

Key to the Geotrupini of Mexico and Central America, with the description of a new species (Scarabaeidae, Geotrupinae)

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Geotrupes reddelli n. sp. from Puebla, Mexico, is described and figured. The key of the Mexican and Central American Geotrupini includes 3 species in the genus *Ceratotrupes* and 18 species and subspecies in the genus *Geotrupes*.

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On trouvera ici la description de *Geotrupes reddelli* n. sp. de Puebla, au Mexique. La clé des Geotrupini du Mexique et de l'Amérique Centrale compte 3 espèces du genre *Ceratotrupes* et 18 espèces et sous-espèces du genre *Geotrupes*.

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Introduction

Since my 1964 paper on the Geotrupinae of Mexico and Central America a number of new taxa have been described in the tribe Geotrupini (Howden 1967, 1974). The discovery of yet another species, described herein, makes a revision of my 1964 key desirable. The revised key, as presented, is almost entirely artificial. Subgeneric names have been included but their use remains debatable. In the key an attempt has been made to utilize

characters that are not sex associated but in some cases male characters have been included. For positive identification, particularly of worn or unusual specimens, the male genitalia need to be examined and compared with the illustrations provided in the papers cited above. In the key, if the species occurs south of Mexico, the country is cited. If the species occurs in Mexico, the state is given; therefore, Mexico represents the state, not the country, and D.F. denotes Distrito Federal.

KEY TO THE GEOTRUPINI OF MEXICO AND CENTRAL AMERICA

1. Pronotum with anterior horn in male, and with slight rounded, anterior postmarginal protrusion in female (*Ceratotrupes*)2
 Pronotum in both sexes evenly convex or excavated behind anterior pronotal marginal bead, never with horn or protrusion on disc (*Geotrupes*)4
2. External face of terminal antennal segment lacking distinct U-shaped furrow; mesosternum between and in front of middle coxae not elevated into sharp, pointed carina3
 External face of terminal antennal segment with distinct U-shaped furrow; mesosternum ridged between middle coxae and raised into sharp, pointed carina at anterior edge of coxae; Chihuahua, D.F., Durango, Michoacan, Morelos, Queretaro, Sinaloa, Sonora, Veracruz*Ceratotrupes bolivari* Halffter and Martinez
3. Posterior pronotal margin usually complete; elytral striae shallowly punctate at least laterally; well-developed males with anterior edge of clypeal horn starting at anterior margin of clypeus; D.F., Mexico, Michoacan, Morelos, Queretaro*Ceratotrupes fronticornis* (Erichson)
 Posterior pronotal margin incomplete; elytral striae impunctate; well-developed males with anterior edge of clypeal horn starting well behind anterior margin of clypeus; Guerrero, Oaxaca*Ceratotrupes sturmi* (Jekel)
4. Pronotum at most only shallowly indented behind anterior margin; second segment of antennal club with ventral edge of approximately uniform thickness, not hidden by first and third segments when club is closed6
 Pronotum with distinct concavity behind anterior margin, margin thickened and elevated in front of concavity; second segment of antennal club with ventral edge narrowed, largely hidden by first and third segments when club is closed5
5. Disc of pronotum either side of midline behind concavity impunctate or with only two or three moderate-sized punctures; dorsal lobes of parameres of male genitalia broadly rounded at apices; Durango, Sinaloa
Geotrupes (Geotrupes) caviollis Bates
 Disc of pronotum either side of midline behind concavity with scattered punctures; dorsal lobes of parameres of male genitalia becoming slender near apices and bent downward; Jalisco, Michoacan
Geotrupes (Geotrupes) fisheri Howden

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6. Elytral striae distinct7
 Elytral striae obsolete, indicated only by rows of fine punctures; Chihuahua, Durango
 *Geotrupes (Cnemotrupes) cnephosa* Howden
7. Antennal club dark, grayish or brownish black; ventral portions of prothorax and legs usually with distinct
 violaceous iridescence8
 Antennal club yellowish or reddish brown to brown; ventral portions of prothorax and legs brownish black or
 iridescent, iridescence often subdued10
8. Each mandible with outer margin lobed adjacent to acute apical tooth; median apical emargination of labium
 U shaped; males with mandibles and fore tibiae not distinctly longer than in females (Mexico)9
 Right mandible with outer margin feebly lobed at most, left mandible with margin merely sinuate; median apical
 emargination of labium V shaped; males with mandibles and fore tibiae distinctly elongated, often one-quarter to
 one-third longer than in females of equal size; El Salvador and Guatemala
 *Geotrupes (Onthotrupes) onitidipes* Bates
9. Apex of each elytron acute, curvature of outer margin not becoming more strongly arcuate near suture; clypeal
 margins laterally nearly straight, strongly convergent to abruptly rounded apex; Southern Oaxaca
 *Geotrupes (Cnemotrupes?) lobatus* Howden
 Apex of each elytron rounded, obtuse, curvature of outer margin more abrupt near suture; clypeal margin arcuate,
 sometimes more strongly so anteriorly; Durango, Hidalgo, Mexico, Michoacan, Morelos, Puebla, Veracruz ...
 *Geotrupes (Cnemotrupes) herbeus* Jekel
10. Dorsally and (or) ventrally with at least a trace of iridescence, this most often evident in elytral striae, on femora
 and on abdominal sternites13
 Dorsally and ventrally lacking any trace of iridescence11
11. Pronotal disc in median two-thirds with at least a few scattered coarse or medium-sized punctures; elytra with
 striae strongly crenulate and (or) intervals opaque; posterior clypeal tubercle in males conical12
 Pronotal disc in median two-thirds lacking scattered punctures, smooth; elytra with striae only very feebly
 crenulate, intervals shining; posterior clypeal tubercle in males with transversely compressed horn, apex trun-
 cate; Guerrero *Geotrupes (Cnemotrupes) truncaticornis* Howden
12. Pronotum, scutellum and frequently elytral intervals finely shagreened, opaque; male with ventral margin of fore
 femur abruptly excavated near coxa; Guanajuato, Hidalgo, Jalisco, Oaxaca
 *Geotrupes (Cnemotrupes) sallei* Jekel
 Pronotum, scutellum and elytral intervals shining, not shagreened; male with ventral margin of fore femur not
 distinctly excavated; Hidalgo, Oaxaca, Puebla, Veracruz
 *Geotrupes (Cnemotrupes) nebularum* Howden (in part)
13. Posterior femur with line of setigerous punctures normally extending at least half the length of femur along apical
 posterior third; pronotal punctures usually extending from lateral margins onto disc farther than length of antennal
 club14
 Posterior femur with only three or four setigerous punctures near tibia on posterior third of ventral surface;
 pronotal punctures extending from lateral margins onto disc no farther than length of antennal club; Hidalgo ...
 *Geotrupes (Cnemotrupes) sobrina* Jekel
14. Metasternal setae and most other ventral setae very dark brownish black to black; male with apical tooth of fore
 tibia proximally expanded (a character of the subgenus *Cnemotrupes*), often appearing feebly bifurcate15
 Metasternal setae and some other ventral setae tan to brown; male with apical tooth of fore tibia acute, not
 expanded (a character of the subgenus *Phelotrupes*)19
15. Dorsum with greenish caste, if bluish then femora distinctly iridescent; pronotal punctures below and posterior to
 lateral fovea mostly in clusters of two or three, the punctures in each cluster contiguous16
 Dorsum with subdued bluish or bluish-green caste, femora at most feebly tinged with blue, usually appearing dark
 brown to black; pronotal punctures below and posterior to lateral fovea with most punctures discrete, a few
 clusters present; some species in this group with scattered large punctures on pronotal disc17
16. From dorsal aspect approximately one-half of median length of clypeus visible; frons on each side with longitudi-
 nal ridge elevated at middle to form small conical tubercle near inner margin of eye (most evident in fresh
 specimens); elytral striae on disc frequently distinctly crenulate; male with dorsal median paramere grooved and
 varying in width to apex; Oaxaca *Geotrupes (Cnemotrupes) viridiobscura* Jekel
 From dorsal aspect approximately one-third of median length of clypeus visible; frons on each side with low
 rounded tumid area near eye, a distinct conical elevation lacking; elytral striae on disc frequently only feebly,
 irregularly crenulate; D.F., Mexico, Michoacan, Morelos, Puebla . *Geotrupes (Cnemotrupes) rufoclavata* Jekel
17. Pronotum with feeble, closely punctate groove (bead) contiguous to posterior edge, the groove frequently
 obsolete anterior to scutellum; elytral striae on disc usually feebly to distinctly crenulate18
 Pronotum with posterior marginal groove obsolete between seventh stria on each elytron, the groove sometimes
 represented by small, distinctly separated punctures; elytral striae on disc, at most, feebly crenulate; Guerrero
 *Geotrupes (Cnemotrupes) guerreroensis* Howden

18. Length usually less than 18 mm; pronotal disc with scattered coarse punctures similar in size to coarsely punctate midline; bluish or greenish-blue cast extremely faint or lacking dorsally; southern Oaxaca *Geotrupes (Cnemotrupes) pecki* Howden
 Length usually over 18 mm; pronotal disc impunctate (including midline) or with widely scattered punctures, these punctures usually smaller than scattered coarse punctures along midline; dorsum usually with distinct bluish cast; Hidalgo, northern Oaxaca, Puebla, Veracruz *Geotrupes (Cnemotrupes) nebularum* Howden (in part)
19. Apex of hind tibia (Fig. 6) bilobed on outer margin, one lobe at edge of apical transverse carina, the other near base of smaller, nearly straight, apical spur; pronotum opaque with very slight bluish tinge; elytral intervals shining, bluish purple with striae greenish blue; Puebla *Geotrupes (Phelotrupes) reddelli* n.sp.
 Apex of hind tibia trilobed on lower margin, one lobe at edge of apical transverse carina, one median lobe and third lobe near base of apical spur; pronotal surface shining, not noticeably differing from surface of bluish to purple elytral intervals, iridescence slightly subdued on pronotum; Chiapas, El Salvador, Guatemala
 subspecies of *Geotrupes (Phelotrupes) guatemalensis* Bates 20
20. Shallow pronotal concavity posterior to anterior marginal carina approximately as wide as distance between eyes; teeth on undersurface of male fore tibia small, usually a well-developed single tooth 21
 Shallow pronotal concavity posterior to anterior marginal carina extending laterally about two-thirds the distance between eyes; three well-developed teeth on undersurface of male fore tibia; El Salvador
 *Geotrupes guatemalensis tridentatus* Howden
21. Pronotal concavity longitudinally widest at midline; lateral third of pronotal disc with distinct secondary (minute) punctures; Guatemala *Geotrupes guatemalensis guatemalensis* Bates
 Pronotal concavity longitudinally widest and most evident on either side of midline; the concavity slightly shallower and somewhat constricted at midline; pronotal disc with secondary punctures feebly represented or lacking; Chiapas *Geotrupes guatemalensis unidentatus* Howden

***Geotrupes (Phelotrupes) reddelli* n.sp.**
 (Figs. 1–6)

HOLOTYPE: Male, length 21 mm, greatest width 11.5 mm. Head and pronotum dull black, a faint greenish hue present near lateral pronotal punctures; elytra shining black with strial punctures distinctly bluish green. Antennal club light brown or reddish brown, unmodified (middle segment not reduced in thickness on one side). Clypeus U shaped, not noticeably reflexed; disc finely, closely punctate; surface between somewhat irregular and finely granulate; posteriorly with distinct, parallel-sided, nearly truncate tubercle (Fig. 1) approximately 0.8 mm high. Eye canthus laterally arcuate. Pronotum at midline with anterior face of marginal bead thickened, approximately 1.2 mm, with very shallow concavity or flattened area behind, midline of pronotum faintly indented; pronotal disc opaque, impunctate except near (2 to 3 mm) lateral margins where closely, irregularly punctate; punctures small to moderate, mostly shallow; pronotum posteriorly lacking marginal line or bead. Scutellum broadly arcuate, surface slightly opaque, impunctate, midline feebly impressed. Each elytron distinctly striate, first stria extending only to scutellum, striae finely but distinctly punctate, crenate; intervals convex, smooth and shining; row of epipleural setae occasionally irregular. Fore tibia with six teeth along outer margin, apical tooth (Fig. 5) not enlarged or modified; ventral flattened surface with two distinct rounded teeth near middle and a poorly developed third tooth near basal third, one or two other teeth feebly

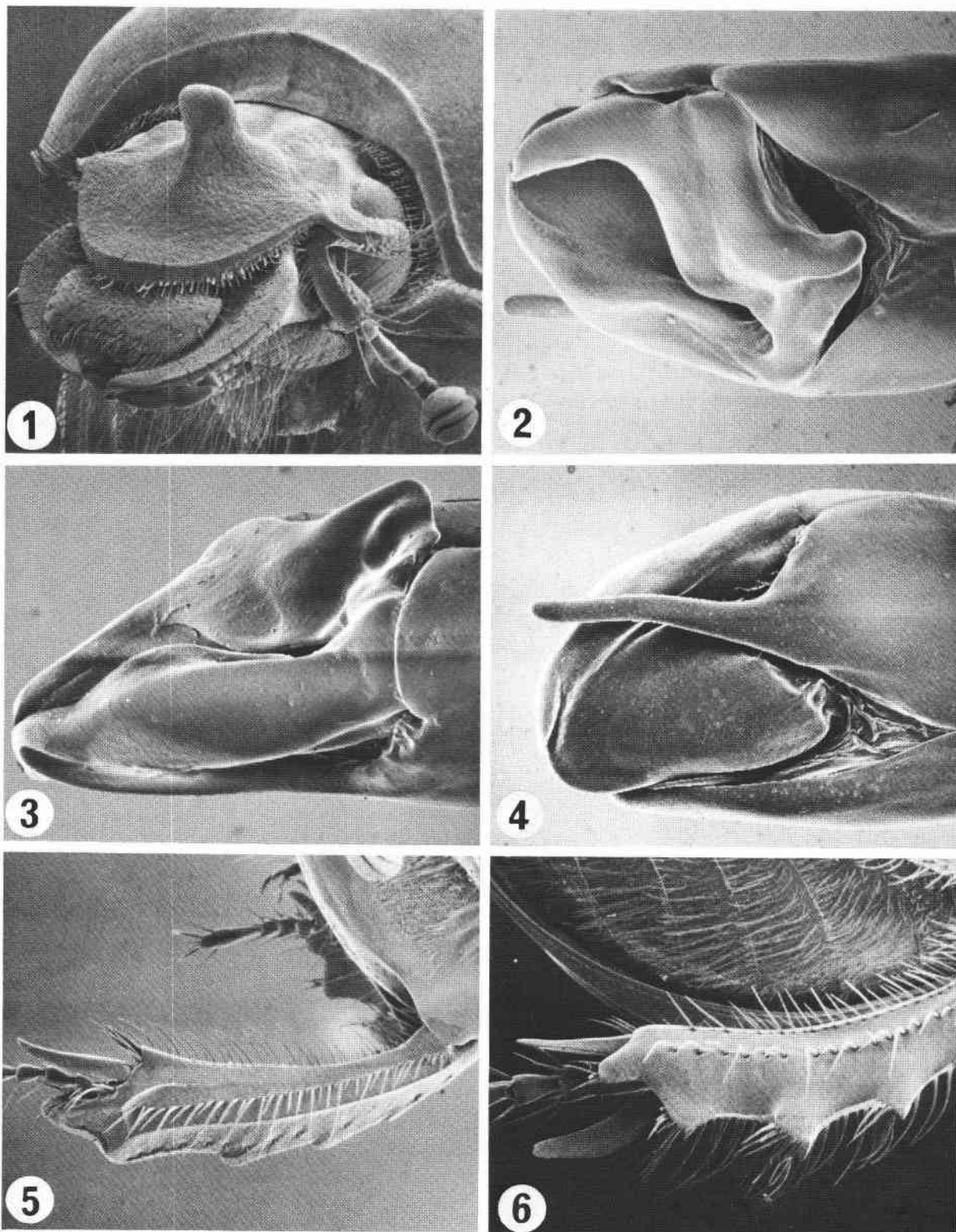
indicated. Fore femur not excavated near base on surface adjacent to tibia. Fore coxa anterior to femoral insertion with rounded ridge anteriorly, the ridge not knobbed or angulately produced. Middle and hind tibia each with four transverse carinae on outer surface; each middle and hind tibial apex bilobed at exterior edge (Fig. 6). Mesosternum with small, acutely angulate narrow median carina anterior to middle coxae. Legs brownish black in color, ventral setae brown to brownish black. Genitalia as in Figs. 2–4.

FEMALE: Unknown.

TYPE MATERIAL: Holotype, male, Mexico, Puebla, 3 km southeast of Xochitlan, Cueva Xochitl, 30.XII.1973, James Reddell (Howden).

REMARKS: This species is most closely related to *Geotrupes guatemalensis* Bates. This relationship is shown both in the characteristics of the male genitalia and in the unmodified apical tooth of the male fore tibia. While the species is related to *guatemalensis* it differs in a number of characteristics, the most obvious one being the large, truncate, nearly vertical-sided tubercle near the median posterior margin of the clypeus. Also, the pronotum has a wide, shallow indentation behind the anterior marginal bead. The pronotal surface is dull or opaque and the elytral intervals shiny, giving the species a rather unusual appearance. Some of the distinguishing characters, such as the tubercle on the head, are almost certainly sex associated but the other characters mentioned will probably serve to distinguish the females.

The species is named in honor of its discoverer,



FIGS. 1-6. *Geotrupes reddelli* n.sp.; holotype. Fig. 1. Head. Fig. 2. Male genitalia, dorsal view. Fig. 3. Male genitalia, lateral view. Fig. 4. Male genitalia, ventral view. Fig. 5. Left fore tibia. Fig. 6. Right hind tibia.

Mr. James Reddell, who has very kindly given me a number of interesting scarabs including a number associated with caves. However, the species described above cannot be considered cavernicolous.

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