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REDEFINITION OF THE OPATRINE TRIBES IN
NORTH AMERICA WITH NOTES ON SOME
APTEROUS GENERA (COLEOPTERA:
TENEBRIONIDAE: TENEBRIONINAE)

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ABSTRACT

The opatrine lineage of the subfamily Tenebrioninae is redefined for the Nearctic region of North America. The genera *Hyocis*, *Gonocephalum* and *Cyclosattus* are not North American. The relationships of the genera *Alaudes*, *Tonibiastes*, *Nocibiotes* and *Tonibius* are discussed. *Tonibius rossi* Blaisdell is transferred to *Nocibiotes*. The species is illustrated and a modified generic diagnosis is provided for *Nocibiotes*. A revised key is presented for the Nearctic members of the opatrine tribes and genera.

Le lignage des opatrine de la sous-famille Tenebrioninae est reconstruit pour la région Néarctique de l'Amérique du Nord. Les genres *Hyocis*, *Gonocephalum* et *Cyclosattus* ne sont pas de l'Amérique du Nord. Les rapports systématiques entre les genres *Alaudes*, *Tonibiastes*, *Nocibiotes* et *Tonibius* sont examinés. *Tonibius rossi* Blaisdell est transféré parmi les *Nocibiotes*. L'espèce est illustrée et une diagnose générique modifiée pour les *Nocibiotes* est présentée. Une clé modifiée est fournie pour les tribus et les genres d'opatrine de la région Néarctique.

The opatrine lineage of the subfamily Tenebrioninae is best represented in the Ethiopian and Palearctic faunal regions, only approximately 14% of the known genera being from the New World. Of these, 21 are known from the Nearctic region (including 17 endemic genera). Arnett (1962), relying mainly on Bradley's (1930) key and Gebien's (1937-48) catalog, placed many of these genera in the Pedinini, a tribe not presently known to occur in the New World, according to the classifications of Koch (1956), Español (1945, 1958), and Medvedev (1968).

The opatrine lineage presently contains 14 tribes [*sensu* Medvedev, 1968, minus the New World tribes subsequently removed to the subfamily Tentyriinae: see Doyen (1972) and Watt (1974)]. Most of these are restricted to the Ethiopian or Mediterranean regions, with only four tribes occurring in North America. These North American representatives include the Leichenini (*Leichenum* Blanchard), and the Platynotini (*Opatrinus* Latreille), the Melanimini (*Cheirodes* Gené¹), and the Opatrini (with the remainder of the genera). These changes are summarized in Table 1.

DISCUSSION

A number of genera currently listed as belonging to the opatrine lineage present problems. Certain genera have been included erroneously in checklists and catalogs of North American Opatrini. Others have been incorrectly placed

¹ The genus *Anemia* Laporte was synonymized under the genus *Cheirodes* by Spilman (1973:41).

Table 1. Nearctic Opatrine genera: changes in Arnett's (1962) *The beetles of the United States*.

<i>sensu</i> Arnett	Present lineage and tribe
Opatrini	
<i>Alaudes</i>	Tentyriinae (see text)
<i>Cheirodes</i> (= <i>Anemia</i>)	opatrine, Melanimini
<i>Lepidocnemeplatia</i>	Tentyriinae
<i>Ammodonus</i>	opatrine, Opatrini: Opatrina
<i>Leichenum</i>	opatrine, Leichenini
<i>Ephalus</i>	opatrine, Opatrini: Opatrina
<i>Pseudephalus</i>	opatrine, Opatrini: Opatrina
Pedinini	
<i>Idiobates</i>	Tenebrioninae, Tenebrionini
All other Pedinini	opatrine, Opatrini: Opatrina
Tenebrionini	
<i>Opatrinus</i>	opatrine, Platynotini: Platynotina

in the North American fauna. Still others have since been removed to other groups. These changes are discussed below:

1. The species *Hyocis championi* Fauvel has often been mistakenly listed from Baja California, Mexico (i.e., Blackwelder 1944). The genus *Hyocis* Pascoe, is found in Australia and Polynesia. *Hyocis championi* (Fauvel 1904:166) is from Noumea, New Hebrides.

2. The monotypic genus *Cyclosattus* Casey (1892:710), based on *Eusattus websteri* (Casey 1891:56), has been mistakenly recorded by Casey from Colorado. This insect is actually an Australian nyctozioline (Doyen, pers. comm.).

3. *Blapstinus latifrons* was described by LeConte (1874:70) from a single specimen from Vancouver Island, British Columbia, Canada. This species was correctly transferred to *Gonocephalum* by Casey (1890:393). For this reason, *Gonocephalum latifrons* (LeConte) has been listed as occurring on the North American continent. Since no other specimens of this species are known, we believe this record was based on an interception of a *Gonocephalum* from overseas. Kaszab (1952:682) listed *G. latifrons* as a synonym of *G. bilineatum* Walker, a widespread species in Southeast Asia. A specimen of the same species (*Gonocephalum bilineatum* Walker, det. Spilman 1964) was also collected in Montauk Point, New York [VIII-10-47, V. M. Kirk col., USNM], apparently on or adjacent to a sand beach, possibly on drift (Spilman, pers. comm.). Since no other specimens of this genus have been seen from the east coast of North America since that time, this isolated record no doubt also represents an accidental interception, possibly originating from a ship in the nearby heavily used shipping lanes.

4. The status of the genus *Alaudes* is problematic. Although *Alaudes* lacks abdominal defensive glands and has concealed membranes between the apical two abdominal sternites (tentyriine characters), the tegmen of the aedeagus is dorsal (a tenebrionine character). Doyen and Lawrence (1979:368) have suggested placement of the genus in the Typhlusechini (now Tentyriinae: Stenosini Aalbu and Andrews in press).

The Opatrini, consisting of 117 genera, have a worldwide distribution (Medvedev 1968). Koch (1956) proposed five subtribes, only one of which, Opatrina,

is known to occur in the New World. Among the 16 North American genera of this tribe is a distinct group of closely related genera, the species of which are apterous and are limited to the arid areas of southwestern United States and Mexico. These are easily distinguished from other Opatrini by a very broad and short scutellum and include the LeConte genera *Notibius* (1851:144) and *Conibius* (1851:145), and the Casey genera *Conibiosoma* (1890:476), *Tonibiastes* (1895:617), *Nocibiotes* (1895:618) and *Tonibius* (1895:622). They are found on a number of substrates including sand dunes and alkali scrub vegetation (*Notibius*, *Tonibius*), rocky desert areas (*Conibiosoma*, *Tonibiastes*, *Nocibiotes* and *Tonibius*), dry caves (*Conibius*), and are often associated with rodent or ant nests (*Tonibius*, *Conibius*).

As a result of better techniques for the collection of small apterous beetles, such as overnight (dry or baited) pitfall traps or longer duration ethylene glycol (antifreeze) traps, and with the greater accessibility of previously difficult to reach places, numerous specimens belonging to this group have accumulated in collections.

Tonibius was established in 1895 by Casey to include *Conibius sulcatus* LeConte (1851:145) [reassigned to *Notibius* by Casey (1890:472)] and *Conibius alternatus* Casey (1890:473). He characterized the genus by the presence of a feebly differentiated antennal club, convex and "simply punctate" elytral intervals, and a prothorax which is not narrowed behind. With the transfer of *rossi* to *Nocibiotes*, *Tonibius* is left with only these two species. The latter (*T. alternatus*) was reduced to synonymy by Horn (1894:352), but Casey (1895:662) supplied additional information to effectively revalidate the name. Gebien (1910:303) recognized both *T. sulcatus* and *T. alternatus*, but in 1938 (p. 444) considered *T. alternatus* a subspecies of *T. sulcatus*. Leng (1920:232) likewise gave *T. alternatus* subspecific status, but Blackwelder (1944:525) considered it a synonym of *T. sulcatus*. Whether one recognizes one or two species of *Tonibius*, the fact remains that it is a very distinctive genus in having the pronotum quadrate, not narrowed behind and not fimbriate laterally, and with sulcate elytra having strongly convex (not costiform) intervals.

The monotypic genus *Tonibiastes* Casey (1895:617) is clearly closely related to *Nocibiotes* in sharing a pronotum which is distinctly rounded laterally and narrowed behind and not laterally fimbriate. It is distinct in having the elytral intervals acutely costiform. The only species is *Tonibiastes costipennis* (Horn 1894:430), originally placed in *Notibius* and apparently confined to Baja California Sur. Another superficially similar, mostly apterous, opatrine genus, *Pedonoeces* (restricted to the Galapagos Islands), also containing a species with costate elytra, is more closely related to the genus *Blapstinus* than to this group and may indeed prove to be of subgeneric status under *Blapstinus* (Van Dyke 1953:99).

The species described as *Tonibius rossi* Blaisdell (1943:260) should be transferred to the genus *Nocibiotes* Casey as a **new combination**. We discovered this error while attempting to identify specimens using Blaisdell's 1943 paper (which contains no keys). Blaisdell (1943:260) gave a brief generic diagnosis under *Nocibiotes granulatus* (LeConte): "In this genus the elytra are sulcate, the intervals convex and asperate." Under *Tonibius sulcatus* (LeConte), he (1943:262) characterized that genus as "elytra are sulcate, the intervals convex and simply punctate." Clearly, on the basis of these statements alone, *rossi* should have been placed in *Nocibiotes*. Equally puzzling, Blaisdell (1943:262) compared *Tonibius rossi* with *Nocibiotes granulatus*, not with *Tonibius sulcatus*, an indication that the two were very similar.

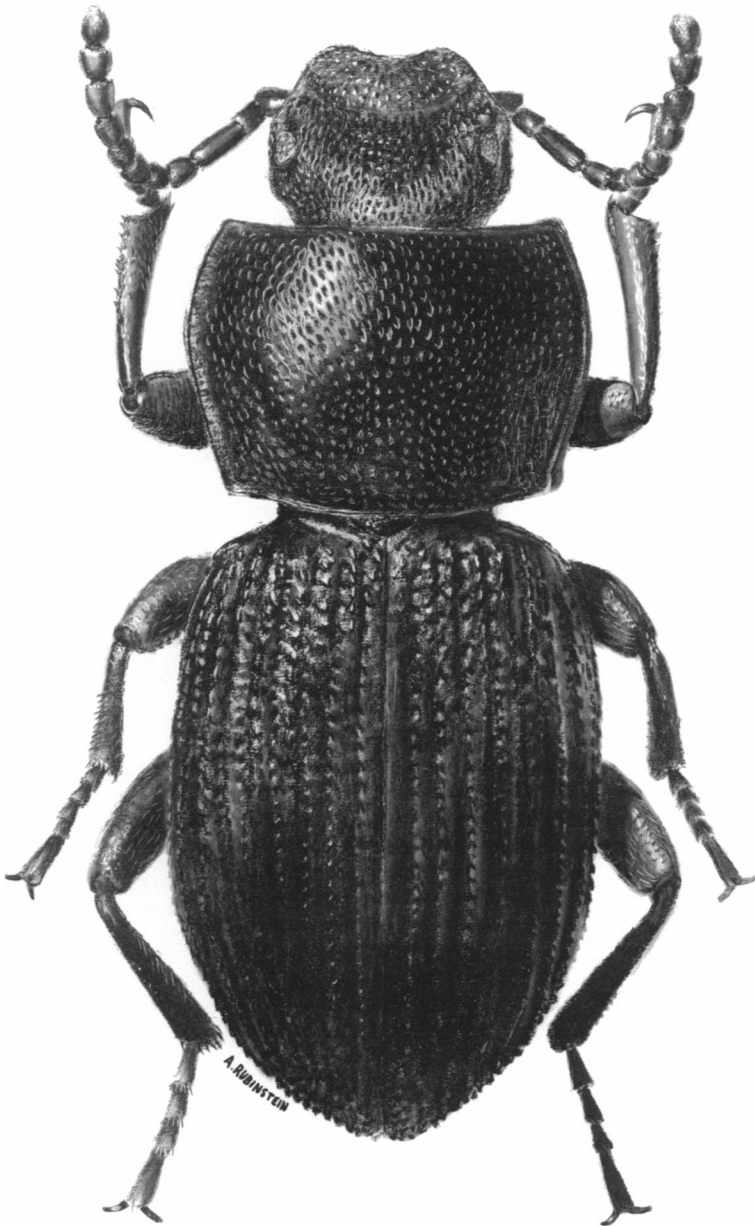


Fig. 1. *Nocibiotes rossi* (Blaisdell), adult, dorsal habitus.

The identity of *N. rossi* (Blaisdell) (Fig. 1) was verified by examination of the type (California Academy of Sciences collection type No. 5073) by the junior author. We have studied an additional 25 specimens from the following localities: Mexico, Baja California Sur, Comondu; 5 mi N El Refugio; 4.2 mi W Miraflores; 5 mi NW El Triunfo, 1900'; 8 mi S Miraflores; Rancho La Burrera, 24 km E Todos Santos; 29 km SSE Constitucion; and Playa Santispac, 21 km S Mulege. Specimens have been collected throughout the year. This species may be distinguished from all other North American Opatrini by the presence of the serially tuberculate elytral intervals (asperate in all other *Nocibiotes*), each tubercle very "shiny" and bearing a short seta posteriorly. It is also distinguished by the distinct elongate, subparallel mentum with strongly produced frontal lobes.

CLASSIFICATION

Casey's 1895 key to the genera of North American Blapstini (=Pedinini, Arnett) is still the best available, even though it is almost 100 years old. Arnett's 1962 key (p. 658), taken from Bradley's 1930 (p. 189) key is essentially a modification of Casey's. This key has perhaps led to some confusion for three reasons. First, Arnett included *Idiobates*, on the basis of eyes being completely divided by the epistomal canthus. This genus is clearly not an opatrine but a member of the Tenebrionini as stated by Tschinkel and Doyen (1980). Second, for perhaps the same character state of the eye, Arnett excluded the genus *Opatrinus* which lacks divided eyes (included by Bradley, but not included in Casey's keys). Third, in an apparent misspelling in his couplet 12(11), Arnett stated that *Nocibiotes* has "elytral intervals separate" as opposed to punctate in *Tonibius*. We believe that Arnett actually meant "elytral intervals asperate" (as mentioned in Casey's key) rather than "separate," which causes some specimens of *Nocibiotes* to key out to *Tonibius*.

Davis (1970:40; 1976:40) apparently was not aware of the changes made in the opatrine lineage by Old World workers. He correctly removed *Idiobates* and entirely dropped the elytral interval character from his key to North American Pedinini. However, his key leads to perhaps more confusion, favoring instead the antennal character (but misspelled): last 3 segments abruptly clubbed (*Nocibiotes*) vs last 3 segments freely (feebly in Arnett) differentiated (*Tonibius*). In both cases, we have found this character to be unreliable as it is apparently sex linked in some species.

The genera *Cenophorus*, *Platylus*, *Diastolinus*, *Ctesicles*, and *Sellio*, all known from the West Indies or Central America, are closely related to the genus *Blapstinus*. Since, at the present time, there is some controversy on the exact status and validity of these genera, some of which are currently being revised, we have decided not to include them in the following key.

This key, partly modified from those of Medvedev (1968:111), Koch (1956: 20), Bradley (1930:189), Arnett (1962:653, 658) and Davis (1976:40), should serve to identify correctly to genus any known Nearctic opatrine (excluding West Indian and Central American genera).

KEY TO THE NORTH AMERICAN OPATRINE TRIBES AND GENERA

1. Gula with stridulating surface, consisting of symmetrically arranged, slender, transverse ridges and fossae; eyes not entirely divided by epistomal canthus Platynotini (*Opatrinus*)

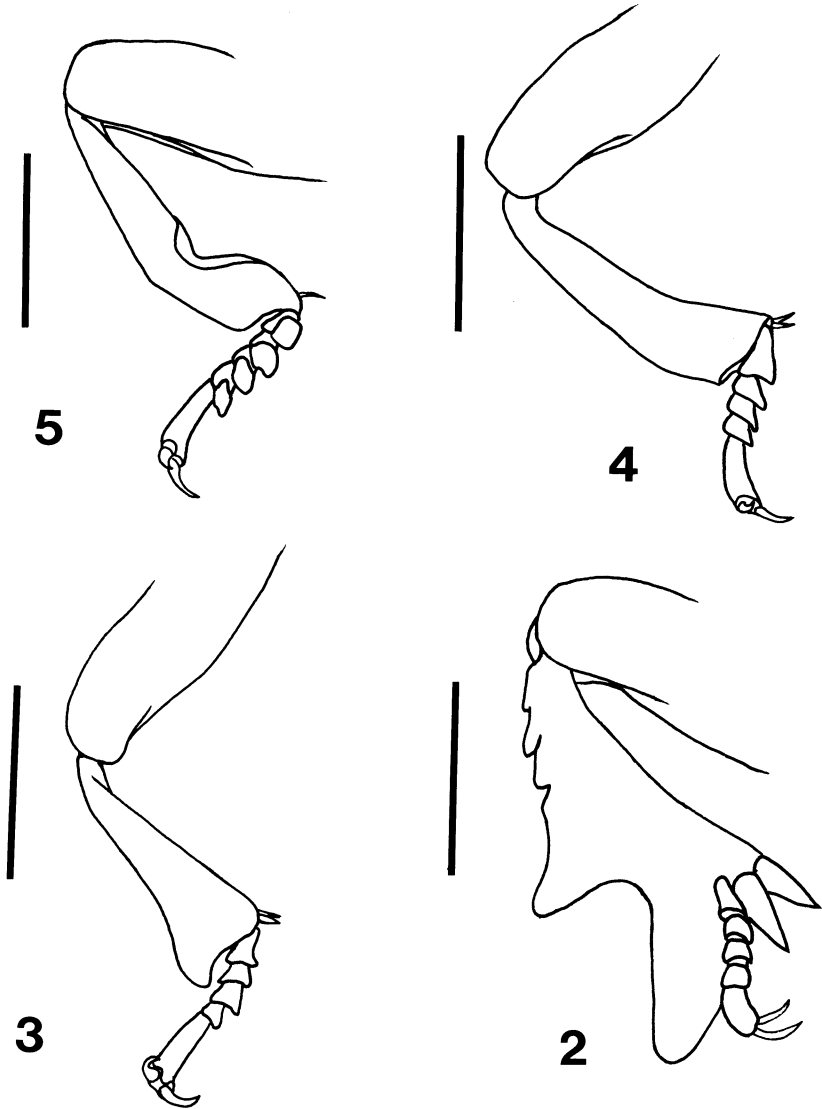


Fig. 2. *Cheirodes californica* (Horn), right protibia, anterior aspect. Fig. 3. *Ulus crassus* (LeConte), right protibia, anterior aspect. Figs. 4-5. *Trichoton sordidum* (LeConte), left protibia, posterior aspect. 4, female. 5, male. Scale lines: Fig. 2 (0.5 mm); Figs. 3-5 (1.0 mm).

-	Gula simple, irregularly sculptured or smooth without stridulating surface; eyes entirely divided or not	2	
2(1).	Eyes with erect scales between corneal facets		
 Leichenini (<i>Leichenum</i>)	3	
-	Eyes without erect scales between corneal facets	3	
3(2).	Protibia with two greatly produced, dorsal extensions, one apical and one near midpoint of tibia (Fig. 2)	Melanimini (<i>Cheirodes</i>)	
-	Protibia unmodified, triangular or at most with one greatly produced, dorsal extension	Opatrini: <i>Opatrina</i>	4
4(3).	Eyes completely divided by epistomal canthus	8	
-	Eyes whole or emarginate, not completely divided by epistomal canthus	5	
5(4).	Apical segment of maxillary palp elongate-oval, finely acuminate	6	
-	Apical segment of maxillary palp triangular or securiform	7	
6(5).	Protibia triangular, with a single long, stout spur	<i>Bycrea</i>	
-	Protibia gradually expanded but strongly produced laterally at apex; two short subequal spurs	<i>Ammodonus</i>	
7(5).	Elytra without striae, but with dense confused granules	<i>Ephalus</i>	
-	Elytra with punctate striae, fine granules on intervals only	<i>Pseudephalus</i>	
8(4).	Scutellum triangular to subtriangular; metathoracic wings often well developed; protarsus of male usually distinctly dilated	9	
-	Scutellum very broad and short; metathoracic wings absent; protarsus of male not dilated	14	
9(8).	Base of pronotum bisinuate	10	
-	Base of pronotum not bisinuate	12	
10(9).	Protibia distinctly bent apically; vestiture of two types (Figs. 4 & 5)	<i>Trichoton</i>	
-	Protibia straight; vestiture simple	11	
11(10).	Protibia produced dorsally at apex; body laterally fimbriate (Fig. 3)	<i>Ulus</i>	
-	Protibiae not produced dorsally at apex; body not laterally fimbriate	<i>Blapstinus</i>	
12(9).	Basal pronotal margin evenly arcuate; body, in dorsal view, narrow, convex; surface and sides densely fimbriate	<i>Aconobius</i>	
-	Basal pronotal margin straight; surface and sides not densely fimbriate	13	
13(12).	Body, in dorsal view, broadly oval, strongly convex; pronotum widened behind; basal pronotal margin equal in width to elytral base; males with dense setal patches laterally to midline of metasternum;	<i>Cybotus</i>	
-	Body, in dorsal view, elongate, subparallel; pronotum narrowed behind; basal pronotal margin less than width of elytral base	<i>Mecysmus</i>	
14(8).	Pronotum densely fimbriate laterally	15	
-	Pronotum not fimbriate laterally	16	
15(14).	Protibia broadly triangular, compressed; body stout, oblong-oval	<i>Notibius</i>	
-	Protibia narrow, non-fossorial; body narrow, parallel-sided	<i>Conibiosoma</i>	

- 16(14). Elytral intervals elevated on disc 17
 - Elytral intervals not elevated on disc *Conibius*
 17(16). Elytral intervals acutely and continuously costate; pronotum narrowed behind (Baja California) *Tonibiastes*
 - Elytral intervals convex, serially tuberculate or asperate; pronotum variable behind 18
 18(17). Elytra, pronotum distinctly narrowed at base; basal width of pronotum narrower than basal width of elytra, widest anterior to middle; elytral intervals moderately convex with serial rows of asperate punctures or tubercles on crest (Fig. 1) *Nocibiotus*
 - Elytra subparallel, not narrowed at base; pronotum with lateral margins subparallel, basal width of pronotum equal to basal width of elytra; elytral intervals strongly convex, minutely punctate along crest *Tonibius*

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