

## The Systematic Positions of Some Buprestid Genera (Coleoptera, Buprestidae)

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**Abstract** The Chalcophorinae is regarded as a synonym of the buprestid subfamily Buprestinae. Four new tribes, Exagistini, Pseudoperotini, Iridotaenini and Evidini, are established in the subfamily Buprestinae. The genus *Pelecopselaphus* SOLIER, 1833, is transferred to the tribe Agaocerini from the Chalcophorini. The tribe Paratrachyini is transferred to the subfamily Trachyinae from the subfamily Polycestinae.

In the course of my systematic study on the buprestid beetles, it was found that there were some wrong classifications on the buprestid genera.

The subfamily Chalcophorinae is herewith regarded as a synonym of the Buprestinae, since the so-called diagnostic features separating the two subfamilies vary continuously and gradually from one to the other. On the other hand, some authors are of the opinion that the wing venation presents the most important characteristics in the higher classification of the Buprestidae. I have also tried to classify buprestid genera on the basis of this feature. The above synonymy is strongly supported by the characteristics of wing venation. Four new tribes, Exagistini, Pseudoperotini, Iridotaenini and Evidini, will be established though certain confusion still remains in the Buprestinae.

On the other hand, the systematic position of the genus *Paratrachys* SAUNDERS, 1873, has not been settled till now. Recently, I was able to examine some larvae of *Paratrachys hederæ* SAUNDERS, 1873. Judging from the larval characteristics, it is apparent that *Paratrachys* should be classified in the Trachyinae and be regarded as the most archaic of the trachyine genera.

Before going further, I wish to express my deep gratitude to Dr. Yoshihiko KUROSAWA for his constant guidance, and to Dr. Shun-Ichi UENO of the National Science Museum (Nat. Hist.), Tokyo, for his critical reading of the original manuscript. I am also indebted to Dr. Svatopluk BÍLÝ of the National Museum of Natural History, Prague, for his kind help during the course of this study. Thanks are also due to Messrs. Masaro EJIMA, Shoichi IMASAKA and Masao ITOH for their kind offer of materials.

### Subfamily **Buprestinae** ESCHSCHOLTZ, 1829

Buprestides ESCHSCHOLTZ, 1829, Zool Atlas, 8-9.

Chalcophorides LACORDAIRE, 1857, Gen. Coléopt., 14-15.

Two subfamilies Buprestinae and Chalcophorinae are divided mainly by the dis-

tribution of sensory pores on the serrate antennal segments. It has been said that the pores concentrate in the sockets on the ventral surface of the serrate segments in the Buprestinae, and are evenly diffused on both sides of them in the Chalcophorinae. In the genus *Hippomelas* LAPORTE et GORY, 1837, however, the pores are diffused on both sides and concentrate in the fossae. In the genus *Evides* THOMSON, 1878, the pores concentrate in very large sockets on both sides of the serrate segments. These two genera have been currently classified in the subfamily Chalcophorinae, but the antennal structure shows an intermediate condition between the two subfamilies. It is, therefore, probable that the change of antennal structure is progressive and cannot serve as a diagnostic character separating the two subfamilies. Thus, the Chalcophorinae is treated herewith as a synonym of the Buprestinae.

On the other hand, the tribe Psilopterini is closely related to the tribe Dicercini mainly in view of the peculiarity of wing venation, though they have been classified into different subfamilies, the Chalcophorinae and Buprestinae. The tribes Chalcophorini and Chrysochroini are also related to the tribe Buprestini for the same reason.

#### Tribe *Exagistini* nov.

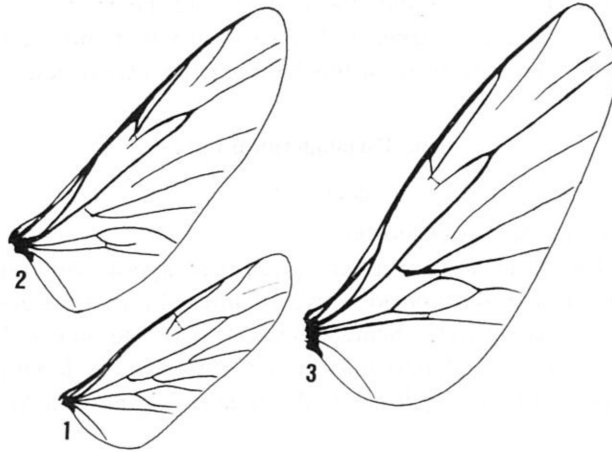
(Fig. 1)

Frons not concave medially; antennal cavities rather small and subtriangular; clypeal suture absent. Antennae eleven-segmented; sensory pores evenly diffused on both sides of serrate segments. Maxillary palpus with the last segment not enlarged apically. Prosternum without gular lobe. Sternal cavity formed by mesosternum medially and by metasternum laterally. Abdomen with eight visible tergites, which are not divided into mid- and paratergites by longitudinal lateral grooves. Legs slender; posterior tarsi with the first segments about as long as the following two united.

Hind wing with a radial cell, vein  $R_s$  not joining vein M, cross vein (r-m) visible, and anal cell absent.

*Remarks.* The present tribe includes only the genus *Exagistus* H. DEYROLLE, 1864, which has been placed in the tribe Melanophilini. It is easily distinguished from the latter tribe by the following features of wing venation: anal cell absent, instead of being distinctive. It is also closely allied to the tribe Dicercini, but is easily distinguished from it by the following characteristics: 1) antennal cavities small, instead of being large; 2) antennae with sensory pores evenly diffused on both sides of serrate segments, while in the Dicercini, they concentrate in the terminal sockets on the ventral surface of serrate segments; 3) maxillary palpus with the last segment not enlarged apically, while in the Dicercini, they are strongly enlarged apicad.

The present new tribe is classified into the Psilopterini–Dicercini tribal group in view of the characteristics of wing venation. This group is distinguished from the other tribal groups of the subfamily Buprestinae except for anthaxine tribes by the following characteristics of wing venation: 1) anal cell absent; 2) vein  $2dA_3$  fully developed, reaching the margin.



Figs. 1-3. Hind wings. — 1, *Exagistus brunneus* FISHER, 1930; 2, *Pelecopselaphus depressus peruvianus* THÉRY, 1911; 3, *Iridotaenia sulcifera* E. SAUNDERS, 1874.

### Tribe *Agaeocerini* NELSON, 1982

*Agaeocerini* NELSON, 1982, *Coleopt. Bull.*, **35**: 431-450.

### Genus *Pelecopselaphus* SOLIER, 1833

(Fig. 2)

*Pelecopselaphus* SOLIER, 1833, *Annls. Soc. ent. Fr.*, **2**: 286-287.

Frons with a distinct median groove; clypeus short, depressed, and not separated from frons; antennal cavities small; antennae with sensory pores diffused on both sides and concentrated in terminal sockets on the ventral surface of serrate segments; maxillary palpi very compact. Pronotum with the basal margin slightly sinuate, marginal carinae entire. Scutellum visible. Prosternum without gular lobe. Sternal cavity formed by mesosternum medially and by metasternum laterally. Hind-wing with the vein  $R_s$  not joining vein M, cross vein (r-m) visible, anal cell absent.

*Remarks.* The tribe *Agaeocerini* was established on the basis of the American genus *Agaeocera* WATERHOUSE, 1882, alone. However, judging from the characteristics mentioned above, mainly from the characteristics of wing venation, *Pelecopselaphus* must be transferred from the tribe *Chalcophorini* to the tribe *Agaeocerini*. In the *Agaeocerini*, the anal cell on the hind-wing is absent, while in the *Chalcophorini*, it is distinct.

This tribe is distinguished from the others of the subfamily Buprestinae by the following characteristics of wing venation: 1) anal cell absent; 2) vein  $2dA_3$  distinctly short, and not reaching the margin; 3) vein  $R_s$  not directly joining vein M; 4) cross vein (r-m) visible. It is similar to the tribe *Chalcophorellini* in the wing venation, but

in that tribe, the vein  $R_s$  directly joins the vein M, and the cross vein (r-m) is absent. These features may, however, change rather easily, so that more intensive study is needed for clarifying the true relationship between the two tribes.

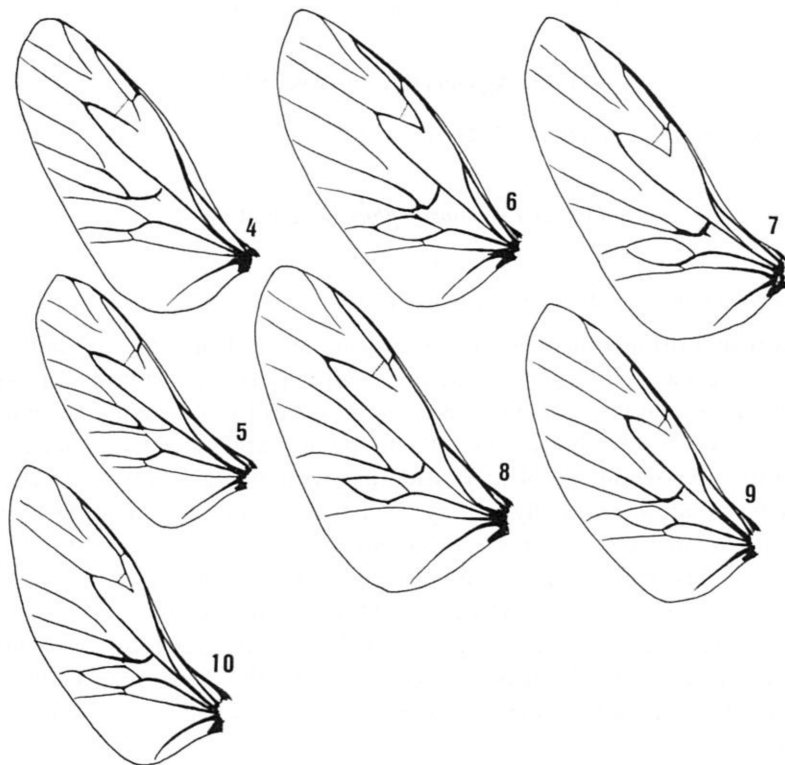
### Tribe *Pseudoperotini* nov.

(Figs. 6, 7, 10)

Type genus: *Pseudoperotis* OBENBERGER, 1936.

Frons without small pores near antennal cavities; clypeal suture absent. Antennae eleven-segmented, with sensory pores evenly diffused on both sides of serrate segments. Maxillary palpi compact. Scutellum visible. Prosternum without gular lobe. Abdominal tergites not divided into mid- and paratergites by longitudinal grooves. Hind wing with radial and anal cells, vein  $R_s$  directly joining vein M, and cross vein (r-m) visible.

*Remarks.* Although the genus *Pseudoperotis* OBENBERGER, 1936, has been regard-



Figs. 4-10. Hind wings. — 4, *Oedisterna cuprea* (LINNÉ, 1758); 5, *Strandissa vansoni* OBENBERGER, 1936 (syntype); 6, *Pseudoperotis scabrosula* OBENBERGER, 1924; 7, *Pseudoperotis subviolacea* (PÉRING, 1886); 8, *Fahraeusia chalcea* OBENBERGER, 1936 (holotype); 9, *Chalcopecila ornata* (GORY, 1840); 10, *Hypoprasia harpagon* FAIRMAIRE et GERMAIN, 1864.



ed as a subgenus of the psilopterine genus *Oedisterna* LACORDAIRE, 1857, it is distinctly separable from it by the following characteristics of wing venation: anal cell distinct, instead of being absent. This feature is very important in the classification of the Buprestidae, so that the genera *Pseudoperotis* and *Oedisterna* must belong to different tribes.

The present new tribe is distinguished from the tribe Chalcophorini by the following characteristics: cross vein (r-m) visible, instead of being absent. It is also distinguished from the tribe Buprestini by the following characteristics: 1) vein  $R_s$  directly joining vein M, instead of being separated; 2) antennal sensory pores evenly diffused, instead of concentrating in sockets.

Some South American genera are doubtless closely related to the present tribe. Further studies on these genera are awaited. One of them, *Hypoprasis* FAIRMAIRE et GERMAIN, 1864, is herewith transferred to the present tribe from the tribe Chalcophorini.

#### Genus *Pseudoperotis* OBENBERGER, 1936, stat. nov.

*Pseudoperotis* OBENBERGER, 1936, Festschr. Embrik Strand, 1: 115, 118 (subgenus of *Oedisterna* LACORDAIRE, 1857). Type species: *Psiloptera scabrosula* OBENBERGER, 1924 (Original designation.)

Although this genus was described as a subgenus of *Oedisterna* LACORDAIRE, 1857, it is easily distinguished from it by wing venation. It is divided into the two subgenera: *Pseudoperotis* (s. str.) and *Retopis* subgen. nov.

#### Subgenus *Retopis* nov.

Type species: *Psiloptera subviolacea* PÉRING, 1886.

Differing from the subgenus *Pseudoperotis* OBENBERGER, 1936, in the following point: cross vein (r-m) lying outside of cross vein (r-r), instead of being inside of it.

#### Tribe *Iridotaenini* nov.

(Fig. 3)

Type genus: *Iridotaenia* DEYROLLE, 1864.

Frons longitudinally and strongly concave, with a distinct median groove, and without small pores near antennal cavities. Antennae with sensory pores evenly diffused on both sides of serrate segments. Maxillary palpi rather compact, with the last segment distinctly enlarged apically. Sternal cavity formed only by mesosternum. Legs slender; posterior tarsus with the first segment about as long as the following two united.

Hind wing with vein  $R_s$  not joining vein M, vein  $1^{st}A_1$  visible, and cross vein (r-m) visible, radial and anal cell visible.

*Remarks.* The present new tribe is related to the tribe Pseudoperotini nov., but

can be distinguished from it by the following characteristics: 1) frons distinctly concave, instead of being simple; 2) vein  $R_s$  not joining vein M, instead of directly joining vein M. It is also distinguished from the tribe Chalcophorini by the following characteristics: 1) maxillary palpi rather compact, with the last segment distinctly enlarged apically, while in the Chalcophorini, they are loose and the last segment is elongate; 2) hind wing with vein  $R_s$  not joining vein M, and cross vein (r-m) visible, while in the Chalcophorini, vein  $R_s$  directly joining vein M, and cross vein (r-m) absent. The African genus, *Parataenia* KERREMANS, 1892, must also be included in the present tribe.

The American genus *Hippomelas* LAPORTE et GORY, 1837, also bears the same wing venation as this tribe, but its maxillary palpi are distinctly elongate. It should be separated from the tribe Chalcophorini.

#### Tribe **Evidini** nov.

Type genus: *Evides* THOMSON, 1878.

Frons without small pores near antennal cavities. Antennae with sensory pores concentrating in large sockets on the both sides of serrate segments. Maxillary palpi rather compact. Hind wing with vein  $R_s$  not joining vein M, vein  $1^{st}A_1$  visible, and cross vein (r-m) visible, radial and anal cell visible.

*Remarks.* The present new tribe is closely related to the tribe Iridotaenini nov., but can be distinguished from it by the following characteristics: antennal sensory pores concentrating in large sockets on both sides of serrate segments, instead of being evenly diffused on both sides of serrate segments. It is distinguished from the tribe Chalcophorini by the following characteristics: 1) hind wing with vein  $R_s$  not joining vein M, and cross vein (r-m) visible, while in the Chalcophorini, vein  $R_s$  directly joining vein M, and cross vein (r-m) absent. It is also distinguished from the tribe Buprestini by the following characteristics: antennal sensory pores concentrating in large sockets on both sides of serrate segments, while in the Buprestini, they concentrate in terminal sockets only on the ventral surfaces of serrate segments.

#### Tribe **Buprestini** ESCHSCHOLTZ, 1829

Buprestides ESCHSCHOLTZ, 1829, Zool Atlas, 8-9.

#### Genus *Fahraeusia* OBENBERGER, 1936, stat. nov.

(Fig. 8)

*Fahraeusia* OBENBERGER, 1936, Festschr. Embrik Strand, 1: 115-116, 118 (subgenus of *Oedisterna* LACORDAIRE, 1857). Type species: *Oedisterna (Fahraeusia) chalcea* OBENBERGER, 1936. (Original designation.)

Although the present genus has been regarded as a subgenus of *Oedisterna* LACORDAIRE, 1857, it is clearly different from it in the following characteristics: 1) antennal

sensory pores concentrating in terminal sockets on the ventral surface of serrate segments, instead of being evenly diffused; 2) anal cell on hind wing distinct, instead of being absent. Judging from these characteristics, the present genus is not a member of the tribe Psilopterini. Though the first posterior tarsal segment is distinctly shorter than those in the other genera, *Fahraeusia* is provisionally classified into the tribe Buprestini.

This genus is closely related to some South American genera of the tribe Buprestini. Its short first segment of posterior tarsus suggests that it is the most archaic genus within the genus-group.

#### Genus *Chalcopocila* THOMSON, 1878

(Fig. 9)

*Chalcopocila* THOMSON, 1878, Typi Bupr. Mus. Thoms., 37. Type species: *Psiloptera ornata* GORY, 1840. (Original designation.)

Although currently placed in the tribe Discercini, this genus is clearly different from all the dicercine genera by the wing venation. The tribe Dicercini is characterized by the absence of an anal cell, whereas *Chalcopocila* has a distinct anal cell. The latter is, therefore, transferred to the tribe Buprestini from the tribe Dicercini.

#### Subfamily **Trachyinae** GORY et LAPORTE, 1840

##### Tribe **Paratrachyini** COBOS, 1980, stat. nov.

Paratrachysae COBOS, 1980, Eos, 54: 46-47.

Paratrachyinae Y. KUROSAWA, 1985, in KUROSAWA, Y. *et al.*, Coleopt. Japan Col., Osaka, 3: 2.

The genus *Paratrachys* E. SAUNDERS has been classified into the tribe Ptosimini of the subfamily Polycestinae. COBOS erected Paratrachysae as one of the genus-groups of the Ptosimini. It is treated herewith as a full tribe of the subfamily Trachyinae for reasons given below.

#### Genus *Paratrachys* E. SAUNDERS, 1873

(Figs. 11, 12)

*Paratrachys* E. SAUNDERS, 1873, J. Linn. Soc. Zool. Lond., 9: 523. Type species: *Paratrachys hederace* E. SAUNDERS, 1873, by monotypy.

*Imago*. Body small but robust. Head distinctly narrower than the base of pronotum; frons not concave, without small pores just above antennal cavities; eyes subparallel; clypeal suture absent; antennal cavities small; antennae eleven-segmented, with sensory pores concentrating in terminal sockets on the ventral surface of serrate segments. Pronotum evenly convex; anterior margin slightly bisinuate; posterior margin subtruncate; marginal carinae sharply defined throughout. Scutellum triangular. Elytra convex, without distinct costae or striae. Prosternum without gular

lobe; procoxal lines rather strongly divergent anteriorly. Mesosternum completely separated. Metasternum convex, and obsoletely grooved medially. Abdomen with less sclerotized tergites not divided by longitudinal grooves. Hind wing with less sclerotized subquadrate radial cell, vein  $R_s$  not joining vein  $M$ , cross vein (r-m) and anal cell absent, vein  $P_{CV}$  visible but very inconspicuous, vein  $1A_{1+2}$  visible. Male genitalia without hairs on the apical parts of lateral lobes.

*Larva* (middle instar). Body elongate, entirely milky-white, lustrous, widest at mesothorax, always strongly bent to the left in dorsal aspect when alive; all the segments with pubescence laterally. Head small, retractable into prothorax; mandibles well sclerotized, simple, short and robust. Pronotum with subquadrate plate, but the plate is not sclerotized. Prosternum with subquadrate and not sclerotized plate divided into two parts by the median line. Mesothorax slightly broader than pro- and metathoraces, and without any plate. Metathorax without any plate, either. Abdomen ten-segmented, narrower than thoraces, without any plate; first segment the widest; the last slightly emarginate at apex, but without spines. Leaf miner.

*Remarks.* The above description of the larva is based on the following materials: *Paratrachys hederæ* E. SAUNDERS, 1873: 13 exs. (middle instar larvae), Mt. Kazakashi-rayama, Nagasaki City, Nagasaki Pref., Japan, 28. XII. 1983, M. EJIMA lgt. (Host plant: *Ficus pumila* LINN.)

The following relationships between this and other tribes are observed in some structures.

*Frons.* The small pores just above antennal cavities are lacking in the present

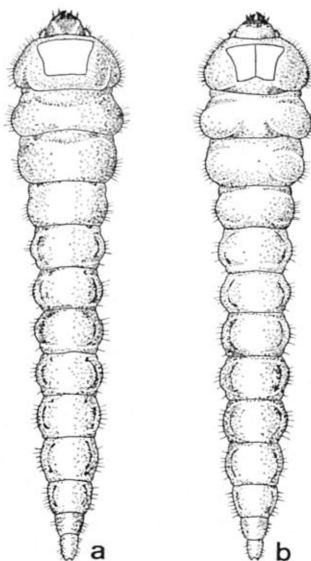


Fig. 11. Middle instar larva of *Paratrachys hederæ* E. SAUNDERS, 1873. — a) Dorsal view; b) ventral view.



Fig. 12. Mining trace of *Paratrachys hederæ* E. SAUNDERS, 1874. (In winter.)

tribe. Generally, these pores are distinctive in the Agrilinae–Trachyinae subfamilial group excepting some aberrant genera. All the genera belonging to other subfamilies except for stigmoderid genera lack such pores on frons

**Prosternum.** The procoxal lines are distinct in the present tribe. They are distinct only in the subfamilies Trachyinae and Mastogeniinae with some exceptions. No genera of other subfamilies have such lines.

**Abdominal tergites.** The abdominal tergites of the present tribe are less sclerotized and not divided into mid- and paratergites by lateral longitudinal grooves. On the other hand, in all the genera belonging to the Agrilinae–Trachyinae group, they are strongly sclerotized and distinctly divided into mid- and paratergites by lateral longitudinal grooves, though only the tribe Aphanisticini JACQUELIN DU VAL<sup>1)</sup> has less sclerotized and not divided abdominal tergites. The abdominal tergites are longitudinally and narrowly membranous along the sides and less sclerotized at middle in the mastogeniine and some anthaxine genera (*Anthaxia* ESCHSCHOLTZ, 1829, and *Melanophila* ESCHSCHOLTZ, 1829,<sup>2)</sup> etc.). Generally, all the genera belonging to the Polycestinae–Buprestinae subfamilial group have well sclerotized and not divided tergites, though some acmaeoderine and anthaxine genera have less sclerotized tergites, which are not membranous laterally. The genera, whose abdominal tergites are longitudinally and narrowly membranous along the sides and less sclerotized at middle, are most archaic in the Buprestidae.

**Male genitalia.** The lateral lobes of the male genitalia are devoid of hairs at the apical parts in the subfamilies Mastogeniinae, Acmaeoderinae and Polycestinae. The present tribe is also characterized by hairless lateral lobes, though the members of the Trachyinae have haired ones.

**Larva.** The paratrachyid larva is a leaf miner, being elongate, widest at meso-

<sup>1)</sup> Though two genera, *Endelus* H. DEYROLLE, 1864, and *Anthaxomorphus* H. DEYROLLE, 1864, have been classified into the tribe Aphanisticini, they have well sclerotized and divided abdominal tergites. They must be separated from the tribe.

<sup>2)</sup> Some Central and South American species have well sclerotized abdominal tergites. A new genus should be erected for them.

thorax, and not bispinose at apex, and the pronotum bears unsclerotized subquadrate plate and not grooved. On the other hand, the larvae of the Polycestinae–Buprestinae subfamilial group are widest at prothorax.

The present tribe was originally established by A. COBOS in 1980 as one of the genus-groups of the tribe Ptosimini in the subfamily Polycestinae. It is, however, easily distinguished from the Polycestinae by the following characteristics: 1) procoxal lines on prosternum distinct, instead of being absent; 2) hind wing with less sclerotized large subquadrate radial cell, while in the Polycestinae, it has an elongate and not sclerotized cell; 3) larva widest at mesothorax, and without sclerotized groove on pronotum, while in the Polycestinae, it is widest at the prothorax, and bears a distinct groove on the pronotum.

Judging from the characteristics mentioned above, especially from the larval characteristics, the present tribe should be classified into the subfamily Trachyinae as its most archaic representative, and the subfamily Mastogeniinae may be the most archaic subfamily in the Buprestidae. The present tribe may also be regarded as an intermediary between the Mastogeniinae and Trachyinae.

Although the systematic position of some tribes belonging to the Trachyinae is very doubtful, the present tribe is distinguished from all the other tribes of the Trachyinae by the following characteristics: 1) frons without small pores just above antennal cavities, instead of bearing the pores; 2) clypeal suture absent; 2) abdominal tergites less sclerotized and not divided, instead of being well sclerotized and divided by longitudinal grooves.

## 摘 要

タマムシ科のタマムシ亜科 Buprestinae とウバタマムシ亜科 Chalcophorinae の2 亜科について、従来これらの区別点とされていた特徴が両亜科間で連続的に変化することから、後者を前者のシノニムとして扱った。また、本亜科に含まれる数属について、その所属する族の変更を行なった。

さらに、従来 Polycestinae 亜科の Ptosimini 族に含まれていた *Paratrachys* 属を、おもに幼虫の形態的特徴からチビタマムシ亜科 Trachyinae のツブタマムシ族 Paratrachyini に置いた。

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