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## THE SPECIES OF *MATUS*, A GENUS OF CARNIVOROUS WATER-BEETLES (COLEOPTERA, DYTISCIDAE) \*

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The species of the genus *Matus* are as yet known only from America north of Mexico and may be separated from all other Dytiscidae of this area by the following combination of characters: Length 7 to 9.5 mm.; color brownish-red to piceous; scutellum visible; eyes emarginate above the bases of the antennae; metatarsal claws of unequal length; *prosternum and its process on a plane, almost flat, and with a longitudinal median sulcus.*

The genus *Matus* was proposed by Aubé (1836:189) † for the *Colymbetes bicarinatus* of Say, which is thus the genotype. Clark (1863:15) named *Batrachomatus*, based on his *B. wingi* from Australia. Sharp (1882:600) described *Matus daemeli* from Australia, and somewhat hesitantly placed *Batrachomatus* in synonymy. In 1919, Zimmermann (pp. 197, 215) recognized both genera and proposed the tribe Matini for them. Although I have seen neither *wingi* nor *daemeli*, I have before me two undescribed Australian species and consider *Batrachomatus* to be valid. The present paper deals with the species of *Matus*, which can be separated from *Batrachomatus* by the epipleura which are narrowed abruptly adjacent to the first apparent abdominal segment instead of being very gradually narrowed from base to apex.

A critical study of material comprising the *Matus bicarinatus* (Say) of collections, shows that it is composite. Say (1823:98) did not give a type locality for his species, and since his description is not very detailed, it has been difficult to decide which of the two species now known is the true *bicarinatus*. I had hoped that there might be an example of *bicarinatus* passed upon by Say in the Harris Collection at the Museum of the Boston Society of Natural History. Dr. Dow has been so kind as to examine Harris' three specimens; none of them bears a red "u", which would indicate an examination and return by Say, and according to Harris' manuscript catalogue, his first specimen was not taken until 1828.

Say described the body as "oblong-oval", and the elytra as "attenuated behind". Of the two species at hand, one is always oblong-oval, with the elytra attenuated behind; the other is more variable, but typically it is oval, rarely if ever attenuated posteriorly. Accordingly the former is here recognized as *bicarinatus*, and the latter is described as new (see figures 6 and 8). The diagrammatic drawing of a paramere of *bicarinatus* given by Zimmermann (1919:195, fig. 4) is of the species so recognized here; but the illustration of the beetle in Sharp (1882, fig. 192) and that of Dimmock (1884:392, fig. 469) are apparently the *M. ovatus* of this paper. The two species must have been confused in Aubé's series; when erecting the genus *Matus* for *bicarinatus*, he says in the generic synopsis, "Corps ovalaire" and "Elytres ovalaires" while in the more detailed specific description he writes "Elongato-ovalis, convexus, postice attenuatus,....",

\*Contribution No. 2043, Division of Entomology, Science Service, Department of Agriculture, Ottawa.

†This is the original description of *Matus*. The reference given by various American authors, to Aubé, 1838:390, is to a redescription.

"Corps ovale, très-allongé, atténué en arrière et très-convexe" and "Elytres ovalaires, très-allongées, atténuées en arrière, et très-convexes;....." The *bicarinatus* of the present article has decidedly convex elytra, *ovatus* has not; yet the figure to which Aubé refers us (plate 23, fig. 3), is surely my *M. ovatus*.

KEY TO THE SPECIES AND SUBSPECIES.

1. Form elongate-oval, attenuated behind (fig. 8); metacoxal plates polished, not microreticulate though sparsely punctate; male genitalia as in figures 3, 4, and 5. General distribution along a line drawn from Massachusetts to Texas ..... *bicarinatus* Say.  
Form more evenly ovate, usually not attenuated behind, or if so, sides subparallel (fig. 6); metacoxal plates microreticulate (warning: harder to see in general specimens), and punctate; male genitalia as in figures 1, 2 and 7. General distribution from Ontario to Florida and west to Illinois ..... 2.
2. Larger (average length 8.5 mm.), general color brownish-red, the elytra slightly darker; anterior pronotal angles acute except in small specimens; metacoxal plates more coarsely and closely punctate .... *ovatus ovatus* n. sp.  
Smaller (average length 8 mm.), general color piceous, the elytra often much darker; anterior pronotal angles rounded; metacoxal plates usually very finely and sparsely punctate. Known from Florida and Georgia ..... *ovatus blatchleyi* n. subsp.

***Matus bicarinatus* (Say)**

C. [*olymbetes*] *bicarinatus* Say, 1823, Trans. Am. Philos. Soc., 2 (N.S.):98.

*Male.* Length 8.7 mm., width 3.9 mm. Body elongate-oval, attenuated posteriorly (fig. 8), slightly gibbous at the middle in profile; dorsal surface very finely alutaceous, shining. General color brownish-red both dorsally and ventrally, the antennae, palpi, legs and epipleura paler. Head paler than pronotum, narrowly piceous along subgenal sutures, the ventral antennal sockets showing dorsally as a round spot in front of each eye; anterior and posterior margins of pronotum vaguely piceous; disk of elytra a little darker than the pronotum; elytral tracheae visible through the clear integument.

*Head* broad, two-thirds as wide as base of pronotum, surface microreticulate and punctate, the labrum less strongly so, meshes small and equal; with a series of contiguous punctures forming an interrupted groove near edge of clypeus on each side of the median anterior emargination, an impressed line of punctures extending from the inner margin of each antennal socket to tentorial pits, bifid at inner ends.

*Pronotum* slightly more than two-fifths as long as broad, widest at base; anterior angles rounded, posterior angles subrectangular. Sides evenly arcuate, the marginal bead well defined, extending from anterior to posterior angles and about as wide as a terminal antennal segment. Microsculpture more strongly impressed laterally than on disc; punctation finer and sparser than that on head.

*Elytral* reticulation with meshes a little coarser but more lightly impressed than that of head or pronotum, while the punctation is finer and sparser, especially on disc. Three longitudinal series of punctures on each elytron: one discal and impressed, one just before the humerus and faint, one subhumeral and very faint.

*Prosternum* with a deep longitudinal median sulcus extending to the tip of the prosternal process, the groove slightly constricted between the coxae; sides of process almost parallel, narrowly margined, converging apically to the acute, but not acuminate, tip. First three segments of pro- and mesotarsi clothed

ventrally with a pad of flat-tipped hairs; first segment very slightly broader (dorsal view) than second; anterior (inner) protarsal claws bent downward a little above the base and twice as wide as their fellows. Metacoxal plates polished, not microreticulate, though sparsely punctate. Abdominal sternites finely, sparsely punctate; very finely reticulate, especially apically.

*Male genitalia.* Aedeagus, figures 3, 4; parameres, figure 5.

*Females.* Similar except that the pro- and mesotarsi are not dilated nor clothed beneath with pads of hairs.

*Neotype.* Since Say's types are considered lost, I here designate as neotype of *Colymbetes bicarinatus* Say the male described above; it is labelled: W. Peabody, Mass., August, 1921. (Percy Gardiner Bolster Collection), Type No. 25,256 in the Museum of Comparative Zoology, Cambridge, Mass.

*Distribution.* I have sixty-seven specimens before me from the following localities: NEW JERSEY: Rivervale; NEW YORK: Huguenot, Peekskill; CONNECTICUT: (no locality specified); MASSACHUSETTS: Billerica, Cambridge, Concord River, West Peabody, Framingham (Beaver Dam Brook), Saugus; N. ATTLEBORO; MICHIGAN: Palmer Park; MISSISSIPPI: Leakesville, Lucedale; LOUISIANA: Sabino River Ferry opposite Orange, Tallulah; TEXAS: Dallas Co.

*Variation.* The slight dorsal gibbosity (profile) is not always apparent. Some beetles, especially those from Mississippi and Louisiana, have the anterior pronotal angles rather sharp, more as in typical *ovatus*, and the majority of these specimens have the elytra unusually strongly attenuate posteriorly. *M. bicarinatus* does not vary much in size; the smallest one seen is 8 mm. long, the largest 8.75 mm. There are some differences in color, a few specimens being uniformly yellowish-brown; these beetles are probably teneral. Aubé remarked on similar color variation in his material.

*Life history.* Unknown, or at least has not been published upon. Teneral adults at hand were collected in June (Mississippi, Louisiana), July (Michigan, Louisiana), and September (Massachusetts).

#### ***Matus ovatus* n. sp.**

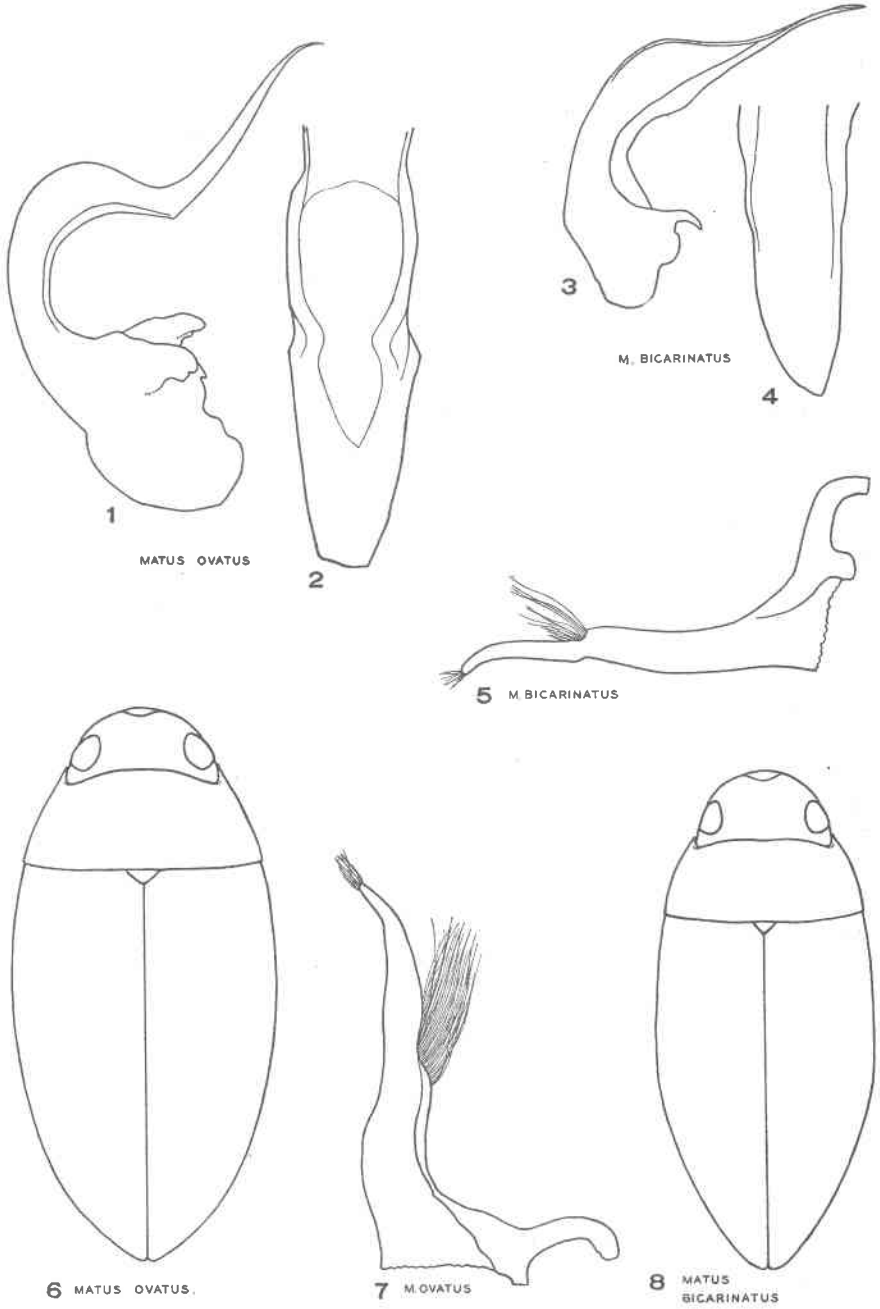
*Male.* Length 9.3 mm., width 4.3 mm. Body evenly oval, not attenuated apically (fig. 6), not gibbous in profile; dorsal surface finely alutaceous, moderately shining. General color brownish-red both dorsally and ventrally, the antennae, palpi, legs and epipleura a little lighter; head paler than pronotum, narrowly piceous along subgenal sutures, the ventral antennal sockets showing dorsally as a round spot in front of each eye; anterior and posterior margins and disk of pronotum tinged with piceous; elytra, especially posteriorly, slightly darker than pronotum.

*Head* broad, almost seven-tenths as wide as base of pronotum, surface microreticulate and punctate, the labrum less strongly so, meshes small and equal; with a series of contiguous punctures forming an interrupted groove near edge of clypeus on each side of the median anterior emargination, and an impressed line of punctures extending from inner margin of each antennal socket to tentorial pits, bifid at inner ends.

*Pronotum* two-thirds as long as broad, widest at base, with a shallow longitudinally impressed area near each basal angle; anterior angles acute, posterior angles subrectangular. Sides evenly arcuate, the mariginal bead well defined, extending from anterior to posterior angles and about as wide as a terminal antennal segment. Microsculpture weakly impressed on disc, but clearly defined in front of anterior transverse line of punctures; punctuation finer and sparser than that of head.

*Elytral* microreticulation more evident than that of head or pronotum, most strongly impressed dorsally and apically, least obvious laterally. Puncta-

PLATE VI.



THE SPECIES OF *MATUS*

tion a little finer and denser than that of the pronotum, with the exception of three longitudinal series of bigger punctures on each elytron: one discal and impressed, one just before the humerus and faint, one subhumeral and very faint.

*Prosternum* with a deep longitudinal median sulcus extending to tip of prosternal process, the groove slightly narrowed between the coxae; sides of process almost parallel, narrowly margined, converging apically to the acute, but not acuminate, tip. First three segments of pro- and mesotarsi clothed ventrally with a pad of flat-tipped hairs; first segment broader but less than twice as broad (dorsal view) as following segments; anterior (inner) protarsal claws more sharply bent at base and twice as broad as their fellows. Claws of metalegs unequal, the outer ones narrower and only half as long as the inner. Metacoxal plates and last abdominal sternite microreticulate and punctate, the punctures of about the same size as those on the head; metasternum and the remaining abdominal sternites less evidently reticulate, more finely and sparsely punctate.

*Male genitalia.* Aedeagus, figures 1, 2; parameres, figures 7.

*Female.* Similar, except that the pro- and mesotarsi are not dilated nor clothed beneath with pads of hairs.

*Holotype.* ♂, Lexington, Mass., May 1, 1926 (Darlington; John George Gehring Collection). No. 25,257 in the Museum of Comparative Zoology, Harvard College, Cambridge, Mass.

*Allotype.* ♀, swamp, Lexington, Mass., May 1, 1926 (Darlington; P. J. Darlington Collection). In the Museum of Comparative Zoology.

*Paratypes.* ONTARIO: 1 ♂ Pr[ince] Edw[ard] Co., August 22, 1923 (Brimley); 2 ♀ Pr. Edw. Co., August 22, 1932 (Brimley). QUEBEC: 1 ♀, Hemmingford, (Petch); 1 ♀, Montreal, April 25, 1935 (Fr. Hugues); 4 ♀, Montreal, September 2, 1934 (J. I. Beaulne). MICHIGAN: 1 ♀, Detroit, July 23, 1910 (A. W. Andrews). NEW YORK: 1 ♂, Huguenot, Staten Is., December 17, 1939 (L. Faas); 1 ♀ Malden Bridge, May 30, 1928 (Chamberlain); Peekskill, 1 ♀, April 21, 1897, 1 ♀, May 29, 1890, 1 ♀, July 21, 1891 (Sherman); 1 ♂, 1 ♀, "N. Y." only. MASSACHUSETTS: Arlington, 1 ♂, October 25, 1924, 1 ♀, October, 1924, 1 ♂, May 23, 1925 (P. J. Darlington); 2 ♂, Fresh Pond, Cambridge, November 2 (P. J. Darlington) 1 ♂, Cambr[idge], (Uhl.); 3 ♂, 2 ♀, Drac[ut]; Framingham, 2 ♀, October 21, 1907 (C. A. Frost), 1 ♀, October 22, 1916 (C. A. Frost; sifting moss); 1 ♂, Low[ell]; 1 ♀, N. Attleboro, October 3, 1920 (Frost); 1 ♀, Saugus, Essex Co., August; 1 ♂, 1 ♀, Southboro, April 20, 1939 (J. G. Thorndike); Stoneham, 1 ♂, March 16, 1913, 1 ♀, July 12, 1916 (F. W. Dodge); 2 ♂, Swampscott, Essex Co. (F. W. Dodge); 1 ♂, Wayland, March 13, 1925, (P. J. Darlington); 3 ♂, 5 ♀, "Mass" only. RHODE ISLAND: 1 ♀, Providence, November 20, 1896 (Crew). PENNSYLVANIA: 1 ♀, Harrisburg, July 11, 1939 (A. B. Champlain). NEW JERSEY: 1 ♂, Palisades, May 20, 1936; 1 ♂, Rivervale, May 25, 1930 (P. J. Darlington); 1 ♀, "N. J." only. MARYLAND: Edgewood, 1 ♂, August 24, 1918, 1 ♀, September 17, 1918 (H. Dietrich). ILLINOIS: 2 ♂, 1 ♀, Beach, Lake Co., April 28, 1932 (B. Benesh); 1 ♀, Algonquin, July, 1910 (Nason).

In addition, specimens (not paratypes) have been seen from the following localities: Indiana (all teneral); Mobile, Alabama.

Paratypes will be distributed as follows: Museum of Comparative Zoology, 22; Canadian National Collection, 5; Cornell University, 4; University of Illinois, 1; British Museum, 2; J. B. Wallis, Winnipeg, Man., 8; F. N. Young, Gainesville, Fla., 2; C. A. Frost, Framingham, Mass., R. Hopping, Vernon, B. C., 3; my own collection, 12.

*Variation.* The paratypes vary in length from 7.5 to 9.4 mm., the majority being between 8.75 and 9 mm. The width is also somewhat variable, and in a few specimens the elytra are vaguely attenuated. In typical examples the

anterior pronotal angles are sharp, though not acuminate; in some of the paratypes the angles are blunter, while in others they are fully as rounded as in typical *bicarinatus*; these differences are not correlated with distribution. The punctuation of the metacoxal plates is variable as to size and density of the punctures.

*Life history.* Unknown. Teneral adults (lighter in color than fully matured specimens) have been taken in April (Massachusetts) and August (Ontario).

### ***Matus ovatus blatchleyi* n. subsp.**

In 1919, Blatchley drew attention to a specimen of *Matus* from Jerry Lake, Dunedin, Fla.; the beetle was only 7.3 mm. long and had the elytra a uniform shining piceous, as compared with Indiana examples of 8.5 to 9 mm. in length and of a uniform brownish-red color. Excepting teneral, all Florida and Georgia specimens which I have seen are much darker than those from further north. They average only 8 mm. in length, tend to be subparallel and slightly attenuated behind, and have the anterior pronotal angles rounded, thus simulating *bicarinatus*. However, their true affinity is shown by the reticulate metacoxal plates and the male genitalia, in both of which they agree with *ovatus*.

*Description:* ♂, length 8 mm.; width 3.8 mm. Similar to *M. ovatus mihi* (q. v.) except as follows: Surface more shining, the reticulations not so deeply impressed; anterior pronotal angles rounded; head and pronotum tinged with piceous, elytra piceous except at sides near base, ventral surface brownish-red, abdominal sternites piceous except the first and second medially; metasternal plates more finely punctate.

*Holotype.* ♂, Brighton, Fla., Okeechobee, June 16, 1929 (Darlington; P. J. Darlington Collection). No. 25,258 in The Museum of Comparative Zoology, Cambridge, Mass.

*Allotype.* ♀, same data as holotype.

*Paratypes.* 6 ♀, same data as holotype; 1 ♀, Pinecrest, Collier Co., Fla., June 19, 1929; 2 ♂, Sanford, Fla.; 1 ♂, 1 ♀, Gainesville, Fla., April 15, 1933 (Sadler); 1 ♂, 1 ♀, Alachua Co., Fla., April 22, 1937 (F. Young) and 1 ♂, October 11, 1937; 2 ♂, 3 ♀, Flagler Co., Fla., April 1, 1937 (H. H. Hobbs); 1 ♂, 1 ♀, Leon Co., Fla., June 5, 1938 (F. Young); 12 ♂, 7 ♀, Clinch Co., Ga.,\* October 27, 1938 (F. N. Young); 1 ♀, Chickasaw, Ala., June 25, 1931 (H. Dietrich) (teneral).

Paratypes will be distributed as follows: Museum of Comparative Zoology, 2; Canadian National Collection, 2; Cornell University, 1; British Museum, 2; F. N. Young, 28; J. B. Wallis, 2; C. A. Frost, 1; my own collection, 3.

*Variation.* The paratypes vary in length from 7 to 8.5 mm. Both the smallest and the largest specimens are from Florida; the examples from Georgia are almost all parallel-sided and small. The single teneral female paratype from Alabama is quite typical of the subspecies *blatchleyi*, but a male and two females from Mobile, Ala., are somewhat intermediate between that and *ovatus* and have not been designated paratypes with either series. Further material from Alabama and the Carolinas may delimit the range of the subspecies. A small variation has been noted in the shape of the anterior pronotal angles and in the punctuation of the metasternal plates.

In addition, I have seen two teneral specimens (not paratypes) from St. Johns Co., Fla., April 23, 1938 (F. Young), and other teneral from Clinch Co., Ga., and Alachua Co., and Miami, Fla.

*Acknowledgments.* I am most grateful to the following persons who have

\*I have been informed by Mr. Young that these specimens were taken 7.6 miles north of Fargo on Georgia Highway 89.

generously loaned specimens from either their own collections or those in their charges: Drs. P. J. Darlington, Jr., J. C. Bradley, H. Dietrich, W. V. Balduf, and Messrs. F. N. Young, W. J. Brown, J. B. Wallis, C. A. Frost, R. Hopping, L. Faas. In addition, Dr. R. Dow and Mr. F. N. Young have given helpful notes.

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## EXPLANATION OF PLATE VI.

- Fig. 1. *Matus ovatus* n. sp. Median lobe of male genitalia, profile.  
 Fig. 2. *M. ovatus*. Upper two-thirds of Fig. 1, viewed from above.  
 Fig. 3. *Matus bicarinatus* (Say). Median lobe of male genitalia, profile.  
 Fig. 4. *M. bicarinatus*. Upper two-thirds of Fig. 3, viewed from above.  
 Fig. 5. *M. bicarinatus*. Lateral lobe (paramere) of male genitalia.  
 Figures 1, 2, 3, 4, 5, and 7 are drawn to the same scale.  
 Fig. 6. *Matus ovatus*. Outline.  
 Fig. 7. *M. ovatus*. Lateral lobe (paramere) of male genitalia.  
 Fig. 8. *M. bicarinatus*. Outline.

Figures 6 and 8 are drawn to the same scale.

## A NEW SPECIES OF *MIRAX* PARASITIC ON *COPTODISCA ARBUTIELLA* BSK. (HYMENOPTERA, BRACONIDAE) \*

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In rearing the lepidopterous leaf miner *Coptodisca arbutiella* Bsk. from the leaves of the Madrona (*Arbutus menziesii* Pursh.) at Vancouver, B. C., Mr. W. G. Mathers and Professor G. Spencer obtained specimens of a Braconid parasite which on examination proved to be an undescribed species of the genus *Mirax*. The species in question is very similar to *Mirax ectodemiae* (Roh.) and examples were submitted to Dr. C. F. W. Muesebeck who has kindly compared them with *ectodemiae* and has supplied additional data concerning that species.

\*Contribution No. 2086, Division of Entomology, Science Service, Department of Agriculture, Ottawa, Canada.