

## A Revised Classification of the Major Divisions and Subdivisions of *Carabus* (s. lat.) (Coleoptera, Carabidae)

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**Abstract** Major divisions and subdivisions of the genus *Carabus* (s. lat.) are revised and a new classification is proposed with descriptions of three new subdivisions, i.e., *Latitarsi* nov., *Arciferi* nov. and *Procrustimorphi* nov. Japanese names of all the subdivisions and subgenera are given.

The most recent classification of the supraspecific categories belonging to the genus *Carabus* (s. lat.) is that proposed by DEUVE (1994). His system is constructed on the basis of endophallic characters of the male genital organ, the fundamental idea of which has already been established by ISHIKAWA (1973, '78, '79). The French author divided the genus into five "subdivisions", namely, *Spinulati*, *Digitulati* (=genus *Carabus* sensu ISHIKAWA, 1973), *Lipastromorphi* (=genus *Lipaster* sensu ISHIKAWA, 1978), *Archicarabomorphi* (=genus *Ischnocarabus* sensu ISHIKAWA, 1979) and *Lobifera* (= *Multistriati* sensu ISHIKAWA, 1978). Through my recent study on the taxonomy and phylogeny of carabid beetles, I have been able to examine all the subgenera now adopted by most authors and nearly all the hitherto known species of the genus on a worldwide basis, and have come to the conclusion that DEUVE's system still involves some basic problems as mentioned below, and that there still is room for improvement or modification, at least partly.

In the first place, the five "subdivisions" consisting of his system are not completely equivalent in their taxonomical value. Three of them, *Digitulati*, *Lipastromorphi* and *Archicarabomorphi*, are phylogenetically very close to one another, and should be treated as a well-defined unit, as was unified by ISHIKAWA (1978, '79) into a single division, *Carabogenici*. The *Lobifera* in DEUVE's sense is a group to be placed at a little higher rank than these three "subdivisions". Secondly, I strongly hesitate to place the *Spinulati* at the beginning of a catalogue. Although most authors after BREUNING have put this group at the first section of check lists merely according to its "custom usage", it is doubtless more closely allied to the *Multistriati* (sensu ISHIKAWA, 1978) or to the *Lobifera*, than to the *Carabogenici*, not only from the external and genitalic morphology but also from the larval characters and the molecular biological viewpoint based on analysis of mitochondrial DNA (cf. SU, 1995, pp. 18–19; KASHIWABARA, 1995, pp.

119–123). It should therefore be placed at the side of, or be regarded as a member of the Multistriati. Thirdly, the Lobifera in DEUVE's sense contains too many subgenera that seem more or less randomly enumerated, and whose phylogenetic relationships are not clearly indicated. In my opinion, it should be separated into several subdivisions mainly on the basis of basic characters of the male genital organ.

In conclusion, I propose to divide the genus *Carabus* (s. lat.) at first into two large divisions, the Carabogenici and the Multistriati. The former contains three subdivisions, Digitulati, Lipastromorphi and Archicarabomorphi, each of which is almost equivalent to that proposed by DEUVE, though somewhat different in the construction and sequence of the component subgenera. The latter is separated into five subdivisions: the first is the Spinulati which is downgraded to one of the subdivisions of the Multistriati; the second is a well-defined complex composed of *Hemicarabus* and *Homoeocarabus*, which has been termed the Crenolimbi by REITTER (1896, p. 55); the third is a complex defined by ISHIKAWA (1984) for a single genus, *Chaetocarabus*, and I call it Arciferi nov., after its characteristically developed ligulum, named "arculus" (see description of the subdivision in the following lines); the remaining large part is divided into two more subdivisions, Latitarsi nov. and Procrustimorphi nov., though the two groups seem to be very closely allied to each other.

In the first section of the present paper, I am going to give descriptions of three new subdivisions, then I will propose a new classification of my own in the latter half. For the convenience of further studies, above all those to be written in Japanese, I will give the Japanese names for all the subdivisions and subgenera, most of which are proposed for the first time in this paper. In other articles of mine now under preparation, I am going to give detailed descriptions of all the higher taxa and keys to them, as well as a discussion on the phylogenetic relationship among these higher taxa.

Before going further, I wish to express my deep gratitude to Dr. Shun-Ichi UENO of the National Science Museum (Nat. Hist.), Tokyo, not only for kindly revising the manuscript but also for giving valuable suggestions to my study.

## Description of New Subdivisions

### Subdivision *Latitarsi* nov.

Head almost normal in appearance, with the mandibles neither remarkably elongated nor modified; retinaculum of right mandible narrow, with the anterior tooth subequal in length to the posterior; penultimate segment of labial palpus basically bisetose; median tooth of mentum not remarkably modified, and submentum basically setaceous; male antennae basically with thiridium on the ventral surface; elytral sculpture variable from triploide to heptaploide, or sometimes indicated by multiply divided rows of granules; basal four segments of male foretarsus dilated, and basically with hair pads on the ventral surface (the fourth segment usually not remarkably smaller in size than the basal three); male genital organ with ostium lobe basically bilobate, though rarely vestigial; ligulum usually indicated by an assemblage of pigmented gran-

ules, though rarely developed to a plate-like sclerite; larva with quadricuspidate epistoma.

Containing 17 subgenera distributed in Eurasia, North Africa and North America.

#### Subdivision **Arciferi** nov.

Genus *Chaetocarabus*: ISHIKAWA, 1984, Kontyû, Tokyo, **52**, pp. 94–109.

Mandible long and slender, usually roundly arcuate inwards though rarely deformed in the outline, with the inner margin of left one exceptionally double-edged in the subgenus *Platycarabus*; retinaculum of right mandible remarkably bifurcate, with the anterior tooth subequal in length to, or a little shorter than the posterior; median tooth of mentum not remarkably modified, and submentum setaceous; male antennae without thiridium on the ventral surface; elytral sculpture basically triploide; the fourth segment of male foretarsus narrower than the basal three, and sometimes lacking hair pads on the ventral surface; ostium lobe basically unilobate, though variable in shape according to the species, from almost bilobate condition to vestigial; ligulum situated at the right side near the base of endophallus, strongly developed, with the apex free from the membraneous wall and sharply pointed, and the outer margin rather sharply ridged to form a crescent-shaped sclerite (I call it “arculus”, a term newly proposed in this paper); endophallus sometimes with median lobe (=basal lobe sensu ISHIKAWA, 1984), and aggonoporius variable both in shape and degree of sclerotization according to the species; larva with quadricuspidate or rostrilabral epistoma.

Containing 4 subgenera distributed in Europe and Asia Minor.

#### Subdivision **Procrustimorphi** nov.

Head often showing a tendency of hypertrophy or cychrization, with mandibles relatively elongate and gently arcuate inwards in most species; retinaculum of right mandible often modified, with the anterior tooth not equal in length to the posterior; median tooth of mentum usually well-developed and often protruding ventrad; thiridium never recognised on the ventral surface of male antennae; elytra basically triploide, and often showing a striking development in the sculptural condition; fourth segment of male foretarsus basically smaller than the basal three, and often lacking hair pads on the ventral surface; ostium lobe usually unilobate, though sometimes bifurcate at the tip, and very rarely bilobate or even vestigial; ligulum constantly indicated by an assemblage of pigmented granules; pre- or parapraeputial pads often well-developed; praeputial pad and aggonoporius often modified both in shape and degree of sclerotization; larva with rostrilabral epistoma.

Containing 53 subgenera distributed in Eurasia, North Africa and North America.

### Classification

Genus *Carabus* LINNÉ, 1758 オサムシ属

#### I. Division Carabogenici 真正オサムシ群

##### I-1. Subdivision Digitulati DEUVE, 1991 骨片オサムシ亜群

- I-1-(1) Subgenus *Carabus* LINNÉ, 1758 アカガネオサムシ亜属
- I-1-(2) Subgenus *Eucarabus* GÉHIN, 1885 ツヤオサムシ亜属
- I-1-(3) Subgenus *Isiocarabus* REITTER, 1896 タイリクオオサムシ亜属
- I-1-(4) Subgenus *Ohomopterus* REITTER, 1896 オオサムシ亜属

##### I-2. Subdivision Lipastromorphi DEUVE, 1991 カザリオサムシ亜群

- I-2-(1) Subgenus *Morphocarabus* GÉHIN, 1885 カザリオサムシ亜属
- I-2-(2) Subgenus *Mimocarabus* GÉHIN, 1885 カタビロカザリオサムシ亜属
- I-2-(3) Subgenus *Cryptocarabus* REITTER, 1896 ツブカザリオサムシ亜属
- I-2-(4) Subgenus *Ophiocarabus* REITTER, 1896 ドウガネカザリオサムシ亜属
- I-2-(5) Subgenus *Lipaster* MOTSCHULSKY, 1865 オオズカザリオサムシ亜属
- I-2-(6) Subgenus *Cyclocarabus* REITTER, 1896 ツヤヒョウタンオサムシ亜属

##### I-3. Subdivision Archicarabomorphi DEUVE, 1991 マルオサムシ亜群

- I-3-(1) Subgenus *Archicarabus* SEIDLITZ, 1887 マルオサムシ亜属
- I-3-(2) Subgenus *Acrocarabus* LAPOUGE, 1930 キンマルオサムシ亜属
- I-3-(3) Subgenus *Ischnocarabus* KRAATZ, 1877 ツツオサムシ亜属
- I-3-(4) Subgenus *Gnathocarabus* DEUVE, 1991 キバヒョウタンオサムシ亜属

#### II. Division Multistriati 多条オサムシ群

##### II-1. Subdivision Spinulati ISHIKAWA, 1973 トゲオサムシ亜群

- II-1-(1) Subgenus *Apotomopterus* HOPE, 1838 トゲオサムシ亜属
- II-1-(2) Subgenus *Taiwanocarabus* IMURA et M. SATÔ, 1989 マスゾウトゲオサムシ亜属
- II-1-(3) Subgenus *Limnocarabus* GÉHIN, 1876 マークオサムシ亜属
- II-1-(4) Subgenus *Euleptocarabus* NAKANE, 1956 アキタクロナガオサムシ亜属

##### II-2. Subdivision Crenolimbi REITTER, 1896 セアカオサムシ亜群

- II-2-(1) Subgenus *Hemicarabus* GÉHIN, 1885 セアカオサムシ亜属
- II-2-(2) Subgenus *Homoeocarabus* GÉHIN, 1885 セスジアカガネオサムシ亜属

##### II-3. Subdivision Latitarsi IMURA, nov. ダルマオサムシ亜群

- II-3-(1) Subgenus *Tomocarabus* REITTER, 1896 ヒメダルマオサムシ亜属
- II-3-(2) Subgenus *Stephanocarabus* IMURA, 1995 カンスーダルマオサムシ亜属

- II-3-(3) Subgenus *Scambocarabus* REITTER, 1896 マルダルマオサムシ亜属
- II-3-(4) Subgenus *Semnocarabus* REITTER, 1896 テンシヤンダルマオサムシ亜属
- II-3-(5) Subgenus *Ulocarabus* REITTER, 1896 タジクダルマオサムシ亜属
- II-3-(6) Subgenus *Pachystus* MOTSCHULSKY, 1865 ダルマオサムシ亜属
- II-3-(7) Subgenus *Eurycarabus* GÉHIN, 1876 ハバビロオサムシ亜属
- II-3-(8) Subgenus *Nesaeocarabus* BEDEL, 1895 カナリアオサムシ亜属<sup>1)</sup>
- II-3-(9) Subgenus *Rhipocarabus* REITTER, 1896 シワマルオサムシ亜属
- II-3-(10) Subgenus *Autocarabus* SEIDLITZ, 1887 キンイロオサムシ亜属
- II-3-(11) Subgenus *Mesocarabus* THOMSON, 1875 ヒサゴオサムシ亜属
- II-3-(12) Subgenus *Tanaocarabus* REITTER, 1896 ホクベイミヤマオサムシ亜属
- II-3-(13) Subgenus *Pachycarabus* GÉHIN, 1876 ニブイロオサムシ亜属
- II-3-(14) Subgenus *Oreocarabus* GÉHIN, 1876 ミヤマオサムシ亜属
- II-3-(15) Subgenus *Rhigocarabus* REITTER, 1896 ドウガネオサムシ亜属
- II-3-(16) Subgenus *Leptocarabus* GÉHIN, 1885 クロナガオサムシ亜属
- II-3-(17) Subgenus *Meganebrius* KRAATZ, 1895 マルクビオサムシ亜属
- II-4. Subdivision *Arciferi* IMURA, nov. ヒラタオサムシ亜群
- II-4-(1) Subgenus *Platycarabus* MORAWITZ, 1886 ヒラタオサムシ亜属
- II-4-(2) Subgenus *Chaetocarabus* THOMSON, 1875 キバナガヒラタオサムシ亜属
- II-4-(3) Subgenus *Heterocarabus* MORAWITZ, 1886 ヒメツヤヒラタオサムシ亜属
- II-4-(4) Subgenus *Hygrocarabus* THOMSON, 1875 ミズベオサムシ亜属
- II-5. Subdivision *Procrustimorphi* IMURA, nov. ヨロイオサムシ亜群
- II-5-(1) Subgenus *Eotribax* SEMENOV, 1898 テンシヤンチビオサムシ亜属
- II-5-(2) Subgenus *Alipaster* REITTER, 1896 アラメチビオサムシ亜属
- II-5-(3) Subgenus *Cechenotribax* SEMENOV-TIAN-SHANSKIJ et ZNOJKO, 1932 ケシオオズオサムシ亜属
- II-5-(4) Subgenus *Cratocarabus* REITTER, 1896 ツブオオズオサムシ亜属
- II-5-(5) Subgenus *Cratocephalus* KIRSCH, 1859 アラメオオズオサムシ亜属
- II-5-(6) Subgenus *Cratocechenus* REITTER, 1896 コブスジオオズオサムシ亜属
- II-5-(7) Subgenus *Leptoplesius* REITTER, 1898 ホソムネオオズオサムシ亜属

1) A well sclerotized process on the ventral wall of the endophallus of this subgenus is not considered to be homologous with the digitulus, as has been pointed out by ISHIKAWA (1991, p. 225). It is therefore classified into the Multistriati, together with the subgenus *Eurycarabus*, both of which were placed by DEUVE in the Digitulati.

- II-5-(8) Subgenus *Cratophyrtus* REITTER, 1896 キバオオズオサムシ亜属  
 II-5-(9) Subgenus *Pantophyrtus* THIEME, 1881 ホトトゲオオズオサムシ  
 亜属  
 II-5-(10) Subgenus *Cechenochilus* MOTSCHULSKY, 1846 カフカスオオズ  
 オサムシ亜属  
 II-5-(11) Subgenus *Iniopachys* SOLIER, 1848 イベリアオオズオサムシ亜属  
 II-5-(12) Subgenus *Tribax* FISCHER, 1817 アトキリオサムシ亜属  
 II-5-(13) Subgenus *Neoplectes* REITTER, 1885 オオズアトキリオサムシ  
 亜属  
 II-5-(14) Subgenus *Microplectes* REITTER, 1896 チビアトキリオサムシ  
 亜属  
 II-5-(15) Subgenus *Archiplectes* GOTTWALD, 1982 ニジアトキリオサムシ  
 亜属  
 II-5-(16) Subgenus *Sphodristocarabus* GÉHIN, 1885 コブスジオサムシ亜属  
 II-5-(17) Subgenus *Ctenocarabus* THOMSON, 1875 スジバネオサムシ亜属  
 II-5-(18) Subgenus *Cathoplius* THOMSON, 1875 クチボソオサムシ亜属  
 II-5-(19) Subgenus *Oxycarabus* SEMENOV, 1898 サメハダオサムシ亜属  
 II-5-(20) Subgenus *Imaibius* BATES, 1889 オニオサムシ亜属  
 II-5-(21) Subgenus *Imaibiodes* DEUVE, 1990 ニセオニオサムシ亜属  
 II-5-(22) Subgenus *Deroplectes* REITTER, 1895 パミールオサムシ亜属  
 II-5-(23) Subgenus *Apoplesius* DEUVE, 1990 アトキリモドキ亜属  
 II-5-(24) Subgenus *Relictocarabus* LEDOUX, 1984 アフリカアトキリモド  
 キ亜属  
 II-5-(25) Subgenus *Gonicarabus* GÉHIN, 1885 キバナガオサムシ亜属  
 II-5-(26) Subgenus *Axinocarabus* MORAWITZ, 1886 ツヤキバナガオサム  
 シ亜属  
 II-5-(27) Subgenus *Acathaicus* REITTER, 1896 マンボウオサムシ亜属  
 II-5-(28) Subgenus *Cathaicus* BATES, 1870 コウガオサムシ亜属  
 II-5-(29) Subgenus *Eupachys* CHAUDOIR, 1857 クギヌキオオズオサムシ  
 亜属  
 II-5-(30) Subgenus *Cychrostomus* REITTER, 1896 ホソキバオサムシ亜属  
 II-5-(31) Subgenus *Teratocarabus* SEMENOV-TIAN-SHANSKIJ et ZNOJKO,  
 1932 ムラサキホソキバオサムシ亜属  
 II-5-(32) Subgenus *Cephalornis* SEMENOV, 1889 セダカモドキ亜属  
 II-5-(33) Subgenus *Eocechenus* SEMENOV-TIAN-SHANSKIJ et ZNOJKO, 1932  
 タカネオオズオサムシ亜属  
 II-5-(34) Subgenus *Cryptocechenus* SEMENOV, 1898 アカアシオオズオサ  
 ムシ亜属  
 II-5-(35) Subgenus *Calocarabus* SEMENOV, 1887 キンスジオオズオサム  
 シ亜属  
 II-5-(36) Subgenus *Neoplesius* REITTER, 1896 チベットオサムシ亜属  
 II-5-(37) Subgenus *Pseudocranion* REITTER, 1896 ニセキンオサムシ亜属

- II-5-(38) Subgenus *Shunichiocarabus* IMURA, 1995 コブキバオサムシ亜属  
 II-5-(39) Subgenus *Pseudocoptolabrus* REITTER, 1896 ヌバタマキンオサムシ亜属  
 II-5-(40) Subgenus *Pagocarabus* MORAWITZ, 1886 マンダラオサムシ亜属<sup>2)</sup>  
 II-5-(41) Subgenus *Megodontoides* DEUVE, 1991 オオズマンダラオサムシ亜属  
 II-5-(42) Subgenus *Aristocarabus* SEMENOV, 1896 ニシキオサムシ亜属  
 II-5-(43) Subgenus *Eccoptolabrus* SEMENOV, 1898 ヒメカブリモドキ亜属  
 II-5-(44) Subgenus *Lasiocoptolabrus* IMURA, 1993 アラメカブリモドキ亜属  
 II-5-(45) Subgenus *Coptolabrus* SOLIER, 1848 カブリモドキ亜属  
 II-5-(46) Subgenus *Damaster* KOLLAR, 1836 マイマイカブリ亜属  
 II-5-(47) Subgenus *Acoptolabrus* MORAWITZ, 1886 クビナガオサムシ亜属  
 II-5-(48) Subgenus *Megodontus* SOLIER, 1848 キンオサムシ亜属  
 II-5-(49) Subgenus *Procerus* DEJEAN, 1826 イボハダオサムシ亜属  
 II-5-(50) Subgenus *Macrothorax* DESMAREST, 1850 ムナビロオサムシ亜属  
 II-5-(51) Subgenus *Chrysocarabus* THOMSON, 1875 コガネオサムシ亜属  
 II-5-(52) Subgenus *Procrustes* BONELLI, 1809 ヨロイオサムシ亜属  
 II-5-(53) Subgenus *Lamprostus* MOTSCHULSKY, 1865 トックリオサムシ亜属

## 要 約

井村有希：オサムシ属の上位分類体系に関する再検討。—— DEUVE (1994)により提唱された広義のオサムシ属の上位分類体系における問題点を指摘したうえで、筆者独自の見解に基づき、その再編成を試みた。その結果、オサムシ属をまず真正オサムシと多条オサムシの2群に分け、前者に3亜群、後者に5亜群（うち、みつつの亜群をあらたに記載）を認める新しい分類体系を提唱した。本論文ではさらに、今後、和文によって記される類書への一助として、世界のオサムシ属に含まれるすべての亜群と亜属に対し和名を与えた。

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 ISHIKAWA, R., 1973. Notes on some basic problems in the taxonomy and the phylogeny of the subtribe Carabina. *Bull. natn. Sci. Mus., Tokyo*, **16**: 191-215.

2) The subgenus *Pagocarabus* in the present sense contains only a few species allied to the type species (*Carabus crassesculptus*), i.e., *C. promachus*, *C. poschingerianus*, etc., and the other members that have been traditionally placed in the same subgenus are transferred to *Neoplesius* which is considered distinct as a subgenus.

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## A New Record of *Aceraius alutaceosternus* (Coleoptera, Passalidae) from Sumatra

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*Aceraius alutaceosternus* was described by KUWERT (1898) from the Malay Peninsula. Later, GRAVELY (1918) recorded it from the Malay Peninsula and Borneo.

Recently, we had an opportunity to examine a long series of *Aceraius* specimens from Sumatra and found two specimens of *A. alutaceosternus* among them. This is the first record of *A. alutaceosternus* from Sumatra.

*Specimens examined.* *Aceraius alutaceosternus* KUWERT: 1 ♀, Harau Valley, Paya Kumbuh, Sumatra, Morlis ELIS leg.; 1 ♂, Sibolangit 800 m in altitude, Sumatra, II–1995, Kazuhisa FUJITA leg.

*Distribution.* Malay Peninsula, Sumatra (new record), Borneo.

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