THE SUBFAMILIES OF THE BRUCHIDAE (COLEOPTERA).

By John Colburn Bridwell.

From the year ten of the first French republic (1802) when Latreille assembled *Rhinosimus*, *Anthribus*, and *Bruchus* into his family *Bruchèles* (*Bruchelae*), up to this troubled year 1932, the conception of the family *Bruchidae* has been constantly changing and but few of the desirable subdivisions of the old genus *Bruchus* of Linnaeus, Fabricius, and Latreille are as yet commonly recognized. After fifteen years' study of the Bruchidae the writer has arrived at some definite opinions in these matters which he wishes to record. The description of the family here presented excludes *Bruchela* Dejean 1821 (*Urodon* Schoenherr 1823) and *Rhaebus* Fischer von Waldheim 1824 and includes *Eubaptus* Lacordaire 1845, treated as forming

the subfamily EUBAPTINAE. The other four subfamilies here recognized are the BRUCHINAE including the greater part of the genera and species of the family; the PACHYMERINAE, dealt with in some detail in these Proceedings, volume 31; the AMBLYCERINAE, including the species usually included in *Spermophagus;* and the KYTORHININAE, including only *Kytorhinus*, represented in the American fauna by *K. prolixus* (Fall 1926).

CHARACTERS OF THE BRUCHIDAE.

The Bruchidae are pubescent, punctate and micropunctulate Phytophaga having cryptopentamerous tarsi, third tarsal joint bilobate, ungues appendiculate except in *Zabrotes;* head closely applied, when at rest, to the pro- and mesosternum, mandibles then directed backward; mandibles elongate, acute, a membraneous flap on the inner margin between the cutting apex and a basal molar mass; a suture separating clypeus from front; eyes emarginate in front; antennae 11-jointed compressed, expanded except basal 2, 3, or 4 joints, and subperfoliate, serrate, pectinate or flabellate rarely subfiliform; antennal sockets in front of and close to the emargination of the eyes; head with a transverse furrow extending across the ventral surface and on either side behind, to the summit of the eyes, setting off the occiput as a neck, which is largely concealed above when the head is extended, and exposed with head at rest; gular sutures distinct behind, abruptly bent inward and joined in the middle behind the transverse furrow; gula at and before the furrow not separated from epicranium, continued forward between the buscal fissures to receive the mentum on the entire anterior margin; front coxae elongate, received in elongate coxal cavities, nearly closed behind by posterolateral pieces which are not joined in the middle line; prosternum short, vertical or nearly so, with lateral wings definitely limited on either side and an intercoxal process partially or completely separating the coxae; elytra punctate-striate with 10 striae (some striae abbreviate and joined at apex), separately rounded at apex, and revealing the pygidium; middle coxal cavities with a trochantin extension; front and middle femora slender; hind femur compressed and more or less incrassate, often flattened on ventral margin, with one or two longitudinal carinae, these often armed with serrations, teeth and denticles, especially near apex; hind tibiae usually longitudinally carinate, truncate and variously armed with fixed spines or teeth at apex, less often bicalcarate; pygidium exposed behind the elytra (in some males an additional tergite exposed between pygidium and last sternite); five sternites visible, first and, usually, fifth longer than one of the three equal intermediate sternites; edeagus with apical portion of tegmen well developed, usually bilobate, connected by lateral commissures with one or two ventral struts, internal sac well developed with sclerotizations on the internal surface characteristic of species; median lobe with characteristic apical structures and usually cucullate basally; ovipositor with two segments supported by sclerotised struts and telescoping one into the other, copulatory bursa usually bearing on its internal surface sclerotizations characteristic of the species; first stage larva with a transverse pectinate plate on pronotum, unknown in other coleopterous larvae; advanced

larvae with characteristic modification of the labio maxillary region of the mouth, with oblong head capsule deeply inserted into the thoracic mass, larva curved and grublike and not greatly unlike some Bostrychoid and Curculionoid larvae.

POSITION OF BRUCHELA.

From the Bruchidae as described above the adult *Bruchela* differs in almost every particular. The mandibles somewhat resemble those of the Bruchidae but lack the membraneous flap and molar mass which seems diagnostic of that family. The first stage larva of *Bruchela* is unknown but Dr. Böving has studied the advanced larva and has pointed out to me the characters which show its very close relationship to the Anthribidae and the absence of all the special structures found in the *Bruchidae*. The adult differs in important characters sufficient to exclude it from Anthribidae but agrees with them in the significant absence of gular sutures. Hence the writer is disposed to accept a family Bruchelidae closely allied to Anthribidae, including *Bruchela* (= *Urodon*), *Cercomorphus* Perris 1864, and *Urodoplatus* Motschulsky 1874. Neither family seems to him closely allied to the *Bruchidae*.

RHAEBUS NOT A BRUCHID.

Rhaebus is known to the writer only by descriptions and the weight of authority seems to be against considering it a bruchid. Schoenherr and his associates excluded it from the Bruchidae and Lacordaire, Chapuis and Suffrian all considered it chrysomelid. The only eminent student of *Chrysomelidae* considering it a bruchid seems to be Weise. Its recorded structures agree with the *Bruchidae* in several particulars, but these are all found also in genera universally considered chrysomelid. The mandible is described as having a second tooth near apex and the head as not being capable of being bent down against the breast; either character seems sufficient to exclude it from the *Bruchidae*. The larva is unknown.

EUBAPTUS AS A BRUCHID.

Specimens of a small unidentified yellow-and-black beetle were shown to me in Washington in 1920, by H. S. Barber, and in London in 1924, by K. G. Blair, each considering it a strange bruchid. This has since been found to agree with the description of *Eubaptus palliatus* Lacordaire 1845 (Monogr. Phytoph. 1 : 605–607), placed by him after *Rhaebus* in the *Crioceridae*. On the basis of this description, Chapuis 1874, in Lacordaire Hist. Nat. Col. 10: 49–54, referred it to a tribe *Rhaebites* in the *Sagridae*. While peculiar in form, coloration, and male genitalia *Eubabtus* has all the characters of the Bruchidae as described above, including the peculiar bruchid mandible. The

type of the species from Bolivia would appear to be in the D'Orbigny material in the Paris Museum. The United States National Museum has three specimens from Paraguay and one from Trinidad. There are a few individuals in the British Museum from some northern South American locality. Nothing is known of its habits.

TABLE OF SUBFAMILIES.

1. Mesopleural suture obsolescent, joining mesometapleural suture at an acute angle near its middle, leaving mesepimeron remote from coxal cavity; or, less often, mesopleural suture approaching mesometapleural suture closely and running subparallel to it to trochantin extension of coxal cavity so that the mesepimeron attains the coxal cavity very narrowly; tibiae without calcaria; hind tarsus about as long as tibia; hind femur about as wide as coxa.....BRUCHINAE.

   Mesopleural suture distinct, free from mesometapleural suture; mesepimeron attaining coxal cavity with about its width at middle; one to three pairs of tibiae sometimes bicalcarate at apex.....2.

2. Prothorax without carina separating flank from dorsum; hind femur never strongly incrassate; hind tibiae straight.....3.

   Prothorax with carina separating flank from dorsum; hind femur sometimes strongly incrassate, hind tibia then strongly arcuate.....4.

3. Pygidium short, one or two tergites also exposed behind elytra; ♂ antennae flabellate or pectinate; tibiae not calcarate; hind femur narrower than coxa; hind tarsus about as long as tibia.....KYTORHININAE new subfamily.

   Pygidium short, covered at base by elytra; antennae alike in sexes, subperfoliate; hind tibia with two very unequal calcaria; hind coxa much narrower than femur and than first sternite behind it; hind tarsus about half as long as tibia.....EUBAPTINAE new subfamily.

4. Hind femur not strongly incrassate, only half as wide as coxa, channelled and longitudinally bicarinate beneath, carinae usually unarmed, never with more than one short blunt tooth; hind coxa very broad, wider than length of first sternite behind it; hind tibia straight, not mucronate, bicalcarate; hind tarsus as long as tibia; front and middle tibiae not calcarate; pronotum without impressed line above lateral carinae.....AMBLYCERINAE new subfamily.

   Hind femur strongly incrassate, much wider than coxa, unicarinate beneath with a strong denticulate crista; hind coxa narrower than length of first sternite behind it; hind tibia strongly arcuate, with a trowel-shaped mucro (and paired calcaria in *Caryoborus*) at ventral apex; hind tarsus about half as long as tibia; front and middle tibiae with feeble paired calcaria hidden in apical pubescence; pronotum with distinct impressed line continued from basal margin above lateral carina.....PACHYMERINAE.

GENERA OF BRUCHIDAE ARRANGED IN THE SUBFAMILIES, WITH THEIR GENOTYPES.[1]

BRUCHINAE.

Acanthoscelides Schilsky 1905, Käfer Europa's 41: f, C, no. 95–98.
Genotype, designated by Bridwell 1929 Proc. Ent. Soc. Wash. 31:42, *Bruchus irrasectus* Fahraeus 1839, in Schoenherr Gen. Curc. 5:5:18 [=*Bruchus obtectus* Say 1831 N. Am. Curcul. 1 (=Leconte Ed. Say 1:259)].

Bruchidius Schilsky 1905, Käfer Europa's 41 e, B. no. 36–94.
Genotype, by present designation, *Bruchus quinqueguttatus* Oliver 1795 Ent. (4) 79:15.

Bruchinus Schilsky 1905, Käfer Europa's 41: no. 38.
Genotype, monobasic, *Laria monstrosicornis* Pic 1904, Échange 20:40= *Bruchinus walkeri* Schilsky l. l. cited in synonymy of *Bruchidius monstrosicornis* (Pic) Schilsky l. c. Valid and available if needed in dismemberment of *Bruchidius*.

[**Bruchus** Linnaeus 1758, Systema Naturae Ed. 10 1:1:356.
Cited in synonymy of *Dermestes pisorum* Linnaeus l. c. According to Opinion 5 of the International Commission *Bruchus* is not here validated. Many practical considerations, too involved to present here, suggest the use of *Bruchus* as of this date.]

Bruchus Linnaeus 1767, Systema Naturae Ed. 12 1^2:604.
Genotype, designated by Latreille 1810, Consid. Gener. 430, *Bruchus pisi* Linnaeus l. c. [=*Dermestes pisorum* Linnaeus 1758]. (Not *Bruchus* Geoffroy 1762 Hist. Abreg. Ins. Paris. 1:163–165. Genotype, by present designation, *Cerambyx fur* Linnaeus 1758, Syst. Nat. Ed. 10 1:393. Not *Laria* Scopoli 1763, Ent. Carniol. Index [2], 21–22. Genotype, by present designation, *Laria dulcamarae* Scopoli l. c. 22=*Pria dulcamarae* auctorum, to accord with first revision Linnaeus 1767, removing *salicis* to *Bruchus*, accepted by Goeze 1777.

Mylabris Geoffroy 1762, Hist. Abreg, Ins. Paris 1:266–269.
Genotype, by present designation, *Bruchus pisi* Linnaeus 1767, first named species included, by Linnaeus 1767.

Callosobruchus Pic 1902 Rev. d'Ent. 22:6.
Genotype, designated by Bridwell 1929, Proc. Ent. Soc. Wash. 31:40, *Bruchus scutellaris* Fabricius 1792, Ent. Syst. $1^2$372 [=*Curculio chinensis* 1758, Syst. Nat. Ed. 10 1:386] (Sharp 1914 Zool. Rec. 50: Ins. 260 cited *B. chenensis* [=*Curculio chinensis* as type of *Callosobruchus* Pic 1912, Échange 28:92]).

Caryedes Hummel 1827, Essais Ent. 6:11.
Genotype, monobasic, *Bruchus faldermanni* Mannerheim in Hummel l. c.

Pachymera Berthold 1827, Latreille Fam. Nat. Tierreich 378. No species included. Based on *Pachymère* Latreille 1825, a vernacular French name without standing in zoological nomenclature. Believed to be subsequent to *Caryedes* but not certainly so.

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[1]Genera designated by an Asterisk (*) have been placed from the literature, no material representing them being available to the writer for study.

Pachymerus "Latreille" Schoenherr 1833, Gen. Curc. 1: 2, 84–92.
Genotype, originally designated, *Bruchus brasiliensis* Thunberg 1816 Vetensk. Acad. Handl. 1816: 45, congeneric, and perhaps conspecific with *Bruchus faldermanni*.

Andromisus des Gozis 1881 (as *Adromisus* typ. err.), Ann. Soc. Ent. France (6) 1: CXIII. Substitute name for *Pachymerus* "Latreille" [Schoenherr], therefore isogenotypic.

Pseudopachymerus Pic 1913, Col. Cat. 55: 10.
Substitute name for *Pachymerus* Schoenherr, therefore isogenotypic, also originally designated, *Bruchus brasiliensis*.

Cosmobruchus Bridwell 1931, Proc. Ent. Soc. Wash. 33: 41.
Genotype, monobasic, originally designated, *Cosmobruchus russelli* Bridwell l. c.

Dahlibruchus Bridwell 1931, Proc. Ent. Soc. Wash. 33: 40.
Genotype, originally designated, *Cosmobruchus sharpianus* Bridwell l. c. =*Bruchus longulus* Sharp 1885, Biol. Centr.-Am. Col. 5: 482 (not Kraatz 1868).

Falsobruchus Pic 1913, Échange 29: 110.
Genotype, monobasic, *Bruchus* (*Pachymerus*) *cristatus* Fahraeus 1839, in Schoenherr Gen. Curc. 5: 122.

Gibbobruchus Pic 1913, Échange 29: 110.
Genotype, by present designation, *Bruchus* (*Pachymerus*) *speculifer* Gyllenhal 1833, in Schoenherr Gen. Curc. 1: 87.

***Impressobruchus** Pic 1910, Échange 26: 95.
Genotype, monobasic, *Impressobruchus semiruber* Pic l. c.

Megacerus Fahraeus 1839, in Schoenherr Gen. Curc. 5: 34.
Genotype, monobasic, *Bruchus pescaprae* Fahraeus l. c.

Pachybruchus Pic Pic 1912, Échange 28: 92.
Genotype, designated by Bridwell 1929, Proc. Ent. Soc. Wash. 31: 113, *Bruchus coryphae* Olivier 1795, (4) 79: 16.
[The genotypes may well be considered as subgenerically distinct.]

Phelomerus Pic 1912, Échange 28: 92.
Genotype, designated by Pierce 1930, Proc. Ent. Soc. Wash. 32: 37, *Phelomerus ochropygus* Pic. l. c.

***Pygiopachymerus** Pic Échange 27: 134.
Genotype, monobasic, *Pygiopachymerus theresae* Pic. l. c.

Rhipibruchus new name for *Megalorhipis* Philippi 1869, An. Univ. Chile 16 :668 (not Lacordaire 1857).
Genotype, monobasic, *Megalorhipis leiboldi* Philippi l. c. [=*Bruchus picturatus* Fahraeus 1839, in Schoenherr Gen. Curc. 5: 2].

KYTORHININAE.

Kytorhinus Fischer von Waldheim 1809, Mem. Soc. Nat. Moscou 2: 298–304.
Genotype, designated by Crotch 1870, Trans. Ent. Soc. London 1870: 222, *Kytorhinus karasini* Fischer l. c.

Pygobruchus Sharp 1886, Ann. Mag. Nat. Hist. (5) 17:38.
Genotype, monobasic, *Pygobruchus scutellaris* Sharp l. c. [not *Kytorhinus scutellaris* (Fabricius) Motschulsky 1874 (=*Kytorhinus sharpianus* new name)].

EUBAPTINAE.

Eubaptus Lacordaire 1845, Monogr. Phytoph. 1:605.
Genotype, monobasic, *Eubaptus palliatus* Lacordaire l. c.

AMBLYCERINAE.

Amblycerus Thunberg 1815, Nova Acta Upsal. 7:121–122.
Genotype, designated by Bridwell 1930, in Pierce Proc. U. S. Nat. Mus. (77) 17:29, *Bruchus robiniae* Fabricius 1781, Spec. Ins. 1:75, cited by Thunberg as *Amblycerus robiniae*.

Euspermophagus Zacher 1930, Arb. Biol. Reichsanst. Land-u. Forstwirtsch. 18:237.
Genotype, originally designated, "*sericeus* Geoffroy" [=*Bruchus cardui* Boheman 1829, Mem. Soc. Nat. Moscou 7:117 (=Nouv. Mem. 1:117) =? ? *Mylabris sericea* Geoffroy 1785 in Fourcroy Ent. Paris 112 (not *Mylabris sericea* (Pallas 1782) Tauscher 1812)].

***Pygiospermophagus** Pic 1917, Mél. Exot. Ent. 26:8.
Genotype, monobasic, *Pygiopachymerus brevicornis* Pic. l. c.

Spermophagus Schoenherr 1833, Gen. Curc. 1:2, 102.
Genotype, originally designated, *Spermophagus titivilitius* Boheman 1833, op. cit. 1:106.

Spermatophagus Gistl 1856, Myster. Europ. Insectenw. 375.
Emendation of *Spermophagus*, therefore isogenotypic.

Zabrotes Horn 1885, Trans. Am. Ent. Soc. 12:157.
Genotype, designated by Zacher 1930, Arb. Biol. Reichsanst. Land-u. Forstwirtsch. 18:237, *Zabrotes cruciger* Horn l. c.

PACHYMERINAE.

Caryedon Schoenherr 1823, in Isis von Oken 1823:1134.
Genotype, originally designated, *Bruchus serratus* Olivier 1790, Encycl. Meth. Ins. 5:199 [=*Bruchus fuscus* Goeze 1777, Ent. Beytr. 1:332.]

Caryoborus Schoenherr 1833, Gen. Curc. 1:2, 92–97.
Genotype, originally designated, *Bruchus serripes* Sturm 1826 Cat. Ins. 74.

Caryobruchus Bridwell 1929, Proc. Ent. Soc. Wash. 31:148.
Genotype, originally designated, *Dermestes gleditsiae* Linnaeus 1763, Amoen. Acad. 6:392.

Caryopemon Jekel 1855, Ins. Saund. Curc. 25–29.
Genotype, monobasic, originally designated, *Caryopemon hieroglyphicus* Jekel l. c. 27–29.

***Diegobruchus** Pic 1913 Échange 29:110.
Genotype, monobasic, *Bruchus suarezicus* Pic. 1904, Échange 20:35 (*soarezicus*, typ. err.).

Pachymerus Thunberg 1805, Goeting. Gel. Anz. 28:281.
Genotype, monobasic, *Dermestes bactris* Linnaeus 1763, Amoen. Acad. 6:392, cited as *P. bactris*.