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SYSTEMATICS OF DUBOISIUS, A NEW GENUS OF PEDILID BEETLES (PEDILIDAE)

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A new genus of pedilid beetles belonging to the tribe Eurygeniini is described with twelve new species. The genus is named after Mr. John J. du Bois, whose personal collection of Pedilidae proved highly valuable to the author in his present study.

Duboisius is distinguished from all other described genera of Eurygeniini (i.e., *Bactrocerus* LeConte, *Pseudobactrocerus* Abdullah (1961), *Egestria* Pascoe, *Pergetus* Casey, *Stereopalpus* Laferte, *Mastoremus* Casey, *Leptoremus* Casey, and *Retocomus* Casey) by the following combination of characters: Antennae with terminal segment not much longer than penultimate segment, pronotum usually without a median canal, fourth segment of maxillary palpi obconical and slightly excavated laterally, eyes entire or only feebly emarginate and coarsely faceted, tempora prominent, metasternum with a patch of spines in males of most species, fifth visible abdominal sternum emarginate, strongly laterally produced in male, rounded to feebly emarginate in female, seventh tergum laterally produced in female and usually with a median projection, female genitalia long, slender, sparsely hairy at apex.

SYSTEMATICS

Duboisius, new genus.

Moderate sized. Body irregularly covered with white pubescence. Tempora prominent. Eyes entire or only feebly and broadly emarginate, coarsely faceted, large, separated by less than their width above, bulging laterally. Antennae filiform; first segment large, more than twice longer than wide; second half as long as first; third nearly as long as first; fourth shorter than or equal to third; segments five to ten becoming succeedingly broader; last segment slightly longer than penultimate, equally slightly tapering at both ends with greatest width at middle. Labrum half as long as wide, flat ventrally, slightly elevated in center dorsally, fringed with long hairs apically. Mandibles longer than wide, prosthema large, fringed anteriorly, molar lobe smooth with only a few ridges. Maxillary palpi with first segment smallest, quadrate, second segment less than twice longer than third, third segment half as long as fourth, fourth segment obconical, slightly excavated laterally. Labium with mentum subtrapezoidal, broad at base, bulging at sides; labial palpi three segmented, third segment largest, subtriangular. Neck not constricted at base, half as wide as pronotum.

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Pronotum nearly as long as broad, punctate, pubescent, subcircular, constricted apically to form a narrow flange as wide as neck. Mesepisterna meeting in front of mesosternum. Metasternum with a patch of spines in males or else simply pubescent ventrally. Scutellum rounded at apex, notched at base and laterally, sulcated medially towards base, surface nearly concealed with dense pubescence. Elytra punctate, maculated, pubescence dimorphic. Wing with anal cell open or closed. Legs piceous, clothed with silvery pubescence and bristly hairy, coxae nearly contiguous, tibial spurs thick, short, tarsi with antepenultimate segments lobed below, claws with a basal dentation, empodium small, chitinous, setose. Abdomen with seventh sternite (= fifth visible sternite) emarginate, strongly laterally produced in male; rounded to feebly emarginate in female; seventh tergite broadly truncate in male; emarginate, laterally produced, usually with median projection in female; eighth sternite emarginate, laterally produced, variously formed medially in male; eighth tergite more or less truncate in male. Male genitalia with parameres (lateral lobes) polyspined, punctate, tapering near apex; aedeagus (median lobe) with a pair of cuticular backwardly directed processes at apex, basal processes short (fig. 6). Female genitalia long, slender, flattened, sparsely hairy at apex.

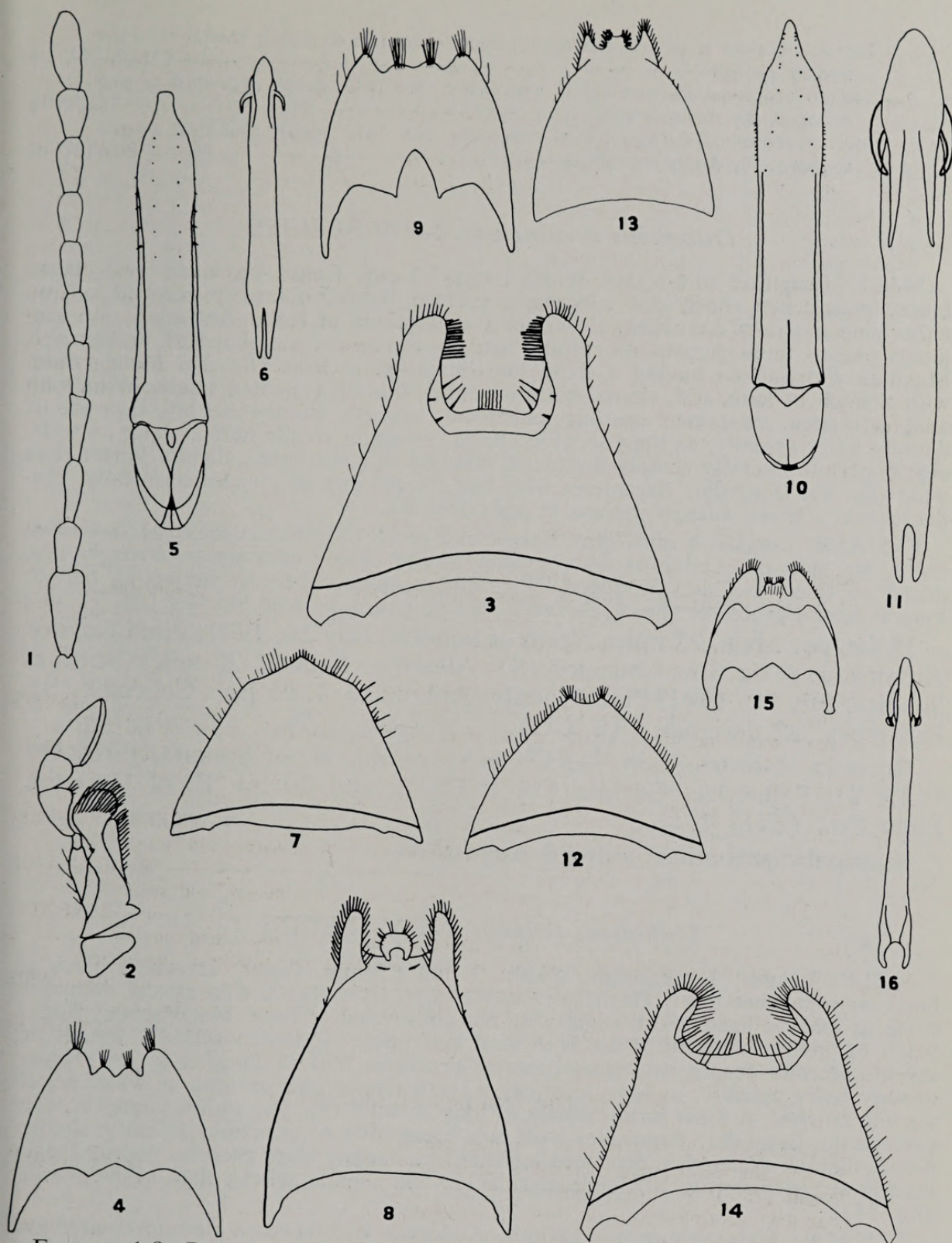
Type species: *D. arizonensis*.

Key to the males of *Duboisius*

1. Metasternum with a patch of spines ventrally----- 2
Metasternum without a patch of spines ventrally, seventh abdominal sternum feebly emarginate (fig. 27)-----HOWDENI
2. Tegmen with two rows of spines and punctures----- 3
Tegmen irregularly punctured and spined----- 4
3. Seventh abdominal sternum with lateral processes long (fig. 3), parameres blunt apically (fig. 5) -----ARIZONENSIS
Seventh abdominal sternum with lateral processes short, parameres tapering apically (fig. 10) -----TEXANUS
4. Parameres abruptly tapering near apex, wing with anal cell open----- 5
Parameres not abruptly tapering near apex (fig. 26), wing with anal cell closed -----WICKENBURGIENSIS
5. Seventh abdominal sternum with lateral processes bent inwards and short (fig. 14) -----PUNCTULATUS
Seventh abdominal sternum with lateral processes not bent inwards and short (fig. 22) -----BENEDICTI
6. Seventh abdominal sternum with lateral processes not bent inwards and long----- 6
Seventh abdominal tergum half as long as wide, aedeagus with the head end sharply arrowshaped -----MEXCALIENSIS
Seventh abdominal tergum more than half as long as wide, aedeagus with the head end not sharply arrowshaped (fig. 16)-----BOWDITCHI

Key to the females of *Duboisius*

1. Seventh abdominal tergum with a median process----- 2
Seventh abdominal tergum without a median process (fig. 32)-----TERMINALIS
2. Median process of seventh abdominal tergum longer than lateral processes (fig. 21), seventh abdominal sternum feebly emarginate and medially depressed and ridged (fig. 20) -----ABNORMIS
Median process of seventh abdominal tergum as long as or shorter than lateral processes, seventh abdominal sternum not grooved or ridged medially----- 3
3. Median process of seventh abdominal tergum small, pointed, not emarginate, simple (fig. 31) -----DISTINGUENDUS
Median process of seventh abdominal tergum small to large, blunt, usually emarginate, variously modified ----- 4
4. Seventh abdominal sternum entire----- 5
Seventh abdominal sternum emarginate----- 6
5. Lateral processes of seventh abdominal tergum twice as long as the median process (fig. 8) -----ARIZONENSIS



FIGURES 1-8, *D. arizonensis*: FIG. 1, Antenna of male; FIG. 2, Maxilla of male; FIG. 3, Seventh sternite of male, ventral view; FIG. 4, Eighth sternite of male, ventral view; FIG. 5, Tegmen of male, ventral view; FIG. 6, Aedeagus of male, ventral view; FIG. 7, Seventh sternite of female, ventral view; FIG. 8, Seventh tergite of female, ventral view.

FIGURES 9-13, *D. texanus*: FIG. 9, Eighth sternite of male, ventral view; FIG. 10, Tegmen of male, ventral view; FIG. 11, Aedeagus of male, ventral view; FIG. 12, Seventh sternite of female, ventral view; FIG. 13, Seventh tergite of female, ventral view.

FIGURE 14, *D. punctulatus*: FIG. 14, Seventh sternite of male, ventral view.

- Lateral processes of seventh abdominal tergum as long as or slightly shorter than the median process -----EMARGINATUS
6. Seventh abdominal sternum deeply emarginate (fig. 12), seventh abdominal tergum comparatively shallowly emarginate (fig. 13)-----TEXANUS
- Seventh abdominal sternum feebly emarginate (fig. 18), seventh abdominal tergum comparatively deeply emarginate (fig. 19)-----BOWDITCHI

Duboisius arizonensis, NEW SPECIES

MALE: Length: 5 mm-6 mm. Width 1 mm-1.5 mm. Color: brownish black. Head black, pubescence short, not concealing surface below, obliquely combed off on either side medially on vertex. Eyes feebly emarginate in front. Antennae with segments one to three piceous or rufous, four to eleven rufous, shape as in figure 1. Maxillae with lacinia having a tooth like dilatation at base (fig. 2). Metasternum with a patch of long, stiff, sharp spines on either side of a median sulcus. Wing with anal cell open. Abdomen sparsely pubescent; seventh sternite deeply emarginate, densely hairy apically, as long as wide (fig. 3); seventh tergite half as long as wide; eighth sternite laterally acutely produced, notched at inner bases, slightly longer than wide (fig. 4). Genitalia: Parameres with two linear rows of punctures apically, produced into a short, narrow process at apex (fig. 5).

FEMALE: Length: 6 mm-7mm. Larger and more robust than male. Metasternum hairy, not spinous. Abdomen with seventh tergite deeply emarginate, strongly produced on sides, medially produced in a bulbous spinous process projecting half as long as lateral processes (fig. 8); seventh sternite entire, pointed apically (fig. 7).

Holotype: Male, 28 miles North of Sonoita, July 20, 1941, Pima County, Arizona, J. J. du Bois Collector (S). **Allotype:** Female, 28 miles North of Sonoita, July 20, 1941, Pima County, Arizona, J. J. du Bois Collector (S). **Paratypes:** 22 designated (S, CU).

Records of distribution: ARIZONA: 28 mi. N. of Sonoita, Pima Co. (CU, S); Palmerlee, Cochise Co. (CU) 2; and 30 mi. E. of Quijotoa, Pima Co., (CU) 1.

Seasonal distribution: July 20-August 29.

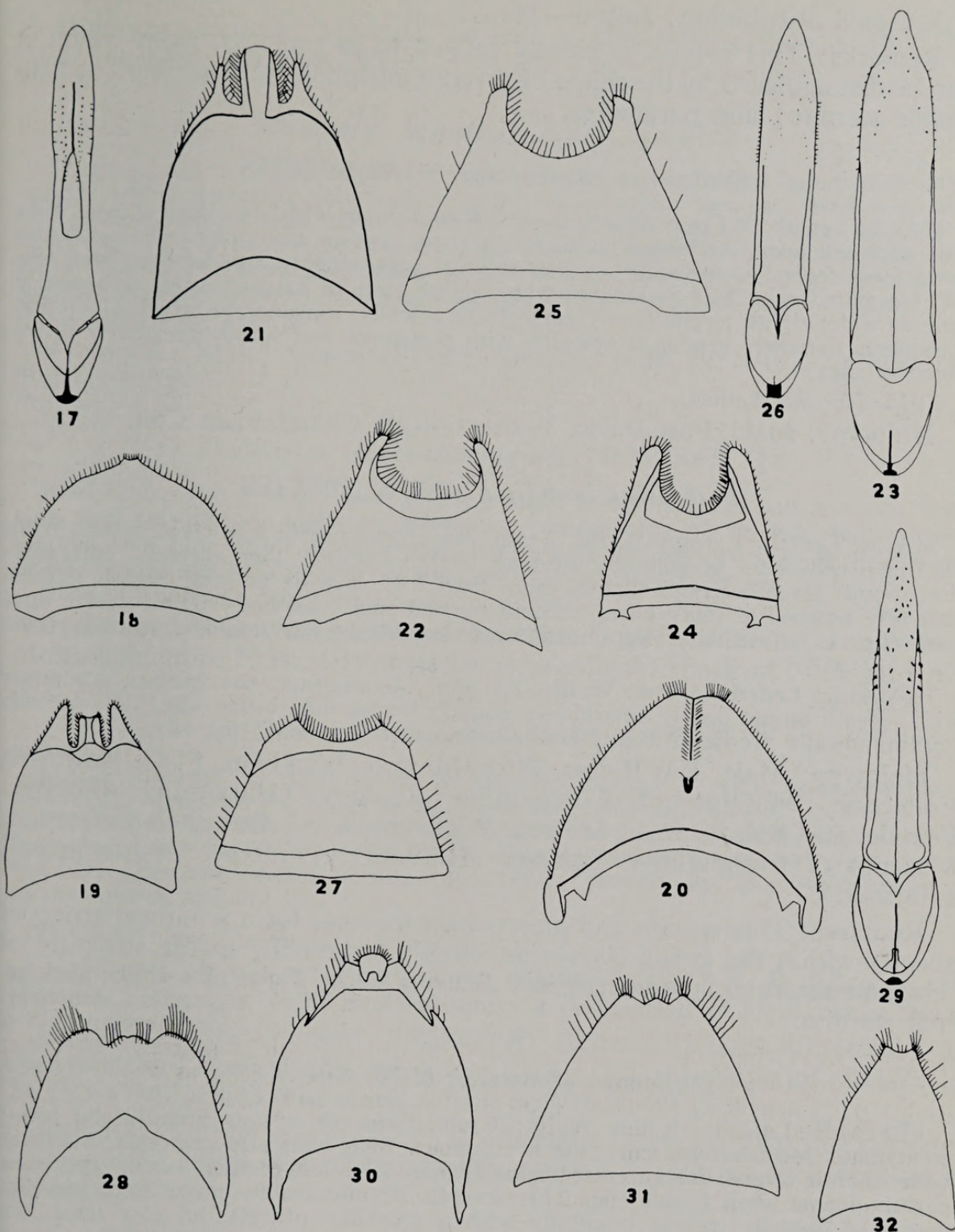
Duboisius texanus, NEW SPECIES

MALE: Length: 7 mm-9mm. Width: 2 mm-2.5 mm. Color: brownish black to black or somewhat paler. Head as in *arizonensis*. Eyes feebly emarginate. Antennae twice as long as head. Neck slightly or not constricted at base. Metasternum with a patch of spines ventrally. Wing with anal cell open. Abdomen sparsely pubescent; seventh sternite deeply emarginate, lateral processes half as long as in *arizonensis*, densely hairy apically, as long as wide; seventh tergite half as long as wide; eighth sternite notched at inner bases, nearly as long as wide (fig. 9); eighth tergite broadly emarginate. Genitalia: Parameres with two linear rows of punctures apically, slightly denser than in *arizonensis*, produced apically in a narrow blunt process, slightly longer than in *arizonensis* (fig. 10); aedeagus thicker and slightly shorter than in *arizonensis* (fig. 11).

FEMALE: Metasternum not spinous. Abdomen with seventh sternite emarginate, half as long as wide (fig. 12); seventh tergite medially produced in a spinous, notched process projecting as long as lateral processes, as long as wide (fig. 13).

Holotype: Male, 1 mi. North of Fort Davis, Jeff Davis County, Texas, July 16, 1941, J. J. du Bois Collector (S). **Allotype:** Female, 1 mi. North of Fort Davis, Jeff Davis County, Texas, July 16, 1941, J. J. du Bois Collector (S). **Paratypes:** 20 designated (S, CU, Harvard).

Records of distribution: Texas: 1 mi. N. of Ft. Davis (S) 8; Davis Mts. (CU) 1 (Harvard) 3. NEW MEXICO: Lordsburg (Harvard) 2 (CU) 2.



FIGURES 15-19, *D. bowditchi*: FIG. 15, Eighth sternite of male, ventral view; FIG. 16, Aedeagus of male, ventral view; FIG. 17, Tegmen of male, ventral view; FIG. 18, Seventh sternite of female, ventral view; FIG. 19, Seventh tergite of female, ventral view.

FIGURES 20-21, *D. abnormis*: FIG. 20, Seventh sternite of female, ventral view; FIG. 21, Seventh tergite of female, ventral view.

FIGURES 22-23, *D. benedicti*: FIG. 22, Seventh sternite of male, ventral view; FIG. 23, Tegmen of male, ventral view.

FIGURE 24, *D. mexcaliensis*: FIG. 24, Seventh sternite of male, ventral view.

(Caption continued, next page.)

Seasonal distribution: July 6—16.

Remarks: This species is closely related to *arizonensis*, from which it can be distinguished by the shape of seventh morphological sternite (= fifth visible sternite) and parameres.

Duboisius punctulatus, NEW SPECIES

MALE: Length: 7.5 mm. Width: 2 mm. Metasternum with a patch of spines. Wing with anal cell open. Abdomen pubescent; seventh sternite with apices of lateral processes bent centrally, enclosing a rather suboval area, slightly broader than long (fig. 14); seventh tergite half as long as wide; eighth sternite notched at inner bases, as long as wide; eighth tergite feebly emarginate apically, longer than broad. Genitalia: Parameres narrowly produced apically, with punctures and spines irregularly distributed at apex,

FEMALE: not known.

Holotype: Male, Fort Davis, Texas, 6-8-28. Chamberlain Coll. (CU)

Duboisius bowditchi, NEW SPECIES

MALE: Length: 7.5 mm. Width: 2 mm. Metasternum with a patch of spines. Wing with anal cell open. Seventh sternite with lateral processes long, straight, emargination round; seventh tergite slightly more than half as wide as long; eighth sternite narrowly notched at inner bases, median portion small, bilobed, slightly wider than long (fig. 15). Genitalia: Parameres long, irregularly punctate and spinous (figs. 16, 17).

FEMALE: Length: 8 mm. Width: 2.5 mm. Metasternum not spinous. Abdomen with seventh tergite deeply emarginate, slightly longer than broad (fig. 19); seventh sternite apically produced, feebly emarginate, wider than long (fig. 18).

Holotype: Male, Rio Balsas, Gro., Mexico, Wickham, F. C. Bowditch Collection, Museum of Comparative Zoology (Harvard). Allotype: Female, Rio Balsas, Gro., Mexico, Wickham, F. C. Bowditch Collection, Museum of Comparative Zoology (Harvard). Paratypes: 6 designated (Harvard).

Remarks: This species and *punctulatus* together form a natural group of species within the genus *Duboisius*, closely resembling in the structure of wing, metasternum, parameres, and differing in the shape of seventh abdominal sternite.

Duboisius abnormis, NEW SPECIES

FEMALE: Length: 10 mm. Width: 3 mm. Eyes not or only broadly and feebly emarginate. Metasternum hairy, but not spinous. Wing with anal cell open. Abdomen with seventh tergite deeply emarginate, median lobe longer than lateral processes, slightly longer than broad (fig. 21); seventh sternite feebly emarginate, medially depressed dorsally, ridged internally with a toothlike process, broader than long (fig. 20).

(Caption continued from previous page.)

FIGURES 25-26, *D. wickenburgiensis*: FIG. 25, Seventh sternite of male, ventral view; FIG. 26, Tegmen of male, ventral view.

FIGURES 27-29, *D. howdeni*: FIG. 27, Seventh sternite of male, ventral view; FIG. 28, Eighth sternite of male, ventral view; FIG. 29, Tegmen of male, ventral view.

FIGURE 30, *D. emarginatus*: FIG. 30, Seventh tergite of female, ventral view.

FIGURE 31, *D. distinguendus*: FIG. 31, Seventh tergite of female, ventral view.

FIGURE 32, *D. terminalis*: FIG. 32, Seventh tergite of female, ventral view.

MALE: not known.

Holotype: Female, Mexcala, Gro., (= Guerrero), Mexico, June 29, 1951, at light, H. Evans (CU).

Duboisius benedicti, NEW SPECIES

MALE: Length: 7 mm. Width: 1.5 mm. Color: rufous, much lighter than other species, elytra becoming yellowish at apex. Metasternum spinous. Wing with anal cell open. Abdomen with seventh sternite densely hairy apically, nearly as long as wide (fig. 24); seventh tergite half as long as wide; eighth sternite notched at inner bases. Genitalia: Parameres irregularly punctate and spinous with occasional linear arrangement, not abruptly tapering; aedeagus with the head end arrow shaped.

FEMALE: not known.

Holotype: Male, Mexcala, Gro., Mexico, June 29, 1951, at light, H. Evans (CU).

Duboisius wickenburgiensis, NEW SPECIES

MALE: Length: 4 mm-5 mm. Width 1 mm-1.5 mm. Metasternum spinous. Wing with anal cell closed. Abdomen pubescent; emargination of seventh sternite semi-circular (fig. 25); eighth sternite with inner process less notched than in *arizonensis*. Genitalia: Parameres irregularly spinous and punctured apically (fig. 26).

FEMALE: not known.

Holotype: Male, Wickenburg, Maricopa County, Arizona, August 18, 1950, light trap; H. K. Gloyd leg. presented by O. Park (CNHM).

Duboisius howdeni, NEW SPECIES

MALE: Labrum one third as long as wide, not elevated in center dorsally in some specimens. Metasternum not spinous. Wing with anal cell closed. Abdomen with seventh sternite moderately emarginate with lateral processes short, slightly wider than long, hairy (fig. 27); seventh tergite slightly wider than long with short central and lateral processes; eighth sternite with a central process (fig. 28). Genitalia: Parameres tapering apically (fig. 29).

FEMALE: not known.

Holotype: Male, Cortaro, Arizona, August 7, 1940, R. P. Allen, H. F. Howden Collection (CNC). Paratypes: 4 designated (CU, S, and U.K.).

Records on distribution: ARIZONA: Arivaca, VII-24-40 (U.K.) 1, eyes one third black in this specimen; Globe (CU) 1; Superior, VII-25 to 27 (S) 1. MEXICO: Hermosillo, Sonora, VII-25-59 (S) 1.

Remarks: In one specimen eye is one third black and two thirds white. It is unusual among the males of other species in that the metasternum is not spinous.

Duboisius emarginatus, NEW SPECIES

FEMALE: Length: 7 mm. Width: 2 mm. Metasternum not spinous. Wing with anal cell closed. Abdomen with seventh tergite longer than broad, sides produced into short lateral processes, median spinous process slightly longer than lateral processes (fig. 30); seventh sternite entire, broader than long.

MALE: not known.

Holotype: Female, Tehwantapac, 16 mi. W. Oax., Mexico, July 8, 1953, 700 ft., V. R. Mexico Expedition (U.K.).

Duboisius distinguendus, NEW SPECIES

FEMALE: Length: 8.5 mm. Width: 2.5 mm. Metasternum not spinous. Wing with anal cell closed. Abdomen with seventh tergite wider than long, with a small pointed median process (fig. 31); seventh sternite feebly emarginate, broader than long.

MALE: not known.

Holotype: Female, Wickenburg, Maricopa County, Arizona, August 20, 1950, light trap, H. K. Gloyd leg. presented by O. Park (CNHM).

Duboisius terminalis, NEW SPECIES

FEMALE: Length: 8 mm. Width: 2.5 mm. Pronotum feebly sulcated medially. Metasternum not spinous. Wing with anal cell closed. Abdomen densely pubescent, seventh tergite without a median process, longer than broad (fig. 32); seventh sternite feebly emarginate, broader than long.

MALE: not known.

Holotype: Female, 10 miles East of Globe, Arizona, June 21, 1956, H. A. Howden (CNC).

GENERAL REMARKS ON PHYLOGENY

Any attempt to interpret phylogeny is premature in this genus unless both sexes of all the species are known. However, certain trends are apparent. In the family Pedilidae wings usually have an open anal cell, which is considered as a specialization over the closed cell condition usual in the family Oedemeridae. Anal cell is open in the following species of *Duboisius*: *arizonensis*, *texanus*, *mexcaliensis*, *benedicti*, *punctulatus*, *bowditchi*, and *abnormis*; while *howdeni*, *terminalis*, *distinguendus*, *wickenburgiensis*, and *emarginatus* have wings with anal cell closed.

Among the open anal cell group, punctures and spines on the parameres exhibit greater morphological resemblances between the following species groups: (a) *arizonensis* and *texanus*, (b) *benedicti* and *mexcaliensis*, (c) *bowditchi* and *punctulatus*.

In the closed anal cell group, *howdeni* is apparently the only species where metasternum is not spinous in male. Seventh tergite of female lacks a median process in *terminalis*; as against *distinguendus* and *emarginatus*, although it is small, pointed and simple in the former and large, un-pointed and as long as the lateral processes in the latter.

ACKNOWLEDGMENTS

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The letters in parantheses are the same as those used in citing specimens used in the descriptions and indicate their disposition.

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