

Terrestrial Isopods from Caves and Mines in Texas and Northern Mexico with a Description of *Venezillo tanneri* (Mulaik and Mulaik) Allotype

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INTRODUCTION

Terrestrial isopods found in caves and mines in Texas and northern Mexico were sent to the author by James Reddell of the Texas Speleological Survey for identification. There were 8 isopod species from 23 sites. All specimens except those from one Mexican cave were of the terrestrial suborder Oniscoidea. Specimens from the Mexican cave were *Cirolana* (*Speocirolana*) *pelaezi*, a species of blind *Cirolanidae* of the suborder *Flabellifera*. Only one terrestrial oniscoid species demonstrated true cavernicolous traits; it was a blind pigmentless *Trichoniscoidea* and is described in a new genus by Schultz (1964a). All other specimens, except some *Porcellio laevis*, had the typical color and morphology characteristic of their species, and were not modified towards cave life in any apparent manner. The *P. laevis* specimens included albinos, but albino individuals are commonly found in situations outside of caves so albinism is most likely not a particular cave modification in this species (Vandel, 1950; Schultz, 1964b).

The male allotype of *Venezillo tanneri* (Mulaik and Mulaik, 1942) is described here for the first time along with some characters of the female. A key to the terrestrial species found is presented, but it has limited usefulness since examination of other caves and mines can be expected to yield more species. Most specimens were found near the entrance to the cave or mine, and hence were probably part of the fauna outside the cave that was able to adapt successfully to underground life after being transported into the caves or mines.

RESULTS

The results of isopod collections in caves and mines are arranged in two tables (one a species list, the other a site list) and a map. The numbers after the species name in Table 1 and the numbers on the

map correspond to the site number in Table 2. A key to the terrestrial species collected is followed by a description of the allotype of *Venezillo tanneri* (Mulaik and Mulaik, 1942).

TABLE 1

Species found in Texas and Mexican Caves and Mines

Oniscoidea
<i>Armadillidium vulgare</i> (Latreille)-3, 7, 8, 15, 18, 19, 23.
<i>Cylisticus convexus</i> (De Geer)-4.
<i>Metoponorthus pruinosis</i> Budde-Lund--1, 2, 5, 6, 8, 10, 11, 12, 16, 19, 20, 21, 22.
<i>Mexiconiscus tlamayaensis</i> Schultz (1964a) (from Tlamaya near Xilitla, Luis Potosi, Mexico).
<i>Porcellio laevis</i> Latreille-4, 5, 8, 15.
<i>Porcellio gertschi</i> Van Name (1942)-9.
<i>Venezillo tanneri</i> (Mulaik and Mulaik, 1942)-13, 14, 17; (24—type locality).
Flabellifera
<i>Cirolana (Speocirolana) pelaezi</i> Bolivar and Pieltain (a Cirolanidae from, Sotano del Arroyo, San Luis Potosi, Mexico).

TABLE 2

A List of Caves and Mines

(location and ecological data are included)

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1. ADAM'S GOLD MINE, Bell Co., Tex. A few miles west of Prairie Dell on the Bell-Williamson Co. line. Col. by J. Reddell and D. McKenzie. No ecological data. July 27, 1963. *M. pruinosis*, 1 medium size male.
 2. ASPERMONT BAT CAVE, Stonewall Co., Tex. 10 mi. south of Aspermont. Col. by J. Reddell and W. Russell. No ecological data. May 1963. *M. pruinosis*, 1 large female.
 3. BANDIT CAVE, Travis Co., Tex. In Rollingwood (a suburb of Austin). Col. by J. Reddell. In twilight zone at the main entrance. Oct. 14, 1963. *A. vulgare*, 1 large female.
 4. BIG MOUTH CAVE, Wheeler Co., Tex. Two miles north of Shamrock. Col. by J. Reddell and W. Russell. No ecological data. May 1963. *P. laevis*, 2 large males, 1 female, 2 unsexed. *C. convexus*, 1 large male.
 5. BLACK HAND CAVE, Childress Co., Tex. Four miles east of Newlin. Col. by J. Reddell and D. McKenzie. Most were found in silt and guano under rocks. May 1963. *P. laevis*, 3 females (2 albino, 1 of normal color), 3 males (2 albino, 1 of normal color).
 6. BURIAL CAVE, Uvalde Co., Tex. 22 miles northwest of Uvalde. Col. by J. Reddell and D. McKenzie. At the bottom of entrance drop. Apr. 5, 1963. *M. pruinosis*, 3 large females, 1 large male.
 7. COFFIN CAVE, Williamson Co., Tex. 10 miles northwest of Georgetown. Col. by J. Reddell, J. Porter and Bud Frank. Found in darkness on sticks. Nov. 4, 1963. *A. vulgare*, 1 female, 1 male.

8. CORE HOLE CAVE, Williamson Co., Tex. 2 mi. south of Georgetown. Col. by J. Reddell and J. Porter. On silt about a breakdown cone which originated on surface. Nov. 3, 1963. *A. vulgare*, 1 female; *M. pruinosus*, 2 males; *P. laevis*, 4 males, 1 immature female.
 9. CUEVA DE LOS LAGOS, Coahuila, Mex. 15 mi. northwest of Ciudad Acuña. Col. by J. Reddell, J. Porter and D. McKenzie. No ecological data. Jan. 24, 1964. *P. gertschi*.
 10. EMERALD SINK, Val Verde Co., Tex. 5 mi. north of Langtry. In darkness on silt. Jan. 25, 1964. *M. pruinosus*, 2 females.
 11. ESS CAVE, Pecos Co., Tex. 5 mi. southwest of Iraan. In Drip Room in darkness. June 15, 1963. *M. pruinosus*, 4 very large females.
 12. EZELL'S CAVE, Hays Co., Tex. In San Marcos. Col. by J. Reddell, D. McKenzie and R. Ballinger. Sept. 7, 1963. *M. pruinosus*, 1 gravid female.
 13. DIABLO CAVE, Val Verde Co., Tex. 15 mi. northwest of Del Rio on the Rio Grande. Col. by J. Reddell and D. McKenzie. On walls and floor of cave. Aug. 11, 1963. *V. tanneri*, 8 males, 1 female, 1 unsexed.
 14. GRUTA DEL PALMINTO, Nuevo Leon, Mex., 4 mi. southwest of Bustamante. On silt and rotting paper in darkness near entrance. Col. by J. Reddell. Feb. 21, 1964. *V. tanneri*, 4 females, 1 male.
 15. HILL'S CAVE, Bell Co., Tex. 2 mi. west of Salado. On organic debris in entrance room. Col. by J. Reddell and D. McKenzie. Jul. 26, 1963. *A. vulgare*, 1 large male; *P. laevis*, 1 large male.
 16. KEN HARRELL CAVE, Travis Co., Tex. 15 mi. north of Austin. No ecological data. Col. by W. Russell. *M. pruinosus*, 6 females.
 17. LADDER CAVE, Val Verde Co., Tex. 2 mi. east of Diablo Cave (see above). Col. by Reddell and D. McKenzie. On rotting wood, Aug. 11, 1963. *V. tanneri*, 4 males, 1 female.
 18. LONGHORN CAVERNS, Burnet Co., Tex. In Longhorn Caverns State Park. Found 50' from entrance. Col. by Bud and M. Frank. Mar. 24, 1963. *A. vulgare*, 1 large female.
 19. McNEIL QUARRY CAVE, Williamson Co., Tex. One mi. north of McNeil. Under rocks in darkness and twilight zone of entrance room. Col. by J. Reddell and W. Russell. Jul. 25, 1963. *A. vulgare*, 1 male; *M. pruinosus*, 5 males; 6 females.
 20. ORIENTE MILESTONE MOLASSES BAT CAVE, Val Verde Co., Tex. 25 mi. northeast of Del Rio. On rotting sticks and guano, in darkness. Col. by J. Reddell and J. Porter. Jan. 26, 1964. *M. pruinosus*, 5 females. (3 gravid), 1 male.
 21. STARK'S NORTH MINE, Travis Co., Tex. A few miles northwest of Austin. No ecological data. Col. by W. Russell. Aug. 20, 1963. *M. pruinosus*, 5 females (3 gravid), 3 males.
 22. THREE MILE CAVE, Williamson Co., Tex. 4 mi. west of Georgetown. In small circular room in darkness about 150' from entrance. Col. by J. Reddell. Aug. 4, 1963. *M. pruinosus*, 2 males.
 23. WILLIAMS CAVE, Williamson Co., Tex. 2 mi. northwest of Georgetown. No ecological data. Col. by J. Reddell and W. Russell. Aug. 24, 1963. *A. vulgare*, 1 small female.
 24. EDINBURG, Hidalgo Co., Tex. type locality of *Venezillo tanneri* (Mulaik and Mulaik, 1942).
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A KEY TO THE SPECIES FOUND IN THIS STUDY

This key is useful for identification of the species listed in this paper, but for positive identification of other species the works of Richardson (1905), Van Name (1936), Hatch (1947) or Mulaik (1960) should be used.

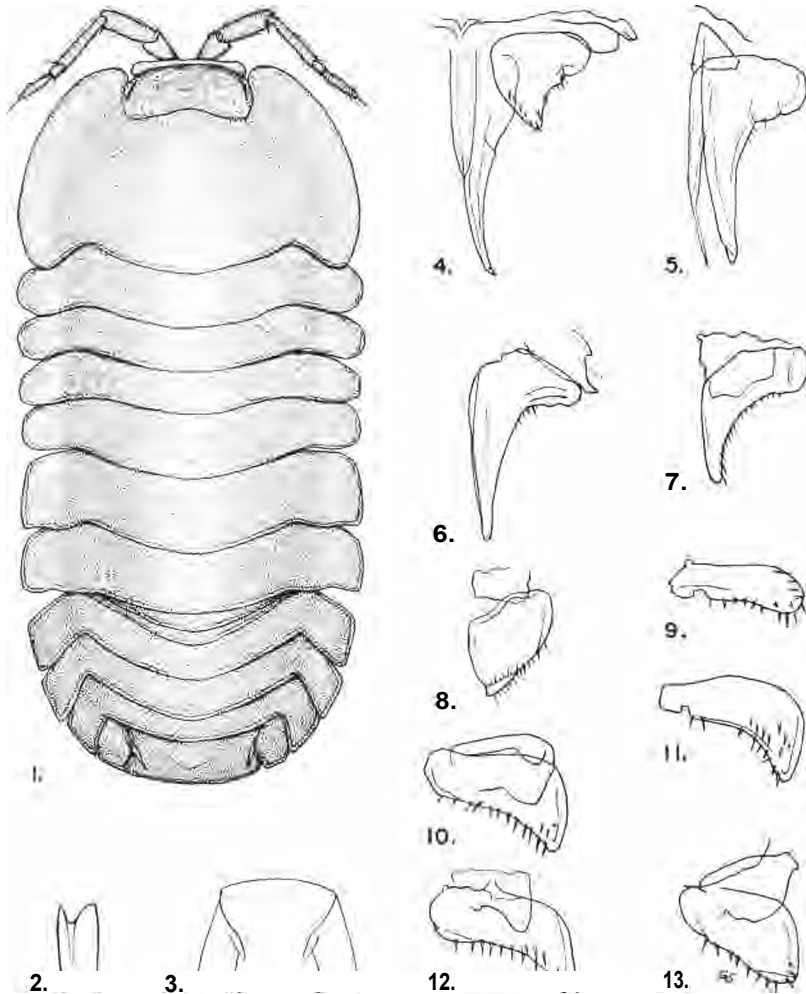
- 1a. Capable of rolling into a ball ----- 2a
- 1b. Not capable of rolling into a ball ----- 4a
- 2a. Uropods extend from edge of posterior margin of carapace --
Cylisticus convexus
- 2b. Uropods extend only to edge of posterior margin of
carapace 3a
- 3a. Pleotelson trapezoidal, posterior corners rounded; exopod
broad and flat extends to posterior edge of carapace -----
Armadillidium vulgare
- 3b. Pleotelson hour glass-shaped, exopods minute, basis of uro-
pod extends to posterior margin of carapace -----
Venezillo tanneri
- 4a. Blind and pigmentless ----- *Mexiconiscus tlamayaensis*
- 4b. Never blind (sometimes albinos are found) ----- 5a
- 5a. Abdominal segments abruptly narrower than thorax; hind
angle of anterior segments rounded, never produced; some-
times dorsal surface iridescent reddish-purple when alive
(reddish-brown in alcohol) first flagellar segment always
longer than second ----- *Metoponorthus pruinosus*
- 5b. Abdominal segments not abruptly narrower than thorax, hind
angles of anterior segments slightly or greatly produced,
never simply rounded; never iridescent when alive and they
do not change color markedly in alcohol; first flagellar seg-
ment slightly longer or shorter than second ----- 6a
- 6a. Dorsal surface including head fairly smooth; color slate gray
with yellow; first segment of flagellum longer than second;
broadly oval (Albinos are fairly common) ---- *Porcellio laevis*
- 6b. Dorsal surface smooth, head slightly tuberculated; color
brownish with much yellow; flagellar segment one shorter
than two; narrowly oval ----- *Porcellio gertschi*

A DESCRIPTION OF VENEZILLO TANNERS (MULAIK
AND MULAIK, 1942) ALLOTYPE MALE

The species was first described from a single female as a member of the genus *Cubaris*. Van Name (1936) considered it in Group IIc of that genus, or in *Venezillo* a subgenus, that has now been raised to full generic rank. The specimens that were collected in this study were both male and female, hence, the allotype male is partially described

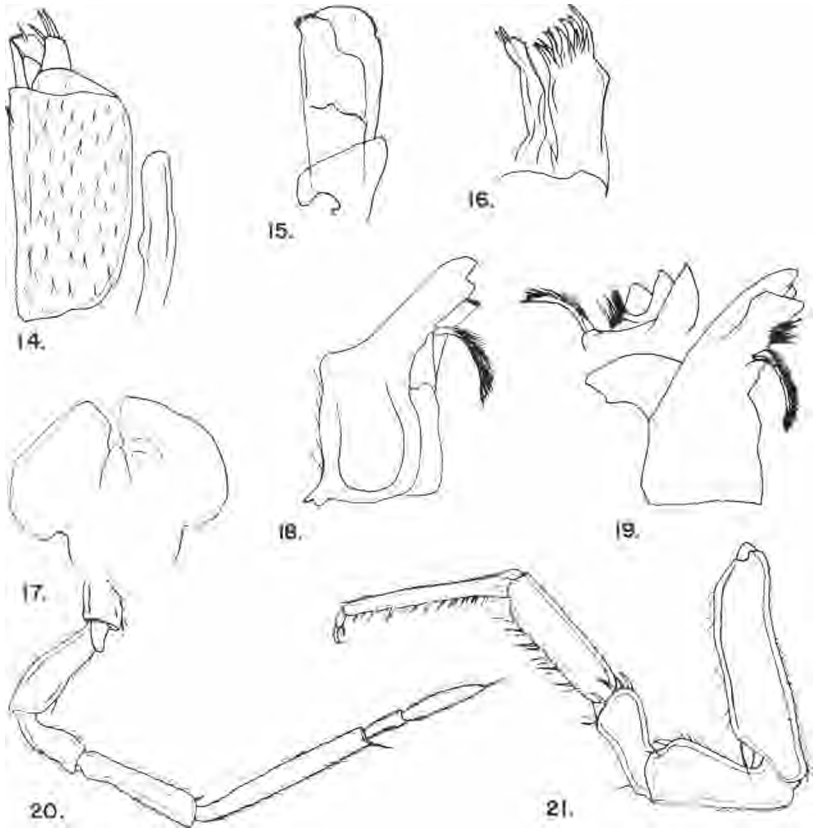
here (Figs. 1-8,14-21) along with some additional data on the female (Figs. 9-13).

Length just over twice width. Body comparatively smooth. Head deeply set into first thoracic segment. Body highly arched, but pleons



Figs. 1-13. 1. *Venezilla tanneri* (Mulaik and Muliak, 1942), Allotype male. 2. Sulcus underside first thoracic segment. 3. Pleotelson with uropods. 4. Male first pleopod (exopod and endopod). 5. Male second pleopod (exopod and endopod). 6. Male third exopod. 7. Male fourth pleopod (exopod and endopod). 8. Male fifth exopod. 9. Female first pleopod. 10. Female third pleopod (exopod and endopod). 11. Female second pleopod. 12. Female fourth pleopod (exopod and endopod). 13. Female fifth pleopod (exopod and endopod).

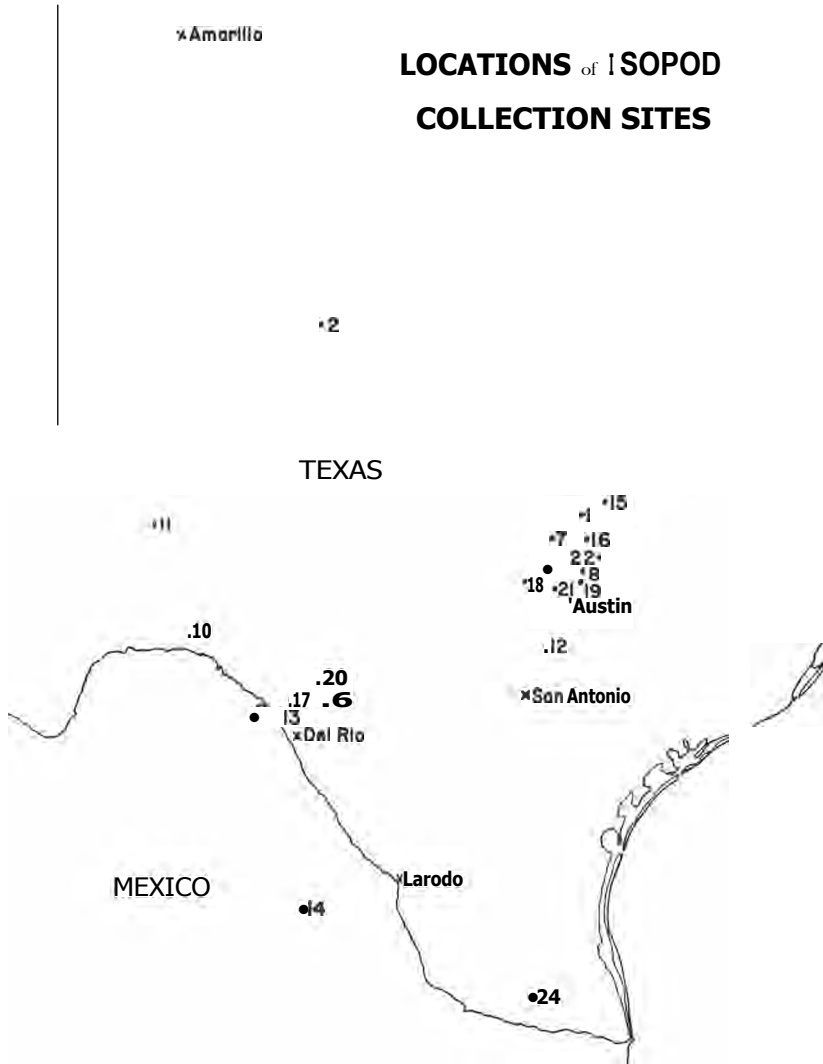
recurved so as to form a more flattened looking animal. About 8 ocelli in eyes. Pleopod one of male with endopod strongly produced; exopod small and triangulate. Distal third of endopod of male second pleopod abruptly narrower than proximal two thirds. Apices of exopods of pleopods 2, 3 and 4 greatly produced. Mouth parts as in Figures 14 to 19. Color grayish brown; males darker than females, both with irregularly shaped small white spots.



Figs. 14-21. 14. Maxilliped. 15. Second maxilla. 16. First maxilla. 17. Hypopharynx. 18. Right (ventral) mandible. 19. Left mandible (two views). 20. Second antenna. 31. Male seventh leg.

DISCUSSION

The most widespread species was *M. pruinus* which was collected from 13 of the 23 sites. The next most abundant was *A. vulgare* (7



sites) followed by *P. laevis* (4 sites). *Venezillo tanneri* was found in 3 sites. *Porcellio gertschi* and *C. convexus* were found in only one location. The species *M. pruinus* has been shown to be very widespread by Hatch (1947), Lindroth (1957) and Schultz (1964b). Since gravid females of *M. pruinus* were found in summer and winter (January, September and August) a year round breeding is indicated for cave populations of the species. A year round breeding season has