophinae (Hymenoptera). *Acta Entomologica Musei Nationalis Pragae*. **33**: 117-170.

Boucek, Z. 1977. Descriptions of two new species of Neotropical Eulophidae (Hymenoptera) of economic interest, with taxonomic notes on related species and genera. *Bulletin of Entomological Research*. **67**(1): 1-15.

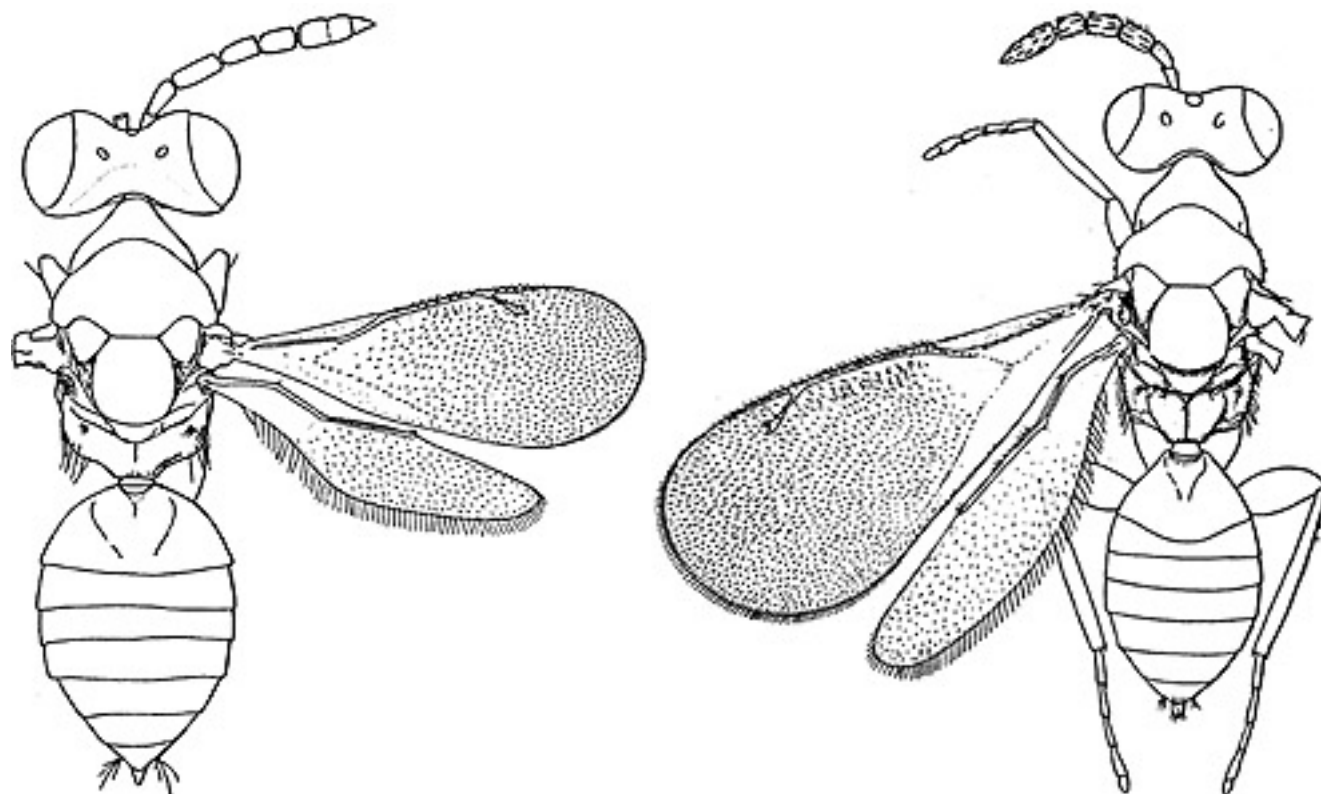
LaSalle, J. & M.E. Schauff. 1992. Preliminary studies on Neotropical Eulophidae (Hymenoptera: Chalcidoidea): Ashmead, Cameron, Howard, and Walker species. *Contributions of the American Entomological Institute* **27**.

Schauff, M.E., J. LaSalle, & L.D. Coote. 1997. Chapter 10. Eulophidae. in "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.

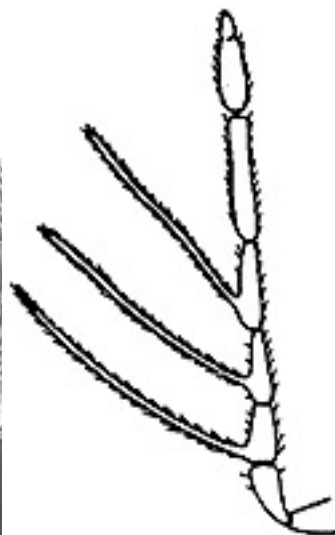
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***Necremnus* Thomson, 1878** [comparative info](#) return to: [prev](#) [home](#)

Mandibles capable of meeting medially, not reduced. Flagellar formula 1,3,3 in females, 1,3,3 or 1,4,2 in males; basal 3 funicular segments with long branches in males, 1st funicular segment at least slightly longer than pedicel in males. Notauli incomplete; scutellum quadrate or longer than broad, without submedian or sublateral grooves. Postmarginal vein at most 1.7x stigmal vein length; uncus rarely arising more than its own length from pigmented apex of stigmal vein [known exceptions: *N. metalarus* (Walker)]. Propodeum with a median carina, that is frequently reduced and incomplete; with or without plicae, some species with 'step-like' plicae that separate raised median panels from sunken paraspiracular area; costula absent. 1st mesotarsal segment longer than 2nd. Compare with: ***Microlycus*, *Eulophus*, *Dahlbominus*, *Sympiesis*.**



1a-b: *Necremnus capitatus* Boucek female (left), and *N. propodealis* Boucek female (right)



2a-b: *Necremnus* face (left), and *N. leucarthros* (Nees) male antenna (right)

**Biology:** Parasitoids of Lepidoptera, Coleoptera.

**Comments:** Large genus with certain species similar to a number of other genera. Forms the central part of a group including *Eulophus*, *Dicladocerus*, *Microlycus*, and perhaps *Dahlbominus*. This is a very poorly known and poorly defined genus, approaching the aforementioned genera and some others that may not be closely related to it. Females cannot be fully separated from those of *Dicladocerus*.

### Comparative information:

***Microlycus*:** Body short and stout: 0.9-1.9mm in length. Scape length subequal distance between lateral ocelli; lateral ocelli near eye margin; **apical pair of funicular segments subquadrate to much broader than long in females**. Scutellum distinctly broader than long. Very difficult to distinguish except by using vague differences in proportion of the scape, flagellomeres and scutellum.

***Dicladocerus*:** Males with 2 antennal branches. Most males and females with strong parallel submedian scutellar grooves. All female *Dicladocerus* that I am aware of with faint submedian scutellar grooves have plicae or plical ridges delimiting median panels that are slightly to sharply raised above the lateral areas of the propodeum, and in nearly all species of *Dicladocerus* the uncus is separated from the stigmal apex by more than its own length. *Necremnus propodealis* Boucek is notable as a species of *Necremnus* with a strong median carina and step-like plicae, but in that species the uncus is separated by its own length from the stigmal apex. This still leaves a few species of *Dicladocerus* in which females cannot be separated from *Necremnus* females. This problem is compounded by the fact that some *Necremnus* specimens have very faint submedian scutellar grooves. Separation of these two poorly known genera is problematic, and cannot be fully accomplished at this time.

***Eulophus***: Mandibles reduced, not capable of meeting medially. Basal mesotarsal segment (sometimes also basal metatarsal segment) shorter than 2nd segment, subequal or shorter than mesotibial spur. Body form strongly resembling *Necremnus*, but easily distinguished using the above characters.

***Dahlbominus***: Flagellum with 4 funicular segments in females; flagellum strongly compressed and broadening apically. Forewing disc almost always with large fuscate area posterior to marginal and postmarginal veins [lost in some specimens]. Scape, mesocoxa, and metacoxa usually light tan to white (sometimes brown, especially in males). This genus is remarkably similar to *Necremnus* in general form. *Necremnus californicus* (Girault) strongly resembles *Dahlbominus* in every way except scape and coxal coloration and flagellar formula of females. Males may be more difficult to distinguish, and species-level differences such as the coloration characters become very important at that point.

***Sympiesis***: Flagellum usually with 4 funicular segments, rarely 5 in males. Postmarginal vein about 2x stigmal vein length or longer. Median propodeal carina often absent, sometimes plicae present as diagonal carinae. Some species strongly resembling *Necremnus*, but easily distinguished by postmarginal vein length, flagellar formula of females, and with experience, by propodeal features.

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## References

- Askew, R.R. 1968. Hymenoptera 2. Chalcidoidea section (b). *Handbooks for the Identification of British Insects*. 8(2)b.
- Boucek, Z. 1959. A study of central European Eulophidae, 1: Eulophinae (Hymenoptera). *Acta Entomologica Musei Nationalis Pragae*. 33: 117-170.
- Boucek, Z. 1974. On some European Eulophidae (Hymenoptera), with Descriptions of three new species. *Acta entomologica Jugoslavica*. 10(1-2): 117-123.
- Graham, M.W.R. de V. 1959. Keys to the British genera and species of Elachertinae, Eulophinae, Entedoninae, and Euderinae (Hym., Chalcidoidea). *Transactions of the Society for British Entomology*. 13: 169-204.
- Graham, M.W.R. de V. 1963. Additions and corrections to the British list of Eulophidae (Hym., Chalcidoidea). *Transactions of the Society for British Entomology*. 15(9): 167-275.
- Schauff, M.E., J. LaSalle, & L.D. Coote. 1997. Chapter 10. Eulophidae. in "Annotated Keys to

the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.

Image credits: 1a-b: Boucek (1959). 2a: Schauff, et al. (1997). 2b: Graham (1963).

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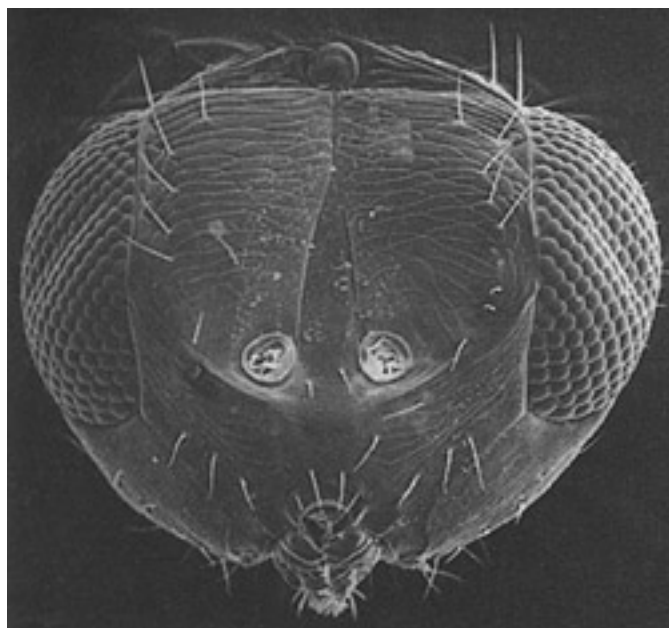
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***Neopomphale*** LaSalle & Schauff, 1994 [comparative info](#) return to: [prev](#) [home](#)

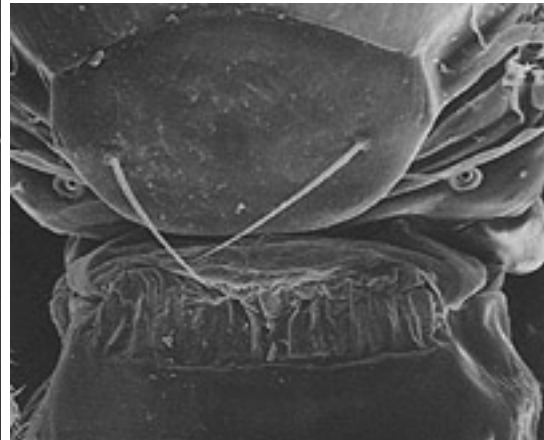
Eyes setose. Transverse frontal groove straight, located near median ocellus; scrobal grooves uniting before reaching transverse groove. Malar sulcus complete, not curving posteriad.

**Vertex with transverse groove between median and lateral ocelli**; occiput with longitudinal and transverse grooves. Clypeus defined dorsally by a semicircular sulcus. Flagellum presumably always 6-segmented, including 2 (possibly sometimes 1) tiny anelli, 1 preclaval segment that is longer than broad, as broad as club, and a 3-segmented club that is much longer than the rest of the flagellum; club with apical spicule. Pronotal collar not formed; mesoscutal midlobe with 1 pair of setae; **axillae advanced entirely anterior of scutellar margin, but weakly or not separated from mesoscutum medially**, when apparent, the dorsal surface of the axilla is about 2x longer than broad; scutellum transverse, shorter than mesoscutum, with 1 pair of setae. Postmarginal vein shorter than stigmal vein, stigma petioate; submarginal vein with 2 dorsal setae; speculum present. Propodeum extremely short. Petiole transverse. **Base of gt1 with transverse membranous region**. Compare with:

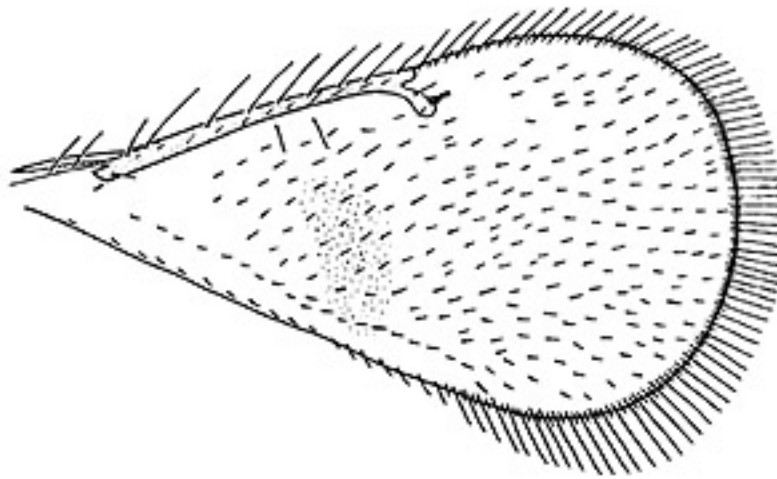
***Euderomphale*.**



***Neopomphale* face (left), and female antenna (right)**



*Neopomphale* mesosomal dorsum (left), and 1st gastral tergite and posterior part of mesosoma(right)



*Neopomphale* forewing

**Biology:** Parasitoids of Aleyrodidae.

**Comments:** 21 described species.

**Comparative information:**

***Euderomphale*:** Axillar sulci present dorsally and complete across mesoscutum. Malar sulcus incomplete, directed posteriad.

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## References

Hansson, C. & J. LaSalle. 2002. Revision of the Neotropical species of the tribe

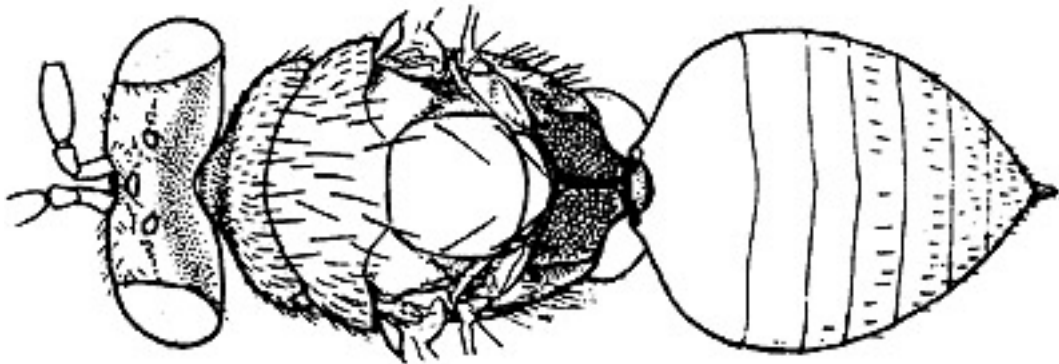
Euderomphalini (Hymenoptera: Eulophidae). *Journal of Natural History*. **37**(6): 697-778.

LaSalle, J. & M.E. Schauff. 1994. Systematics of the tribe Euderomphalini (Hymenoptera: Eulophidae): parasitoids of whiteflies (Homoptera: Aleyrodidae). *Systematic Entomology*. **19**: 235-258.

Image credits: LaSalle & Schauff (1994).

***Notanisomorphella* Girault, 1913** [comparative info](#) return to: [prev](#) [home](#)

Basal 3 funicular segments branched in males; males and females with 4 funicular segments. Notauli incomplete; mesoscutal midlobe evenly setose or with 2 rows of setae; scutellum without submedian grooves. Postmarginal vein at least 2x stigmal vein length. **Propodeum with complete "step-like" plicae** (enclosed median panels of propodeum elevated above the sunken paraspiracular areas) immediately medial to spiracles; median panels large, glossy or reticulate; median carina distinct and simple; costula absent. Compare with: ***Sympiesis***, ***Pnigalio***, ***Dimmockia***.



1a: *Notanisomorphella*



2a: *Notanisomorphella* propodeum

**Biology:** Parasitoids of Coleophoridae and other small Lepidoptera, leaf-mining Hispine beetles, also reared from spider egg-sacs.

**Comments:** 10 described species. Very close to *Sympiesis* and *Dimmockia*, but of distinctive habitus so that it is easily recognizable once reference specimens have been examined.

## Comparative information:

***Sympiesis***: Seldom with strong median carina and plicae, but if so then median panels not raised sharply above areas lateral to the plicae. There are a few species of *Sympiesis* with somewhat step-like plicae, but in those species the propodeum is only slightly ( $<1.75\times$ ) longer than broad, resembling that of many *Hemiptarsenus*.

***Pnigalio***: If propodeal costula lacking **then** median panels not raised sharply above areas lateral to plicae.

***Dimmockia***: Clypeal margin bilobed.

***Dicladocerus***: Flagellum with 3 funicular segments in females, males with 2 antennal branches. Scutellum in most species with parallel longitudinal grooves.

## References

Boucek, Z. 1988. Australasian Chalcidoidea (Hymenoptera). A biosystematic revision of genera of fourteen families, with a reclassification of species. CAB International, Wallingford, UK.

Schauff, M.E., J. LaSalle, & L.D. Coote. 1997. Chapter 10. Eulophidae. *in* "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.

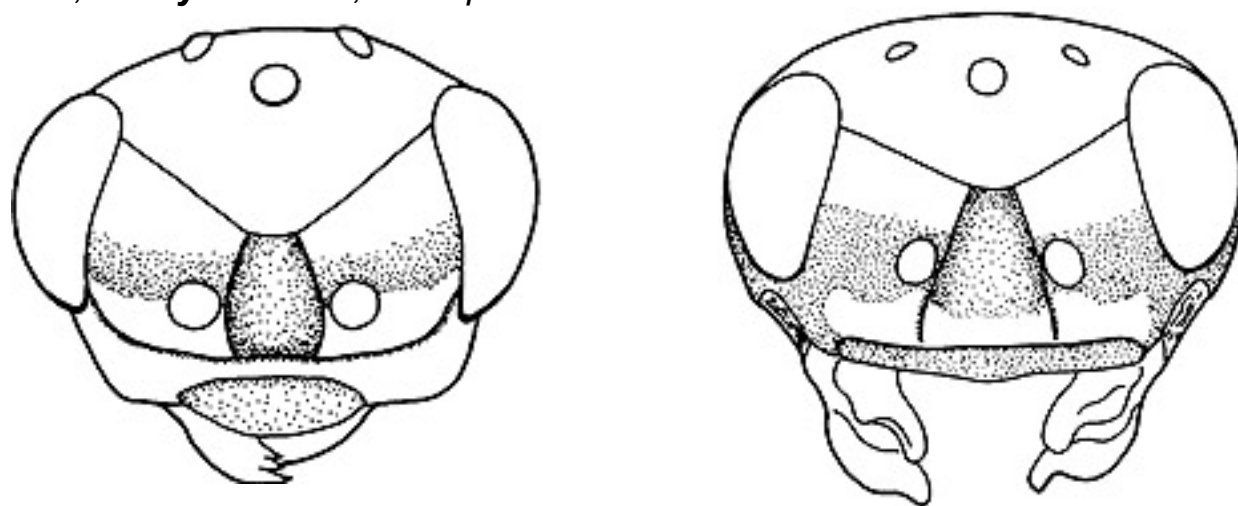
Image credits: 1a: Boucek (1988). 2a: Schauff, et al. (1997).

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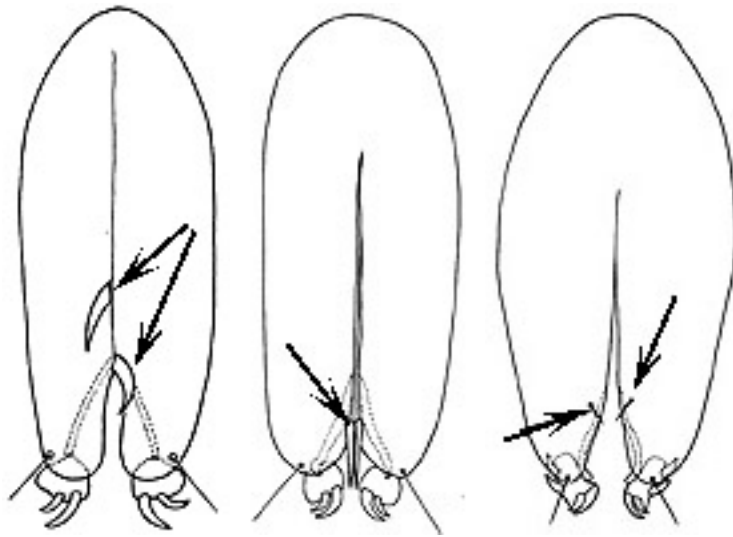
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**Omphale** Haliday, 1833 [comparative info](#) return to: [prev\(ent 21\)](#) [prev\(ent 29\)](#) [home](#)

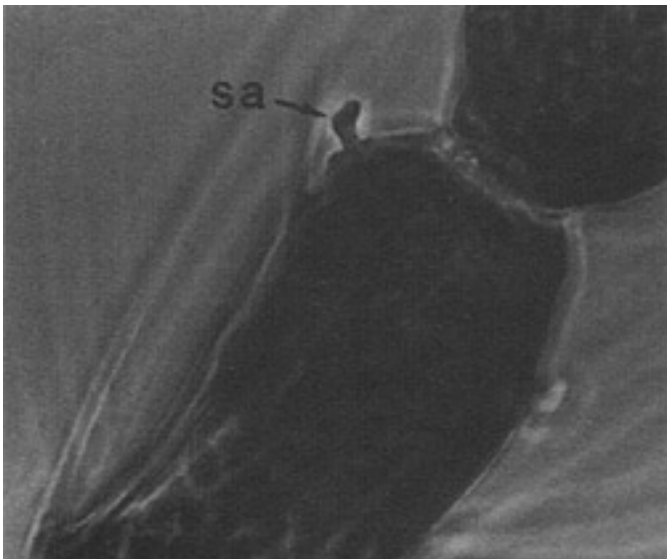
Body usually >1mm in length. Mandibular formula 3:3, exodont in a few species. **Clypeus usually set off by distinct sutures** (dorsal suture rarely missing, a few species with all clypeal sutures missing, ie: in the *O. obscurinotata* (Girault) species group, discussed below), **much wider than long in most species**, or with broadly semicircular dorsal margin, and/or with convex, projecting ventral margin; **transverse ridge present separating toruli from clypeus in most species**; mouth opening usually relatively wide. Transverse frontal groove weakly to strongly v-shaped; scrobal grooves almost always reaching transverse groove separately, rarely uniting at or before groove; scrobal grooves may or may not extend below the toruli. **Occipital margin never carinate**. Flagellum with 5 postanellar segments, these grouped into 1-3 claval segments and 2-4 funicular segments; number of anelli apparently variable, ranging from 1-3; **heads of flagellar peg sensilla always slanting, asymmetrical, sometimes elongate** (types 2 or 3); flagellar setae often arranged in whorls in males; sensory pores present along nearly the entire ventral margin of scape in males. Mesoscutal midlobe almost always with 2 pairs of setae (rarely 1 pair); transepimeral sulcus straight or weakly curved, arching dorsad. Forewing variable in shape; postmarginal vein 0.4-2.2x stigmal vein length; 1 or no setal tracks radiating from stigma; radial cell bare or setose; forewing sometimes with fuscate areas, including distinct transverse or longitudinal bands; speculum large; apical fringe relatively short. Propodeum usually very short, smooth, without median carina; callus with 2 setae; **petiolar foramen large in most species, rendering propodeum strongly emarginate posteriorly**. Petiole always much broader than long and not sculptured. **Male genitalia with enlarged and/or displaced volsellar setae in most species** (volsellar setae always present, but very small in some species currently assigned here--this is not an absolute character); **parameres short and rounded apically, hardly distinguishable, never elongate or sinuate** [as opposed to *Perditorulus*]. Compare with: *Perditorulus*, *Closterocerus*, *Ametallon*, *Chrysonotomyia*, *Callifrons*, *Chrysocharis*, *Holcopelte*.



1a-d: *Omphale* faces



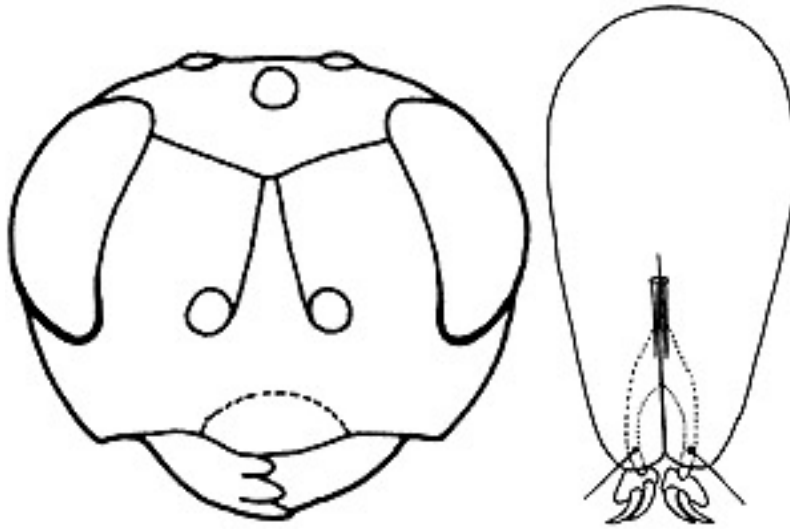
2a-c: *Omphale* male genitalia: *O. straminea* Hansson (left), *O. longiseta* Hansson (center), and *O. aureopurpurea* Hansson (right)



3a-b: *Omphale* flagellomeres with peg sensilla [sa]: slightly asymmetrical (left), and strongly asymmetrical (right)

***Omphale obscurinotata* species group:**

**Clypeus poorly set off from rest of face, not clearly delimited by sutures or distinct color** (except for *O. exserta* Hansson, in which the clypeus is strongly protruding); apical margin convex. Antenna with slightly asymmetrical peg sensilla. Forewing with radial cell bare in all but *O. masneri* Hansson; **no setal tracks radiating from stigmal vein**; speculum closed posteriorly. Male genitalia with volsellar setae slightly flattened, arising far anterior of usual position. **Slide mounting necessary to distinguish this species group reliably from many genera.** Compare with: ***Closterocerus*** (especially).



4a-b: *Omphale obscurinotata* face (left), and *O. acuminativentris* (Girault) male genitalia (right)

**Biology:** Parastoids of cecidomyiids.

**Comments:** Very large and diverse genus, likely paraphyletic. Can be the easiest or the most frustrating genus to identify, depending on the state of the clypeus. No other genus of Nearctic Entedoninae has species with a strongly broadened or protruding clypeus, but several have a "distinct," but more "normally-shaped" clypeus. Most keys are misleading on this point, making *Omphale* one of the most difficult genera of Entedoninae to consistently identify accurately. Even when all the facts are known, some species are very difficult to place to genus, requiring slide-mounting of males for confident exclusion of *Omphale*. This genus forms the major part of a clade including *Perditorulus*, *Closterocerus*, *Asecodes*, and *Callifrons*, perhaps related to *Holcopelte*, and *Chrysonotomyia* as well.

**Comparative information:**

***Perditorulus*:** Body unusually small (<1mm). Mandibles never exodont. Flagellar formula 2,4,1; **heads of flagellar peg sensilla always elongate, strongly asymmetrical**; pedicel about 3x longer than broad. **Mesosomal dorsum with relatively long setae (also on vertex)**; midlobe of mesoscutum with 2 pairs of long setae. Forewing relatively narrow, **with broad fuscate band**

**posterior to marginal vein**; postmarginal vein 0.3-0.7x stigmal vein length; no setal tracks radiating from stigma; speculum small, always closed posteriorly. **Male genitalia without volsellar setae**, but sometimes with paired "parameral" setae in which one pair is indistinguishable from volsellar setae; **parameres often elongate or sinuate** (especially helpful in species with ambiguously placed "parameral" setae). Color always dark with weak metallic tinge. Extremely difficult to distinguish with strong certainty. The only 100% reliable character is that of the male genitalia, which requires slide-mounting, and even that character is difficult to assess in some cases.

**Closterocerus**: Clypeus sometimes faintly defined by sutures, but always small and nearly square in shape. Some species with straight transverse frontal groove placed near median ocellus. Volsellar setae not enlarged. Face without cross-ridge between toruli and clypeus. May require slide-mounting to distinguish with certainty.

**Ametallon**: Mesoscutal midlobe with 1 pair of setae (the posterior pair) **and** forewing with 2 setal tracks radiating from the stigma. Volsellar setae not enlarged. Base of gaster with lateral indented, distinctly sculpted areas.

**Chrysonotomyia**: **Transverse frontal groove straight**, not v-shaped. Mesoscutal midlobe with 1 pair of setae (the posterior pair) **and** forewing with 2 setal tracks radiating from the stigma. Volsellar setae not enlarged. Some *Omphale* have only 1 pair of mesoscutal setae as well, but they can be distinguished by the v-shaped transverse frontal groove and the number of setal tracks radiating from the stigma. *Chrysonotomyia* always have 3 claval segments.

**Callifrons**: **Upper portion of frons strongly projecting anteriad, dorsal surface of head very long; occiput very strongly concave, sharply margined. Scape and 2 basal flagellomeres strongly flattened in females**; flagellar formula apparently 0,2,3 in females, 0,4,1 in males. **Forewing distinctive in shape: submarginal vein only slightly shorter than marginal vein and disc distinctly expanded beyond venation; disc with distinct longitudinal fuscate band branching apically** (but sometimes fuscate area reduced to traces near venation in males). Volsellar setae not enlarged. Usually easily recognized, but I would not be surprised to find some species of *Omphale* with one or more of these characters.

**Chrysocharis sensu strictu**: Volsellar setae not enlarged. Interscrobal ridge not meeting transverse groove. Petiole often as long or longer than broad, with dorsal sculpture (never in *Omphale*). Propodeum in many species with anterior median structures (often a triangle or anchor) formed by carinae, or with a pair of pits, a few species with plicae. Male flagellum never with whorls of erect setae. Flagellar peg sensilla always rounded, symmetrical. This genus is only rarely confusable with *Omphale*, but there are some Mexican species of *Omphale* with the interscrobal ridge not reaching the transverse frontal groove that could be misplaced here (see Hansson 1997).

**Holcopelte**: Face, frons, and occiput completely smooth and shiny. Interscrobal process raised above surrounding area. Median furrow extending from posterior part of mesoscutum to anterior part of scutellum (rarely faint: *H. huggerti* Hansson). Petiole distinct, subquadrate. Volsellar setae not enlarged. Usually easily distinguished, with facial features as the most reliable character if any doubt exists. Many species of *Omphale* have a shiny face, but none have the raised and outlined interscrobal process.

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## References

Hansson, C. 1996a. Taxonomic revision of the Nearctic species of *Omphale* Haliday (Hymenoptera: Eulophidae). *Entomologica Scandinavica supplement* **49**.

Hansson, C. 1996b. A new genus of Eulophidae (Hymenoptera: Chalcidoidea) with remarkable male genitalia. *Systematic Entomology*. **21**: 39-62.

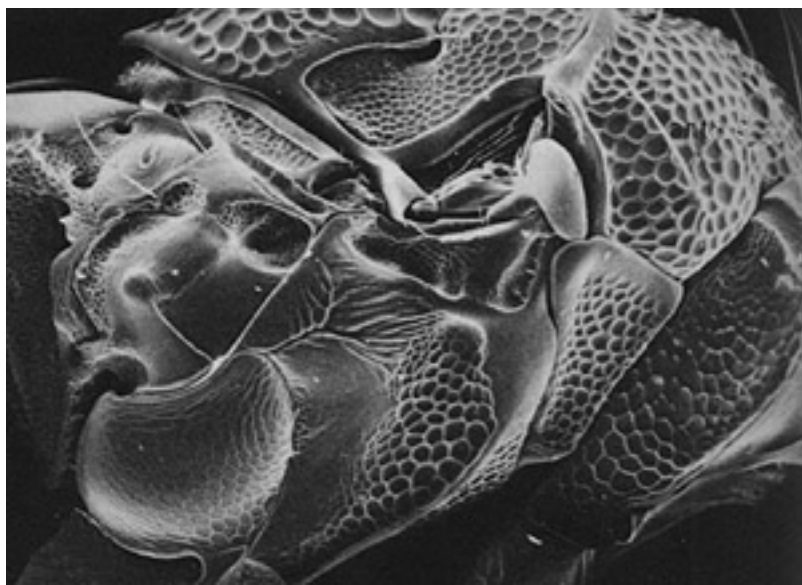
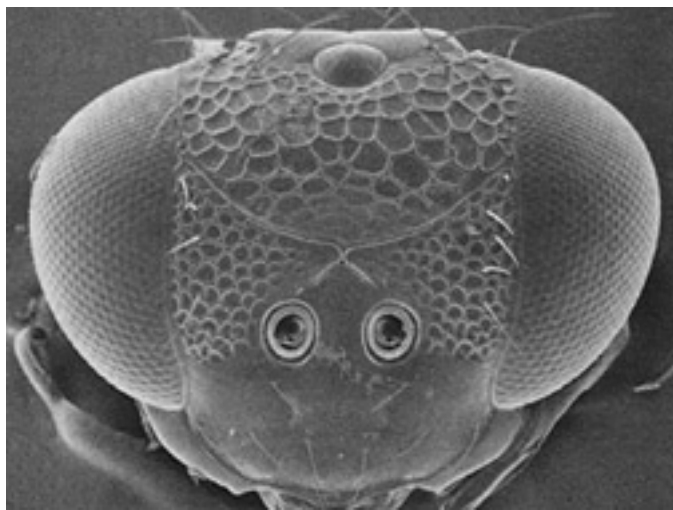
Hansson, C. 1997. Mexican species of the genus *Omphale* Haliday (Hymenoptera: Eulophidae), a taxonomic study. *Journal of Hymenoptera Research*. **6**(1): 107-151.

Image credits: Hansson (1996a).

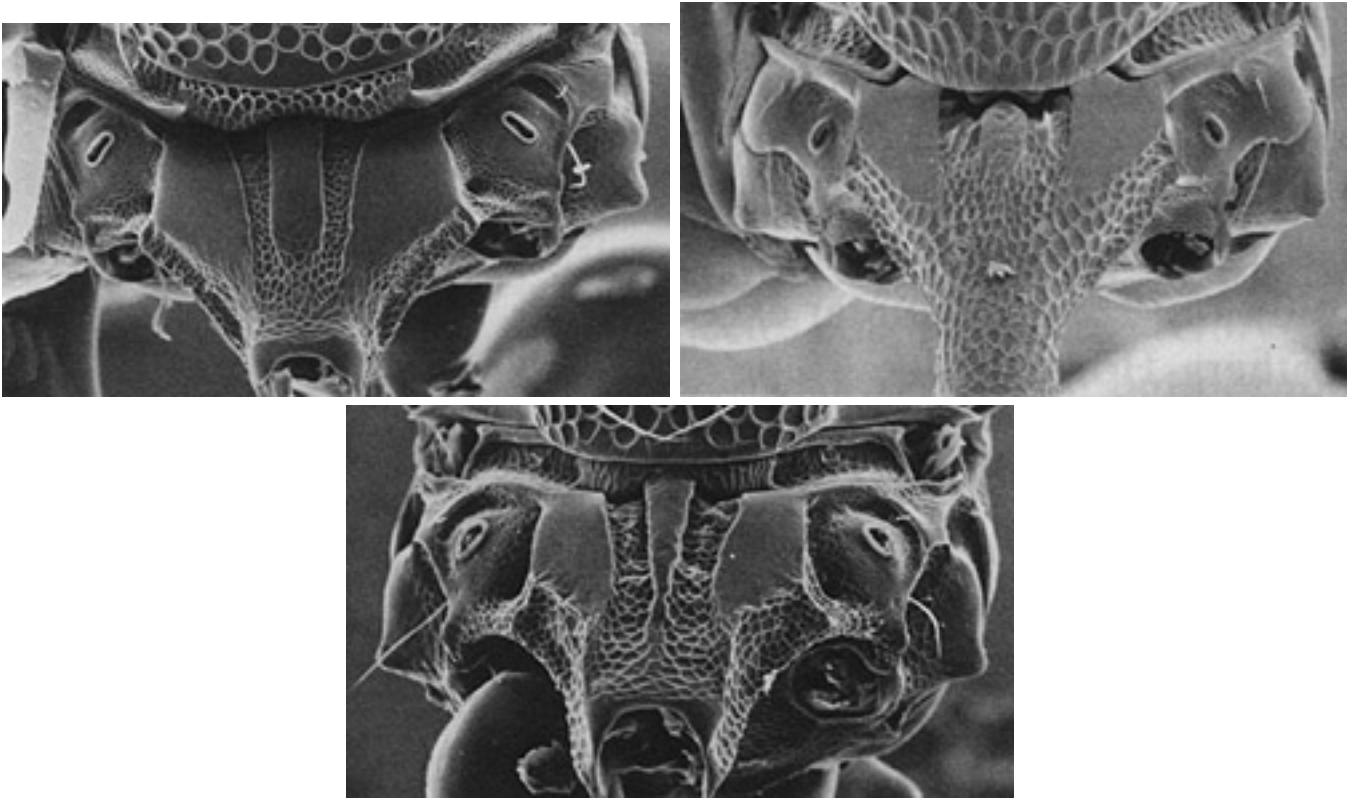
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***Paracrias*** Ashmead, 1904 [comparative info](#) return to: [prev](#) [home](#)

Mandibular formula 2:2. Vertex carinate or abruptly margined behind ocellar triangle, lateral ocelli touching or nearly touching vertex; scrobal grooves present as distinct sulci and nearly always uniting (one clear exception is *Paracrias sulcifer* Hansson) before reaching the transverse groove. Antenna with 5 postanellar flagellomeres, with at least 2 as funicular segments and at least 1 as a claval segment. Pronotal collar rounded anteriorly, not carinate; mesoscutal midlobe with 2 pairs of setae; scutellum without longitudinal groove; scutellar-axillar border without dorsal pit; epicnemial carina absent; metapleuron with strong, sharply pointed protuberance that is anteriorly carinate, the carina running diagonally antero-ventrad to the anterior metapleural border. Marginal vein much longer than the very short stigmal and postmarginal veins; postmarginal vein extremely short or absent, generally shorter than stigmal vein. **Propodeum in most species with broad, smooth, raised median strip flanked by sunken channels contrasting in sculpture**; plicae present near spiracles, formed by ledges, not carinae; nucha long and conspicuous **and/or** posterior half of propodeum rugulose, this area bordered anterior by a distinct cross-carina in many species and sharply contrasting the smooth anterior half. Petiole simple anteriorly, without dorsal flange, though sometimes with a ventral projection. Gt1 covering 0.5x or more of gaster. Some species with greatly enlarged metatibial spur. Compare with: *Horismenus*, *Edovum*, *Pediobius*, *Entedon*.



1a-b: *Paracrias* face (left), and mesosomal pleuron (right)



2a-c: *Paracrias* propodea: *P. arizonensis* (Ashmead) (top left), *P. anthonomi* Woolley & Schauff (top right) and *P. strii* Schauff (bottom)

**Biology:** Some species are larval parasitoids of weevils.

**Comments:** Especially common in tropical America. Similar to some other large-bodied Entedoninae, such as *Pediobius* and the *Horismenus* group, but may constitute part a group distinct from both.

**Comparative information:**

**Horismenus:** Scutellar-axillar groove with large dorsal pit. Scutellum in most species with longitudinal groove, extending at least half scutellar length; posterior edge of prepectus partially overlapped by narrow, extension of mesepisternum that is set off by a dorsal sulcus throughout its length (sometimes overlapping prepectus in *Paracrias*, but the extension in those cases does not have a dorsal sulcus). Pronotal collar carinate.

**Edovum:** Scutellar-axillar groove with large dorsal pit. Scutellum with longitudinal groove, extending no more than half scutellar length; posterior edge of prepectus partially overlapped by narrow extension of mesepisternum; epicnemial carina present, extending from posterior edge of mesepisternal extension; posterior edge of prepectus partially overlapped by narrow, extension of mesepisternum that is set off by a dorsal sulcus throughout its length (sometimes overlapping prepectus in *Paracrias*, but the extension in those cases does not have a dorsal sulcus). Pronotal collar carinate.

**Pediobius**: Propodeum with 1 median carina splitting posteriorly or with 2 submedian carinae diverging posteriorly, but sometimes with strip-like anterior extension (which becomes diverging carinae posteriorly). **Petiole with dorsal flange embracing propodeal nucha**. Pronotal collar carinate. Lateral ocelli in most species separated from vertex carina by half their own length or more (some very rare exceptions exist). Scrobal grooves not uniting, reaching transverse frontal groove separately.

**Entedon**: Propodeum with single narrow median carina placed in a more or less distinct recessed channel; plicae absent; **channel between median panels and supracoxal flange crossed by distinct costulae**.

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## References

Gumovsky, A.V. 2001. Review of the genus *Paracrias* (Hymenoptera, Eulophidae, Entedoninae). *Vestnik zoologii*. **35**(5): 9-26.

Hansson, C. 2002. Eulophidae of Costa Rica (Hymenoptera: Chalcidoidea), 1. *Memoirs of the American Entomological Institute* **67**.

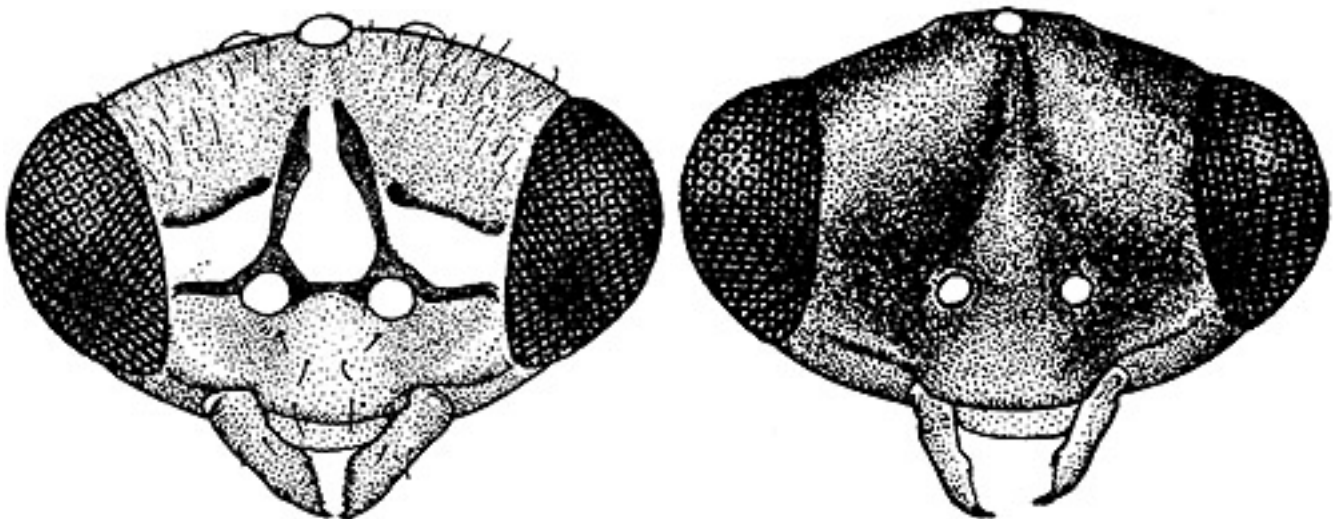
Schauff, M.E. 1985. The new world genus *Paracrias* Ashmead (Hymenoptera: Eulophidae). *Proceedings of the Entomological Society of Washington*. **87**: 98-109.

Woolley, J.B. & M.E. Schauff. 1987. A new species of *Paracrias* (Hymenoptera: Eulophidae) parasitic on *Anthonomus*-spp. (Coleoptera: Curculionidae). *Proceedings of the Entomological Society of Washington*. **89**(4):770-775.

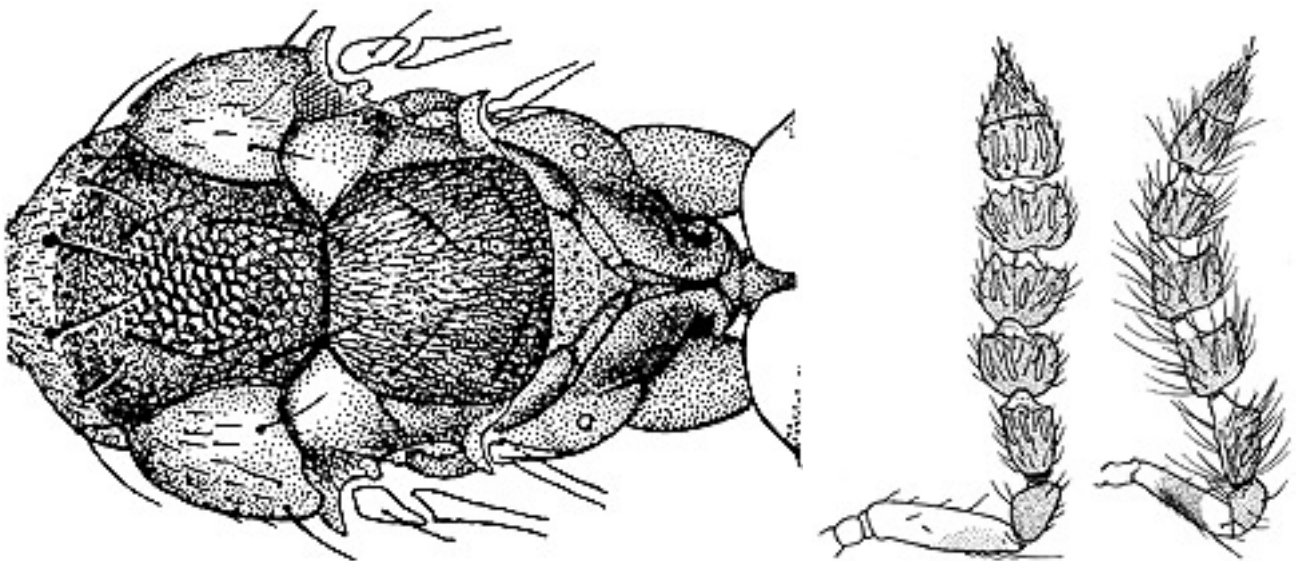
Image credits: 1a, 2b: Woolley & Schauff (1987). 1b, 2a, 2c: Schauff (1985).

*Paraolinx* Ashmead, 1894 [comparative info](#) return to: [prev](#) [home](#)

Females with transverse white stripe present on face at level of toruli, bordered above and below by dark stripes, although this pattern is sometimes reduced to a simple white spot near each eye; clypeal margin convex. **Mandibles long, with many tiny denticles.** Flagellar formula 2,4,3 in females, 1,4,2 in males; flagellar segments expanded and asymmetrical in males. Notauli complete to scutellar apex or ending in axillae near scutellar apex; mesoscutal midlobe with 2 or 3 pairs of setae; scutellum faintly sculpted and dull, without submedian or sublateral grooves. Propodeum with median carina simple or sometimes with short anterior split; plicae and costula absent. Forewing often fuscate near stigma and parastigma. Compare with: *Miotropis*, *Grotiusomyia*, *Aulogymnus*, *Hoplocrepis*, *Dasyeulophus*.



1a-b: *Paraolinx* faces: female (left), and male (right)



2a-c: *Paraolinx* mesosoma (left), female antenna (center), and male antenna (right)

**Biology:** Parasitoids of Lepidoptera.

**Comments:** Forms with the white facial markings are easily identified, but males are much more difficult. I have found them misidentified more often than any other Eulophine. Mandibular form and flagellomere shape are the best characters for males, along with absent scutellar grooves.

### Comparative information:

***Miotropis*:** Scutellum smooth, sublateral grooves nearly always present anteriorly, usually easily traceable to posterior pair of setal sockets. Face without white markings. Mandibles not elongate. Flagellomeres not asymmetrical in males.

***Grotiusomyia*:** Face without white markings. Mandibles not elongate. Median panels of propodeum sharply raised above supracoxal flange and lateral areas of propodeum, lateral edge of raised area with 1 seta on each side near midlength. Actually very similar to *Paraolinx* in some ways, such as the clypeal margin and head shape, but easily distinguished.

***Aulogymnus*:** Face without white markings. Mandibles not elongate. Often with fewer than 4 funicular segments. **Stigma elongate, with uncus separated from stigmal apex by more than its own length.** Can strongly resemble some *Paraolinx* in color and sculpture.

***Hoplocrepis*:** Head broad, with face strongly narrowed in ventral half. **Mandibles reduced, not capable of meeting medially, without teeth.** Occipital carina (often a transverse ledge) present near occipital foramen, vertex also usually sharply margined. **Forewing with distinct tuft of enlarged, darkened setae near parastigma;** usually with fuscate transverse stripe(s). Petiole longer than broad. Color typically semi-transparent brown to tan or amber. Sulci, carinae, and sutures usually with conspicuously sharp edges. Rarely confusable.

***Dasyeulophus*:** **Notauli incomplete.** Eyes setose. **Clypeal margin bilobed.** All funicular segments quadrate to broader than long. **Scutellum and mesoscutal midlobe with numerous irregularly distributed setae** (rarely scutellum with as few as 2 pairs of setae). Dorsellum large and convex: propodeum only slightly longer than dorsellum medially. Similar in form to some strongly reduced *Paraolinx*.

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### References

Miller, C.D.F. 1964. Some species of the New World genus *Paraolinx* Ashmead (Hymenoptera: Eulophidae). *Canadian Entomologist*. **96**: 1352-1362.

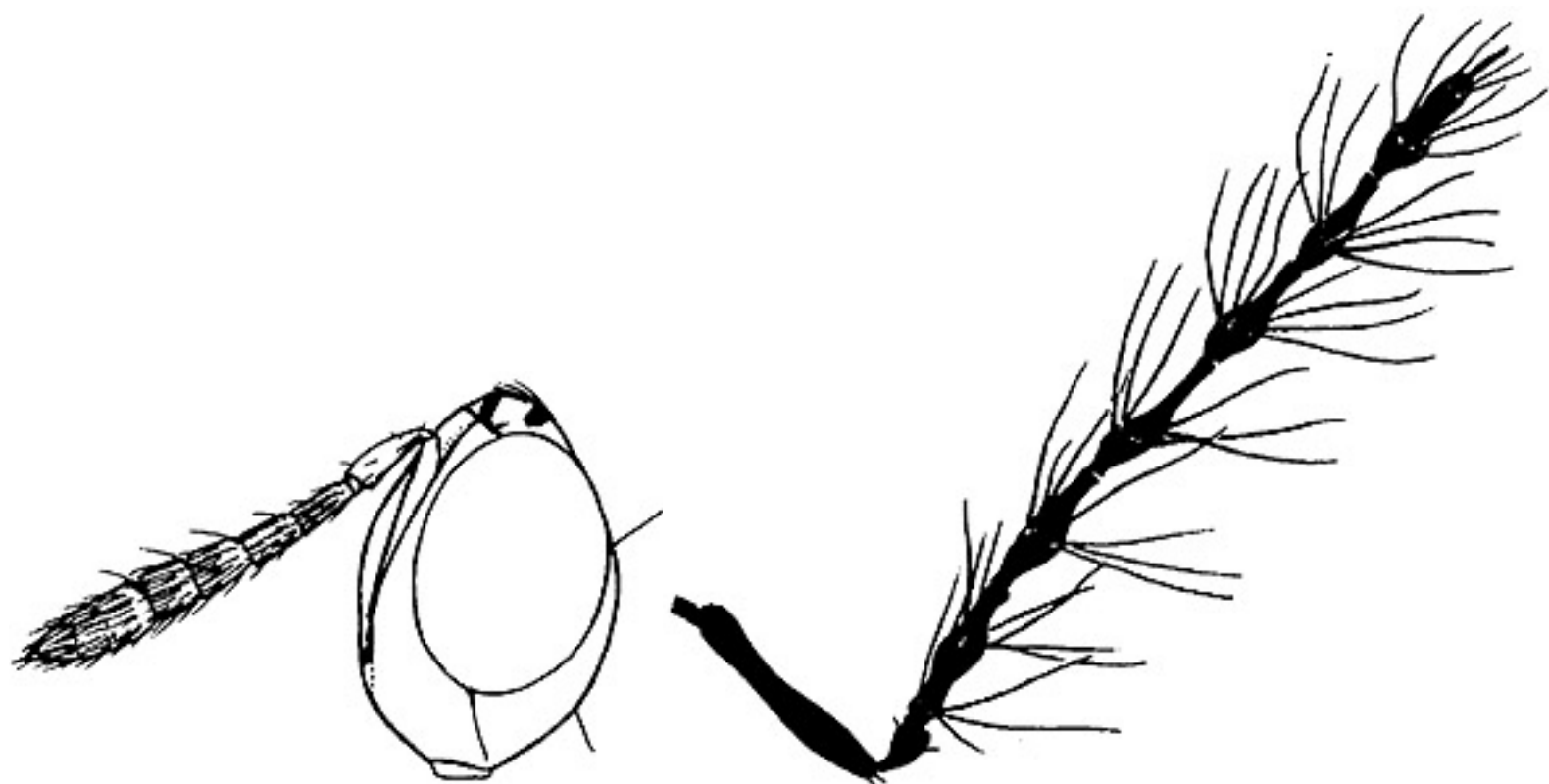
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***Parasecodella* Girault, 1915** [comparative info](#) return to: [prev home](#)

[This genus has not been formally synonymized with *Euderus*, but has recently been treated as a likely synonym.] Very similar to some species of *Euderus*, but distinguishable using a combination of characters. **Forewing with indistinct or no setal tracks radiating from stigma, and: females with both pedicel and 1st funicular segment 2x longer than broad, apical funicular segments much shorter than basal ones; males with nodose flagellomeres and 1st funicular segment with two complete whorls of erect setae; males sometimes with 5 funicular segments.** Propodeum with median carina. Apical gastral tergite (epipygium) much shorter than preceding tergite. Compare with: ***Euderus*, *Carlyleia*.**



1a-b: *Parasecodella* female profile (left), and male antenna (right)

## Biology:

**Comments:** 4 described species. I am confident that this genus renders *Euderus* paraphyletic, but it is not clear whether it should simply be lumped into that large genus, or if some species of *Euderus* should be placed in *Parasecodella*. *Euderus* may remain paraphyletic with respect to most of the other genera in the subfamily if species with nodose flagellomeres in males are retained. The situation clearly requires further study for its resolution.

## Comparative information:

**Euderus**: Combination of characters not entirely present. Especially, in most species forewing with 2-3 rows of setae radiating from stigmal apex **and/or** funicular segments not nodose in males **and/or** pedicel or 1st funicular segment <2x longer than broad in females.

**Carlyleia**: Propodeum without median carina. Apical gastral tergite (epipygium) much longer than preceding tergite in females.

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## References

Boucek, Z. 1963. Studien über europäische Eulophidae, III: Euderinae (Hymenoptera: Chalcidoidea). *Beiträge zur Entomologie*. **13**: 257-281.

Boucek, Z. 1988. Australasian Chalcidoidea (Hymenoptera). A biosystematic revision of genera of fourteen families, with a reclassification of species. CAB International, Wallingford, UK.

Coote, L.D. 1994. Review of Nearctic genera of Euderinae (Hymenoptera: Eulophidae), with descriptions of two new species of *Allocerastichus* Masi, and redescription of *Carlyleia marilandica* Girault. *Canadian Journal of Zoology*. **72**: 1044-1054.

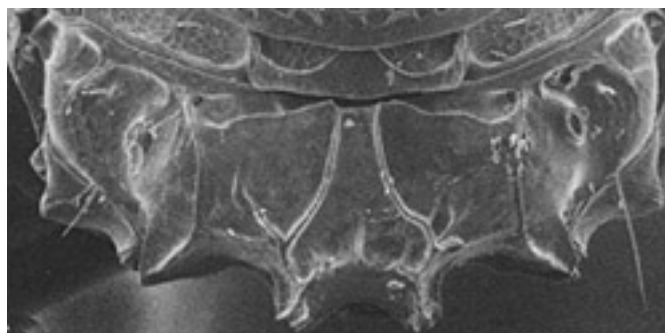
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***Pediobius* Walker, 1846** [comparative info](#) return to: [prev](#) [home](#)

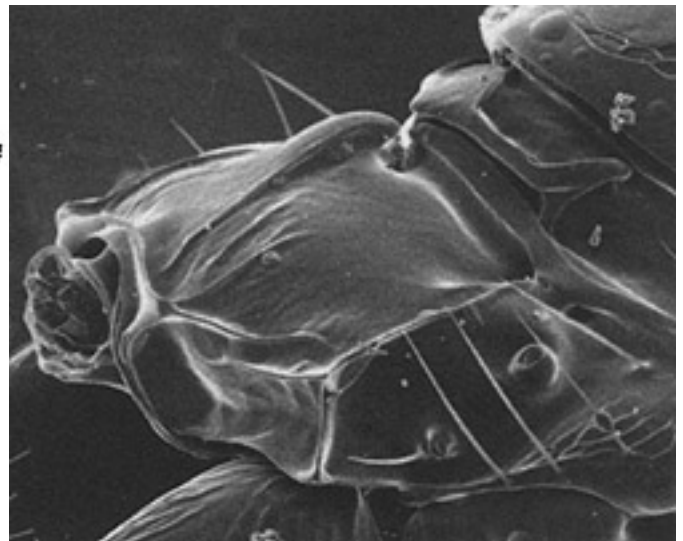
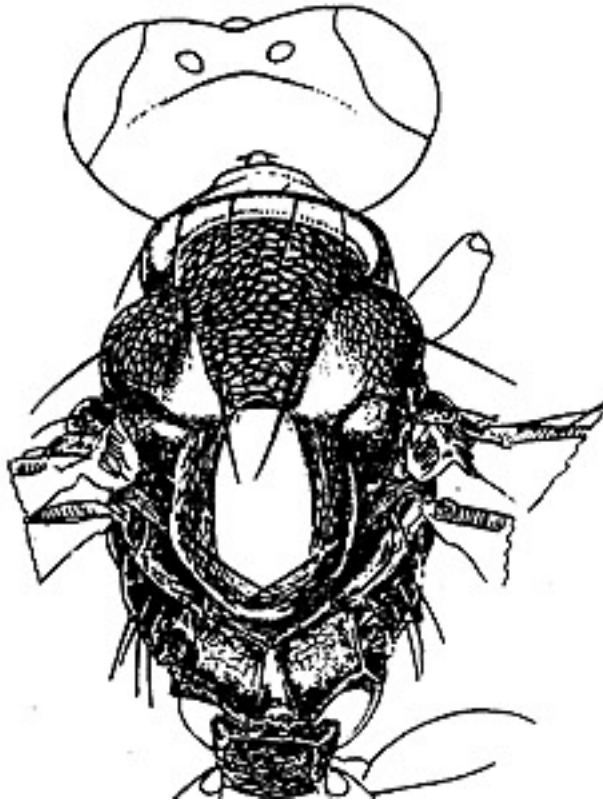
Transverse frontal groove broadly V-shaped, with scrobal grooves present as distinct sulci and reaching the transverse groove before meeting; **vertex carinate or sharply margined posteriorly**, with lateral ocelli distant from the vertex margin by at least half their own diameter in nearly all species (I have a series of an exceptional species from Australia). Flagellum with 5 postanellar flagellomeres, with at least 2 of them as funicular segments and at least 1 as a claval segment. **Pronotal collar at least weakly, usually strongly, carinate**; mesoscutal midlobe with 2 pairs of setae; scutellum without longitudinal groove (but often with broad smooth area); scutellar-axillar border with or without a distinct dorsal pit; posterior edge of prepectus overlapped by narrow extension of mesepisternum that is set off by a dorsal sulcus, but this sulcus is weak in many species; epicnemial carina absent; metapleuron with a strong, sharply pointed projection. Postmarginal and stigmal veins very short, several times shorter than the marginal vein; **stigmal vein with a very short stalk**, stigma not appearing petiolate. **Propodeum with 1 median carina splitting posteriorly, 2 submedian carinae diverging posteriorly, raised median strip, or median channel separating raised submedian panels**; anterior portion of median carina without cup-shaped structure, but sometimes with tooth-like extension; **plicae present**. **Petiole with anterior flange embracing nuchal apex**; with ventrally-projecting tooth (generally difficult to locate without removing it or a metacoxa from the body). Gt1 usually covering 0.5x or more of gaster, rigidly convex and not collapsing when dry, rigid and longer than the other tergites which frequently telescope inside it in air dried specimens. A few species with greatly enlarged metatibial spur; first gastral sternite with a strongly sclerotized, reticulate region at the petiolar base. Compare with: ***Proacrias***, ***Emersonella***, *Edovum*, *Horismenus*, *Paracrias*, *Entedon*, *Achrysocharoides*.



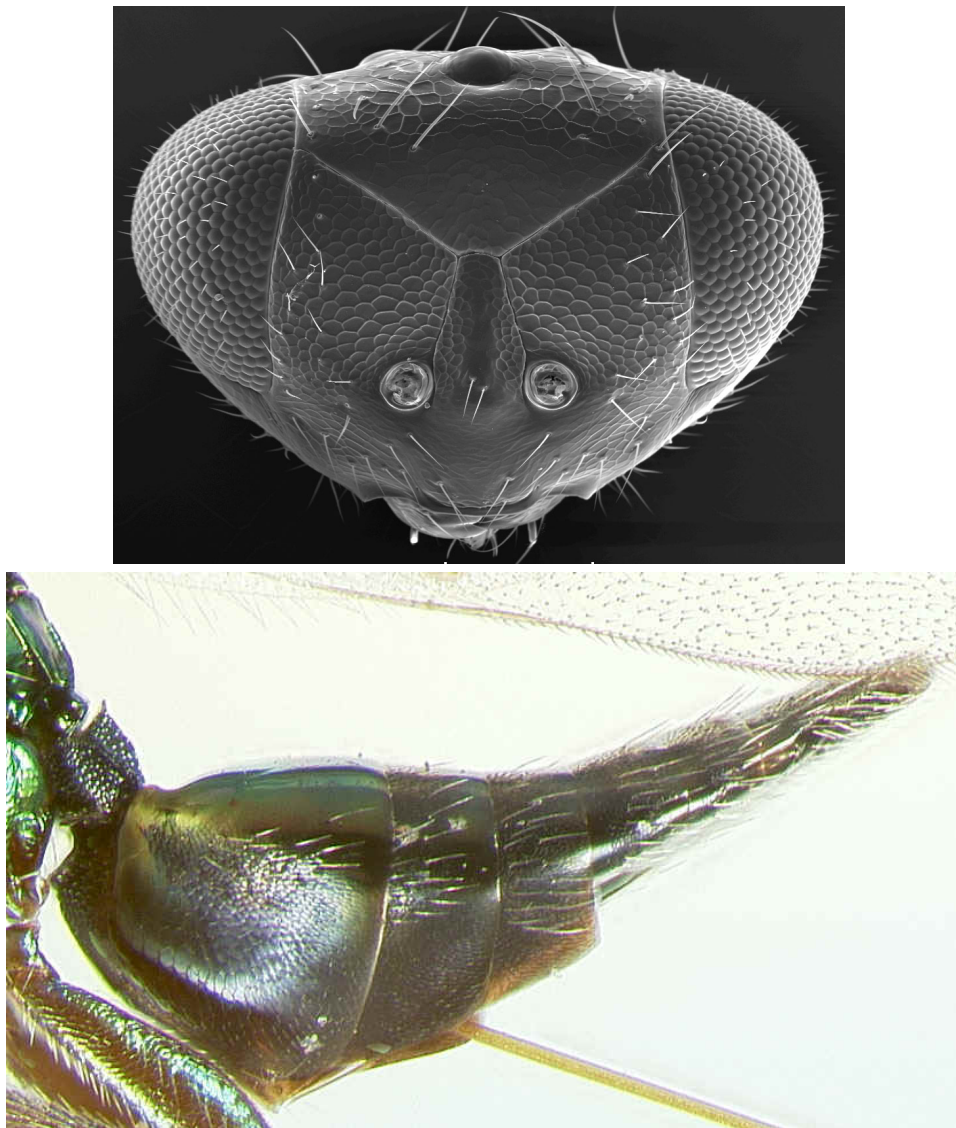
1a-b: *Pediobius foveolatus* (Crawford) mesosomal dorsum (left), and propodeum (right)



2a-b: *Pediobius* propodea: *P. adelphae* Peck (left), and *P. nigratarsis* (Thomson) (right)



3a-b: *Pediobius alcaeus* (Walker) dorsal view (left), and lateral view of propodeum (right)



*Pediobius* face (top), and gaster (bottom)

## Biology:

**Comments:** Large genus linked with the *Horismenus* group and *Paracrias*. The posteriorly split median carina sometimes forms part of a median raised smooth strip, which recalls the median groove of *Horismenus*, and the mesepisternum has a frequently indistinct special projection set off by a dorsal sulcus and extending to overlap the posterior border of the prepectus, that is a defining apomorphy of the *Horismenus* genus-group. Also, some species have an apparent pit on the dorsal part (anterior half) of the scutellar-axillar border, another defining apomorphy of the *Horismenus* group. Less convincing characters that they all share are the very short postmarginal and stigmal veins, very long marginal vein, scrobal grooves present as distinct sulci, and general body form, sclerotization, and sculpture. It is difficult to point out unique apomorphies linking this genus to *Paracrias*, *Emersonella*, and especially to *Entedon*, although they share certain characters mentioned above, such as the scrobal grooves present as distinct sulci and relative lengths of the forewing veins, that are nevertheless highly variable in *Entedon* and a number of other apparently related genera. All of these genera, except many species of *Entedon*, also have a strong, sharp projection extending laterally from the metapleuron. I have

found this character to be helpful in identification in some cases, but it is too variable to be used as a convincing apomorphy, as it is present in large-bodied *Chrysocharis* as well, but absent from most species of that genus.

### **Comparative information:**

***Proacrias***: Upper mesepimeron without extension over posterior border of prepectus. First gastral tergite collapsing in air-dried specimens, not more rigid than the other tergites. First gastral sternite without the ventral punctulate region at petiolar base.

***Emersonella***: **Propodeum with semicircular submedian carinae, most broadly separated in middle of propodeum**; anterior ends of the submedian carinae arising from broad pits or sunken areas with longitudinal rugae extending from the anterior propodeal margin. **Face almost always entirely smooth**. Transverse frontal groove nearly straight; scrobal grooves uniting before reaching transverse groove. Only resembling *Pediobius* in having a pair of submedian propodeal carinae, differing strongly in other features, including superficial aspects of body form and sculpture.

***Edovum***: **Petiole with longitudinal ribs**. Scutellum with median longitudinal groove; epicnemial carina present, extending from posterior edge of mesepisternal extension.

***Horismenus***: Vertex not carinate (though rarely with a small transverse ruga at the top of the rounded vertex). Scutellum with longitudinal groove in most species. Propodeum always with broad, smooth, raised median strip flanked by sunken channels, never with submedian or median carinae.

***Paracrias***: **Petiole without dorsal flange**. Lateral ocelli in all species very close to the vertex margin. Scrobal grooves uniting before reaching transverse frontal groove. Pronotal collar never carinate. Propodeum almost always with broad, smooth, raised median strip flanked by sunken channels; nucha long and conspicuous and/or propodeum divided into anterior and posterior halves by a distinct cross-carina, the posterior half rugulose in contrast to the mostly smooth anterior half.

***Entedon***: **Propodeum with single narrow median carina placed in a more or less distinct recessed channel**; plicae absent; **channel between median panels and supracoxal flange crossed by distinct costulae**. Scrobal grooves (when distinct) uniting before reaching transverse frontal groove.

***Achrysocharoides***: Some species have paired propodeal carinae, but differ from *Pediobius* in that they have a much smaller petiole without an anterior flange. Very few species with a pronotal collar or propodeal plicae.

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## References

Boucek, Z. 1965. Studies of European Eulophidae, IV: *Pediobius* Walk. and two allied genera (Hymenoptera). *Acta Entomologica Musei Nationalis Pragae*. **36**: 5-90.

Hansson, C. 2002. Eulophidae of Costa Rica (Hymenoptera: Chalcidoidea), 1. *Memoirs of the American Entomological Institute* **67**.

Peck, O. 1985. The taxonomy of the Nearctic species of *Pediobius* (Hymenoptera: Eulophidae), especially Canadian and Alaskan forms. *Canadian Entomologist*. **117**: 647-704.

Schauff, M.E. 1991. The Holarctic genera of Entedoninae (Hymenoptera: Eulophidae). *Contributions of the American Entomological Institute* **26**.

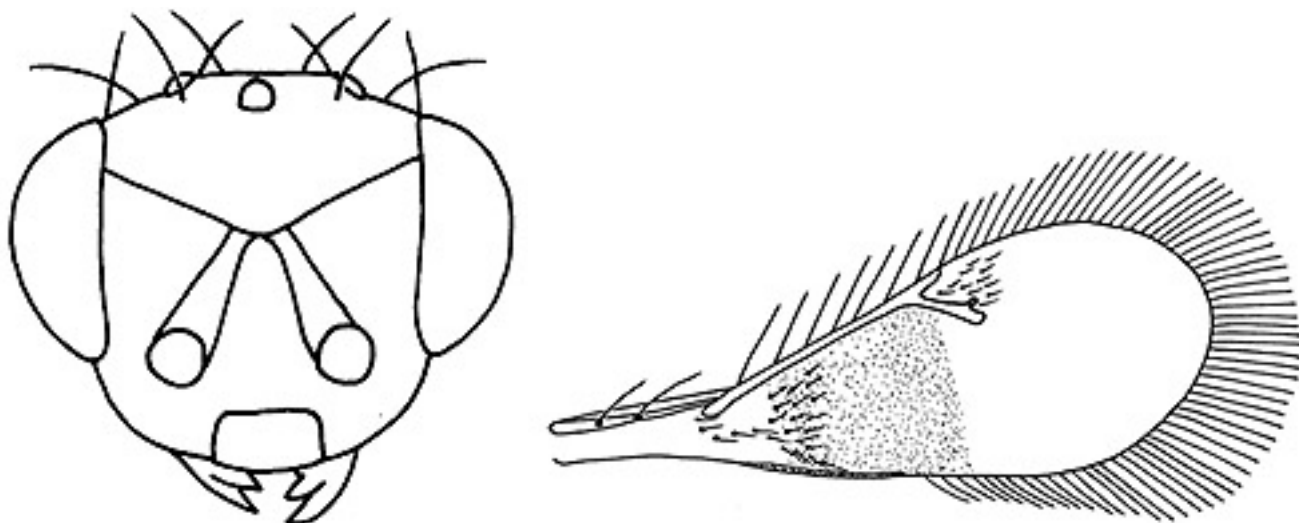
Image credits: 1a-b, 3b: Schauff (1991). 2a-b, 3a: Boucek (1965).

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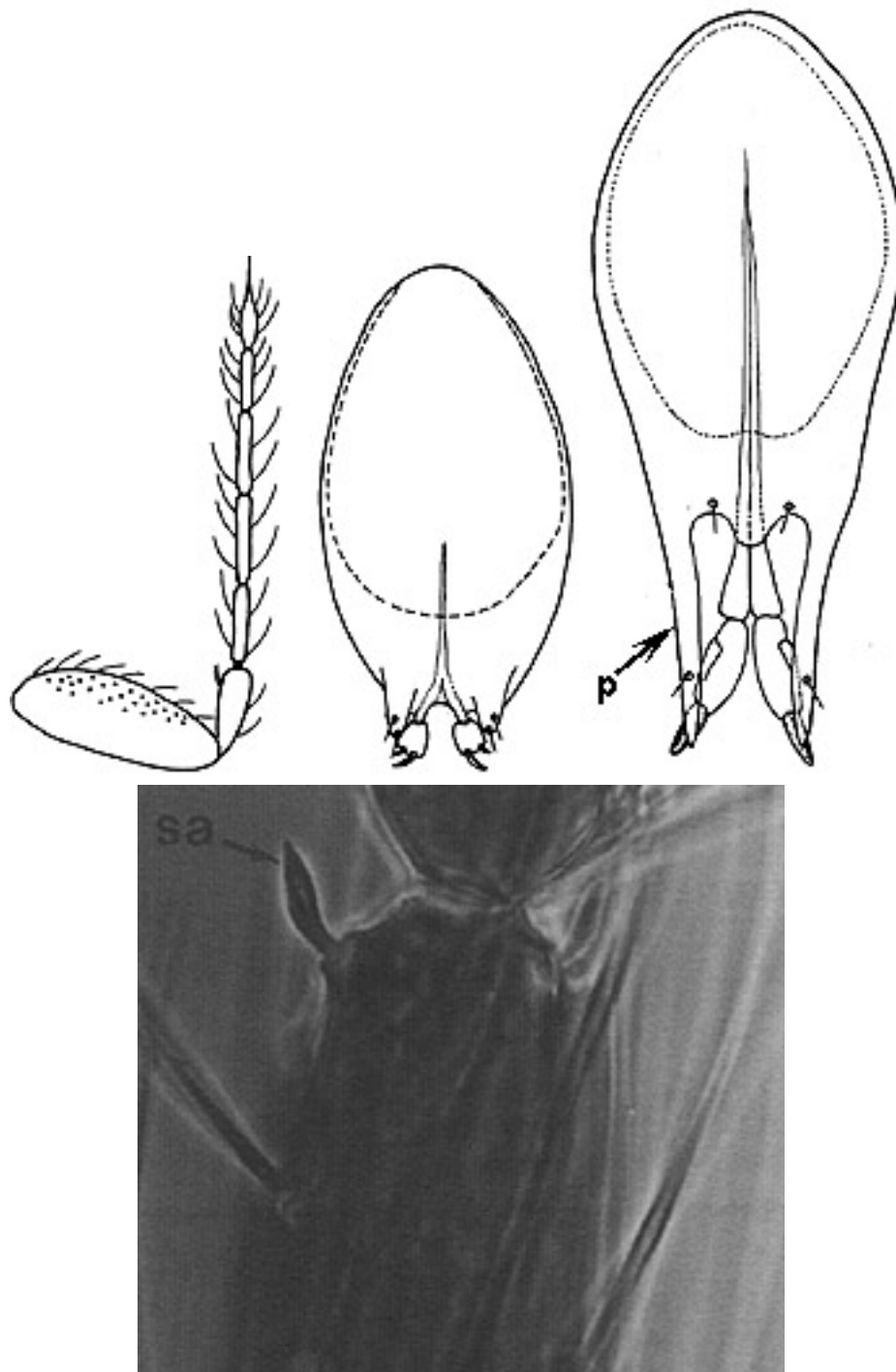
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***Perditorulus*** Hansson, 1996 [comparative info](#) return to: [prev](#) [home](#)

Body unusually small (<1mm). Mandibular formula 3:3, never exodont. **Clypeus set off by distinct sutures**. Transverse frontal groove weakly to strongly v-shaped; scrobal depressions uniting at transverse groove or reaching transverse groove separately. **Occipital margin never carinate**. Flagellar formula 2,4,1; **heads of flagellar peg sensilla always elongate, spear-shaped** (type 3); flagellar setae long, often arranged in whorls in males; placoid sensilla present along most of the ventral margin of scape in males; pedicel about 3x longer than broad. Mesosomal dorsum weakly sculpted, **with relatively long setae (also on vertex)**; pronotum not or hardly visible dorsally; mesoscutal midlobe with 2 pairs of long setae; transepimeral sulcus weakly curved, arching dorsad. Forewing relatively narrow, sometimes with broad fuscate band posterior to marginal vein; postmarginal vein 0.3-0.7x stigmal vein length; no setal tracks radiating from stigma; radial cell bare or setose; speculum small, always closed posteriorly; apical fringe setae relatively long. Propodeum very short, smooth, without median carina; callus with 2 setae; **petiolar foramen often large, rendering propodeum strongly emarginate posteriorly**. Petiole always much broader than long and not sculpted. **Male genitalia without volsellar setae**, but sometimes with paired "parameral" setae in which one pair is indistinguishable from volsellar setae; **parameres often elongate or sinuate** (especially helpful in species with ambiguously placed "parameral" setae). Color always dark with weak metallic tinge. Compare with: ***Omphale***, ***Closterocerus***.



1a-b: *Perditorulus* face (left), and forewing (right)



2a-d: Top left to right: *Perditorulus* male antenna, *P. bidenticulatus* Hansson male genitalia, *P. longiparameratus* Hansson male genitalia (p=paramere), and Bottom: *Omphale* flagellomere showing strongly asymmetrical peg sensilla (sa) as in *Perditorulus*



3: *Perditorulus*

## Biology:

**Comments:** Many described species. Obviously very similar to *Omphale*, and requires slide-mounting of males to reliably distinguish from that genus. This genus is very similar in some characters (lack of volsellar setae, type 3 sensilla) to the extralimital genus *Tropicharis*, but differs from it in many other ways.

## Comparative information:

***Omphale*:** Male genitalia with volsellar setae that are usually conspicuously enlarged and flattened; parameres indistinct, never elongate. Body length usually >1mm. Mandibles exodont in a few species. Flagellar peg sensilla often L-shaped, greatly elongate in only a few species. Head and mesosomal dorsum usually without long setae. Forewing often without elongate

fringe setae. Only the male genitalic characters are 100% reliable for distinguishing this genus from *Perditorulus*.

**Closterocerus**: Clypeus usually not set off by distinct sutures (but often with faint lateral sutures). Male genitalia with volsellar setae. Flagellar peg sensilla L-shaped, not greatly elongate. Forewing often without elongate fringe setae. Some species with only 1 pair of setae on mesoscutal midlobe.

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## References

Hansson, C. 1996a. Taxonomic revision of the Nearctic species of *Omphale* Haliday (Hymenoptera: Eulophidae). *Entomologica Scandinavica supplement* **49**.

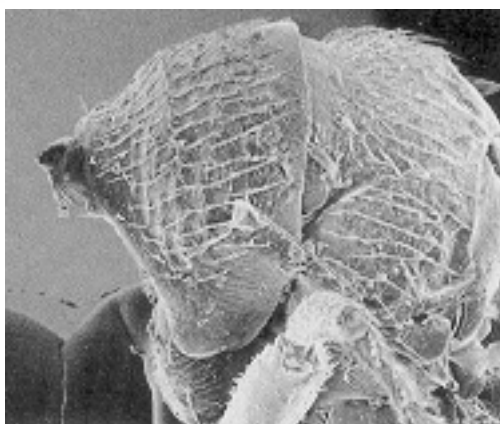
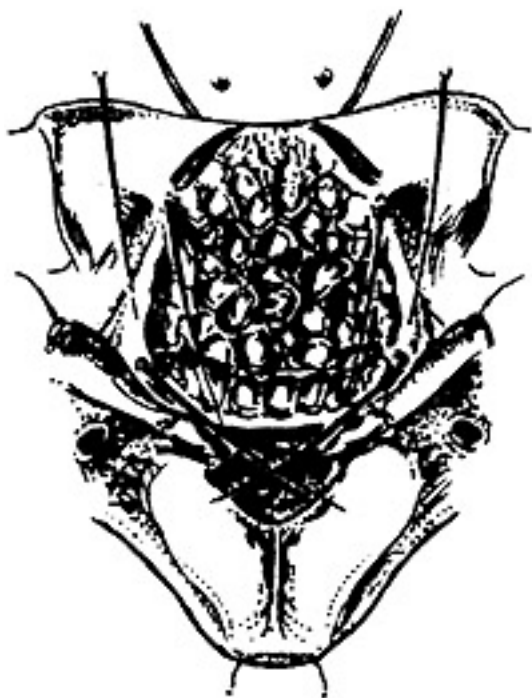
Hansson, C. 1996b. A new genus of Eulophidae (Hymenoptera: Chalcidoidea) with remarkable male genitalia. *Systematic Entomology*. **21**: 39-62.

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*Platyplectrus* Ferrière, 1941 [comparative info](#) return to: [prev](#) [home](#)

Occipital and/or postoccipital carinae at least sometimes present. **Pronotal collar gradually sloping**, almost never with anterior carina, but if so then weakly defined "collar" is 2x or less broader than long in dorsal view; notauli complete; **scutellum nearly always with sublateral grooves or carinae** that may or may not curve to meet posteriorly. Propodeum with 1 median carina, split anteriorly or with a basal cup. Always with 2 metatibial spurs; longest metatibial spur reaching halfway point of 2nd metatarsal segment. Compare with: *Euplectrus*.



*Platyplectrus* scutellum and propodeum (left), and pronotum (right, head removed)

**Biology:** Solitary or gregarious larval ectoparasitoids of Lepidoptera.

**Comments:** Many described species.

**Comparative information:**

***Euplectrus*:** Scutellum smooth or at most with faint impressed sculpture, never with sublateral grooves or carinae, not rugulose. Pronotal collar well-differentiated and sharply defined by an anterior carina; horizontal, not gradually sloping, at least 3x broader than long in dorsal view [except in some small males, which are recognizable using the scutellar character].

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## References

Boucek, Z. 1988. Australasian Chalcidoidea (Hymenoptera). A biosystematic revision of genera of fourteen families, with a reclassification of species. CAB International, Wallingford, UK.

Lin, K. 1963. Revision of the tribe Euplectrini from Taiwan. Part I. (Hymenoptera, Eulophidae). *Quarterly Journal of the Taiwan Museum*. **16**: 101-124.

Wijesekara, G.A.W. & M.E. Schauff. 1994. Revision of the tribe Euplectrini of Sri Lanka (Hymenoptera: Eulophidae). *Oriental Insects*. **28**: 1-48.

Wijesekara, G.A.W. & M.E. Schauff. 1997. Two new genera and three new species of Euplectrini (Hymenoptera: Eulophidae) from the New World. *Proceedings of the Entomological Society of Washington*. **99**(1): 101-109.

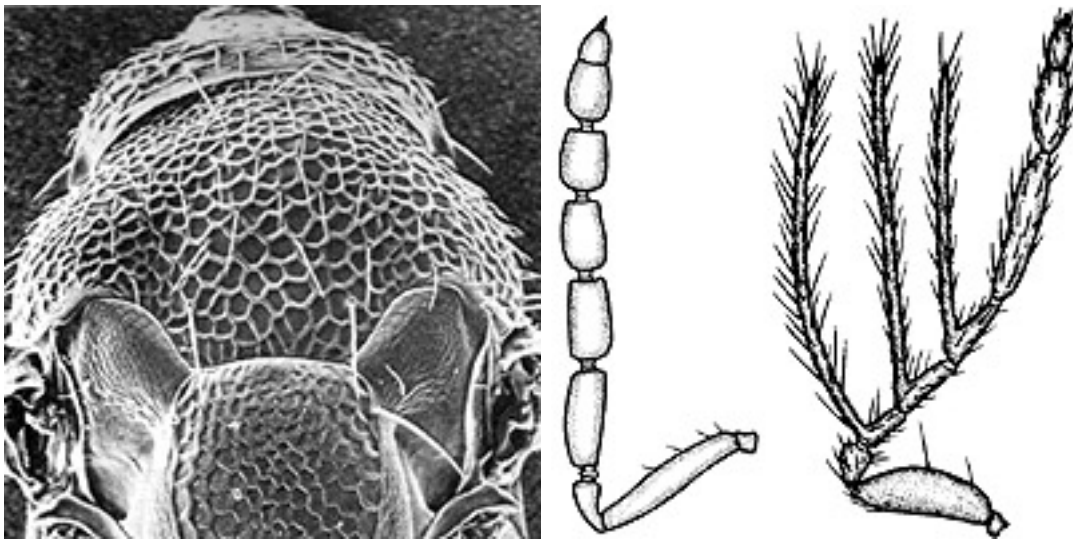
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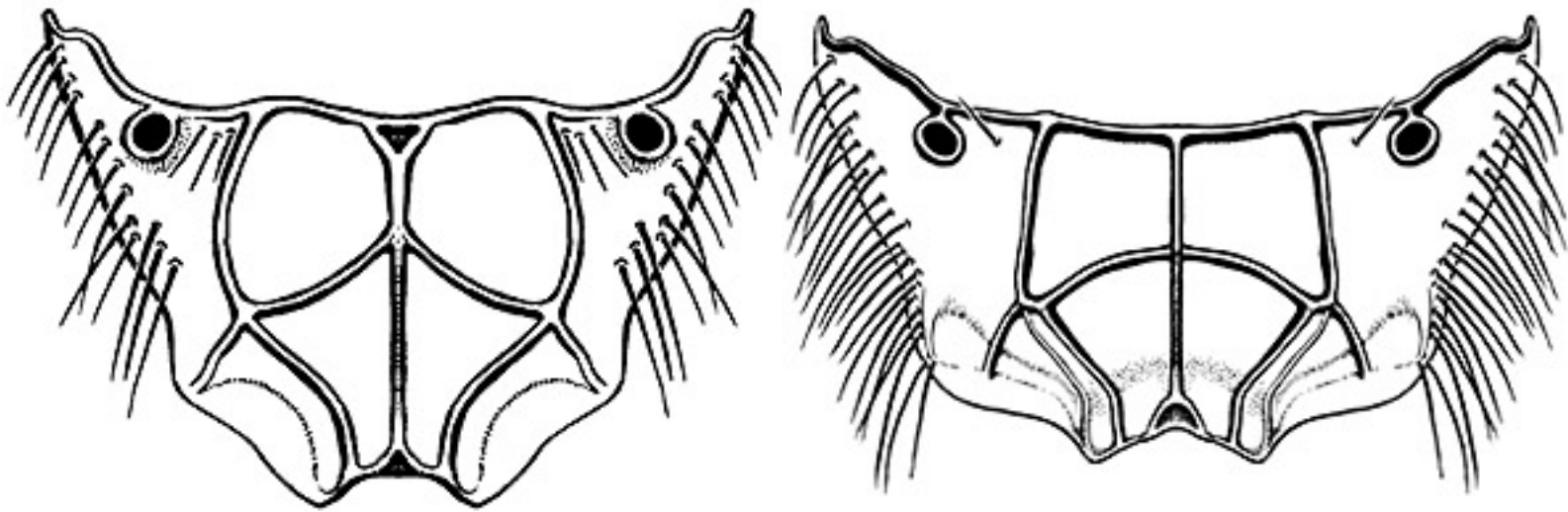
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***Pnigalio* Schrank, 1802** [comparative info](#) return to: [prev\(eul 25\)](#) [prev\(eul 29\)](#) [home](#)

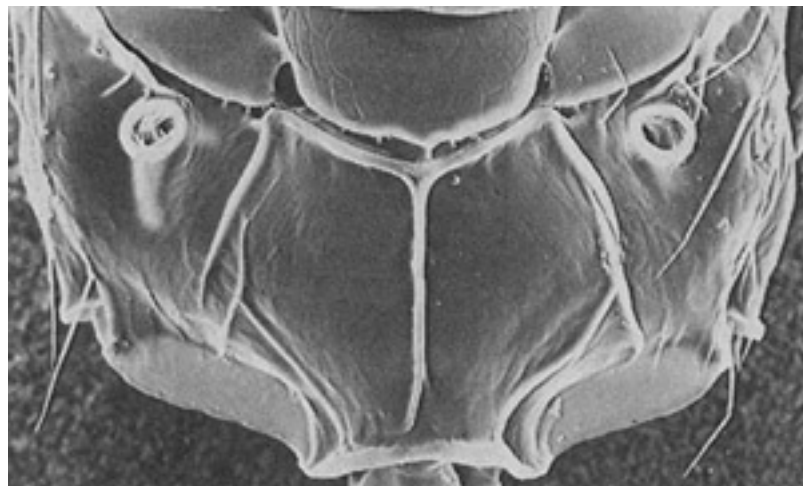
Eyes setose. Flagellum usually with 4 funicular segments, rarely with 3 or 5; basal 3 funicular segments branched in males. Notauli incomplete or ending in anterior half of axillae; **mesoscutal midlobe usually evenly and irregularly setose** (especially in anterior half), rarely arranged in rows; scutellum usually without submedian or sublateral grooves (rarely with traces of sublateral grooves visible); axillae usually smooth in contrast to the usually sculptured mesoscutum and scutellum. Postmarginal vein 2x stigmal vein length or longer; speculum present or absent, basal cell bare; basal and cubital veins setose. **Propodeum with complete plicae and median carina, almost always with costula** (absent in small males and in females of a few species); plicae relatively straight in anterior half of propodeum and sharply convergent posterior to where they meet the costula (rarely, when costula is absent, straight and diverging posteriorly); costula and plicae sometimes obscured by transverse rugae; **median area of propodeum almost always smooth and shiny** (rarely reticulate). Petiole at most slightly longer than broad, smooth, exposed dorsally. Compare with: ***Notanisomorphella***, ***Sympiesis***, ***Hemiptarsenus***.



1a-c: *Pnigalio* mesoscutum (left), and *P. maculipes* (Crawford) female and male antennae (center and right, typical of genus)



2a-b: Typical *Pnigalio* propodea



3a-b: Atypical *Pnigalio* propodea: *P. pallipes* (Provancher) (left), and *P. levis* Yoshimoto (right)



4a: *P. pallipes* female antenna (atypical of genus)

**Biology:** Parasitoids of leaf-mining Lepidoptera, Coleoptera, Diptera, and gall-forming sawflies.

**Comments:** Interesting genus phylogenetically, but I differ from some authors in regarding it as less indistinct from *Sympiesis* than some other genera are. Many of the characters used to distinguish problematic species from other genera are unreliable. *Ratzeburgiola* Erdös is an extralimital genus with a similar costula, but with complete scutellar grooves, usually placed among the elachertines, but it seems barely distinct from *Pnigalio*.

**Comparative information:** No other Nearctic genus of Eulophinae with incomplete notauli has any species with a costula, and the characters given below are for distinction of those genera from the rare forms of *Pnigalio* that do not have a costula.

**Notanisomorphella:** Propodeum with complete "step-like" plicae (enclosed median panels of propodeum sharply elevated above lateral areas) immediately medial to spiracles; median panels large, shiny or reticulate. *Pnigalio* never have raised median propodeal panels in combination with lack of a costula.

**Sympiesis:** Setae on mesoscutal midlobe usually arranged in regular longitudinal rows (if not then propodeum uniformly reticulate, without median carina or plicae). **Plicae extending as straight diagonal lines from spiracle to propodeal nucha, usually incomplete or absent;** median carina present or absent. Distinguished from the rare *Pnigalio* without a costula by propodeal shape and features, and less reliably by arrangement of mesoscutal setae. All *Pnigalio* have a median carina **and** plicae, while *Sympiesis* rarely have both. Most *Sympiesis* have mesoscutal setae arranged in distinct rows, but many do not, and this character should never be used as the sole character separating these genera. The shape of the plicae is especially valuable when distinguishing these two genera, as they arise between the median carina and the spiracles in *Pnigalio* and almost always proceed more or less straight posteriad until they meet the costula, at which point they begin converging strongly, such that there is a corner where the plicae meet the costula. In the exceptions, they are straight and diverge posteriorly. In *Sympiesis*, the plicae, when present, arise nearly adjacent to the spiracles and proceed as essentially straight diagonal lines to the nucha (convergent posteriorly).

**Hemiptarsenus**: Toruli very high on face, far above lower eye margin; scape exceeding vertex (scape slightly exceeds vertex in some other genera). **Forewing and costal cell unusually long and narrow**: forewing at least 2.6x longer than broad and costal cell 7-15x longer than broad; some females brachypterous. Propodeum with or without median carina and plicae, **never** with a costula; sometimes with raised median panels, especially in forms where propodeum is <1.75x broader than long. Legs elongate. Not resembling *Pnigalio* in any way except body shape and sculpture in some, and propodeal sculpture is always sufficient to separate these genera.

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## References

Miller, C.D.F. 1970. The Nearctic species of *Pnigalio* and *Sympiesis* (Hymenoptera: Eulophidae). *Memoirs of the Entomological Society of Canada* **68**.

Yoshimoto, C. 1983. Review of North American *Pnigalio* Schrank (Hymenoptera: Eulophidae). *Canadian Entomologist*. **115**: 971-1000.

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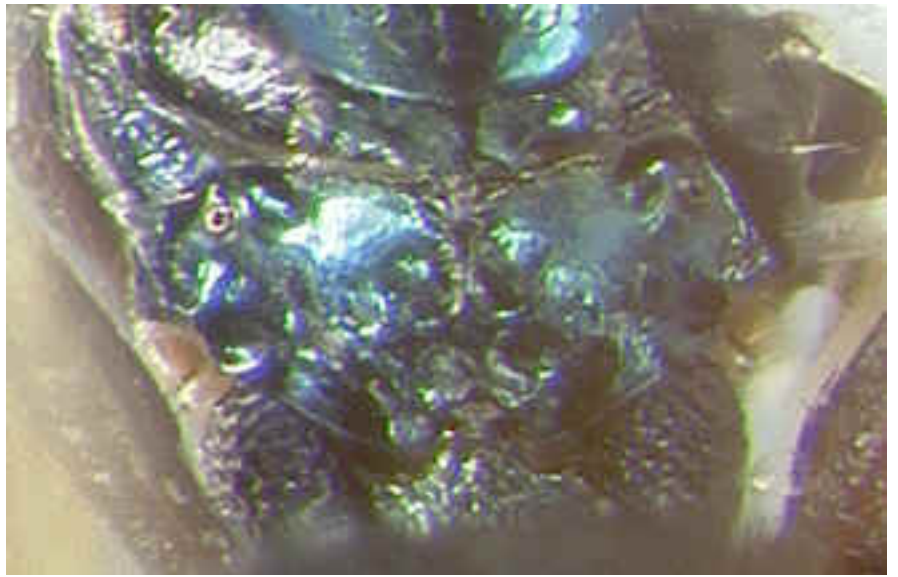
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***Proacrias*** Ihering, 1914 [comparative info](#) return to: [prev](#) [home](#)

Mandibular formula 3:3. Clypeus sometimes faintly outlined by sutures, usually not discernable. Transverse frontal groove V-shaped; scrobal grooves reaching transverse groove separately, usually extending below toruli ventrally; interscrobal process reaching transverse groove. Vertex sometimes carinate. Flagellum 6-segmented, including 1 anellus. Pronotal collar sometimes carinate; mesoscutal midlobe with 2 pairs of setae; anterior portion of notauli curving sharply laterad; upper mesepisternum without an extension overlapping posterior edge of prepectus; no pit between axilla and scutellum. Postmarginal vein length variable: from shorter than stigmal vein to over 2x its length. **Propodeum with modified median carina: either broadened and dorsally flattened, or split posteriorly**; plicae sometimes present. Petiole transverse or longer than broad, sometimes sculpted, sometimes with a dorsal flange. Compare with: *Chrysocharis* (*Zaommomyia*), *Pediobius*, *Closterocerus*, *Chrysocharis*, *Ionympha*.



*Proacrias* face (top), and gaster of female (bottom)



***Proacrias propodea***



***Proacrias mesosoma*, lateral view**

**Biology:** *Proacrias coffeae* has been reared from coffee leafminer, *Leucoptera coffeella* (Guérin-Ménéville & Perrottet), Lyonetiidae. Other species have been reared from agromyzid leaf miners.

**Comments:** A poorly defined genus which may be misinterpreted because the type specimens of the type species, *Proacrias coffeae* Ihering, have been missing since at least 1969. Under the current interpretation, *Proacrias* is very similar to some *Chrysocharis* (*Zaommomyia*), to the point that I cannot confidently place some species to genus. It is also very similar to *Pediobius* and *Closterocerus*, from which it differs only in characters that are usually not used to define genera.

## Comparative information:

**Chrysocharis (Zaommomyia)**: Median carina of propodeum not broadened or posteriorly split.

**Pediobius**: First gastral tergite well-sclerotized and dorsal surface not collapsing or capable of changing shape when drying, dorsally flat, other tergites tending to telescope inside the first tergite in air-dried specimens; as opposed to the condition in *Proacrias* and similar genera (such as *Closterocerus*), where the gaster is dorsally collapsed in air-dried specimens and the first tergite is no more rigid than the others. Upper mesepisternum with an extension that can usually be seen to overlap the posterior margin of the prepectus. First gastral sternite with a strongly sclerotized, densely punctulate region below the petiolar base.

**Closterocerus**: Median carina of propodeum not broadened or posteriorly split.

**Chrysocharis s.s.**: Scrobal grooves uniting before reaching transverse frontal groove.

**Ionympha**: Mandibles elongate and with many small denticles. Gena with an incision for reception of mandibles. Ovipositor extremely short.

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## References:

Boucek, Z. 1977. Descriptions of two new species of Neotropical Eulophidae (Hymenoptera) of economic interest, with taxonomic notes on related species and genera. *Bulletin of Entomological Research*. **67**(1): 1-15.

DeSantis, L. 1972. Chalcidoideos de Tierra del Fuego (Hymenoptera). *in* Anales de Primer Congreso Latinoamericano de Entomología, Cusco, Peru, 12-18 de Abril 1971). *Revista Peruana de Entomología*. **15**(1): 61-64.

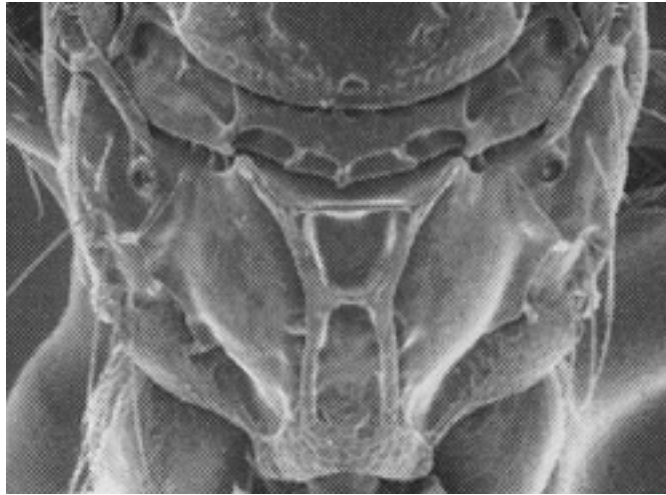
Kerrich, G.J. 1969. Systematic studies on eulophid parasites (Hym., Chalcidoidea) mostly of coffee leaf-miners in Africa. *Bulletin of Entomological Research*. **59**(2): 195-228.

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***Stenomesius* Westwood, 1833** return to: [prev](#) [home](#)

4 funicular segments. Notauli complete; scutellum with complete sublateral grooves meeting posteriorly. **Propodeum with 2 submedian carinae connected at middle, forming an H- or X-shaped structure.**



*Stenomesius* propodeum

**Biology:** Parasitoids of Lepidoptera.

**Comments:** 16 described species.

**Comparative information:** There are no Nearctic Eulophines with similar propodeal features. Some Neotropical Eulophines of unknown placement seem to approach *Stenomesius*, having a Y-shaped median carina.

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## References

Boucek, Z. 1977. Descriptions of two new species of Neotropical Eulophidae (Hymenoptera) of economic interest, with taxonomic notes on related species and genera. *Bulletin of Entomological Research*. **67**(1): 1-15.

Schauff, M.E., J. LaSalle, & L.D. Coote. 1997. Chapter 10. Eulophidae. *in* "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.

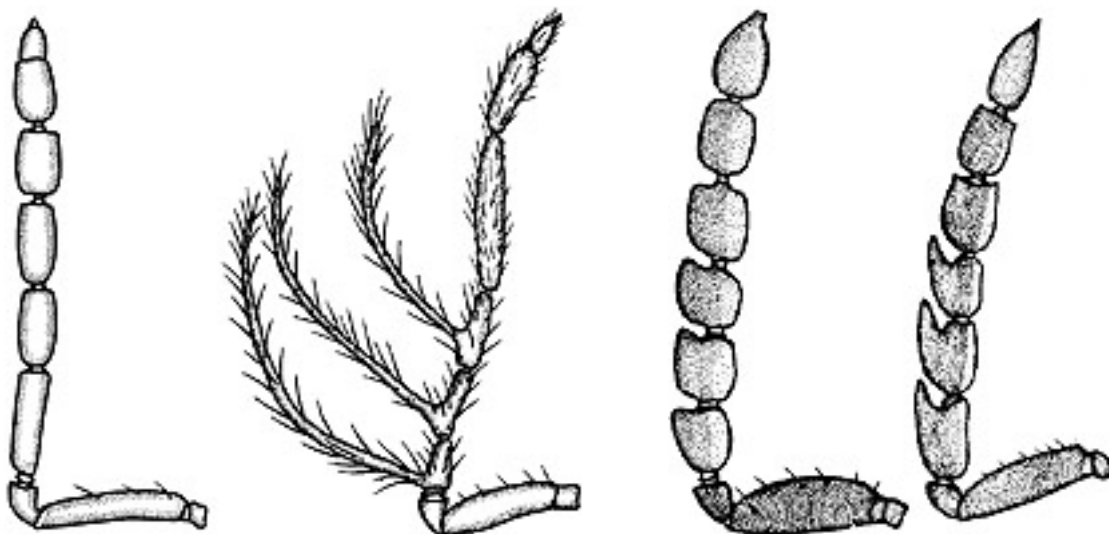
Image credits: Schauff, et al. (1997).

***Sympiesis* Förster, 1856** [comparative info](#) return to: [prev](#) [home](#)

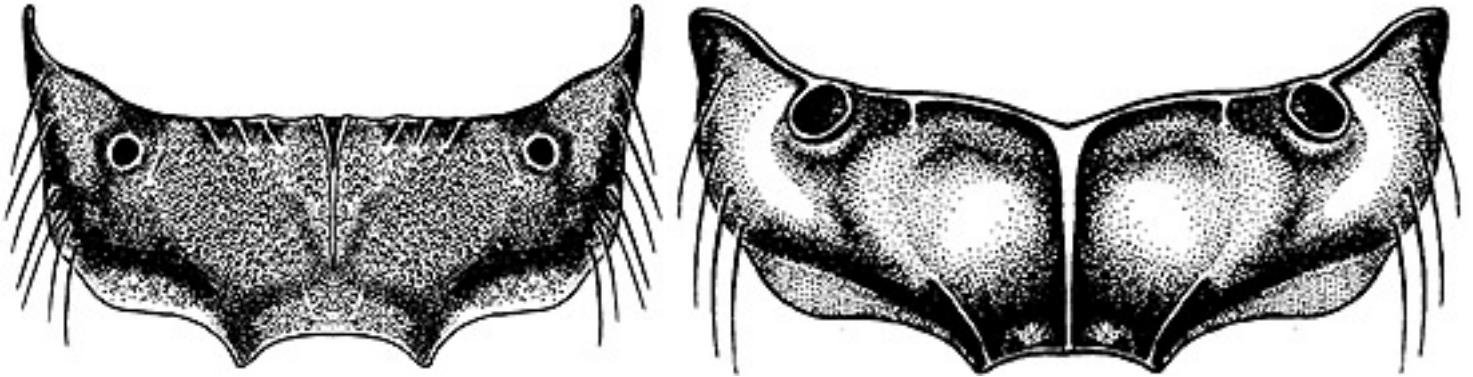
Flagellum usually with 4, rarely 5 funicular segments in both sexes; basal 3 funicular segments usually branched in males. Clypeal margin truncate or slightly concave. Notauli incomplete or ending in anterior half of axillae; **setae on mesoscutal midlobe usually arranged in regular longitudinal rows** (if not, then propodeum without median carina or plicae); scutellum without sublateral grooves (but rarely with visible traces of these grooves), reticulate; sculpture of mesoscutum, scutellum, and axillae nearly uniform. Postmarginal vein 2x stigmal vein length or longer; disc sometimes fuscate near stigma and/or parastigma; speculum present, basal cell bare; basal and cubital veins setose. **Propodeum without costula, plicae usually incomplete or absent**, extending as straight diagonal lines from spiracle to nucha if present; median carina present or absent; median panels shiny to dull and reticulate. Compare with: *Dahlbominus*, *Psigalio*, *Necremnus*, *Notanisomorphella*, *Hemiptarsenus*.



1a-b: *Sympiesis* mesosoma (left), and forewing venation (right)



2a-d: *Sympiesis* female and male antennae: typical (left), and *S. sericeicornis* (Nees) (right, atypical of genus)



3a-b: *Sympiesis ancylae* Girault propodeum (left), and *S. sericeicornis* propodeum (right)



4a: *S. marylandensis* Girault propodeum

**Biology:** Parasitoids of leaf-mining Lepidoptera.

**Comments:** Large and vaguely defined genus. Distinction from many other *Eulophus*-group genera is tenuous and ultimately uncertain. There is a weak division in the *Eulophus*-group between genera related to *Eulophus* (ie: *Necremnus*, *Microlycus*, *Dicladocerus*, etc.) and those related to *Sympiesis* (ie: *Pnigalio*, *Hemiptarsenus*, *Notanisomorphella*, etc.) based mostly on postmarginal vein length and number of funicular segments in females, but this division is not supported by strong evidence at this time and the limits of these groups are far from obvious. *Sympiesis* contains many distinct species groups, some of which are very similar to certain species groups in genera such as *Hemiptarsenus*, which make precise definition of the genus impossible. Gestalt identification in particular of *Sympiesis* is likely to be mistaken for these reasons.

**Comparative information:**

**Dahlbominus:** Postmarginal vein 1.7x stigmal vein length or less. Forewing almost always with vague fuscate cloud posterior to marginal and postmarginal veins. Propodeum with complete median carina, without plicae. Some *Sympiesis* have a similar dark cloud on the forewing, but most that do have dark spots on have them isolated near the stigma and/or parastigma. In *Dahlbominus*, there is either a large, uniform dark cloud or no fuscation at all. A few *Sympiesis*

approach *Dahlbominus* in coloration but differ in the propodeal features (reticulate sculpture, lacking a median carina) and in that the postmarginal vein is about 2x stigmal vein length. It should also be noted that the only absolute difference between the two genera is the postmarginal vein length. These differences are very minor, but no taxonomic changes should be made until the phylogeny of *Sympiesis* and its relatives, including *Necremnus*, is better understood, to insure that the resulting changes produce monophyletic groupings.

***Pnigalio*:** Usually with costula connecting plicae with median carina. Some species and small specimens of others do not have a costula, and are more difficult to separate: median panels of propodeum shiny and smooth, without reticulate sculpture (but transverse rugae present instead of costula in some forms), always with at least nearly complete plicae; mesoscutal midlobe with many dorsal setae arranged irregularly. *Sympiesis* usually do not have plicae, and median panels of propodeum are often distinctly reticulate, although some *Sympiesis* have plicae extending diagonally laterad anteriorly. The shape of the plicae is especially valuable when distinguishing these two genera, as they arise between the median carina and the spiracles in *Pnigalio* and proceed more or less straight posteriad until they meet the costula, at which point they begin converging strongly, such that there is a corner where the plicae meet the costula (in rare exceptional species without a costula, they may be straight and divergent posteriorly). In *Sympiesis*, the plicae, when present, arise nearly adjacent to the spiracles and proceed as essentially straight diagonal lines to the nucha (convergent posteriorly). *Sympiesis* usually have mesoscutal midlobe setae arranged in longitudinal rows, but this character fails in some forms, which are distinguished by propodeal features: median carina and plicae absent, median panels uniformly reticulate, propodeum distinctly convex along transverse axis (but sunken along median axis). The mesoscutal character is essential, however, in recognizing some specimens of true *Pnigalio* that have lost the costula. Another, less reliable, character is that *Pnigalio* usually has a more strongly sculpted and shiny mesoscutum than in *Sympiesis*.

***Necremnus*:** Females with 3 funicular segments (male antenna essentially identical with that of most *Sympiesis*). Postmarginal vein less than 1.7x stigmal vein length, usually 1-1.5x stigmal vein length. *Dahlbominus* may represent a transitional form between these two genera.

***Notanisomorphella*:** Propodeum always with distinct plicae, enclosing sharply raised median panels. Median carina always distinctly complete. Plicae in *Sympiesis* are typically less distinct, extending diagonally when present (ie: *S. marylandensis*), and the median panels are not sharply raised relative to areas lateral to the plicae. A few *Sympiesis*, especially *S. bimaculatipennis* (Girault) and *S. fragariae* Miller, have slightly raised median panels, thus the difference between these two genera is one of continuous variation, and ultimately slight.

***Hemiptarsenus*:** Distinguished from *Sympiesis* using quantitative continuous characters: Toruli very high on face, far above lower eye margin; scape distinctly exceeding vertex; forewing and costal cell unusually long and narrow: forewing at least 2.6x longer than broad and costal cell 7-15x longer than broad. In some species of *Sympiesis*, the scape slightly exceeds the vertex.

Many *Sympiesis* have one or more body parts elongate, but not all in combination. *Hemiptarsenus* has two fairly distinct species groups. In one of these groups, easily distinguished from *Sympiesis*, the scape is elongate and narrow, exceeding the vertex by 2x of more scape width; these forms also have a short propodeum, it being 2x or more broader than long. In the other, more problematic, group, the scape only slightly exceeds the vertex and the propodeal length is subequal ( $<1.75x$ ) its width. This group seems to overlap some species of *Sympiesis*, but no *Sympiesis* that I am aware of have a long propodeum and scape exceeding vertex at the same time. Distinction between these two genera is situational and ultimately difficult for some forms.

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## References

- Boucek, Z. 1988. Australasian Chalcidoidea (Hymenoptera). A biosystematic revision of genera of fourteen families, with a reclassification of species. CAB International, Wallingford, UK.
- Miller, C.D.F. 1970. The Nearctic species of *Pnigalio* and *Sympiesis* (Hymenoptera: Eulophidae). *Memoirs of the Entomological Society of Canada* **68**.

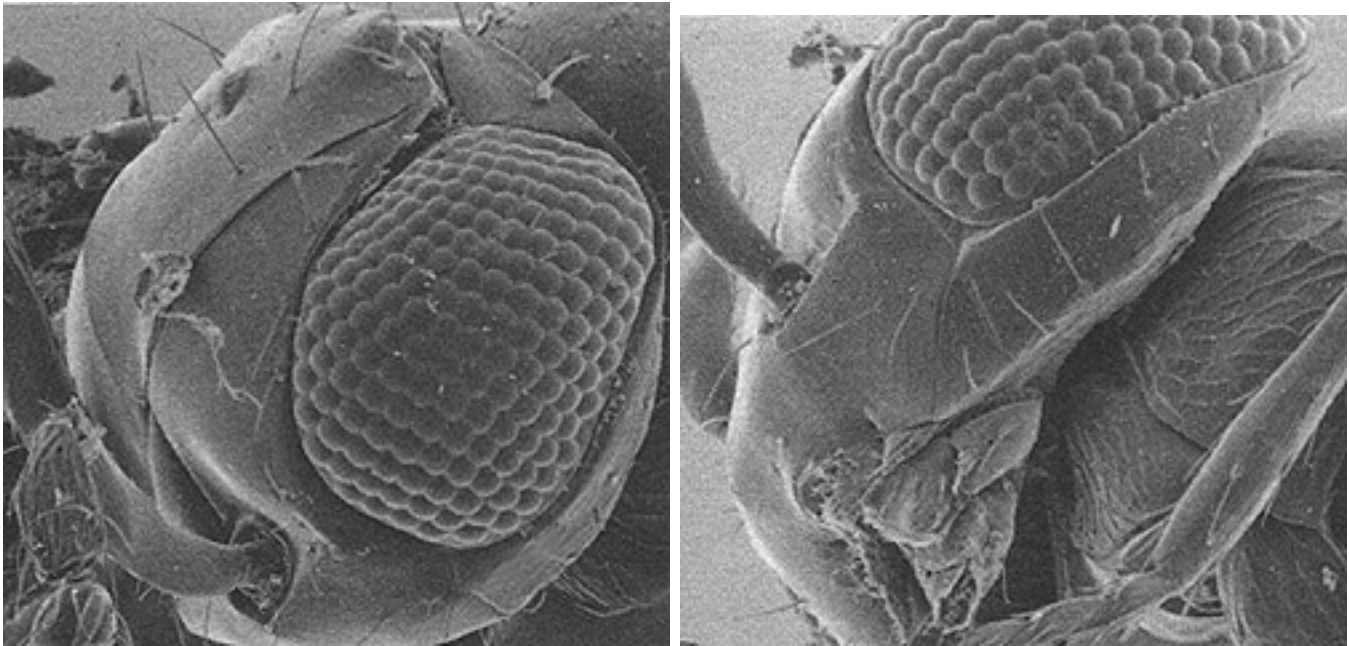
Image credits: 1a-b: Boucek (1988). 2a-d, 3a-b, 4a: Miller (1970).

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***Thripobius* Ferrière, 1938** [comparative info](#) return to: [prev](#) [home](#)

Head and mesosoma smooth or weakly sculpted. **Complete suture present across vertex.** **frontal grooves extending to top of eye, sometimes ending in vertex suture; malar sulcus split ventrally.** Flagellum with 2 funicular segments and 3 claval segments; flagellum with elongate (type 3) peg sensilla. Forewing fringe 0.5x transverse width of wing or less. Petiole much broader than long. Compare with: ***Ceranisus***, *Entedonastichus*.



*Thripobius* face: dorsal view (left), and ventral view (right)

## Biology:

**Comments:** Shared-derived characters argue for a clade of *Thripobius* and *Entedonastichus*, but *Thripobius* is more similar to *Ceranisus* in general form. This genus is part of a clade including the above genera and *Goetheana*, probably related to *Closterocerus*, *Asecodes*, and *Omphale*.

## Comparative information:

***Ceranisus***: frontal grooves meeting eyes at or below level of median ocellus. Malar sulcus not split.

***Entedonastichus***: Petiole quadrate to longer than broad.

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## References

Schauff, M.E. 1991. The Holarctic genera of Entedoninae (Hymenoptera: Eulophidae). *Contributions of the American Entomological Institute* **26**.

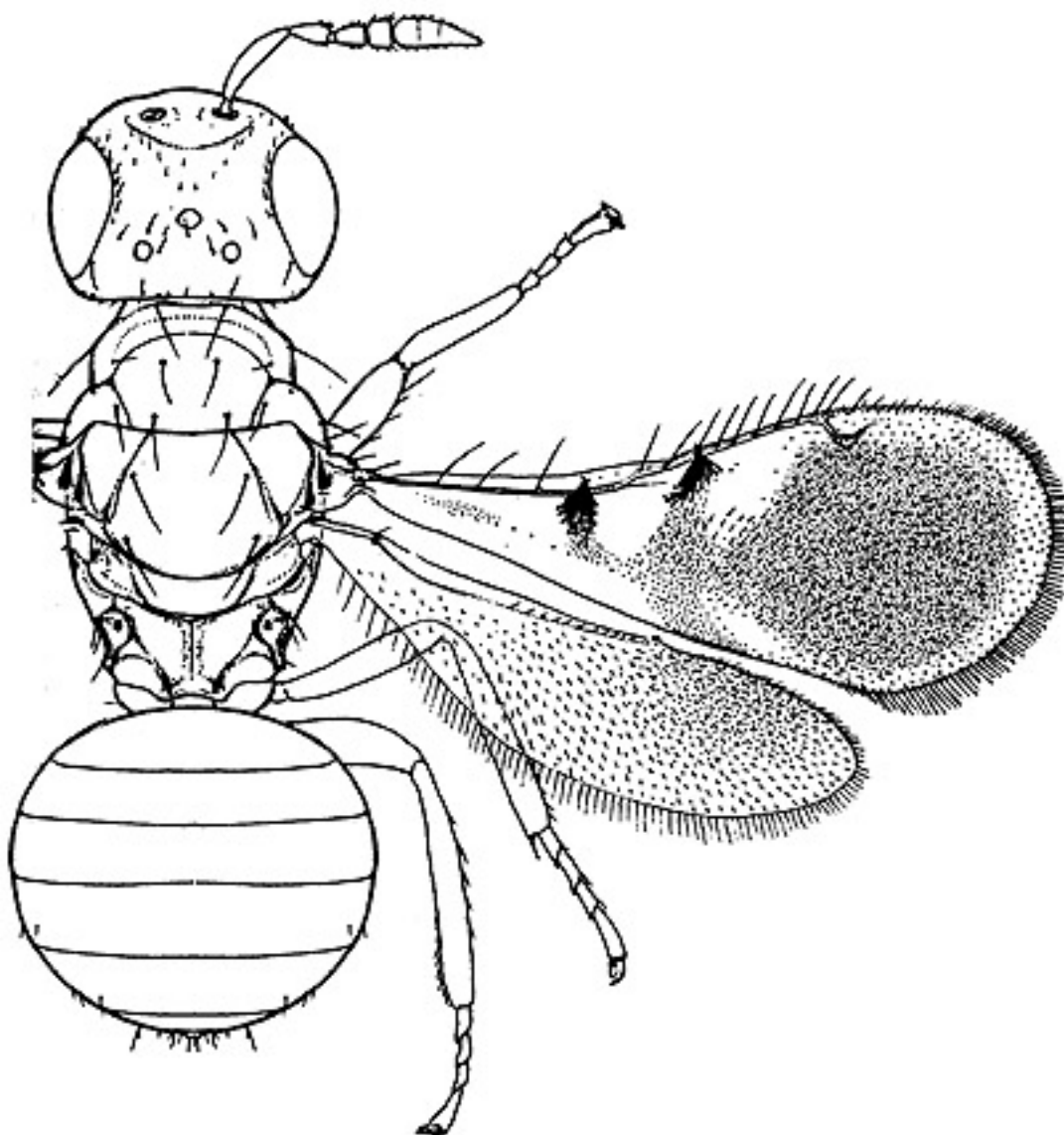
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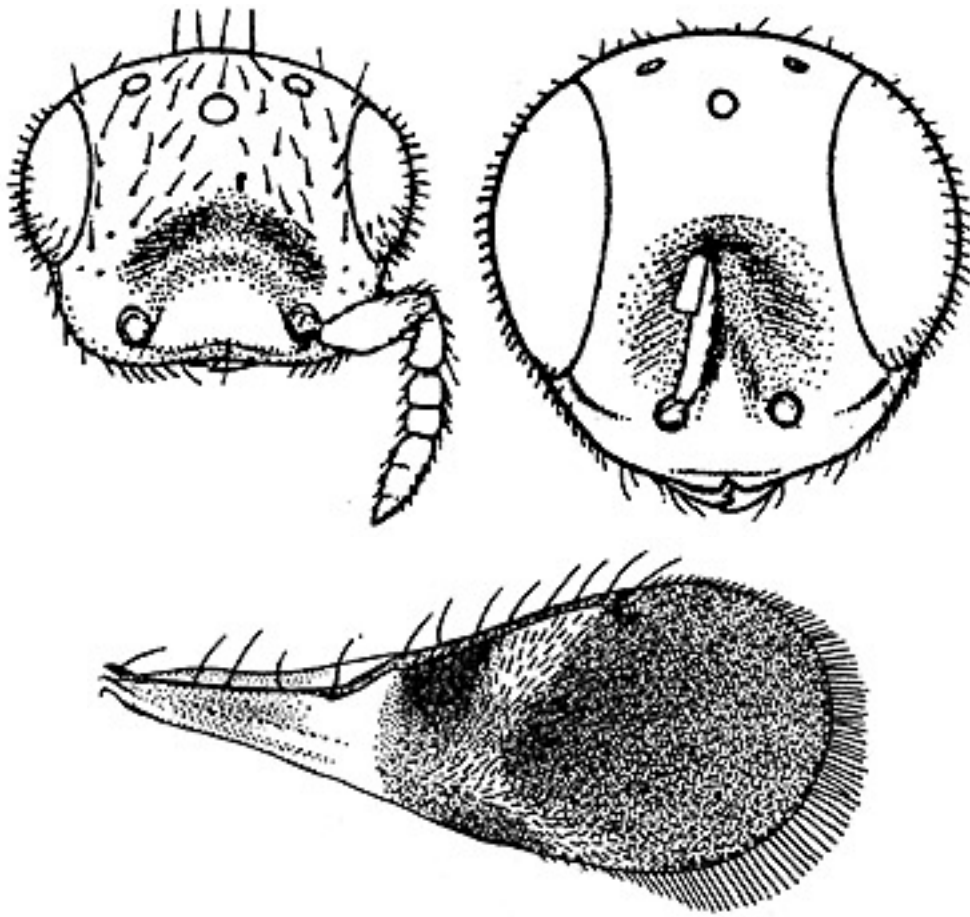
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*Trichospilus* Ferrière, 1930 [comparative info](#) return to: [prev](#) [home](#)

Toruli unusually low, near mouth margin. 2 funicular segments. Forewing with patches of dark or thickened setae, especially near parastigma and base of marginal vein (patch of setae sometimes replaced by strongly darkened spot in venation). Notauli complete; scutellum without submedian or sublateral grooves. Color yellow or brown, never metallic. Compare with: *Hoplocrepis*.



1a: *Trichospilus ferrierei* Boucek female



2a-c: *Trichospilus vorax* Boucek face (top left), *T. boops* Boucek face (top right), and forewing (bottom)

**Biology:** Pupal parasitoids of Lepidoptera.

**Comments:** 5 described species. The similarity to *Hoplocrepis* may not be due to convergence, and should be investigated phylogenetically.

**Comparative information:**

*Hoplocrepis*: 4 funicular segments. Mandibles incapable of meeting medially. Posterior surface of head sharply margined, with eyes not separated from postgenal margin.

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## References

Boucek, Z. 1976. The African and Asiatic species of *Trichospilus* and *Cotterellia* (Hymenoptera: Eulophidae). *Bulletin of Entomological Research*. **65**(4): 669-681.

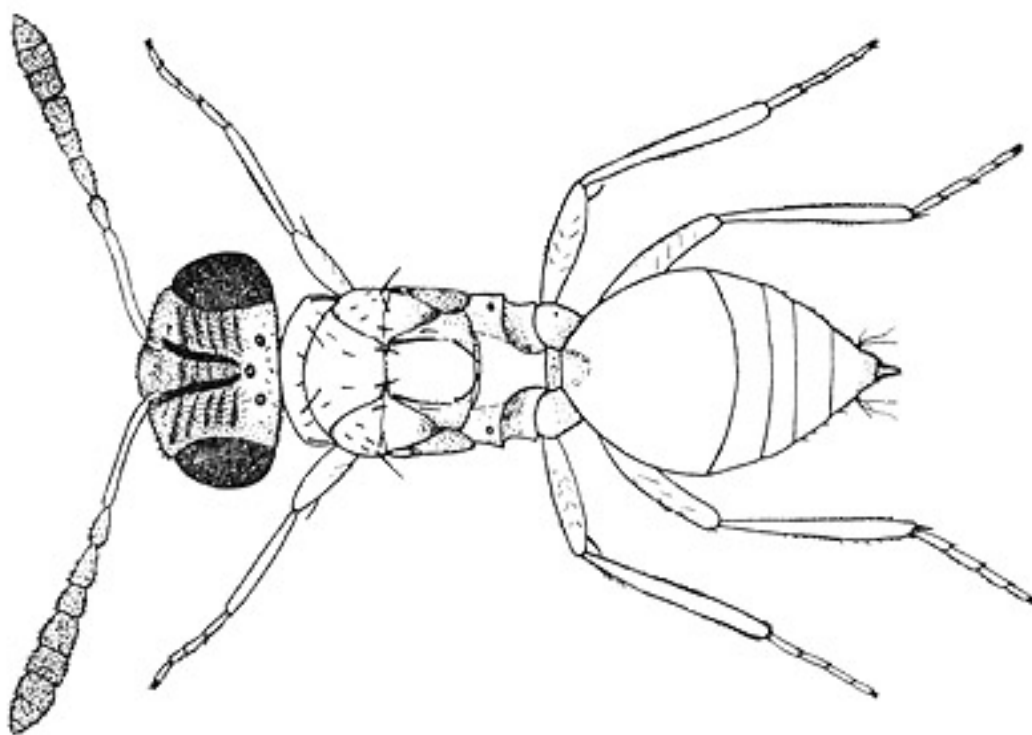
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*Xanthellum* Erdös & Novicky, 1951 [comparative info](#) return to: [prev\(eul 6\)](#) [prev\(eul 16\)](#)  
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**Females brachypterous**, orange-yellow in color **except for black, shiny recessed scrobal grooves extending to median ocellus** and transverse markings on frons that may be indistinct. Notauli complete. **Supracoxal flange expanded into broad translucent flange overhanging metacoxa**; distinct carina extending laterally from above flap to under propodeal spiracle, sometimes forming a Y-shaped carina; propodeal sculpture distinctly granular in females, shiny and similar to that of *Elachertus* in males. Males brownish and macropterous, indistinguishable from those of *Elachertus* using generic characters. Compare with: ***Elachertus***-males only.



*Xanthellum transsylvanicum* female

**Biology:** Parasitoids of Coleophoridae.

**Comments:** **Extremely poorly known.** 1 described species: *X. transsylvanicum* Erdös. Likely renders *Elachertus* paraphyletic. Certain Neotropical species have the dark scrobal grooves found in females of this species, but have macropterous females and no laminar supracoxal flange.

**Comparative information:**

***Elachertus***: Males indistinguishable using generic characters. Females are easily

distinguishable, and males are best identified by association with females. The males of *Xanthellum* that I have seen are small and brown, with a very thin, laminar supracoxal flange, shiny but still brownish scrobal grooves, distinctly setose eyes, and flattened flagellum. Unfortunately, various males of other *Elachertus* species have one or more of these characters as well.

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## References

Askew, R.R. 1968. Hymenoptera 2. Chalcidoidea section (b). *Handbooks for the Identification of British Insects*. **8**(2)b.

Jansson, A. 1958. Studier över svenska chalcidider 5-6. *Entomologisk Tidskrift*. **79**(3-4): 123-130.

Image credits: Askew (1968).

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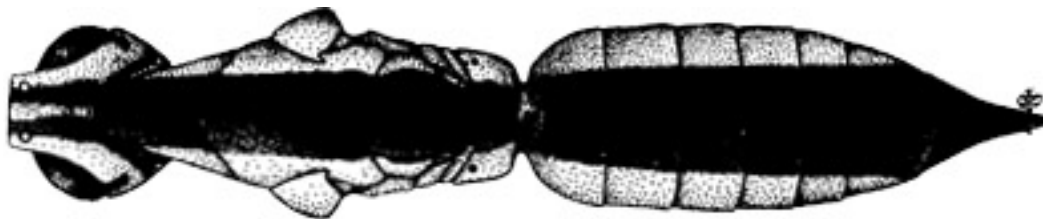
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*Zagrammosoma* Ashmead, 1904 [comparative info](#) return to: [prev](#) [home](#)

Vertex arched high above eye level. 2 funicular segments. **Notauli sharply curved, ending in anterior half of strongly advanced axillae**; mesoscutal sidelobes with tiny scapular flange that does not extend more than 1/4 the axillar length, ending far from the scutellar margin. scutellum with parallel submedian grooves. Forewing always with fuscate areas. Propodeum without plicae, with remnants of a simple median carina. Color at least partly yellow. Compare with: *Cirrospilus*.



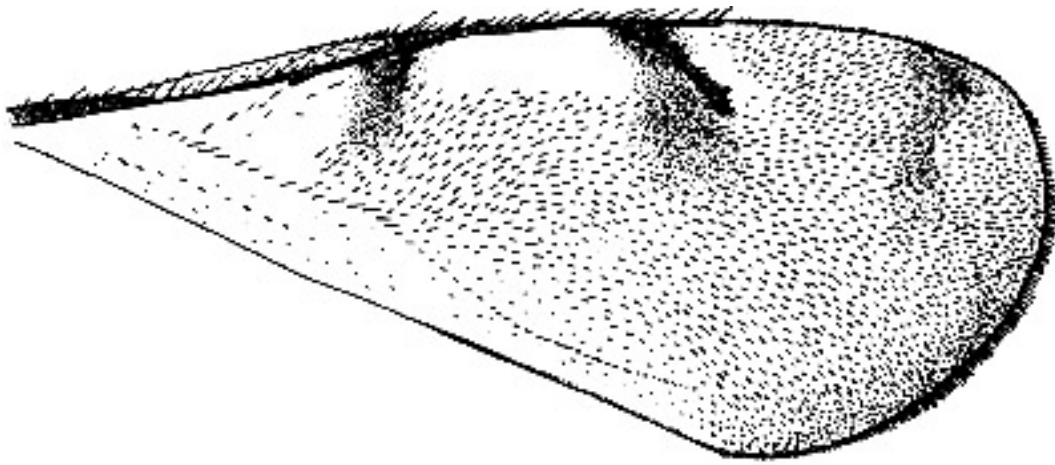
1a: *Zagrammosoma americanum* Girault



2a: *Z. centroleatum* Crawford



3a: *Z. mirum* Girault



4a: *Z. americanum* forewing

## Biology:

**Comments:** This genus is generally considered dubiously distinct from *Cirrospilus*. If notaular form is any indication of phylogeny (which may or may not be the case), it may be more closely related to *Diglyphus*. However, the recent discovery of *Cirrospilus coachellae* Gates, which has a vaulted vertex like all *Zagrammosoma*, is the best evidence for a clade of *Cirrospilus* and *Zagrammosoma*, but raises the possibility of a paraphyletic *Cirrospilus*. At any rate, lumping of *Zagrammosoma* into *Cirrospilus* would be highly premature before extensive analysis is conducted.

## Comparative information:

***Cirrospilus*:** Notauli extending as nearly straight lines to end at or near the scutellar margin; mesoscutal sidelobes with narrow scapular flange extending to or near the scutellar margin. Vertex seldom protruding above upper eye margin (exceptions include *C. coachellae* Gates).

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## References

Boucek, Z. 1988. Australasian Chalcidoidea (Hymenoptera). A biosystematic revision of genera of fourteen families, with a reclassification of species. CAB International, Wallingford, UK.

Gates, M.W. 2000. A new species of *Cirrospilus* Westwood (Hymenoptera: Eulophidae) from the southwestern United States and Mexico. *Proceedings of the Entomological Society of Washington*. **102**(1): 58-61.

Gordh, G. 1978. Taxonomic notes on *Zagrammosoma*, a key to the Nearctic species and descriptions of new species from California (Hymenoptera: Eulophidae). *Proceedings of the Entomological Society of Washington*. **80**: 344-359.

LaSalle, J. 1989. Notes on the genus *Zagrammosoma* (Hymenoptera: Eulophidae) with description of a new species. *Proceedings of the Entomological Society of Washington*. **91**: 230-236.

Image credits: Gordh (1978).

## Eulophid key reference list

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Askew, R.R. 1968. Hymenoptera 2. Chalcidoidea section (b). *Handbooks for the Identification of British Insects*. **8**(2)b.

Askew, R.R. & Ruse, J.M. 1974. Biology and taxonomy of the species of the genus *Enaysma* Delucchi (Hym., Eulophidae, Entedoninae) with special reference to the British fauna. *Transactions of the Royal Entomological Society of London*. **125**: 257-294.

Boucek, Z. 1959a. A study of central European Eulophidae, 1: Eulophinae (Hymenoptera). *Acta Entomologica Musei Nationalis Pragae*. **33**: 117-170.

Boucek, Z. 1959b. A study of central European Eulophidae, II: *Diaulinopsis* and *Cirrospilus* (Hymenoptera). *Acta Entomologica Musei Nationalis Pragae*. **33**: 171-194.

Boucek, Z. 1963. Studien über europäische Eulophidae, III: Euderinae (Hymenoptera: Chalcidoidea). *Beiträge zur Entomologie*. **13**: 257-281.

Boucek, Z. 1965. Studies of European Eulophidae, IV: *Pediobius* Walk. and two allied genera (Hymenoptera). *Acta Entomologica Musei Nationalis Pragae*. **36**: 5-90.

Boucek, Z. 1974. On some European Eulophidae (Hymenoptera), with Descriptions of three new species. *Acta entomologica Jugoslavica*. **10**(1-2): 117-123.

Boucek, Z. 1976. The African and Asiatic species of *Trichospilus* and *Cotterellia* (Hymenoptera: Eulophidae). *Bulletin of Entomological Research*. **65**(4): 669-681.

Boucek, Z. 1977. Descriptions of two new species of Neotropical Eulophidae (Hymenoptera) of economic interest, with taxonomic notes on related species and genera. *Bulletin of Entomological Research*. **67**(1): 1-15.

Boucek, Z. 1977. Taxonomic studies on some Eulophidae (Hym.) of economic interest mainly from Africa. *Entomophaga*. **21**(4): 401-414.

Boucek, Z. 1988. Australasian Chalcidoidea (Hymenoptera). A biosystematic revision of genera of fourteen families, with a reclassification of species. CAB International, Wallingford, UK.

Bryan, G. 1980. The British species of *Achrysocharoides* (Hymenoptera, Eulophidae). *Systematic Entomology*. **5**: 245-262.

- Burks, B.D. 1965. The North American species of *Elasmus* Westwood (Hymenoptera, Eulophidae). *Proceedings of the Biological Society of Washington*. **78**: 201-208.
- Burks, B.D. 1971. A North American *Elasmus* parasitic on *Polistes* (Hymenoptera: Eulophidae). *Journal of the Washington Academy of Science*. **61**(3): 194-196.
- Burks, B.D. 1971. The Nearctic species of *Horismenus* Walker. *Proceedings of the Entomological Society of Washington*. **73**: 68-83.
- Compere, H. 1947. A new genus and species, *Eurymyiocnema aphelinoides* (Hymenoptera, Aphelinidae), and a history of the genera *Euryischia* Riley and *Myiocnema* Ashmead. *Bulletin of Entomological Research*. **38**: 381-388.
- Coote, L.D. 1994. Review of Nearctic genera of Euderinae (Hymenoptera: Eulophidae), with descriptions of two new species of *Allocerastichus* Masi, and redescription of *Carlyleia marilandica* Girault. *Canadian Journal of Zoology*. **72**: 1044-1054.
- Coote, L.D. 1997. Chapter 7. Elasmidae. in "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.
- Erdős, J. 1951. Eulophidae novae. *Acta Biologica Academiae Scientiarum Hungaricae*. **2**: 169-237.
- Gates, M.W. 2000. A new species of *Cirrospilus* Westwood (Hymenoptera: Eulophidae) from the southwestern United States and Mexico. *Proceedings of the Entomological Society of Washington*. **102**(1): 58-61.
- Gauthier, N., J. La Salle, D.L.J. Quicke & H.C.J. Godfray. 2000. Phylogeny of Eulophidae (Hymenoptera: Chalcidoidea), with a reclassification of Eulophinae and the recognition that Elasmidae are derived eulophids. *Systematic Entomology*. **25**(4): 521-539.
- Gordh, G. 1977. A new species of North American *Scotolinx* with taxonomic notes on the genus. *Pan-Pacific Entomologist*. **53**: 205-210.
- Gordh, G. 1978. Taxonomic notes on *Zagrammosoma*, a key to the Nearctic species and descriptions of new species from California (Hymenoptera: Eulophidae). *Proceedings of the Entomological Society of Washington*. **80**: 344-359.
- Gordh, G. & R. Hendrickson. 1979. New species of *Diglyphus*, a world list of the species, taxonomic notes and a key to New World species of *Diglyphus* and *Diaulinopsis* (Hymenoptera: Eulophidae). *Proceedings of the Entomological Society of Washington*. **81**: 666-684.

- Graham, M.W.R. de V. 1959. Keys to the British genera and species of Elachertinae, Eulophinae, Entedoninae, and Euderinae (Hym., Chalcidoidea). *Transactions of the Society for British Entomology*. **13**: 169-204.
- Graham, M.W.R. de V. 1963. Additions and corrections to the British list of Eulophidae (Hym., Chalcidoidea). *Transactions of the Society for British Entomology*. **15**(9): 167-275.
- Graham, M.W.R. de V. 1987. A reclassification of European Tetrastichinae (Hymenoptera: Eulophidae), with a revision of certain genera. *Bulletin of the British Museum (Natural History) Entomology Series* **55**.
- Grissell, E.E. 1981. *Edovum puttleri*, n.g., n.sp. (Hymenoptera: Eulophidae), an egg parasite of the Colorado Potato Beetle (Chrysomelidae). *Proceedings of the Entomological Society of Washington*. **83**: 790-796.
- Grissell, E.E. & M.E. Schauff. 1997. Chapter 3. Chalcidoidea. in "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.
- Gumovsky, A.V. 2001a. Taxonomic notes on the entedonine genera *Rhynchentedon* and *Pediobomyia* (Hymenoptera, Chalcidoidea: Eulophidae) with the description of a new species. *Zoologische Mededeelingen Leiden*. **75**(14): 229-238.
- Gumovsky, A.V. 2001b. The status of some genera allied to *Chrysonotomyia* and *Closterocerus* (Hymenoptera: Eulophidae, Entedoninae), with description of a new species from Dominican Amber. *Phegea* 29(4): 125-141.
- Gumovsky, A.V. 2001c. Review of the genus *Paracrias* (Hymenoptera, Eulopidae, Entedoninae). *Vestnik zoologii*. **35**(5): 9-26.
- Hansson, C. 1983. Taxonomic notes on the genus *Achrysocharoides* Girault, 1913 (Hymenoptera: Eulophidae), with a redescription and a description of a new species. *Entomologica Scandinavica*. **14**: 281-291.
- Hansson, C. 1985a. Taxonomy and biology of the Palearctic species of *Chrysocharis* Förster, 1856 (Hymenoptera: Eulophidae). *Entomologica Scandinavica supplement* **26**.
- Hansson, C. 1985b. The entedonine genera *Achrysocharoides* Girault, *Chrysocharis* Förster and *Kratoysma* Boucek (Hymenoptera: Eulophidae) in the Oriental region. *Entomologica Scandinavica*. **16**: 217-226.

- Hansson, C. 1986a. A revision of the Nearctic species of the genus *Zaommomyia* Ashmead (Hymenoptera, Eulophidae). *Proceedings of the Entomological Society of Washington*. **88**(2): 244-252.
- Hansson, 1986b. Revision of the Asiatic, European and North American species of *Derostenus* Westwood (Hymenoptera: Eulophidae). *Entomologica Scandinavica*. **17**: 313-322.
- Hansson, C. 1987. Revision of the New World *Chrysocharis* Förster (Hymenoptera: Eulophidae). *Entomologica Scandinavica supplement* **31**.
- Hansson, 1988a. A revision of the genus *Mestocharis* and a review of the genus *Grahamia* (Hymenoptera: Eulophidae). *Proceedings of the Entomological Society of Washington*. **90**: 28-36.
- Hansson, C. 1988b. New World species of *Holcopelte* and *Ionympha* (Hymenoptera: Eulophidae), with descriptions of two new species. *Proceedings of the Entomological Society of Washington*. **91**: 59-65.
- Hansson, C. 1990. A taxonomic study on the Palearctic species of *Chrysonotomyia* Ashmead and *Neochrysocharis* Kurdjumov (Hymenoptera: Eulophidae). *Entomologica Scandinavica*. **21**: 29-52.
- Hansson, C. 1993. First record of *Kratoysma* (Hymenoptera: Eulophidae) from the New World, including the description of two new species. *Proceedings of the Entomological Society of Washington*. **95**(2): 253-257.
- Hansson, C. 1994a. Re-evaluation of the genus *Closterocerus* Westwood (Hymenoptera: Eulophidae), with a revision of the Nearctic species. *Entomologica Scandinavica*. **25**: 1-25.
- Hansson, C. 1994b. The classification of *Chrysonotomyia* Ashmead and *Teleopterus* Silvestri (Hymenoptera: Eulophidae), with a review of species in the Nearctic region. *Proceedings of the Entomological Society of Washington*. **96**: 665-673.
- Hansson, C. 1995a. Revision of the Nearctic species of *Neochrysocharis* Kurdjumov (Hymenoptera: Eulophidae). *Entomologica Scandinavica*. **26**(1): 27-46.
- Hansson, C. 1995b. Revised key to the Nearctic species of *Chrysocharis* Förster (Hymenoptera: Eulophidae), including three new species. *Journal of Hymenoptera Research*. **4**: 80-98.
- Hansson, C. 1996a. Taxonomic revision of the Nearctic species of *Omphale* Haliday (Hymenoptera: Eulophidae). *Entomologica Scandinavica supplement* **49**.

- Hansson, C. 1996b. The status of the genera *Asecodes* Förster, *Ionympha* Graham and *Teleopteris* Silvestri (Hymenoptera: Eulophidae) with a review of Nearctic species. *Entomologica Scandinavica*. **27**: 159-167.
- Hansson, C. 1996c. A new genus of Eulophidae (Hymenoptera: Chalcidoidea) with remarkable male genitalia. *Systematic Entomology*. **21**: 39-62.
- Hansson, C. 1997a. Mexican species of the genus *Omphale* Haliday (Hymenoptera: Eulophidae), a taxonomic study. *Journal of Hymenoptera Research*. **6**(1): 107-151.
- Hansson, C. 1997b. Survey of *Chrysocharis* Förster and *Neochrysocharis* Kurdjumov (Hymenoptera, Eulophidae) from Mexico, including eight new species. *Miscellanea Zoologica (Barcelona)*. **20**(1): 81-95.
- Hansson, C. 2000. Description of a new genus of Entedoninae (Hymenoptera: Eulophidae) from the Neotropical region, including three new species. *Journal of Hymenoptera Research*. **9**(2): 313-319.
- Hansson, C. 2002. Eulophidae of Costa Rica (Hymenoptera: Chalcidoidea), 1. *Memoirs of the American Entomological Institute* **67**.
- Hansson, C. & J. LaSalle. 2002. Revision of the Neotropical species of the tribe Euderomphalini (Hymenoptera: Eulophidae). *Journal of Natural History*. **37**(6): 697-778.
- Hayat, M. 1983. The genera of Aphelinidae (Hymenoptera) of the world. *Systematic Entomology*. **8**: 63-102.
- Heraty, J.M. & M.E. Schauff. 1998. Mandibular teeth in Chalcidoidea: Function and phylogeny. *Journal of Natural History*. **32**(8): 1227-1244.
- Husain, T., A. Rauf & P.P. Kudeshia. 1983. *Pomphale striptipennis* gen. et sp. nov. (Hymenoptera: Eulophidae). *Journal of Entomological Research*. **7**: 112-114.
- Ikeda, E. & J.T. Huber. 1996. Review of the world species of *Dimmockia* Ashmead (Hymenoptera: Eulophidae). *Canadian Entomologist*. **128**: 743-746.
- Jansson, A. 1958. Studier över svenska chalcidider 5-6. *Entomologisk Tidskrift*. **79**(3-4): 123-130.
- Kamijo, K. 1977. Five new species of *Cotterellia* (Hymenoptera, Eulophidae) from Japan.

Kontyû, Tokyo. 45(2): 253-261.

Kamijo, K. 1990a. Five new species of *Achrysocharoides* (Hymenoptera, Eulophidae) associated with Leguminosae in Japan. *Japanese Journal of Entomology*. **58**(2): 293-302.

Kamijo, K. 1990b. Notes on *Pleurotroppopsis* (Hymenoptera, Eulophidae) and its allied genera, with descriptions of four new species from Japan. *Japanese Journal of Entomology*. **58**(4): 816-826.

Kamijo, K. 1991. Revision of North American *Achrysocharoides* (Hymenoptera: Eulophidae). *Akitu (new series)*. **124**: 1-34.

Kerrich, G.J. 1969. Systematic studies on eulophid parasites (Hym., Chalcidoidea) mostly of coffee leaf-miners in Africa. *Bulletin of Entomological Research*. **59**(2): 195-228.

LaSalle, J. 1989. Notes on the genus *Zagrammosoma* (Hymenoptera: Eulophidae) with description of a new species. *Proceedings of the Entomological Society of Washington*. **91**: 230-236.

LaSalle, J. 1994. North American genera of Tetrastichinae (Hymenoptera: Eulophidae). *Journal of Natural History*. **28**: 109-236.

LaSalle, J. & M.E. Schauff. 1992. Preliminary studies on Neotropical Eulophidae (Hymenoptera: Chalcidoidea): Ashmead, Cameron, Howard, and Walker species. *Contributions of the American Entomological Institute* **27**.

LaSalle, J. & M.E. Schauff. 1994. Systematics of the tribe Euderomphalini (Hymenoptera: Eulophidae): parasitoids of whiteflies (Homoptera: Aleyrodidae). *Systematic Entomology*. **19**: 235-258.

Lin, K. 1963. Revision of the tribe Euplectrini from Taiwan. Part I. (Hymenoptera, Eulophidae). *Quarterly Journal of the Taiwan Museum*. **16**: 101-124.

Miller, C.D.F. 1964. Some species of the New World genus *Paraolinx* Ashmead (Hymenoptera: Eulophidae). *Canadian Entomologist*. **96**: 1352-1362.

Miller, C.D.F. 1970. The Nearctic species of *Pnigalio* and *Sympiesis* (Hymenoptera: Eulophidae). *Memoirs of the Entomological Society of Canada* **68**.

Narendran, T.C. & S. Sheela. 1993. On a new genus and new species of Eulophidae (Hymenoptera: Chalcidoidea) from India. *Journal of the Zoological Society of Kerala*. **3**(1): 47-

Noyes, J.S. 1998. Catalogue of the Chalcidoidea of the World. CD-Rom. Expert Center for Taxonomic Information, Amsterdam, The Netherlands.

Peck, O. 1985. The taxonomy of the Nearctic species of *Pediobius* (Hymenoptera: Eulophidae), especially Canadian and Alaskan forms. *Canadian Entomologist*. **117**: 647-704.

Pujade i Villar, J. 1991. Nuevas aportaciones al conocimiento de *Aulogymnus* Förster, 1851 (Hym., Chal., Eulophidae) para la Peninsula Iberica, con la descripcion de una especie nueva, *Aulogymnus balani* sp. n. *Graellsia*. **47**: 139-154.

Schauff, M.E. 1985a. The new world genus *Paracrias* Ashmead (Hymenoptera: Eulophidae). *Proceedings of the Entomological Society of Washington*. **87**: 98-109.

Schauff, M.E. 1985b. Taxonomic study of the Nearctic species of *Elachertus* Spinola (Hymenoptera: Eulophidae). *Proceedings of the Entomological Society of Washington*. **87**: 843-858.

Schauff, M.E. 1985c. Revision of the Nearctic species of *Hyssopus* Girault (Hymenoptera: Eulophidae). *Journal of the New York Entomological Society*. **93**: 1096-1108.

Schauff, M.E. 1987. Taxonomy and identification of the egg parasites (Hymenoptera: Platygasteridae, Trichogrammatidae, Mymaridae and Eulophidae) of citrus weevils (Coleoptera: Curculionidae). *Proceedings of the Entomological Society of Washington*. **89**(1): 31-42.

Schauff, M.E. 1988. The species of *Entedon* (Hymenoptera: Eulophidae) in America North of Mexico. *Journal of the New York Entomological Society*. **96**: 30-62.

Schauff, M.E. 1989. A new species of *Horismenus* (Hymenoptera: Eulophidae) parasitic on the lesser cornstalk borer, *Elasmopalpus lignosellus* (Lepidoptera: Pyralidae). *Proceedings of the Entomological Society of Washington*. **91**(4): 534-537.

Schauff, M.E. 1991. The Holarctic genera of Entedoninae (Hymenoptera: Eulophidae). *Contributions of the American Entomological Institute* **26**.

Schauff, M.E. 2000. Review of the species of *Deutereulophus* (Hymenoptera: Chalcidoidea: Eulophidae) of North America. *Journal of Hymenoptera Research*. **9**(2): 416-426.

Schauff, M.E. & Z. Boucek. 1987. *Alachua floridensis*, a new genus and species of Entedoninae (Hymenoptera: Eulophidae) parasitic on the Florida carpenter ant, *Camponotus abdominalis*

(Formicidae). *Proceedings of the Entomological Society of Washington*. **89**: 660-664.

Schauff, M.E. & R. Garrison. 2000. An introduced species of *Epichrysocharis* (Hymenoptera: Eulophidae) producing galls on *Eucalyptus* in California with notes on the described species and placement of the genus. *Journal of Hymenoptera Research*. **9**(1): 176-181.

Schauff, M.E., D.H. Janzen. 2001. Taxonomy and ecology of Costa Rican *Euplectrus* (Hymenoptera: Eulophidae), parasitoids of caterpillars (Lepidoptera). *Journal of Hymenoptera Research*. **10**(2): 181-230.

Schauff, M.E. & J. LaSalle. 1993. Nomenclatural notes on genera of North American Eulophidae (Hymenoptera: Chalcidoidea). *Proceedings of the Entomological Society of Washington*. **95**(3): 488-503.

Schauff, M.E., J. LaSalle, & L.D. Coote. 1997. Chapter 10. Eulophidae. in "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.

Schauff, M.E., J. LaSalle & G.A.W. Wijesekara. 1998. The genera of chalcid parasitoids (Hymenoptera: Chalcidoidea) of citrus leafminer *Phyllocnistis citrella* Stainton (Lepidoptera: Gracillariidae). *Journal of Natural History*. **32**: 1001-1056.

Schauff, M.E., C.M. Yoshimoto, & C. Hansson. 1994. A new genus and species of Entedoninae (Hymenoptera: Eulophidae) from North and Central America. *Proceedings of the Entomological Society of Washington*. **96**: 607-611.

Sureshan, P.M. & T.C. Narendran. 2001. A new species of *Ladna* Boucek (Hymenoptera: Chalcidoidea: Eulophidae) from India. *Oriental Insects*. **35**: 203-206.

Trjapitsyn, S.V. & D.H. Headrick. 1995. A revision of the Nearctic species of the thrips-attacking genus *Ceranisus* Walker (Hymenoptera: Eulophidae). *Transactions of the American Entomological Society*. **121**: 227-248.

Viggiani, G. & M. Carver. 1988. *Cales orchamoplatis* sp. n. (Hymenoptera: Aphelinidae) from Australia. *Journal of the Australian Entomological Society*. **27**(1): 43-45.

Wijesekara, G.A.W. & M.E. Schauff. 1994. Revision of the tribe Euplectrini of Sri Lanka (Hymenoptera: Eulophidae). *Oriental Insects*. **28**: 1-48.

Wijesekara, G.A.W. & M.E. Schauff. 1997. Two new genera and three new species of Euplectrini (Hymenoptera: Eulophidae) from the New World. *Proceedings of the Entomological Society of Washington*. **99**(1): 101-109.

Woolley, J.B. 1997. Chapter 5. Aphelinidae. in "Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)". G.A.P. Gibson & J.T. Huber, eds. NRC Research Press, Ottawa.

Woolley, J.B. & M.E. Schauff. 1987. A new species of *Paracrias* (Hymenoptera: Eulophidae) parasitic on *Anthonomus*-spp. (Coleoptera: Curculionidae). *Proceedings of the Entomological Society of Washington*. **89**(4):770-775.

Yoshimoto, C. 1970. A new species of *Astichus* (Hymenoptera: Eulophidae) associated with the birch bracket fungus *Polyporus betulinus* and woody fungus *Ganoderma applanatum* in eastern Canada. *Canadian Entomologist*. **102**: 656-659.

Yoshimoto, C. 1971. Revision of the genus *Euderus* of America north of Mexico (Hymenoptera: Eulophidae). *Canadian Entomologist*. **103**: 541-578.

Yoshimoto, C. 1976. Revision of the genus *Dicladocerus* (Eulophidae: Chalcidoidea) of America north of Mexico, with particular reference to species attacking larch casebearer (Lepidoptera: Coleophoridae). *Canadian Entomologist*. **108**: 1173-1206.

Yoshimoto, C. 1977. The North American species of the genus *Achrysocharoides* (Hymenoptera: Eulophidae). *Canadian Entomologist*. **109**: 907-930.

Yoshimoto, C. 1981. First record of *Thripoctenoides* from North America, with description of a new species (Hymenoptera: Eulophidae). *Canadian Entomologist*. **113**: 723-725.

Yoshimoto, C. 1983. Review of North American *Phigalio* Schrank (Hymenoptera: Eulophidae). *Canadian Entomologist*. **115**: 971-1000.

Zhu, C.D. & D.W. Huang. 2001. Revision of Chinese *Euplectromorpha* Girault (Hymenoptera: Eulophidae). *Insect Systematics & Evolution*. 31: 401-410.