STUDIES ON THE CAVERNICOLE FAUNA OF MEXICO AND ADJACENT REGIONS

EDITED BY

ROBERT W. MITCHELL and JAMES R. REDDELL

DEPARTMENT OF BIOLOGY
TEXAS TECH UNIVERSITY
LUBBOCK, TEXAS

ASSOCIATION FOR MEXICAN CAVE STUDIES
AUSTIN, TEXAS

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<td>Terry W. Raines</td>
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Photographs by Robert W. Mitchell

Cover: *Hoplobunus inops* Goodnight and Goodnight, Cueva de la Capilla, Tamaulipas, México

Frontispiece: *Paracophus caecus* Hubbell, Cueva de la Mina, Tamaulipas, México

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ASSOCIATION FOR MEXICAN CAVE STUDIES
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(updated 2005)
This volume is dedicated to

THE PEOPLE OF MEXICO

who have guided us to caves,
helped us collect many animals, and
given us their friendship
Recent investigations of several karst regions of México have resulted in the discovery of many new species of unusual interest. In addition study of specimens from other areas has added many other species to the known cave fauna of México.

Many of the species described in this volume were obtained during the course of a reconnaissance trip by David McKenzie, Martha Helen McKenzie, Stuart Murphy, and James Reddell in December 1972 and January 1973 to several previously unvisited karst regions in Tamaulipas, Veracruz, and Oaxaca. Of particular interest were the karst regions of Acatlán, Valle Nacional, Apoala, and San Sebastián de las Grutas, all in the state of Oaxaca. Each of these areas contains a unique troglobite and troglophile fauna of interest. Much additional work in each area will be required before the full extent of the fauna can be known. Detailed reports are planned for each area.

The most remarkable new cave discovered in recent years is one from which many new species are herein described. Cueva del Nacimiento del Río San Antonio is located 10 km southwest of Acatlán, Oaxaca, and is an impressive, well-decorated stream system with several kilometers of surveyed passage. The cave contains a remarkable aquatic troglobite fauna, including a blind catfish (being described elsewhere), blind crayfish, mysids, alpheid shrimp, and palaemonid shrimp.


Most of the present volume concerns the cave fauna of México and 61 new species are described from that country and more than 100 additional species are added to the recorded cave fauna. Of the new species 30 are troglobites.

In addition the scope of this volume has been expanded to include areas adjacent to México which contain related fauna and which have received the attention of members of the Association for Mexican Cave Studies. Included are species from Texas, Belize, and Guatemala. The latter two regions have received considerable recent attention by Dr. Stewart B. Peck of Carleton University, Ottawa, Canada, and by Mr. David McKenzie of Austin, Texas.

Many people have made significant contributions to this volume. We must first thank the authors of the papers included for their contributions.

Although many people have contributed specimens or assisted in collections several have been extremely helpful in obtaining material included in this volume. We wish in particular to thank William Elliott, Roy Jameson, David McKenzie, Martha Helen McKenzie, Stuart Murphy, and Stewart B. Peck.

Our very special thanks are due to Jan Lewis, Martha Helen McKenzie, Terry Raines, and J. Mark Rowland for their help in preparing and publishing this volume.

We also wish to thank the following for their help in various phases of publication: Frank Binney, Don Broussard, Pam Lynn, Ron Ralph, Charlotte Rogers, John Steele, and John Williams.
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ELLIOTT, W.R., J.R. REDDELL, A Checklist of the Cave Fauna of México. VI. Valle de los Fantasmas Region, San Luis Potosí ............................................................... 191
OPILIONIDS (PHALANGIDA) FROM MEXICAN CAVES

Clarence J. and Marie L. Goodnight

Department of Biology, Western Michigan University
Kalamazoo, Michigan 49001

This study is based on a number of specimens collected over a period of years by Mr. James Reddell and Dr. Robert Mitchell and their associates. These field studies involved work in many caves over the entire country of México. An earlier paper (Goodnight and Goodnight, 1971) based on these collections described new species of the family Phalangodidae. This paper describes species and lists records in both the families Phalangodidae and Cosmetidae.

True cave forms have not been noted among the cosmetids, but because of their tendency to congregate in moist areas, they are often found abundantly in caves.

The holotypes of new species are deposited in the arachnid collections of the American Museum of Natural History in New York City. Paratypes are deposited in the collections of the American Museum and in the collections of The Museum, Texas Tech University, Lubbock, Texas.

SUBORDER LANIATURES THORELL
PHALANGODIDAE SIMON
Phalangodinae Roewer
Karos Goodnight and Goodnight


Members of the family Phalangodidae with a common eye tubercle, with five dorsal areas on the abdominal scute, the first area without a median line. Lateral margins of dorsal scute with enlarged tubercles in the region of the first or second dorsal areas; similar tubercles may or may not be present at the lateral-posterior borders of the fifth area and free tergites. Dorsal scute and free tergites may be unarmed, have low tubercles, or at times have somewhat enlarged spines in the median area. Eye tubercle removed from the anterior margin of the cephalothorax; it may or may not have spines above the eyes, and is at times very low.

Legs without conspicuous spines or tubercles, tarsi of third and fourth legs without scopulae, and with simple untoothed double claws; distitarsus of tarsus of first leg with two segments, distitarsus of tarsus of second leg with three segments. Tarsus of first leg with four segments, remaining tarsi somewhat variable in number of segments. The metatarsi of the legs are not divided into astragali and calcanea. The maxillary lobe of each second coxa without a ventral projection.

Palpus normal in size, armed with spines; chelicera normal in size.

Secondary sexual characteristics of males not conspicuous, but may be present in the form of enlarged
portions of various segments of the legs or in the shape of the fourth femora.


The complex of species within this genus often show close relationships to one another; but because of their relative geographic isolation, it appears wiser to consider them separate species. We are including here, descriptions of two previously described species.

Karas dybasi (Goodnight and Goodnight)
Figs. 1-2


Male—Total length of body, 3.5 mm. Cephalothorax, 1.2 mm. Width of body at widest portion, 2.8 mm.

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<tr>
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<td>7.7mm</td>
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Cephalothorax with scattered tubercles. Eye tubercle removed from the anterior margin of the cephalothorax, with a single median spine, and four small hair-tipped spines behind it. First dorsal area without a median line, boundaries of areas distinct, second and third areas each with a median spine, all areas with hair-tipped tubercles. In the region of the first area, on either side, is a large lateral tubercle; similar, though smaller ones, are located at the disto-lateral border of the fifth area and at the lateral margins of the second and third free tergites. The posterior border of the fifth area and the lateral margins of the dorsal scute are bordered with a row of hair-tipped tubercles. Each free tergite with a row of hair-tipped tubercles.

Ventrally, all surfaces are covered with hair-tipped tubercles. Third coxae with low teeth on both anterior and posterior borders. Second coxae with enlarged tubercles at the distal areas. Fourth coxae, slightly visible from above, and thickly covered with hair-tipped tubercles. Spiracles visible.

All segments of the legs, but the tarsi, roughly tuberculate. First metatarsi with proximal enlargements. Third and fourth femora somewhat curved; third coxae slightly enlarged. Tarsal segments: 4-5-6-6. Distitarsus of first tarsus with two segments, second with three.

Palpus: trochanter, 0.4 mm long, femur, 0.9, patella, 0.6, tibia, 0.7, and tarsus, 0.6. Total length, 3.5 mm. Palpus with spines as illustrated.

Entire body yellowish brown, darker mottlings on cephalothorax and on dorsal areas. Lateral borders of scute somewhat darker, with darker mottlings on the legs and palpus.

**Type Locality**—Male holotype from Huichihuayán, San Luis Potosí, México, 20 June 1941, H.S. Dybas collector. Holotype in the collection of the Chicago Natural History Museum.

**Record**—Cueva de El Jobo, 5 km NE Xilitla, San Luis Potosí, México, 18 November 1972, collected by James Reddell and Terry Raines.

Karas unispinosus (Goodnight and Goodnight)
Fig. 3

Chapulobunus unispinosus Goodnight and Goodnight, 1946, Amer. Mus. Novitates, no. 1310, pp. 1, 2, fig. 6-9.

Male—Total length of body, 5 mm. Cephalothorax, 1.5. Width of body at widest portion, 4.5 mm.

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<td>11.3mm</td>
<td>10.5mm</td>
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Entire surface covered with granulations. The eye tubercle is removed from the anterior surface of the cephalothorax, with dorsal tuberculations and with a very low spine over each eye. Dorsal scute with five clearly defined areas, first without a median line, with a low median spine in the center of the second and third areas. A small lateral tuberculation in the region of the first dorsal area. Free tergites and anal operculum with tuberculations.
Ventral surfaces also covered with low tuberculations. All coxae with tuberculations, third coxae, each with anterior and posterior rows of low teeth.

All segments of the legs covered with tuberculations; only exceptions to this are the tarsi. Third femora somewhat curved, fourth femora somewhat enlarged. Fourth tibia with four ventral enlarged tibercles. Tarsal segments: 4-6-6. DISTITARSUS OF FIRST TARSUS WITH TWO SEGMENTS, SECOND WITH THREE.

Palpus: trochanter, 0.4 mm long, femur 1.1, patella, 0.7, tibia, 0.8, and tarsus, 0.6. Total length, 3.6 mm. Palpi arms as in figure, with numerous tuberculations.

Chelicerae not enlarged, first segments with dorsal tuberculations.

Entire body light yellowish brown in color. Trochanters of legs, chelicerae, and palpi somewhat lighter. All femora with proximal and distal shaded areas, lighter in the center, giving a somewhat annulate appearance to the legs.

Type Locality—Female holotype and paratypes from Chapulhuacán, Hidalgo, México, 1100 m, 19 May 1944, collected by C. Bolivar and D. Pelaez.

Record—Male from Chorros de Agua, east of Rayones, 21 km WSW Montemorelos, Nuevo León, México, 19 June 1969, collected by S. and J. Peck.

Hoplobunus Banks


Phalangodids with a common eye tubercle which is usually slightly removed from the anterior margin of the cephalothorax, variously armed above. Abdominal scute with five areas, the first without a median line. Tarsi of third and fourth legs with untoothed double claws. Femur of first leg normal, not unusually elongate or heavily spined. Tarsus of first leg with five or more segments. Distitarsus of first tarsus with two segments, second with three. Metatarsi not divided into astragali and calcanea. Maxillary lobe of second coxa much reduced without any ventral projection. Robust animal with long heavy legs and with the spiracle widely expanded. Secondary sexual characteristics of the male highly variable.

Genotype. Hoplobunus barretti, Banks, from Cuernavaca, Morelos, México.

Hoplobunus apoalensis, new species

Figs. 4-5

Male—Total length of body, 8.7 mm. Cephalothorax, 3 mm. Width of body at widest portion, 5.4 mm.

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<tr>
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<td>38.8mm</td>
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Dorsum quite smooth. Eye tubercle only slightly removed from the anterior margin of the cephalothorax, in the form of a rounded cone, eyes very small, seemingly lacking a retina. Five dorsal areas clearly separated from one another, very small paired tubercles in the median area of the first, third, and fourth areas. A row of tooth-like tubercles on the lateral margins, a few similar tubercles on the posterior lateral margin of the dorsal scute. Free tergites with only a few low tubercles at the posterior borders. Dorsal surfaces of the coxae visible from above, first second with a few small spines, fourth coxa, each with two small spines, one on the outer surface, one on the inner. Ventral surface smooth, with a few low tubercles on the coxae. First coxae with a few scattered larger ones in addition to the low ones; blunt teeth are arranged along the anterior and posterior surfaces of the third coxae. Fourth coxa, each with a midventral row of low tubercles. Spiracles clearly visible.

Each free sternite with a few scattered tubercles and hairs.

Legs relatively smooth. First trochanter with some tubercles, third trochanters somewhat enlarged, fourth trochanters, each with two small spines. Femora quite straight. Third femora with a small spine on the proximal portion of each one. Fourth femora with a few spines at the distal portion; fourth patella with two distal spines. Tarsal segments 6-15-7-7. Distitarsus of first tarsus with two segments, second with three.

Palpus: trochanter, 1 mm long, femur, 3.6, patella, 2.1, tibia, 3, and tarsus, 2.9. Total length, 12.6 mm. Palpi armed as in figure. Tibia and tarsus armed similarly on both surfaces.

Chelicerae enlarged, with numerous hairs.

Dorsum, free tergites and free sternites quite dark brown, contrasting strongly with the lighter appendages and venter.
**Type Locality**—Male holotype and male paratype from Cueva de Apoala, Santiago Apoala, 20 km N Asunción Nochixtlán, Oaxaca, México, 2 January 1973. Collected by James Reddell, David McKenzie, Martha McKenzie, and Stuart Murphy.

The distinctive form of the eye tubercle and the spination of the palpæ distinguish this species from other members of the genus.

**Hoplobunus boneti** (Goodnight and Goodnight)

**Serrobunus boneti** Goodnight and Goodnight, 1942, Amer. Mus. Novitates, no. 1211, p. 2, figs. 7-11.


**Records**—San Luis Potosí: Sótano de Coatimundi, 36 km NNE Valles, 2 January 1973, collected by Roy Jameson; Cueva de Tanchipa, 35 km NNE Valles, 10 January 1972, collected by Roy Jameson; Sótano de Matapalma, 20 km N Valles, 30 December 1972, collected by Ronald Fieseler; Sótano de la Tinaja, 11 km NE Valles, 16 March 1972, collected by G.D. Campbell; Cueva (=Sótano) de los Monos, 15 km NE Valles, 30 December 1971, collected by David Honea and Roy Jameson; Sótano de la Pipa, 35 km NNE Valles, 2 January 1973, collected by Frank Binney. *Tamaulipas*: Cueva del Remolino, 8.5 km W Gómez Farías, 19 May 1971, collected by R.W. Mitchell.

**Hoplobunus inops** Goodnight and Goodnight

**Fig. 7**


**Hoplobunus oaxacensis**, new species

**Fig. 8**

**Male Holotype**—Total length of body, 8.2 mm. Cephalothorax, 1.9 mm. Width of body at widest portion, 4.8 mm.

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<td>33.0mm</td>
<td>24.7mm</td>
<td>31.2mm</td>
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Dorsum quite smooth, somewhat elongate, somewhat more elongate than that of other species of this genus. The eye tubercle is on the anterior margin of the cephalothorax, in the form of a cone with a small spine dorsally. Areas indicated by shallow grooves; each one with a few low tubercles. A row of low tubercles on the lateral and posterior margins of the dorsum, a similar row on the posterior margin of the three free tergites. Ventral surface quite smooth. First coxae, each with a few spine-bearing tubercles on the anterior surfaces; second coxae, each with a row of low spine-bearing tubercles; third coxae, each with a row of low tooth-shaped tubercles on the anterior and posterior surfaces; 4th coxae quite smooth.

Legs relatively smooth, all segments with some hairs. First and second trochanters with a few spine-bearing tubercles on the anterior surfaces. Fourth coxae visible from above, with a few tubercles and a spine at the postero-lateral margin. Fourth femur with several blunt spines on the ventral distal area. Both third and fourth tibiae with low blunt spines at the distal area. Fourth patella with small distal spines at the distal end. Tarsal segments: 7-17-7-7. Distitarsus of first tarsus with two segments, second with three.

Palpus: trochanter, 1.2 mm long, femur, 3, patella, 1.8, tibia, 2.4, and tarsus, 1.8. Total length, 10.2 mm. Palpus armed retrolaterally as in figure; prolaterally, femur without an apical-median spine, tibia and tarsus armed similarly to the retrolateral surface.

Chelicerae: distal segments greatly enlarged.

Dorsum reddish brown with darker markings bordering the areas. Some darker mottlings in the median area of the fifth area and the free tergites, on the palps, and on the cheliceral segments.

**Female**—Total length of body, 8.3 mm; cephalothorax, 1.9 mm. Width of body at widest portion, 4.5 mm. Similar to male in appearance, though somewhat darker. Spines of the legs were less pronounced as was the enlargement of the chelicerae. The tarsal segments
of the females examined were 6-15-7-7, differing from the males, whose first tarsi had 7 segments.

**Type Locality**—Male holotype and female paratypes from Cueva de Llano Grande, 12 km N San Sebastian de las Grutas, 55 km SSE Oaxaca, Oaxaca, México, 16 December 1972, collected by James Reddell, David McKenzie, and Stuart Murphy. Found on walls in darkness throughout cave.

**Record**—Females from Sotano de los Arboles, 5 km S San Vicente Lachixio, 50 km SSE Oaxaca, Oaxaca, México, 1 January 1973. Collected by David McKenzie, Martha McKenzie, and Stuart Murphy.

*H. oaxacensis* differs from other members of this genus by the distinctive form of the eye tubercle, its general lack of spination or tuberculation on the dorsum, and the spination of the palpus.

**Hoplobunus spino-oculorum**, new species

*Fig. 6*

**Male**—Total length of body, 3.5 mm. Cephalothorax, 2.1 mm. Width of body at widest portion, 1.2 mm.

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<th>I</th>
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<tbody>
<tr>
<td>Trochanter</td>
<td>0.4mm</td>
<td>0.4mm</td>
<td>0.7mm</td>
<td>0.6mm</td>
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<tr>
<td>Femur</td>
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<td>0.7</td>
<td>0.8</td>
</tr>
<tr>
<td>Tibia</td>
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<td>1.9</td>
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<tr>
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<tr>
<td>Tarsus</td>
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<td>14.7mm</td>
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</table>

Cephalothorax with some scattered tuberculations, eye tubercle on the anterior margin, in the form of a rounded cone. The height is greater than the diameter, thus appears much taller than the eye tubercle of other members of this genus. The eyes are at the base, and there are several spines on the surface of the tubercle. The abdominal scute somewhat wider in the region of the fourth coxa, narrowing, then widening again at the posterior margin. The five areas have low tuberculation, though the boundaries are without such tuberculations. First area of dorsal scute without median line; the posterior margin with low granulations. Free tergites with similar, though somewhat larger granulations. Venter covered with low hair-tipped tubercles, a row of toothlike tubercles on both the anterior and posterior surfaces of the third coxae. Free sternites each with a row of low tubercles, spiracles visible.

All segments, but metatarsi and tarsi, of legs with hairs. Fourth coxa visible from above, with some low hair-bearing tubercles on its dorsal surface. Trochanters with some tubercles, most conspicuous on the fourth trochanters. Third trochanters somewhat enlarged. Third and fourth femora, patellae, and tibiae with low hair-bearing tubercles. Metatarsi not divided into astragali and calcanea. Tarsal segments: 5-11-7-6. Distitarsus of first tarsus with 2 segments, of second with 3.

Palpus: trochanter, 0.6 mm long, femur, 1.9, patella, 0.9, tibia, 1.2, and tarsus, 1.2. Total length, 5.8 mm. All surfaces of palpi covered with low tubercles, which are most conspicuous on the trochanters, femora, and patellae. All segments armed as in figure. Chelicerae enlarged, first segment, dorsally with low spine-like tubercles.

Entire animal reddish brown, areas slightly darker, some darker mottling on the palpal segments, all segments of the legs slightly lighter.

**Female**—Total length of body, 3 mm. Cephalothorax, 1.1 mm. Width of body at widest portion, 2.1 mm.

Similar in appearance to the male, but without the enlarged chelicerae.

**Type Locality**—Male holotype and male and female paratypes from Cueva del Guayabo, 12 km NE Valle Nacional, Oaxaca, México, 29 December 1972. Collected by James Reddell, David McKenzie, Martha McKenzie, and Stuart Murphy from the floors and walls of the cave in total darkness.

*H. spino-oculorum* is a very distinctive form with the high eye tubercle with its unusual spination and the spination of the palpal segments.

**Hoplobunus planus**, new species

*Fig. 9*

**Female Holotype**—Total length of body, 2.4 mm. Cephalothorax, 0.9 mm. Width of body at widest portion, 1.6 mm.

++Fig. 8. *Hoplobunus oaxacensis*, new species. Lateral view of male.
++Fig. 9. *Hoplobunus planus*, new species. Dorsal view of female.
++Fig. 16. *Cynorta guadalupensis*, new species. Dorsal view of male.
Entire dorsum smooth, with only very fine granulations on the surface. Eye tubercle on the anterior margin, rounded above, without eyes. Posterior boundaries of the cephalothorax and the dorsal areas poorly defined. No tubercles or spines on the dorsum, with small lateral enlargements in the region of the fourth coxae. Venter likewise smooth. Free sternites and anal operculum each with a few scattered tubercles. Spiracles clearly visible.

Legs quite smooth, with occasional scattered hairs. First coxae, each with four small tubercles on the anterior surface, a row of small tubercles on the anterior margin of each of the second coxae. First tarsal segments of the third and fourth tarsi unusually elongate. Tarsal segments: 5-10-6-6. Distitarsi of first tarsus with 2 segments, second with three.

Palpus: trochanter, 0.2 mm long, femur 0.9, patella, 0.5, tibia, 0.8, and tarsus, 0.7. Total length, 3.2 mm. Palpus armed as in figure. Chelicera with a few hairs and some very low granulations.

Entire body and appendages a uniform light yellow.

Type Locality—Female holotype from Cueva de San Nicolás, 10 km SW Aquismon, San Luis Potosi, Mexico, 16 July 1968, collected by John Fish, Dwight Deal, and Duane Faith.

H. planus most nearly resembles H. inops Goodnight and Goodnight, but differs in the form of the lateral tubercle on the dorsum and in the number of tarsal segments.

Hoplobunus robustus Goodnight and Goodnight

Records—Veracruz: Cueva de la Cascada, 1 km SW Tequila, 6 August 1967, collected by James Reddell, John Fish, and T.R. Evans, Cueva del Ojo de Agua Grande (Cueva del Nacimiento Grande), 10 km N Potrero Viejo, 22 August 1965, collected by James Reddell, John Fish, and T.R. Evans.

Paramitraceras Cambridge


Phalangodids with a common eye tubercle located on the anterior margin of the cephalothorax. Eye tubercle in the form of a forward-slanting, pointed cone. Abdominal scute with five areas, the first without a median line. On each side of the first area there is a small lateral enlargement. Tarsi of third and fourth legs without scopulae and with untoothed claws. Femur of first leg not enlarged. Tarsus of first leg with three or four segments. Distitarsi of first tarsus with two segments; second also with two. Metatarsi of legs not divided into calcanea and astragali. Maxillary lobes of second coxae without ventral projections. Chelicerae enlarged, palpi usually heavy, with small ventral spination. Secondary sexual characters of the male usually seen in the heavier chelicerae.

Genotype: Paramitraceras granulatus Cambridge.

Paramitraceras granulatus Cambridge

Figs. 10-12


Paramitraceras chichivaca Goodnight and Goodnight, 1947, Fieldiana: Zool., vol. 32, no. 1, pp. 5-6, fig. 2.

Panzosus hispidulus Roewer, 1939, Senckenbergiana, vol. 30, nos. 1-3, pl. 1, figs. 3a-f.

Solola robusta Roewer, 1939, Senckenbergiana, vol. 30, nos. 1-3, p. 30, pl. 6, figs. 45a-d.

Male—Total length of body, 4.4 mm. Cephalothorax, 0.8 mm. Width of body at widest point, 3.1 mm.
Cephalothorax quite smooth, eye tubercle slightly removed from the anterior margin (see illustration), with many tubercles. The small median spine has tubercles at the base. Dorsal areas, free tergites, and anal operculum thickly covered with tubercles. Boundaries of dorsal areas parallel, first area without a median line. Dorsum strongly arched. All surfaces of the venter with low tubercles, many of which are hair-tipped. First coxae, each with a row of larger tubercles in the median area, third coxae, each with anterior and posterior rows of tooth-like tubercles. Spiracles visible at junction of fourth coxae and first free sternites, several enlarged tubercles at the posterior border.

Legs having all segments but the tarsi with hair-tipped tubercles. Third and fourth femora slightly curved. Tarsal segments: 3-4-5-5. Distitarsi of both first and second tarsi with two segments.

Palpus: trochanter, 0.4 mm long; femur, 1.2; patella, 0.7; tibia, 1; and tarsus, 0.7. Total length, 4 mm. Palpus armed as in illustration. Tibia dorso-ventrally flattened.

Chelicerae with many hairs, otherwise smooth. Median dorsal portion of first segment with a row of tubercles.

Entire animal reddish-yellow in color, appendages somewhat lighter than the dorsum.

Record—Cueva del Guayabo, 12 km N Valle Nacional, Oaxaca, México, 29 December 1972, collected by James Reddell, David McKenzie, Martha McKenzie, and Stuart Murphy.

This record represents a new locality for this highly variable animal; former collections from Guatemala, Chiapas, and Tabasco have illustrated the wide range of variations of this widely distributed form.


Members of the family Phalangodidae without a common eye tubercle and with five dorsal areas on the abdominal scute, the first without a median line. Tarsi of third and fourth legs without scopulae and with simple untoothed claws. Femur of first leg normal. Distitarsi of first tarsus with two segments; second with two or three. Metatarsi not divided into astragali and calcanea. Palpus and chelicera somewhat enlarged, varying with individual species. Maxillary lobe of second coxa without a ventral projection. Secondary sexual characters of the male appear as increased spination of the palpus and chelicera and in the enlargement of some portion of the metatarsus of the third leg.

Genotype: Stygnomma -fuhrmanni Roewer from Colombia.

Stygnomma tuberculata, new species
Figs. 13-15

Male Holotype—Total length of body 2 mm. Cephalothorax, 0.6 mm. Width of body at widest portion, 1.1 mm. Width of body, including expanded fourth coxae, 1.7 mm.
Cynorta jamesoni, new species

Figs. 23-24

Male- Total length of body, 6 mm. Cephalothorax, 1.7 mm. Width of body at widest point, 4.3 mm.


The above is a much abbreviated synonymy of this genus. In 1953 Goodnight and Goodnight synonymized many of the Mexican genera into the single genus Cynorta. This lengthy synonymy is in that publication.

Members of the genus Cynorta have simple untoothed double claws on the third and fourth tarsi, with but six segments in the first tarsus. Distitarsi of both first and second tarsi with three segments. Dorsum with five areas, variously armed with tubercles and spines, without a median large spine on the third area.

Genotype: Cynorta conspersa (Perty)

Cynorta jamesoni, new species

Figs. 23-24

Male—Total length of body, 6 mm. Cephalothorax, 1.7 mm. Width of body at widest point, 4.3 mm.

Trochanter 0.6mm 0.6mm 0.7mm 0.8mm
Femur 4.0 10.2 6.9 8.8
Patella 1.1 1.7 1.8 1.9
Tibia 2.9 8.1 4.0 6.0
Metatarsus 5.3 11.4 6.3 8.8
Tarsus 2.5 6.3 3.2 3.6
Total 16.4mm 38.3mm 22.9mm 29.9mm

Cephalothorax smooth, eye tubercle removed from the anterior margin, each eye with a single small tubercle above it. Dorsal scute smooth, first area with paired tubercles, third with paired spines. Each free tergite with a row of inconspicuous tubercles along the posterior margin. Ventral surface likewise smooth, first coxae, each with two rows of tubercles on the anterior border; third coxae, each with a row of tooth-shaped tubercles on both anterior and posterior margins, but confined to the lateral areas. Each free sternite with a few small hair-tipped tubercles at the posterior border. Stigma visible between the fourth coxae and first free sternites.

Male penis, a slender chitinized shaft with a slightly enlarged tip which appears not to be sclerotized, but with a few bristle-like hairs.

Legs quite elongate and slender. Femur, patella,


and tibia, all with some tuberculations which are quite similar on all legs.

Palpus: trochanter, 0.6 mm long; femur, 1.9; patella, 0.9; tibia, 1.6; and tarsus, 0.8. Total length, 5.8 mm. Chelicerae not enlarged.

Entire animal, including legs, reddish brown, with darker mottlings on lateral borders, central areas, and over and behind the eye tubercle. Legs with some darker markings, palpi with darker areas on the lateral margins, particularly conspicuous on the femur and tibia.

**Type Locality**—Male holotype from Sótano de la Estrella, 36 km NNE Valles, San Luis Potosí, México, 3 January 1973, collected by Roy Jameson.

**Paratypes**—San Luis Potosí: Sótano de la Cuesta, 36 km NNE Valles, 4 January 1973, collected by Roy Jameson; Sótano de Puerto de los Lobos, 2 km S San Francisco, 16 km W Sta. Catarina, 14 September 1968, collected by William Elliott; *Tamauilipas*: Sótano de Vasquez, 7 km SE Ocampo, 29 December 1972, collected by Roy Jameson and Paul Duncan; Grutas de El Puente, 17 km SE Ocampo, 13 July 1967; Cueva de la Florida, 16 km SSW Mante, 28 May 1968, collected by James Reddell in the Right Hand Passage; Cueva de El Pachón, 18 km SSW Mante, collected 8 June 1967 by Rick Remington and 6 June 1967 by R.W. Mitchell; Cueva de la Mina, 7 km NW Gómez Farías, 14 March 1972, collected by G.D. Campbell.

This species is not very distinctive in its characteristics, yet differs from other *Cynortas* in the form of the palpus, the tarsal numbers, and the general configuration of the body. Further collections may require a reevaluation of this species; but it appears to be quite widespread and somewhat variable as to shade of brown, degree of tuberculation on the free tergites and dorsum, and in general appearance.

**Cynorta guadalupensis**, new species

Fig. 16

**Male**—Total length of body, 5.9 mm. Cephalothorax, 2.1 mm. Width of body at widest portion, 4.8 mm.

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<tr>
<td>Patella</td>
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<td>1.4</td>
<td>1.7</td>
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<td>Tibia</td>
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<td>30.6mm</td>
<td>18.8mm</td>
<td>27.4mm</td>
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Dorsum smooth, eye tubercle low, centrally located on the cephalothorax. Dorsal areas clearly visible. Median paired tubercles on the first area, median paired spines on the third. Free tergites with low tubercles on their posterior margins. Ventral surfaces smooth, with scattered hairs. Free sternites with scattered hairs.

Legs all quite similar in appearance; all segments but the metatarsi and tarsi with hair-bearing tubercles.

Palpus: trochanter, 0.9 mm long; femur, 1.8; patella, 1.2; tibia, 1.8; and tarsus, 1.2. Total length, 6.9 mm. Palpi typically flattened femur and tibia. Ventral border of femur with low tooth-like projections. Chelicerae normal in size.

Dorsum dark brownish-red, with white markings as indicated in drawing. Black net-like markings present on the lateral border of the dorsal scute. Chelice-
ral and palpal segments also with black mottlings. Cephalothorax with some darker mottlings. Legs somewhat lighter than the dorsum.

Type Locality—Male holotype from Pozo de Guadalupe, 10.5 km WSW Aquismón, San Luis Potosí, México, 24 November 1972. Collected by James Reddell, Terry Raines, and Eracio Gonzales from a wall of the overhang above a spring-fed well.

Though related to Cynorta triangulata Goodnight and Goodnight, this species has a distinctive dorsal color pattern and tarsal number.

Paecilaema C.L. Koch


Because of the length of the synonymy for this genus, this represents an abbreviated listing. The entire synonymy is in Goodnight and Goodnight, 1953.

Cometids with simple untoothed claws on the third and fourth legs, with more than six segments in the tarsus of the first leg. Distitarsi of both first and second tarsi with three segments. Dorsum with five areas, variously armed with tubercles and spines. Secondary sexual characteristics of the male usually present as increased spination of the femur of the fourth leg.

Genotype: Paecilaema U-flavum (Perty).

Paecilaema lucifugum, new species

Figs. 17-20

Male—Total length of body, 7.8 mm. Cephalothorax, 2.7 mm. Width of body at widest portion, 6.6 mm.

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<thead>
<tr>
<th>Trochanter</th>
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<td>4.6</td>
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<td>1.4</td>
<td>1.4</td>
<td>1.9</td>
</tr>
<tr>
<td>Tibia</td>
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</tr>
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<td>4.8</td>
<td>4.1</td>
<td>6.2</td>
</tr>
<tr>
<td>Tarsus</td>
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<td>3.9</td>
<td>1.3</td>
<td>2.7</td>
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<td>20.7mm</td>
<td>15.1mm</td>
<td>22.4mm</td>
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</table>

Dorsum widely flared, fourth coxae clearly visible from above. Eye tubercle located in the median portion of the cephalothorax, without dorsal spines. Areas not clearly defined, but very small tubercles in median section of first area; paired spines on fourth area. Dorsal surface relatively smooth. Venter with some small granulations and hairs. First and second free tergites each with a small lateral extension as illustrated.

Legs having all segments with scattered tubercles and hairs. Fourth legs enlarged, with spines and tubercles on fourth femur, patella, and tibia. These are smaller on the patella and tibia. Fourth trochanter with inner heavy spines; fourth coxae with dorsolateral spine. Tarsal segments: 7-11-7-8. Distitarsi of both first and second tarsi, three in number.

Palpus: trochanter, 0.8 mm long; femur, 1.3; patella, 1; tibia, 1.3; and tarsus, 0.8. Total length, 5.2 mm. All segments clothed with small hairs and scattered tuberculations. Chelicerae normal in size.

Entire dorsum reddish brown, darker markings on spines and at lateral borders. A complex white pattern is present on the cephalothorax and the lateral and posterior borders of the dorsum. Scattered yellowish markings also are present in the median area. The first three pairs of legs are somewhat lighter than the dorsum, while the fourth pair are somewhat darker.

Type Locality—Male holotype from 8 km NW Paraje Nuevo, Veracruz, México, 3 August 1967, collected by J. Reddell and J. Fish.

Vonones Simon


Inasmuch as there is a very long synonymy for this genus, only a portion has been used here. For a complete synonymy, please see Goodnight and Goodnight, 1953.

Cosmetids with simple untoothed double claws on the third and fourth legs, with five segments in the first tarsus. Distitarsi of both first and second tarsi with three segments. Dorsum with five areas, variously armed with tubercles and spines, without a large median spine on the third area.

Genotype: Vonones octotuberculatus Simon.

Vonones ornata (Wood) Figs. 21-22


Male—Total length of body, 3.9 mm. Cephalothorax, 1.6 mm. Width of body at widest point, 3.3 mm.

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<td>Patella</td>
<td>0.4</td>
<td>0.6</td>
<td>0.6</td>
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<tr>
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<td>4.4mm</td>
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<td>8.1mm</td>
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</table>

Entire dorsum covered with fine granulations which are larger at the posterior portion of the dorsal scute, the free tergites and the free sternites. Eye tubercle removed from the anterior margin of the cephalothorax. Five areas of the dorsal scute clearly defined; with very low paired tubercles on the first area, low spine on the third area, and a row of small tubercles in the median portion of the fourth area. Ventrally the surfaces are finely granulate. The anterior-lateral surface of the fourth coxae each bear a group of small tubercles.

All segments of the legs but the tarsi with granulations. Third and fourth femora somewhat curved. Tarsal segments: 5-10-7-7. Distitarsi of both first and second tarsi with three segments.

Palpus: trochanter, 0.2 mm long; femur, 0.7; patella, 0.4; tibia, 0.7; and tarsus, 0.3. Total length, 2.3 mm. Palpus characteristically flattened; first segment of chelicera dorsally with tuberculations.

General all over coloration of the body is reddish brown, white markings as in illustrations. Some darker mottling is present along the lateral and posterior margins. Legs somewhat darker at distal ends. Palpi slightly lighter than dorsum.

Female—Total length of body, 3.7 mm. Cephalothorax, 0.9; width of body at widest portion, 2.5 mm.

Similar to male, but with somewhat smaller spines on the third area; and in the specimen illustrated, the fourth femora were somewhat squared off at their anterior borders.


Members of this species are found in many localities, from Florida, the gulf states, and Texas, and into México. In this large area, the individuals illustrate a wide range of variations, presenting the difficult problem of what constitutes a valid variation or a new species! We have preferred a more conservative approach and have included illustrations of the variations we have recognized. For a more detailed discussion of this problem, please consult Goodnight and Goodnight, 1953a.

LITERATURE CITED


TWO NEW TROGLOBITIC AMBLYPYGIDA OF THE GENUS *TARANTULA*
FROM MEXICAN CAVES (ARACHNIDA)

J. Mark Rowland

Department of Biology, and The Museum, Texas Tech University
Lubbock, Texas 79409

INTRODUCTION

This paper is concerned with the description of two very interesting new species of troglobitic Amblypygida from southern México, one from Tabasco, another from Yucatán. These are the first troglobites of this order of arachnids reported from the family Tarantulidae, and from the New World. *Charinus dibilemma* (Simon) is the only other known troglobite. Chamberlin and Ivie (1938) report *T. fuscimana* (C.L. Koch) from a number of caves in Yucatán. It is interesting to note that they record this species from the very caves in which one of the new troglobites occurs. It is possible that they collected specimens of the troglobitic species, but failed to notice them in their collections, or passed them off as immature or freshly molted specimens without thorough examination. In still other collections from the type locality of the new Yucatán species I have seen fully eyed and pigmented amblypygids which are perhaps referable to *T. fuscimana*.

While amblypygids have long excited interest, as a taxonomic unit they remain generally imperfectly known, although Weygoldt (1972) has made great progress in the genus *Charinus*. Our poor knowledge is due largely to their reclusive habits which allow them to escape the general collector. They are relatively modestly represented in collections both in numbers of species and specimens. Unfortunately there is little hope of accurately identifying immature specimens, which further obscures our knowledge of this group.

The order Amblypygida in México is represented in the literature by only four described species: *Tarantula crassimana* (C.L. Koch), *T. whitei* (Gervais), *T. fuscimana* and *Acanthophrynus coronatus* (Butler). Reddell (1965, 1971) and Reddell and Mitchell (1971a, 1971b) gave the most thorough account of the records of these species, though they list cave records only. Other records of amblypygids in México are given by Chamberlin and Ivie (1938) and Ryckman (1956). Recent advances in the study of this order (Weygoldt and Levi, pers. comm., and Quintero, indirect pers. comm.) show, however, that traditionally used characters may not be entirely adequate to correctly distinguish species. This information might shed doubt on current methods of distinguishing Mexican species and further complicates the problem of identifying the considerable array of forms occurring in México.

Once again I must tender my thanks to Dr. and Mrs. Clarence Goodnight and Mr. James Reddell for providing excellent collections, and to Dr. Robert W. Mitchell for his continued support.

FAMILY TARANTULIDAE

*Tarantula chacmool*, new species

Figs. 1-2. Dorsal view of carapace: 1, *Tarantula chacmool*, showing reduced eyes; 2, *Tarantula* sp. of similar size, showing normally developed eyes. Note also relative pigmentation.
Paratypes—One juvenile taken at the same locality, on the same date by the same collectors as the holotype, deposited in The Museum, Texas Tech University, Lubbock, Texas; one specimen of undetermined age and sex and one juvenile, taken in Grutas de Balankanche (Balaam Canche), Chichén Itzá, Yucatán, Méxíco, in July 1948, by C. and M. Goodnight, and both deposited in the American Museum of Natural History.

Description—Cephalothorax. Carapace with very fine, widely scattered granulations, 1.3 times wider than long; epistome visible from above, anterior margin of carapace between the limits of the lateral eye groups nearly straight, with 18 setae mounted on short, but well-defined tubercles, the three outermost on each side pointing diagonally inward, the next internal four on each side pointing diagonally outward, and the middle two pointing nearly straight ahead, similar setae border remainder of carapace, but not as closely associated; emarginate posteriorly; eyes reduced in size and completely lacking pigmentation, median eyes separated by more than three times their diameter, ocular mound nearly obsolete, with two median setae longitudinally in line, all lateral eyes slightly larger than median eyes, none contiguous, no evidence of tapetum; tritosternum about three times longer than basal width, with 12 paired and one median setae; tetrasternum and pentasternum nearly equal in dimensions, with four and two setae respectively; metasternum with four setae.

Abdomen more sparsely granular than carapace; dorsoventral muscles and heart visible through cuticle; terga III-VIII with median edges produced anteriorly and emarginate posteriorly; terga IV-VIII decreasing slightly in width and increasing slightly in length posteriorly; tergum XII (anal plate) not incrassate. Sternum II (genital sternum) produced distally; sterna III and IV emarginate anteromedially, produced posteromedially; sterna V-VIII decreasing slightly in width and increasing slightly in length posteriorly.

Pedipalps. Anterodorsal margin of femur with six spines of the following proportions (numbered from proximal to distal) 3 > 2 > 1, 5 > 4, 6, tubercle follows 6 (tubercles have apical setae, spines do not); anterodorsal margin of femur with seven spines of the following proportions, 1 > 2 > 6 > 3 > 4, 7 > 5, tubercles follow 6 and 7; anterodorsal margin of patella with nine spines of the following proportions, 3 > 4 > 5 > 6 > 7 > 2 > 8 > 1, 9, tubercle follows 9; anterodorsal margin of patella with 11 spines of the following proportions 7 > 3 > 5 > 9 > 1 > 4 > 10 > 6, 8 > 2 > 11; anterodorsal margin of tibia with seven spines of the following proportions, 2 > 1 > 5 > 4 > 3 > 7 > 6; anterodorsal margin of tibia with six spines of the following proportions, 3 > 2 > 6 > 5 > 4 > 1, tubercles follow 2 and 3.

Legs. Segments elongate, more densely granular than carapace; patella of all legs somewhat darker than other segments; femur of leg I 3.5 times longer than carapace; length of segments given in Table 1.

Comparisons—See under T. chiztun.

Measurements—Total length of the holotype is
20.1. The carapacial length and width is 7.3 and 10.1 respectively. See also Table 1. All measurements are in millimeters.

Variation—Specimens from Grutas de Balankanche differ most significantly from those of the type locality in retaining some evidence of the tapetum in the lateral eyes. Also, Balankanche paratypes have 15 and 16 tritosternal setae and four pentasternal setae, and a few other minor setational differences exist.

Distribution—Tarantula chacmool is known only from Actun Kaua and Grutas de Balankanche, though it is undoubtedly distributed through many caves of the area.

Etymology—The specific name is taken from Chac Mool, the reclining Toltec-Itza figure which decorates several edifices at the nearby archeological site of Chichén Itzá.

Table 1. Tarantula chacmool.

<table>
<thead>
<tr>
<th>Pedipalp</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coxa</td>
<td>1.4</td>
<td>1.5</td>
<td>2.0</td>
<td>2.3</td>
</tr>
<tr>
<td>Trochanter</td>
<td>0.7</td>
<td>0.7</td>
<td>1.0</td>
<td>1.3</td>
</tr>
<tr>
<td>Femur</td>
<td>2.5</td>
<td>12.8</td>
<td>7.8</td>
<td>9.0</td>
</tr>
<tr>
<td>Patella</td>
<td>2.6</td>
<td>0.9</td>
<td>0.9</td>
<td>1.0</td>
</tr>
<tr>
<td>Tibia</td>
<td>1.6</td>
<td>30.8</td>
<td>11.6</td>
<td>—</td>
</tr>
<tr>
<td>Basitarsus</td>
<td>1.9</td>
<td>38.6</td>
<td>1.0</td>
<td>—</td>
</tr>
<tr>
<td>Tarsus</td>
<td></td>
<td>38.6</td>
<td>1.0</td>
<td>—</td>
</tr>
</tbody>
</table>

Tarantula chiztun, new species

Holotype—An adult, taken in Las Grutas de Cocomá, Teapa, Tabasco, México, on 1 August 1948, by C. and M. Goodnight and deposited in the American Museum of Natural History.

Description—Cephalothorax. Carapace with very fine, widely scattered granulations, 1.2 times wider than long; epistrostrum not visible from above, anterior margin of carapace between the limits of the lateral eye groups emarginate medially, forming two lateral lobes over the chelicerae, with 14 setae mounted on short, poorly defined tubercles, the left outermost and right three outermost pointing diagonally inward; the left five next outermost and right four next outermost pointing diagonally inward; the middle two pointing nearly straight ahead, similar setae border remainder of carapace at about same density; emarginate posteriorly; eyes reduced in size and completely lacking pigment, median eyes separated by more than three times their diameter, ocular mound nearly obsolete, with two lateral setae, all lateral eyes slightly larger than median eyes, none contiguous, the median the smallest, tapetum clearly visible in some; tritosternum slightly less than four times longer than basal width, with 16 paired and one median setae; tetrosternum and pentasternum nearly equal in dimensions, with four and two setae respectively; metasternum with six setae.

Abdomen much more sparsely granular than carapace; dorsoventral muscles and heart visible through cuticle; terga III-VIII with median edges produced anteriorly and emarginate posteriorly; terga IV-VII decreasing slightly in width and increasing slightly in length posteriorly; tergum XII (anal plate) incrassate. Sternum II (genital sternum) produced distally; sternum III and IV emarginate anteromedially, produced posteromedially, sterna V-VIII decreasing slightly in width and increasing slightly in length posteriorly.

Pedipalps. Anterodorsal margin of femur with six spines of the following proportions (numbered from proximal to distal), 3 > 2 > 1 > 5 > 4 > 6, tubercles follow 2, 5 and 6; anteroventral margin of femur with nine spines of the following proportions, 1 > 3 > 6 > 4, 5 > 8 > 7 > 9, tubercles follow 3 and 5; anterodorsal margin of patella with nine spines of the following proportions, 3 > 6 > 4 > 5 > 2, 7 > 8 > 9 > 1, tubercles follow 9; anteroventral margin of patella with 11 spines of the following proportions, 8 > 3 > 6 > 10 > 2, 5 > 11 > 4 > 9 > 1, tubercles follow 2, 5 and 11; anterodorsal margin of tibia with seven spines of the following proportions, 2 > 1 > 6 > 5 > 4 > 7 > 3; anteroventral margin of tibia with five spines of the following proportions, 2 > 1 > 5 > 4 > 3.

Legs. Segments long and more densely granular than abdomen, but more sparsely granular than carapace; patella of all legs much darker than other segments, femur of leg I slightly less than 3.5 times longer than carapace; length of leg segments given in Table 2.

Comparisons—Tarantula chiztun and T. chacmool are easily distinguished from all other New World amblypygids by their extremely reduced eyes, and depigmentation. They are quite small, being about half the size of epigean Mexican species of the genus Tarantula. The limbs, notably the first walking legs, are also proportionately longer.

The most distinctive and probably the most significant differences between *T. chiztun* and *T. chacmool* are the structure of the anterior margin of the carapace, and the epirostrum. In *T. chacmool* the anterior margin is nearly straight, but in *T. chiztun* it is characteristically lobed over the chelicerae and deeply emarginate medially. The epirostrum is not visible from above in *T. chiztun*, but is in *T. chacmool*. Other characters distinguishing these species are the spina­tions of the pedipalps. The anterodorsal and antero­ventral spination of most pedipalpal segments are different, however the most obvious differences are apparent in the spination of the anteroventral margin of the femurs.

**Measurements**—Total length of the holotype is 22.7. The carapacial length and width is 8.7 and 12.5 respectively. See also Table 2.

**Variation**—Only one specimen of this species was available for study.

**Distribution**—*Tarantula chiztun* is known only from Las Grutas de Coconá, Teapa, Tabasco, México.

**Etymology**—The specific name is the Mayan word for amblypygid, used as a noun in apposition.

**Remarks**—The case of two closely related animals, one a troglobite, the other a troglophile, occurring in the same cave provides an extremely interesting problem for study. *Tarantula fuscimana* and *T. chacmool* present such a problem. The likely general explanation of this situation may appear relatively simple. The period of original colonization of the caves could have been followed by a period of unfavorable climate or topographic change that forced the colonizing species out of the area, except for isolated pockets such as in caves. With amelioration of climate the original colonizing species then could have reinvaded the area. Enough divergence on the part of either or both the original (ancestral) and relict populations would be necessary to establish reproductive isolation in order to maintain genetic integrity of both populations once they came into contact.

Table 2. *Tarantula chiztun.*

<table>
<thead>
<tr>
<th></th>
<th>Pedipalp</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coxa</td>
<td>2.0</td>
<td>2.5</td>
<td>2.3</td>
<td>2.5</td>
<td>2.9</td>
</tr>
<tr>
<td>Trochanter</td>
<td>0.7</td>
<td>1.3</td>
<td>1.0</td>
<td>1.1</td>
<td>1.3</td>
</tr>
<tr>
<td>Femur</td>
<td>4.2</td>
<td>13.6</td>
<td>9.8</td>
<td>11.1</td>
<td>9.3</td>
</tr>
<tr>
<td>Patella</td>
<td>4.2</td>
<td>1.0</td>
<td>1.4</td>
<td>1.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Tibia</td>
<td>2.1</td>
<td>28.6</td>
<td>14.0</td>
<td>16.2</td>
<td>15.4</td>
</tr>
<tr>
<td>Basitarsus</td>
<td>2.3</td>
<td>—</td>
<td>1.0</td>
<td>1.3</td>
<td>1.1</td>
</tr>
<tr>
<td>Tarsus</td>
<td></td>
<td></td>
<td>1.4</td>
<td>1.6</td>
<td>1.4</td>
</tr>
</tbody>
</table>

**LITERATURE CITED**


A CHECKLIST OF THE CAVE FAUNA OF MEXICO. IV. ADDITIONAL RECORDS FROM THE SIERRA DE EL ABRA, TAMAU LIPAS AND SAN LUIS POTOSI

James R. Reddell and William R. Elliott

Department of Biology, Texas Tech University
Lubbock, Texas 79409

INTRODUCTION

Since the publication by Reddell and Mitchell (1971) of the first report on the cave fauna of the Sierra de El Abra numerous new records have become available. These new records are largely the result of intensive exploration in caves along the virtually inaccessible crest of the Sierra de El Abra. In addition, however, previously unstudied taxa (such as the Diptera) have now been identified. There have also been published several papers describing new taxa.

Although the previous checklist and this list now bring to about 265 the total species known from the caves of the Sierra de El Abra many species remain to be added to the list. The terrestrial isopods (under study by George A. Schultz), the very rich centipede fauna, the beetle fauna, and the mites are among groups only very poorly known. Besides these obvious exceptions continued intensive exploration will doubtless reveal many species of troglobite of the greatest systematic and zoogeographic interest.

The troglobite fauna of the Sierra de El Abra is much less well developed than that of the adjoining Sierra de Guatemala or nearby regions. Mitchell (1969) has discussed the striking differences between the faunas of lowland tropical regions and the higher mountain regions. It is not appropriate here to discuss his conclusions, but as the Sierra de El Abra becomes better known its terrestrial troglobite fauna has also become expanded to include a total of 12 species, as opposed to 9 species of aquatic troglobite. The following list includes all of the troglobites now known from the Sierra de El Abra.

Copepods
- Diaptomus (Microdiaptomus) cokeri Osorio Talavera

Ostracods
- Sphaeromicola cirolanae Rioja

Isopods
- Speocirolana bolivari (Rioja)
- S. pelaezi (Bolivar)
- Spheramarillo cavernicola Mulaik
- Brackenridgia bridgesi (Van Name)
- Cylindroniscus vallesensis Schultz

Mysids
- Spelaeomysis quinterensis (Villalobos)

Shrimp
- Troglocubanus sp.

Scorpions
- Typhlochactus elliotti Mitchell

Pseudoscorpions
- Aphrostochthonius parvus Muchmore
- A. russelli Muchmore
- Paravachonium bolivari Beier

Schizomids
- Agastoschizomus lucifer Rowland

Opilionids
- Hoplobunus boneti (Goodnight and Goodnight)
Millipeds

*Mexiterpes sabinus* Causey

Undescribed trichopolydesmid

Thysanurans

Undescribed nicoletiid

Fish

*Astyanax antrobius* (Alvarez)

*A. hubbsi* (Alvarez)

*A. jordani* (Hubbs and Innes)

In the following list, with but few exceptions, only new records and significant new bibliographic citations are included. Where recent taxonomic studies (such as that of the spiders of the genus *Loxosceles*) have resulted in possible confusion over previous identifications or where specimens previously listed only by the generic name are now identified to the species level the records are repeated. The cave names used are those standardized in the files of the Association for Mexican Cave Studies. All of the caves in the Sierra de El Abra from which collections have been made are located on the accompanying map (Fig. 1). Troglobites are indicated by an asterisk preceding the taxa name.

Many people have made significant contributions to our continuing study of the cave fauna of the Sierra de El Abra. We wish to thank in particular N.B. Causey, W.J. Gertsch, T.H. Hubbell, R.W. Mitchell, and W.H. Russell for their interest and support of the study of the cave fauna of this region. We also wish to express our appreciation to the following individuals who have aided in collecting or who have contributed specimens: Miles Abernathy, Craig Bittinger, Steve Bittinger, Don Broussard, Mel Brownfield, Jerry Cooke, John A.L. Cooke, John Fish, Blake Harrison, Roy Jameson, Jimmy Jarl, Jan Lewis, Jim McIntyre, David McKenzie, R.W. Mitchell, Neal Morris, James Peck, Stewart Peck, Terry Raines, W.H. Russell, Jim Shepperd, Pierre Strinati, Ann Sturdivant, Jack White, and Suzanne Wiley.

We wish also to thank the following systematists for their identification of the indicated taxa: D.M. Anderson, beetles; T.C. Barr, Jr., beetles; T.E. Bowman, isopods; N.B. Causey, millipeds; K. Christiansen, collembolans; W.E. Duellman, frogs; R.C. Froeschner, hemipterans; R.J. Gagné, flies; G.E. Gates, earthworms; W.J. Gertsch, amblypygids, spiders; R. Gonzalez R., diplurans; A.B. Gurney, roaches; J.L. Herring, hemipterans; H.H. Hobbs, Jr., ostracods; T.H. Hubbell, crickets; J.M. Kingsolver, beetles; R.W. Mitchell, fish, parrots; W.B. Muchmore, pseudoscorpions; V. Roth, spiders; C.W. Sabrosky, flies; G.A. Schultz, isopods; R.L. Smiley, mites; P.J. Spangler, beetles; T.J. Spilman, beetles; W.R. Suter, beetles; R.E. Warner, beetles; Pedro Wygodzinsky, thysanurans and diplurans.

**PHYLUM ANNELIDA**

**CLASS CLITELLATA**

Order Oligochaeta

**Family Dichogasteridae**

*Dichogaster* sp. (det. G.E. Gates)


Comment—Material from Cueva de El Pachón was too poorly preserved to be positively placed in this genus.

**PHYLUM ARTHROPODA**

**CLASS CRUSTACEA**

Order Podocopida

Family Octocytheridae

*Entocythere claytonhoffi* Rioja

Comment—The record of this species from Cueva de San Nicolas, Tamaulipas, is in error and refers instead to Cueva de San Nicolas, San Luis Potosí, a cave in the Aquismon region.

*Sphaeromicola cirolanae* Rioja (det. H.H. Hobbs)

Records—San Luis Potosí: Cueva de la Curva, Sótano de Matapalma, Sótano de las Piedras, and Sótano de Yerbaniz; Tamaulipas: Cueva de El Pachón and Sótano de El Venadito.


Order Isopoda

Family Cirolanidae

*Spectroloplana bolivari* (Rioja)


*Spectroloplana pelaezi* (Bolivari) (det. T.E. Bowman)


Family Trichoniscidae

*Spectroloplana bolivari* (Rioja)


*Spectroloplana pelaezi* (Bolivari) (det. T.E. Bowman)


Family Trichoniscidae

*Cylindroniscus sp. nr. vallesensis* Schultz (det. G.A. Schultz)

Records—San Luis Potosí: Sótano de Yerbaniz.
Order Mysidacea

Family Lepidomysidae

*Speleomysis quinterensis* (Villalobos)


Order Decapoda

Family Astacidae

*Procambarus (Ortmannicus) toltecae* Hobbs

Comment—This species does not occur in the Sierra de El Abra. The record of this species from Cueva de San Nicolas, Tamaulipas, refers instead to Cueva de San Nicolas, San Luis Potosí, a cave in the Aquismón region.

CLASS ARACHNIDA

Order Chelonethida

Family Chernetidae

Unidentified genus & species (det. W.B. Muchmore)


Records—*San Luis Potosí*: Sótano del Tigre and Cueva de Valdosa; *Tamaulipas*: Cueva de El Pachón and Grutas de Quintero.

Comment—Specimens listed earlier as an unidentified genus and species of chernetid from Grutas de Quintero and Cueva de Valdosa have now been determined to belong to this genus.

? *Semeiochernes* sp. (det. W.B. Muchmore)

Records—*San Luis Potosí*: Cueva de los Monos and Cueva de Valdosa; *Tamaulipas*: Cueva Grande del Arroyo Seco, Cueva de la Florida, and Cueva de San Rafael de los Castros.

Comment—All previous records of this genus in Mexican caves should be considered questionable.

Family Chthoniidae

*Aphrastochthonius parvus* Muchmore

Records—*Tamaulipas*: Cueva de la Florida, *Hesperochernes* sp. (det. W.B. Muchmore)


Comment—This species was previously listed as *Aphrastochthonius* sp.

*Aphrastochthonius russellii* Muchmore

Records—*San Luis Potosí*: Cueva Pinta.


Family Vachoniidae

*Paravachonium bolivari* Beier


Order Amblypygida

Family Tarantulidae

*Tarantula crassimanus* (C.L. Koch) (det. W.J. Gertsch)

Records—*San Luis Potosí*: Cueva de Tantobal; *Tamaulipas*: Grutas de Quintero.

*Tarantula fuscimana* (C.L. Koch) (det. W.J. Gertsch)

Records—*San Luis Potosí*: Cueva Chica, Cueva de Tininul n. 1, Sótano de la Tinaja, and Sótano de Yerbaniz.

Comment—The record from Cueva de Tininul n. 1 was previously cited as *Tarantula* sp.

Order Araneae

Suborder Mygalomorphae

Family Theraphosidae

*Aphonopelma* sp. (det. V. Roth)

Records—*San Luis Potosí*: Sótano de la Tinaja.

Comment—No adults were collected in this cave.

*Schizopelma* sp. (det. W.J. Gertsch)

Records—*San Luis Potosí*: Cueva Chica and Sótano de las Piedras; *Tamaulipas*: Cueva de los Pájaros.

Comment—These records were previously listed under *Aphonopelma* sp.

Suborder Araneomorphae

Family Argiopidae

*Meta* sp. (det. W.J. Gertsch)

Records—*Tamaulipas*: Cueva de San Rafael de los Castros.

Comment—Only immature specimens were collected.

Family Clubionidae

*Corinna* sp. (det. W.J. Gertsch)

Records—*Tamaulipas*: Cueva de San Rafael de los Castros.

Family Ctenidae

*Ctenus* sp. (det. W.J. Gertsch)

Records—*Tamaulipas*: Cueva de San Rafael de los Castros.

Family Linyphiidae

*Erigone monterreyensis* Gertsch (det. W.J. Gertsch)

Records—*San Luis Potosí*: Grutas de Quintero.

Family Nesticidae

*Nesticus* sp. (det. W.J. Gertsch)

Records—*Tamaulipas*: Cueva de El Pachón.

Comment—This record was previously listed under *Nesticus pallidus*.

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*Nesticus pallidus* Emerton (det. W.J. Gertsch)

Records—San Luis Potosí: Sótano de las Piedras.

Family Pholcidae

*Metagonia* sp. (det. W.J. Gertsch)

Records—San Luis Potosí: Sótano de las Piedras; Tamaulipas: Sótano de Santa Elena.

*Metagonia pasquinii* Brignoli

Records—San Luis Potosí: Cueva de Los Sabínos.


Comment—This species was previously cited as *Metagonia tinaja* Gertsch.

*Metagonia tinaja* Gertsch (det. W.J. Gertsch)

Records—San Luis Potosí: Sótano de Matapalma; Tamaulipas: Sotano de El Venadito.


*M. boneti* Gertsch (det. W.J. Gertsch)

Records—San Luis Potosí: Sótano de los Monos and Cueva de Taninul n. 1.


*M. texanus* Banks (det. W.J. Gertsch)

Records—San Luis Potosí: Sótano de Yerbaniz.


Order Opilionida

Family Cosmetidae

*Cynorta jamesoni* Goodnight and Goodnight

Records—San Luis Potosí: Sótano de la Cuesta and Sótano de la Estrella; Tamaulipas: Cueva de la Florida and Cueva de El Pachón.


Family Phalangodidae

*Hoplobunus boneti* (Goodnight and Goodnight)

Records—San Luis Potosí: Sótano de Coati-mundi, Cueva de los Monos, Sótano de la Pipa, and Cueva de Tanchipa.


Order Ricinulei

Family Ricinoididae

*Cryptocellus orsorioi* Bolívar


*Cryptocellus pelaezi* Coronado

Bibliography—Coronado, 1970.

Order Acarina

Family Cheyletidae

*Cheyletus malaccensis* Oud. (det. R.L. Smiley)

Records—Tamaulipas: Cueva de El Pachón.

Family Erythraeidae

Unidentified genus and species (det. W.R. Elliott)

Records—San Luis Potosí: Sotano de El Venadito.


Family Myobiidae

*Jamesonia arganoi* Vomero

Records—San Luis Potosí: Cueva de Los Sabínos.


Comment—This mite was taken from *Desmodus rotundus murinus*.

Family Rhagidiidae

*Rhagidia trisetatus* Elliott and Strandtmann

Records—San Luis Potosí: Sótano de la Cuesta; Sótano de la Estrella, Joya de Higuerón, and Cueva de los Monos.


*Rhagidia weyerensis* (Packard)


Family Rosensteinidae

*Nycteriglyphus* sp. (det. R.L. Smiley)

Records—San Luis Potosí: Cueva de Los Sabínos.

Family Trombiculidae

Unidentified genus and species (det. W.R. Elliott)

Records—Tamaulipas: Sotano de El Venadito.


*Microtrombicula boneti* (Hoffmann)
Comment—This species was previously listed as *Eltonella* (*Coecicula*) *boneti*.

**CLASS DIPLOPODA**

Order Chordeumida

*Mexiterpes* sp. (det. N.B. Causey)

Records—San Luis Potosí: Cueva de los Monos.

Order Julida

*Diploius latistriatus* (Curtis) (det. N.B. Causey)

Records—San Luis Potosí: Cueva de las Cuatas.

Order Polydesmida

*Strongyloidesmus conspicuus* Causey

Records—San Luis Potosí: Sótano del Tigre and Sótano de la Tinaja; *Tamaulipas*: Sótano de El Venadito.


Order Xystodesmidae

*Rhysodesmus* sp. (det. N.B. Causey)

Records—San Luis Potosí: Cueva Chica, Cueva de los Monos, and Cueva de Tantobal.

Order Spirostreptida

Family Entomobryidae

*Pseudosinella strinatii* Christiansen (det. K. Christiansen)

Records—San Luis Potosí: Cueva de los Monos, Cueva Pinta, Cueva de Taninul n. 1, Sótano del Tigre, and Sótano de Yerbaniz; *Tamaulipas*: Cueva de la Florida, Cueva de El Pachón, and Cueva de San Rafael de los Castros.


Family Hypogastruridae

*Acherontiella sabina* Bonet (det. K. Christiansen)

Records—San Luis Potosí: Ventana Jabalí and Cueva de los Monos; *Tamaulipas*: Cueva de San Rafael de los Castros.

Family Isotomidae

*Proisotoma* sp. (det. K. Christiansen)

Records—San Luis Potosí: Sótano de la Tinaja.

Order Blattaria

Family Blattellidae

*Nesomyelacris reddelli* Fisk and Gurney

Records—San Luis Potosí: Cueva Chica, Cueva de los Monos, Cueva Pinta, Cueva de Taninul n. 1, Sótano del Tigre, and Sótano de Yerbaniz; *Tamaulipas*: Cueva de la Florida, Cueva de El Pachón, and Cueva de San Rafael de los Castros.

Family Blattidae

*Periplaneta* sp. (det. A.B. Gurney)

Records—San Luis Potosí: Sótano de la Tinaja.

Bibliography—Fisk and Gurney, 1972.
Family Polyphagidae

*Homoeogamia mexicana* Burmeister (det. A.B. Gurney)
Records—San Luis Potosí: Cueva de los Monos.

Order Saltatoria

Family Gryllidae

*Paracophus apterus* Chopard (det. T.H. Hubbell)
Records—San Luis Potosí: Cueva Escondida, Sótano de Ferrocarril, Ventana Jabali, Cueva de los Monos, Sótano de las Piedras, and Cueva de Valdosa; *Tamaulipas*: Cueva Grande del Arroyo Seco, Cueva de la Florida, Cueva de los Pájaros, Cueva de San Rafael de los Castros, and Sótano de Santa Elena.


*Paracophus placonotus* Hubbell (det. T.H. Hubbell)
Records—San Luis Potosí: Cueva Chica and Cueva de Tantabal.


Family Lygaeidae

Unidentified genus and species (det. J.L. Herring)
Records—San Luis Potosí: Sotano de la Tinaja.

Family Naucoridae

*Ambrysus melanopterus* Stal (det. R.C. Froeschner)
Records—San Luis Potosí: Cueva Chica.

Family Reduviidae

*Repipita* sp. (det. R.C. Froeschner)
Records—San Luis Potosí: Joya de Higuerón.

Order Coleoptera

Family Alleculidae

*Hymenorusc* sp. (det. T.J. Spilman)
Records—San Luis Potosí: Cueva de Tanchipa.
Comment—Two larvae of this genus were collected in this cave.

*Lystronychus* sp. (det. T.J. Spilman)
Records—*Tamaulipas*: Grutas de Quintero.

Family Carabidae

*Masoreine* spp. (det. T.C. Barr, Jr.)
Records—Tamaulipas: Cueva de la Florida.

*Amara* sp. (det. T.C. Barr, Jr.)
Records—San Luis Potosí: Sótano de Yerbaniz.

*Clivina* sp. (det. T.C. Barr, Jr.)
Records—San Luis Potosí: Sótano de Yerbaniz.

*Colpodes* sp. (det. T.C. Barr, Jr.)
Records—San Luis Potosí: Sótano de Yerbaniz; *Tamaulipas*: Sótano de El Venadito.

*Pachyteles urrutiae* Bolivar (det. T.C. Barr, Jr.)
Records—San Luis Potosí: Cueva de Taninul n. 1.

*Schizogenius* sp. (det. T.C. Barr, Jr.)
Records—San Luis Potosí: Sótano de Yerbaniz.

*Tachys* (s.str.) sp. (det. T.C. Barr, Jr.)
Records—San Luis Potosí: Sótano de Matapalma and Sótano de Yerbaniz; *Tamaulipas*: Sótano de El Venadito.

*Tachys* (s.lat.) sp. (det. T.C. Barr, Jr.)
Records—San Luis Potosí: Sótano de las Piedras and Sótano de Yerbaniz; *Tamaulipas*: Cueva de El Pachón.

Family Curculionidae

*Dioptrhoporus* sp. (det. R.E. Warner)
Records—Tamaulipas: Cueva de la Florida.

Family Dryopidae

*Pelonomus* sp. (det. P.J. Spangler)
Records—*Tamaulipas*: Cueva de la Florida.

Family Histeridae

*Epirus* sp. (det. J.M. Kingsolver)
Records—San Luis Potosí: Cueva del Nacimiento del Río Choy and Sótano de Yerbaniz; *Tamaulipas*: Cueva de El Pachón.

*Euspilotus* sp. (det. J.M. Kingsolver)
Records—San Luis Potosí: Ventana Jabali; *Tamaulipas*: Sótano de Santa Elena.

Family Leiodidae

Dissochaetus aztecs* Szymczakowski
Records—*Tamaulipas*: Cueva de El Pachón.


*Ptomaphagus* (Adelops) sp.
Records—San Luis Potosí: Sótano de las Piedras.


*Ptomaphagus* (Adelops) elabra* Peck

Family Limnichidae
Unidentified genus and species (det. P.J. Spangler)
Records—San Luis Potosí: Sótano de la Tinaja and Sótano de Yerbaniz.

Family Pselaphidae
Unidentified genus & species (det. D.M. Anderson)
Records—Tamaulipas: Grutas de Quintero.
Comment—A larva of this family was collected.

Family Scydmaenidae
“Gonnophron” sp. nr. humile Casey (det. W.R. Suter)
Records—San Luis Potosí: Sótano de Yerbaniz.
Comment—This is apparently a new species.

Family Staphylinidae
Belonuchus sp. nr. moquinus Casey (det. L.H. Herman)
Records—San Luis Potosí: Ventana Jabalí, Sótano de los Monos, Sótano de las Piedras; Tamaulipas: Cueva del Abra.
Biocrypta sp. (det. L.H. Herman)
Records—Tamaulipas: Sótano de El Venadito.
Diochus sp. (det. L.H. Herman)
Records—San Luis Potosí: Sótano de la Tinaja.
Homaeotarsus sp. (det. L.H. Herman)
Records—San Luis Potosí: Cueva Chica, Sótano de Matapalma, and Sótano de Yerbaniz.
Megalinus sp. (det. L.H. Herman)
Records—San Luis Potosí: Sótano de la Tinaja.
Orus (Nivorus) sp. (det. L.H. Herman)
Records—San Luis Potosí: Sótano de la Tinaja.
O sorius sp. (det. L.H. Herman)
Records—San Luis Potosí: Sótano de la Tinaja.
Stilicolina condei Jarrige (det. L.H. Herman)
Records—San Luis Potosí: Sótano de Yerbaniz.
Tachyperus sp. (det. L.H. Herman)
Records—San Luis Potosí: Sótano de la Tinaja.

Family Tenebrionidae
Eleodes sp. (det. T.J. Spilman)
Records—Tamaulipas: Cueva del Abra.
Eleodes rugosa Perbosc. (det. T.J. Spilman)
Records—Tamaulipas: Grutas de Quintero.
Zophobas atratus (F.) (det. T.J. Spilman)
Records—San Luis Potosí: Cueva del Nacimiento del Río Choy.

Order Diptera
Family Milichiidae
Milichia sp. (det. C.W. Sabrosky)
Records—San Luis Potosí: Cueva Chica.
Comment—Only a single damaged female was available for study.

Family Psychodidae
Unidentified genus and species (det. R.J. Gagné)
niz; Tamaulipas: Cueva de San Rafael de los Castros.

CLASS MAMMALIA
Order Chiroptera

Family Phylllostomatidae
Artibeus jamaicensis yucatanicus Allen
Records—San Luis Potosí: Cueva del Nacimiento del Río Coy.
Artibeus lituratus palmarum J.A. Allen & Chapman
Records—San Luis Potosí: Cueva del Nacimiento del Río Coy.

Desmodus rotundus murinus Wagner
Records—San Luis Potosí: Cueva del Nacimiento del Río Coy.

Micronycteris megalotis mexicana Miller
Records—San Luis Potosí: Cueva de El Nilo.

Family Mormoopidae
Mormoops megalophylla megalophylla Peters
Records—San Luis Potosí: Cueva del Nacimiento del Río Coy.
Pteronotus davii fulvus (Thomas)
Records—San Luis Potosí: Cueva del Nacimiento del Río Coy.
Pteronotus parnelli (Gray)
Records—San Luis Potosí: Cueva del Nacimiento del Río Coy.
Pteronotus personatus psilatis (Dobson)
Records—San Luis Potosí: Cueva del Nacimiento del Río Coy.

Family Natalidae
Natalus stramineus saturatus Gray
Records—San Luis Potosí: Cueva del Nacimiento del Río Coy.

LITERATURE CITED
Vigna Taglianti, A. 1972. The Trechinae of the Italian Zoological Expedition to Mexico, 1969 (Coleoptera,


A CHECKLIST OF THE CAVE FAUNA OF MEXICO. V. ADDITIONAL RECORDS FROM THE SIERRA DE GUATEMALA, TAMAULIPAS

James R. Reddell and William R. Elliott
Department of Biology, Texas Tech University
Lubbock, Texas 79409

INTRODUCTION

The Sierra de Guatemala is the best-known high altitude karst region in México. It is also the richest with 159 species (27 troglobites) recorded in the first checklist of the fauna of this area (Reddell and Mitchell, 1971). Since publication of that list several important taxonomic papers (Hubbell, 1972; Causey, 1971; Mitchell and Kawakatsu, 1973; Muchmore, 1972) have been published. Several caves in the immediate vicinity of Gómez Fariás have been discovered and studied since 1971. This has resulted in the addition of many new species for the Sierra de Guatemala, bringing the total known to about 230. Many new records for previously published species are also now available.

The Sierra de Guatemala contains one of the more remarkable troglobite assemblages in North America. At the present time 35 species of troglobite are known. This includes 7 aquatic and 28 terrestrial species. The significance of this fauna has been briefly discussed by Mitchell and Kawakatsu (1973). They also include maps and descriptions of three of the more significant caves in the area (Cueva de la Mina, Cueva de la Capilla, and Cueva de las Perlas). The following list includes all of the troglobites now known from the Sierra de Guatemala.

Flatworms
- Dugesia barbara Mitchell and Kawakatsu
- D. typhlomexicana Mitchell and Kawakatsu

Ostracods
- Sphaeromicola cirolanae Rioja

Isopods
- Speocirolana bolivari (Rioja)
- S. pelaezi (Bolivar)
- Spherarmadillo cavernicola Mulaik
- Brackenridgia bridgesi (Van Name)

Mysids
- Speleomysis quinterensis (Villalobos)

Scorpions
- Typhlochactas rhodesi Mitchell

Pseudoscorpions
- Aphrastochthonius major Muchmore
- Tyrannochthonius troglobius Muchmore
- Paravachonium superbum Muchmore

Spiders
- Euagrus cavernicola Gertsch
- Cicurina (Cicurusta) mina Gertsch
- Leptoneta capilla Gertsch
- Metagonia capilla Gertsch
- Theotima pura Gertsch

Opilionids
- Hoplobunus boneti (Goodnight and Goodnight)
- H. inops Goodnight and Goodnight

Millipeds
- Glomeroides promiscus Causey
- Strongylodesmus harrisoni Causey
- Unculabes sp.
- ? Speodesmus sp.

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This supplementary checklist includes only those species for which new records or new important bibliographic citations are available or which have been the subject of recent taxonomic study. Previously published records are repeated only where there has been recent taxonomic study. An asterisk indicates that the species is an apparent troglobite. The cave names used follow those standardized by the Association for Mexican Cave Studies. All caves in which collections have been made are located on the accompanying map (Fig. 1).

We wish to express our appreciation here to Mr. John Hunter, Dr. Barbara Warburton, and Southmost College in Brownsville, Texas, for their continued interest in our studies and for permitting us to use the research facilities at the Southmost College Research Station at Rancho del Cielo.

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We wish to express our appreciation to the following people for assisting us in collecting or in supplying us with specimens: Francis Abernethy, Don Brousard, Mel Brownfield, Jerry Cooke, Ronald Fieseler, John George, Russ Harmon, Jimmy Jarl, Masaharu Kawakatsu, Jim McIntyre, David McKenzie, R.W. Mitchell, Neal Morris, Stewart Peck, Terry Raines, W.H. Russell, Pierre Strinati, Ann Sturdivant, Virginia Tipton, and Suzanne Wiley.

We are also deeply grateful to the following systematists for providing us with identifications of the indicated taxa: D.M. Anderson, beetles; T.C. Barr, Jr., beetles; T.F. Halstead, beetles; J.P. Kramer, homopterans; P.M. Marsh, hymenopterans; W.B. Muchmore, pseudoscorpions; S.B. Peck, beetles; R.L. Smiley, mites; Paul Spangler, beetles; T.J. Spilman, beetles; G.C. Steyskal, flies; W.R. Suter, beetles; Sigurd Szerlip, hemipterans; P.G. Thompson, snails; W.W. Wirth, flies.

**PHYLUM PLATYHELMINTHES**

**CLASS TURBELLARIA**

Order Tricladida

*Dugesia* sp.


*Dugesia barbarae* Mitchell and Kawakatsu

Records—Cueva de la Capilla.


Comment—This species was listed as *Dugesia* sp. II in the earlier listing.

*Dugesia guatemalensis* Mitchell and Kawakatsu

Records—Cueva de las Perlas.


Comment—This species was listed as *Dugesia* sp. III in the earlier list.

*Dugesia typhlomexicana* Mitchell and Kawakatsu

Records—Cueva de la Mina.


Comment—This species was listed as *Dugesia* sp. I in the earlier list.

**PHYLUM ANNELEIDA**

**CLASS CLITELLATA**

Order Oligochaeta

Family Lumbricicidae

*Dendrobaena rubida* (Savigny) (det. G.E. Gates)

Records—Harrison Sinkhole.


Family Octochaeididae

*Dichogaster* sp. (det. G.E. Gates)

Records—?Cueva de Tres Manantiales.

Comment—Specimens from this cave were too poorly preserved for positive identification, but probably belong to this genus.
PHYLUM ARTHROPODA
CLASS CRUSTACEA
Order Podogona

Family Entocytheridae
*Sphaeromicola cirolanae* Rioja (det. H.H. Hobbs)
Records—Bee Cave and Sótano de El Molino.
Comment—This troglobitic ostracod was found associated with *Speocirolana pelaezi* (Bolivar).

 FAMILY Amphipoda

Family Hyallellidae
*Hyalella azteca* (Saussure) (det. J.R. Holsinger)
Records—Hoya de Nubas.
Comment—This wide-spread amphipod was collected from the spring entrance to this small cave.

Family Cirolanidae
*Speocirolana bolivari* (Rioja)

*Speocirolana pelaezi* (Bolivar) (det. T.E. Bowman)
Records—Sótano de El Molino, Cueva de Tres Manantiales, and Sótano de Vasquez.

Family Mysidacea

*Spelaeomysis quinterensis* (Villalobos)
Comment—The generic name was misspelled in the previous list.

CLASS ARACHNIDA

Order Chelonethida

Family Chernetidae
*Hesperochernes* sp. (det. W.B. Muchmore)
Records—Cueva de la Mina.

? *Semeiochernes* sp. (det. W.B. Muchmore)
Records—Crystal Cave.
Comment—Specimens from Crystal Cave are only tentatively placed in this genus.

Family Chthoniidae
*Aphrastochthonius major* Muchmore
Records—Cueva de la Capilla.

*Mundochthonius mexicanus* Muchmore
Records—Crystal Cave.
Comment—This species is also known from caves on Chipinque Mesa, Nuevo León.

Family Syarinidae
*Pachychitra similis* Muchmore
Records—Cueva de los Vampiros.
Comment—In the previous list this species was cited as *Pachychitra* sp.

Family Vachoniidae
*Paravachonium superbum* Muchmore
Records—Sótano de Gómez Farías.

Order Uropygida

Family Thelyphonidae
*Mastigoproctus giganteus* Lucas (det. W.J. Gertsch)
Records—Sumidero de El Jineo.

Order Schizomida

Family Schizomidae
*Schizomus mexicanus* Rowland
Records—Sumidero de El Jineo and Cueva del Nacimiento del Río Frío.

Order Amblypygida

Family Tarantulidae
*Tarantula fuscimana* (C.L. Koch) (det. W.J. Gertsch)
Records—Resumidero de los Mangos, Sótano de El Molino, and Sótano de Vasquez.

Order Araneae

Suborder Mygalomorphae

Family Theraphosidae
*Schizopelma* sp. (det. W.J. Gertsch)
Records—Harrison Sinkhole, Cueva de la Mina, and Wet Cave.
Comment—Specimens from Cueva de la Mina and Wet Cave were previously listed as *Aphonopelma* sp.

Suborder Araneomorphae

Family Agelenidae
*Cicurina (Cicurusta) iviei* Gertsch
Records—Harrison Sinkhole and Cueva de la Mina.
Comment—Specimens from Cueva de la Mina are only tentatively identified as this species.

*Cicurina (Cicurusta) mina* Gertsch

Family Argiopidae

*Azilia vagepicta* Simon (det. W.J. Gertsch)
Records—Sótano del Caballo Moro and Sótano de los Pinos.

*Leucauge venusta* (Walckenaer) (det. W.J. Gertsch)
Records—Sótano del Caballo Moro.

Family Clubionidae

*Phrurotimpus* sp. (det. W.J. Gertsch)
Records—Cueva de la Capilla.

*Syriscus affinis* (Banks) (det. W.J. Gertsch)
Records—Cueva del Nacimiento del Río Frío.

Family Ctenidae

*Ctenus* sp. (det. W.J. Gertsch)
Records—Cueva de la Capilla.

*Leptoneta capilla* Gertsch (det. W.J. Gertsch)
Records—Cueva de la Mina.

*Leptoneta rainesi* Gertsch (det. W.J. Gertsch)
Records—Wet Cave.

*Leptoneta pura* Gertsch (det. W.J. Gertsch)
Records—Cueva de las Perlas.

*Leptoneta suzanne* Gertsch (det. W.J. Gertsch)
Records—Sumidero de El Jineo.

Family Linyphiidae

*Linyphiinae* gen. et sp. (det. W.J. Gertsch)
Records—Cueva de las Perlas.

*Eperigone tlaxcalana* Gertsch and Davis (det. W.J. Gertsch)
Records—Cueva de los Vampiros.

Family Pholcidae

*Metagonia* sp. (det. W.J. Gertsch)
Records—Sótano del Molino and Cueva de los Vampiros.

*Metagonia pura* Gertsch

*Metagonia suzanne* Gertsch (det. W.J. Gertsch)
Records—Sumidero de El Jineo.

*Modisimus* sp. (det. W.J. Gertsch)
Records—Sumidero de El Jineo.

*Modisimus merckeni* Gertsch (det. W.J. Gertsch)
Records—Bee Cave and Cueva de la Paloma.

*Modisimus mckenziei* Gertsch (det. W.J. Gertsch)
Records—Bee Cave and Cueva de la Paloma.

Family Salticidae

*Lyssomanes* sp. (det. W.J. Gertsch)
Records—Cueva de Tres Manantiales.

Family Scytodidae

*Loxosceles valdosa* Gertsch (det. W.J. Gertsch)
Records—Cueva de la Mina.

*Stemmops* sp. (det. W.J. Gertsch)
Records—Sumidero de El Jineo.

Family Theridiidae

*Anelosimus studiosus* (Hentz) (det. W.J. Gertsch)
Records—Sótano del Caballo Moro.

*Stemmops* sp. (det. W.J. Gertsch)
Records—Cueva de la Capilla.

Family Uloboridae

*Uloborus* sp. (det. W.J. Gertsch)
Records—Cueva de las Perlas.

Family Zodariidae

*Storena* sp. (det. W.J. Gertsch)
Records—Sumidero de El Jineo.

Order Opilionida

Family Cosmetidae

*Cynorta jameisoni* Goodnight and Goodnight
Records—Cueva de la Mina, Grutas de El Puente, and Sótano de Vasquez.


Family Phalangodidae

*Hoplobunus boneti* (Goodnight and Goodnight)
Records—Cueva del Remolino.

*Bipalopholobunus inops* Goodnight and Goodnight
Records—Sumidero de El Jineo, Cueva de Tres Manantiales, and Sótano de Vasquez.

Order Acarina

Family Rosensteiniidae
*Nycteriglyphus* sp. (det. R.L. Smiley)
Records—Cueva de la Mina.

CLASS DIPOPODA

Order Glomerida

Family Glomeridae
*Glomeroides promiscus* Causey (det. N.B. Causey)
Records—Sótano del Naranjo and Cueva de Tres Manantiales.

Order Chordeumida

Family Cleidogonidae
*Cleidogona* sp. (det. N.B. Causey)
Records—Cueva de la Mina.
*Cleidogona crystalina* Shear
Records—Cueva de la Capilla, Crystal Cave, Cueva Chica de la Perra, and Salamander Cave (=Cueva del Rancho del Cielo n. 3).
Bibliography—Shear, 1972.
Comment—All of the above records were previously listed as *Cleidogona* sp.

*Cleidogona pecki* Shear
Records—Cueva de la Mina.
Bibliography—Shear, 1972.
Comment—This record was previously cited as *Cleidogona* sp.

Order Polydesmida

Family Rhachodesmidae
*Strongylodesmus conspicuus* Causey
Records—Cueva del Rancho del Cielo n. 7 and Sótano de El Refugio.

*Strongylodesmus harrisoni* Causey
Records—"Sinkhole" at Rancho del Cielo, Sótano de Gómez Farías, Harrison Sinkhole, Sumidero de El Jineo, Sótano del León, Sótano de El Molino, Cueva de las Perlas, Cueva del Remolino, Salamander Cave, Sótano de Tres Cerros, Cueva de Tres Manantiales, and Wet Cave.
Comment—Records indicated by a question mark are not known by adult males and so are only tentatively assigned to this species.

*Unculabes* sp. (det. N.B. Causey)
Records—Cueva de la Mina.

Family Trichopolydesmidae

*Speodesmus* sp. (det. N.B. Causey)
Records—Cueva del Remolino.
Comment—Trichopolydesmids from this cave are tentatively assigned to this genus, but may belong to an undescribed genus.

Family Xystodesmidae
*Rhysodesmus* sp. (det. N.B. Causey)
Records—Cueva del Remolino.

ORDER SPIROBOLIDA

Family Atopetholidae
Unidentified genus and species (det. N.B. Causey)
Records—Cueva del Remolino.

ORDER SPIROSTREPTIDA

Family Cambalidae
*Mexicambala blanda* Causey (det. N.B. Causey)
Comment—Some of the above records were previously listed as *Mexicambala* sp.

*Mexicambala inopis* Causey (det. N.B. Causey)
Records—Cueva de la Capilla, Sótano de la Joya de Salas, Cueva de los Leones, and Cueva de la Mina.
Comment—Some of the above records were previously cited as *Mexicambala* sp.

CLASS INSECTA

Order Collembola

Family Entomobryidae
*Pseudosinella reddelli* Christiansen
Records—Bee Cave, Cueva de la Capilla, Cueva del Infiernillo, Cueva de la Mina, Cueva del Remolino, and Cueva de Tres Manantiales.

*Pseudosinella strinatii* Christiansen
Records—Crystal Cave and Cueva de la Paloma.

Family Hypogastruridae
*Acherontiella sabina* Bonet (det. K.C. Christiansen)
Records—Crystal Cave and Cueva del Infiernillo.

Family Oncopoduridae
*Oncopodura prietoi* Bonet (det. K.C. Christiansen)
Records—Bee Cave.
Comment—This species was previously cited as *Oncopodura* sp.

Order Odonata
Family Libellulidae
*Dythemis* sp. prob. *multipunctata* Kirby (det. O.S. Flint)
Records—Sótano de El Molino.
Comment—This species doubtless washed into the cave.

Order Saltatoria
Family Gryllidae
*Nemobius* sp. (det. T.H. Hubbell)
Records—Sótano del Caballo Moro.
Comment—Immature specimens from this cave are tentatively placed in this genus.

*Paracophus apterus* Chopard (det. T.H. Hubbell)
Records—“Cave” at Rancho del Cielo, Dry Cave, Sótano de Gómez Farías, Cueva del Nacimiento del Río Frío, Grutas de El Puente, Cueva del Rancho del Cielo n. 3, Cueva de Tres Manantiales, and Cueva de los Vampiros.
Comment—This species is the common cricket in the caves of the Sierra de El Abra and the lower elevation caves of the Sierra de Guatemala.

*Paracophus caecus* Hubbell (det. T.H. Hubbell)
Records—“Cave” at Rancho del Cielo, Bee Cave, Cueva de la Capilla, Crystal Cave, Sótano de Gómez Farías, Harrison Sinkhole, Cueva del Infiernillo, Sótano de la Joya de Salas, Cueva de la Mina, Sótano de El Molino, Cueva del Nacimiento del Río Frío, Sótano de los Pinos, Cueva de Tres Manantiales, Cueva de los Vampiros, and Wet Cave.
Comment—Many of the above records were previously listed as *Paracophys* sp.

*Paracophus placonotus* Hubbell (det. T.H. Hubbell)
Records—Cueva de Tres Manantiales.


Order Hemiptera
Family Belostomatidae
*Abedus signoreti* Mayr (det. R.C. Froeschner)
Records—Sótano de El Molino.

Family Enicocephalidae
*Systelloderes* sp. (det. R.C. Froeschner)
Records—Harrison Sinkhole.

Family Pyrrhocoridae
*Dysdercus* sp. (det. T.F. Halstead)
Records—Cueva del Nacimiento del Río Frío.

Family Tingidae
*Caratocombus* sp. (det. R.C. Froeschner)
Records—Harrison Sinkhole.

Family Veliidae
*Microvelia* sp. (det Sigurd Szerlip)
Records—Sótano del León.

Order Homoptera
Family Cixiidae
Unidentified genus and species (det. J.P. Kramer)
Records—Cueva de la Mina.
Comment—Nymphs of this family are frequently found in this cave.

Order Coleoptera
Family Anthicidae
*Anthicus* sp. (det. T.J. Spilman)
Records—Salamander Cave.

Family Carabidae
*Agonum (Platynus)* sp. (det. T.C. Barr)
Records—Resumidero de los Mangos.

*Mexaphaenops intermedius* Barr
Records—Cueva de la Mina.

*Tachys* (s.str.) sp. (det. T.C. Barr)
Records—Sumidero de El Jineo, Resumidero de los Mangos, Cueva de Tres Manantiales, and Sótano de Vasquez.

Family Dytiscidae
*Hydropsorus befregaei* Sharp (det. Paul Spangler)
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Records—Cueva de la Capilla.
Comment—This species was previously listed as an unidentified genus and species. It is an abundant troglophilic in pools in this cave.

Family Euglenidae

Arioutus sp. (det. T.J. Spilman)
Records—Sótano de Vasquez.

Family Leiodidae

Aglyptinus sp. (det. J.M. Kingsolver)
Records—Harrison Sinkhole.

Dissochaetus aztecs Szymczakowski
Records—Cueva de la Mina.

Promaphagus (Adelops) sp.
Records—Cueva de la Mina.
Comment—This is apparently an undescribed species.

Promaphagus (Adelops) aebra Peck (det. S.B. Peck)
Records—Sótano del León, Cueva de la Paloma, and Grutas de El Puente.

*Promaphagus (Adelops) troglomexicanus Peck

Family Oedemeridae

Unidentified genus & species (det. D.M. Anderson)
Records—Cueva de la Mina.
Comment—A larva of this family was collected in this cave.

Family Pselaphidae

Unidentified genus & species (det. T.C. Barr)
Records—Sumidero de El Jino, Cueva de las Perlas.

Family Scaphidiidae

Scaphisoma sp. (det. J.M. Kingsolver)
Records—Harrison Sinkhole.

Family Scarabaeidae

Aphodius sp. (det. O.L. Cartwright)
Records—Wet Cave.

Family Scydmaenidae

"Connophron" sp. nr. proximum Casey (det. W.R. Suter)
Records—Sótano del León.
Comment—This probable new species will certainly be located in a different genus once revisionary work in this family is completed.

Family Staphyliniidae

Aleocharinae genus and species (det. L.H. Herman)
Records—Sótano de El Porvenir.

Anotylus sp. (det. L.H. Herman)
Records—Harrison Sinkhole.

Erchomus sp. (det. L.H. Herman)
Records—Sótano de El Molino.

Homaeotarsus sp. (det. L.H. Herman)
Records—Sótano del Caballo Moro, Sumidero de El Jino, and Resumidero de los Mangos.

Philanthus sp. (det. L.H. Herman)
Records—Salamander Cave.

Stilicolina condei Jarrige (det. L.H. Herman)
Records—Harrison Sinkhole.

Family Tenebrionidae

Zopherus sp. nr. nodulosus Solier (det. T.J. Spilman)
Records—Sótano de los Pinos.

Order Lepidoptera

Family Tineidae

Episcardia sp. (det. D.R. Davis)
Records—Salamander Cave.
Comment—Only alcoholic material was available for study.

Order Diptera

Family Chironomidae

Unidentified genus and species (det. W.W. Wirth)
Records—Sótano del Caballo Moro.

Family Dolichopodidae

Chrysotus sp. (det. G.C. Steyskal)
Records—Salamander Cave.

Family Drosophilidae

Drosophila sp. (det. W.W. Wirth)
Records—Cueva de las Perlas.
Comment—This species was present in enormous swarms on the ceiling of this cave.

Family Muscidae

Unidentified genus and species (det. R.J. Gagné)
Records—Sótano del León and Cueva de la Paloma.
Comment—Larvae from these caves are tentatively identified as belonging to this family.

Fannia canicularis (L.) (det. R.J. Gagné)
Records—Salamander Cave.

Phaonia sp. (det. R.J. Gagné)
Records—Crystal Cave and Salamander Cave.

Family Mycetophilidae

Mycetophila sp. (det. R.J. Gagné)
Records—Cueva de las Perlas.

Family Phoridae

Unidentified genus and species (det. W.W. Wirth)
Records—Salamander Cave.

Conicera dauci Meigen (det. W.W. Wirth)
Records—Sumidero de El Jino, Sotano del Lean.

Dohrniphora sp. (det. W.W. Wirth)
Records—Sótano de la Joya de Salas.

Family Mesogastropoda

Order Scelionidae

Unidentified genus and species (det. P.M. Marsh)
Records—Cueva de la Mina.

Comment—This apparently represents an undescribed species.

Family Urocoptidae

Coelocentrum sp. (det. F.G. Thompson)
Records—Harrison Sinkhole and Sótano de El Porvenir.

Comment—This apparently undescribed species is represented only by juvenile or broken material.

Family Xanthonychidae

Xanthonyx sp. (det. F.G. Thompson)
Records—Cueva de la Capilla.

Comment—This is apparently an undescribed species.

PHYLUM CHORDATA

CLASS TELEOSTEI

Order Cypriniformes

Family Characidae

*Astyanax sp. (det. R.W. Mitchell)
Records—Sótano del Caballo Moro, Sótano Escondido, and Sótano de Gomez Farias.

condido, Sumidero de El Jineo, Sótano de El Molino, and Sótano de Vasquez.

CLASS AMPHIBIA
Order Anura
Family Leptodactylidae
*Eleutherodactylus decoratus decoratus* Taylor (det. W.E. Duellman)
Records—Small cave near El Refugio sawmill.
*Syrrophus longipes* (Baird) (det. W.E. Duellman)
Records—Cueva de la Capilla.

CLASS AVES
Order Psittaciformes
Family Psittacidae
*Ara militaris* L.
Records—Sótano de El Refugio.
Comment—Several Military Macaws were observed flying in the entrance to this spectacular sótano; they apparently nest in the cave.

CLASS MAMMALIA
Order Chiroptera
Family Vespertilionidae
*Myotis nigricans dalquesti* Hall and Alvarez
Records—Grutas de El Puente.

LITERATURE CITED


A CHECKLIST OF THE CAVE FAUNA OF MEXICO. VI.
VALLE DE LOS FANTASMAS REGION, SAN LUIS POTOSI

William R. Elliott and James R. Reddell
Department of Biology, Texas Tech University
Lubbock, Texas 79409

This is the first report concerning the cave dwelling fauna of one of the highest altitude karst areas in México. The Valle de los Fantasmas Region lies in the western part of the Sierra Madre Oriental, specifically, in the Sierra de Álvarez which divides the Llanura de Río Verde from the Valle de San Luis Potosí. The region, as defined in this report, lies wholly within the Municipio de Zaragoza and is about 17 km wide and 28 km long (see map, Fig. 1). The largest village in the region is San Francisco, which may be reached by Highway 86 from Ciudad Valles, 227 km to the east, or San Luis Potosí, 38 km to the west. Elevations range from about 2600 m to 2900 m above sea level.

Floristically, the area may be characterized according to the scheme of Rzedowski (1965). Most of the region is “Encinar arbustivo” (oak scrub), a very open woodland with expanses of savannah and occasional clusters of Opuntia and Agave. About 15 km south of San Francisco the vegetation abruptly changes to juniper and, on the higher peaks nearby, pine. This is presumably related to the presence of volcanic soils (Rzedowski, 1965). The climate is temperate (the mean annual temperature is probably 15°C-16°C) and semi-humid (an estimated 1000 mm of rainfall yearly).

Geologically, the area is complex and has not been adequately studied. The Cretaceous limestone has been intensely folded and ranges from massive to thin bedded from east to west. Metamorphism is apparent, especially in the southern and western areas. Red Earth is common in many areas (good examples may be seen along Highway 86 between Valle de los Fantasmas and Puerto Altamira). Karst development is more advanced on the eastern side of the area. Massive karren, lapies, and karst pinnacles have developed near San Francisco and in the Valle de los Fantasmas immediately to the west. Presumably, the building-size karst pinnacles in the Valle de los Fantasmas are the source of the name Fantasmas (phantoms), as they appear rather ghostly in the frequent fogs encountered at these elevations. The development of sótanos is often controlled, especially in the western areas, by steeply dipping or vertical beds. Igneous activity has further complicated the geology, especially to the south in the vicinity of Cueva de la Puente. This system drains a 1 km diameter dolina which is actually a valley flanked by volcanic ridges and blocked at the south end by an igneous bridge (La Puente). The actual extent of the karst is not presently known, but uninvestigated karst terrain may be seen to the north from Puerto Altamira. The area south of Cueva de la Virgen has not been investigated.

The area was first visited by AMCS members in August 1966. John Fish, David McKenzie, James Reddell, and Richard M. Smith explored seven small pits ranging from 10 to 43 m deep, Cueva de Aguacate and Cueva de Carnicerías were also visited and a few collections made. Fish entered the impressive Sótano de San Francisco but was unable to reach the bottom because the rope was not long enough (Fish and Reddell, 1966). The area was again visited in November 1966 by Jonathan Davis, John Fish, Charlie Jennings, Charlie and Susie Loving, and Mac Mc-
Laughlin (Fish, 1966). This time Fish reached the bottom of Sótano de San Francisco, but found only water and no place to get off. Biological collections were made from several unspecified pits in the immediate area, and from Sótano de Carlos. *Mexispodrus* beetles and the first specimens of *Mexaphaenops fishi* Barr, a troglobite carabid beetle, were collected on this trip. As interest in the area grew, nine more expeditions involving forty persons were made to the region in the years 1969, 1971, and 1972. To date, fifty caves and pits have been reported. Forty-eight of these have been explored, eighteen have been mapped, and twenty-one have been studied biologically. Sixteen of the caves and pits have no names and at least seven (most in the immediate San Francisco area) have not been accurately located on a map. Brief descriptions of the caves that have been studied biologically and other important caves are given below. Maps and descriptions of many of these caves are given by Walsh (1972).

**Sótano de Abernathy**—This small pit (22 m drop) is located in the “Los Sótanos Unidos” area, about 2 km west of San Francisco. A hole 6 m above the floor leads into a parallel dome-pit, the bottom of which is 38 m below the surface. The pit was mapped in January 1969 by Miles Abernathy, William Elliott, and David Honea.

**Cueva del Agua**—Located about 14 km SSE of San Francisco in the Cañon de Chivos, this cave ends in a siphon and mud fill after 120 m. The cave was mapped in March 1969 by Jimmy Jarl and Brian Peterson, but no biological collections were made.

**Sótano de las Arañas**—This pit is located in the Los Sótanos Unidos area and is developed along strongly folded bedding planes. The beds dip 65° at the entrance and steepen to 90° farther down. The entrance is 3 m in diameter and drops 46 m to a talus slope, which ends at the 61 m level. Numerous Recent mammal bones were observed in the cave. The cave was mapped in November 1968 by Joe Cepeda and Russell Harmon.

**Cueva de los Caballos**—This cave is about 400 m NW of Sótano de las Arañas, near the bottom of a small valley. The 6 m high, 9 m wide entrance leads into a 13 m x 15 m room formed under vertically dipping beds. About 30 m of low passage leads from the east end of the room in the dark zone, where the air temperature was 17°C. The entrance room is sometimes used as a horse corral. The cave was mapped in January 1969 by Joe Cepeda and Russell Harmon.

**Sótano de Carlos**—This pit is about 2 km N of San Francisco on the other side of a pass. The 2 m diameter entrance is under a boulder and drops 88 m to a room 8 m wide and 23 m long. The total depth is 99 m. The cave was mapped in November 1968 by Russell Harmon and David Honea.

**Cueva de Carnicerías**—This cave was visited in 1966 and is located in the karst valley containing the village of San Francisco. The cave is a single room formed by collapse and is about 15 m in diameter and 9 m deep.

**Cueva de Cinquenta y Ocho**—This 105 m long cave lies 1 km W of the village of Cinquenta y Ocho near the top, and on the south side of an east-west valley. The cave is about 3 m wide and 5 m high for most of its length. The air temperature was 14.5°C at the end of the cave. The cave was mapped in May 1972 by William Elliott, Pam Lynn, and Ron Ralph.

**Cueva de Entrada Chica**—This cave is a 35 m deep vertical pit with a 0.5 m in diameter entrance. It is located in Valle de los Fantasmas and was visited in 1966.

**Sumidero de Fantasmas**—This large sink, located north of the highway in Valle de los Fantasmas, was visited in 1966. It is a vertical shaft 6 m wide, 10 m long, and 30 m deep. It receives the flood waters of a long flat draw. There is no horizontal extent and the floor is of deep mud.

**Sótano de la Golondrina**—This pit is about 500 m west of Highway 86 at the “Agua” sign, which is 800 m north of the cobblestone road leading to the Los Sótanos Unidos area. The 3 m diameter entrance drops 18 m to the top of a muddy talus slope. The room at the bottom of the slope is 15 m wide and 12 m high. The total depth is 38 m. A 10 m long side passage at the 18 m level contains many arthropods. The pit was mapped in November 1968 by Martha Burk, Sharon Cathey, William Elliott, and Jimmy Jarl.

**Cueva de la Iglesia**—This cave is located 1.6 km west of San Francisco in the Valle de los Fantasmas. The 15 m wide, 4 m high entrance slopes down to a single room which is 30 m wide, 40 m long and 14 m high. The total depth is 14 m. The cave was mapped in November 1968 by Keith Heuss, Jimmy Jarl, Jim McIntire, Brian Peterson, and Joe Sumbera, but no biological collections were made.

**Cueva de la Laguna**—This cave is located on the west side of a stock tank, about 5 km north of Highway 86 in the Valle de los Fantasmas. It may be reached by a dirt road. The 6 m wide, 2 to 3 m high entrance leads into a 12 m long, 5 to 6 m wide room, then under a natural bridge into a 9 m square room. The passage continues for 9 m to a crawlway which goes up to the left for 5 or 6 m. The cave was mapped in May 1972 by William Elliott and Mike
McEachern, and is about 34 m long. The air temperature was 17°C.

Cueva de las Moscas—This 12 m long cave was visited in 1968. It is located at the base of a cliff about 2 km south of San Francisco and about 150 m northwest of the dirt road to La Puente.

Sótano de Nopales—This pit lies about 1 km southwest of the village of Cinquenta y Ocho near the top of a ridge. The 14 m long, 4 m wide entrance drops 26 m to a 40 m long sloping room. The pit was mapped in November 1968 by Duane Faith and Jimmy Jarl.

Sótano de Ojo de Agua—This deep pit is located approximately 8 or 9 km ESE of San Francisco in the Sierra de los Arboles. A two hour hike over confusing, obscure trails is required to reach it. The 8 m diameter entrance drops 71 m to the top of a talus slope. Short drops of 2, 3, 2, and 5 m lead to the lowest level at 97 m. A 35 m long, muddy passage doubles back under the entrance at the 93 m level. The mud temperature in this passage was 13.5°C. The pit was mapped in November 1968 by William Elliott and Jimmy Jarl.

Sótano del Pájaro—This pit is located in the Los Sótanos Unidos area. It has two entrances, 2 m and 0.5 m in diameter, which connect at the 5 m level. The larger entrance drops 27 m into a 2 m wide, 10 m long fissure. At the south end of the fissure there is a 6 m drop to a ledge, then a 25 m drop to the main room of the cave. This room is about 9 m in diameter. A 20 m long, 5 m wide, 8 m high passage strikes northeast and ends abruptly. This passage is formed in 70° dipping beds. The lowest point is in the main room (61 m). The bottom of the final drop is littered with many bones (Peromyscus, weasel, skunk, deer, pig, goat, and horse). The pit was mapped in January 1969 by William Elliott and David Honea.

Cueva de la Puente—This large cave is located in the Dolina de la Puente about 17 km SSE of San Francisco. The cave is formed in metamorphosed limestone. It is not uncommon to see cobbles of serpentine, rhyolite, and limestone together on the cave floor, as well as red and yellow streaks in the cave walls. The cave has two entrances. The main arroyo entrance is 24 m wide and 8 m high and accepts most of the run-off from the volcanic ridges that flank the dolina. The 6 m diameter upper entrance is located 100 m inside the main entrance but does not appear to take any run-off. The 5 m high, 12 m wide passage continues until a 1 m high crawlway is encountered 240 m inside the main entrance. After 100 m the passage opens up to 12 m wide and 2 to 5 m high. This continues for 180 m, at which point a small stream enters from a fissure on the right. This high, narrow fissure has been explored for about 300 m to where it ends in a breakdown room. The main passage continues at the same width and with ceiling heights up to 15 m for 800 m to the Big Room, which is 60 m long, 24 m wide, and 25 to 30 m high. A large stream passage enters from the left. This may be followed over cascades and through small lakes for about 300 m upstream, and roughly southeast, to where the water spurts out of a small hole in the wall. At the Big Room the two streams merge and continue another 240 m to a siphon. The cave meanders from northeast to northwest and strikes north. The terminal siphon lies close to a large, sawdust filled dolina near a junction of the La Puente road, 0.5 km north of the Dolina de la Puente. Terraced sandbanks, large cobbles, and large logs attest to the violent flooding which the cave must undergo at times. As a result, most of the cave fauna is washed in. According to the local inhabitants, the cave has two resurgences, Cueva de la Virgen and Cueva de Salida del Agua de la Puente, which will be discussed below. The air temperature in the cave was 21° to 21.5°C, and the water temperature was 18°-19°C. The cave is considerably warmer than other caves in the region and this might be explained by the close proximity of volcanic rock. The cave was mapped in March 1969 by Logan McNatt, Brian Peterson, Joe Sumbera, Mike Walsh, and Gail Webster. About 2400 m of passage have been explored and 2066 m mapped, making this the largest cave in the Valle de los Fantasmas Region.

Sótano de Puerto de los Lobos—This impressive pit is located 2.7 km south of San Francisco on the southern slope of the Sierra de los Arboles. The full name is Sótano Hondo de la Sierra de los Arboles de Puerto de los Lobos. The 10 m diameter entrance is obscured by a thicket of oaks. It does not appear to take surface run-off. The entrance drops 179 m to the top of a steep talus slope. At the bottom of the slope is a 5.5 m drop to a mud slope which ends after 30 m at the low point, 198 m below the entrance. It is possible to rig the pit to obtain a 189 m free drop. At the top of the talus slope is an 8 m x 12 m, 15 m high room, the floor of which is covered with 15 cm of water. A small seep trickles out of the wall and the water flows out of the room and sinks in the talus. At the time of its discovery, the pit was the third deepest drop in México. It was mapped in September 1968 by William Elliott, Duane Faith, Jim McIntire, and Joe Sumbera.

Cueva de Salida del Agua de la Puente—This cave is located in the Cañón de Chivos, 14 km SSE of San Francisco, and about 2.6 km northeast of the terminal siphon in Cueva de la Puente. It is rumored to be
a wet weather resurgence for Cueva de la Puente. Large trees have been reported to wash out of the cave during heavy rains. The cave is a large passage which ends after 122 m in a mud and water siphon. The cave was mapped in March 1969 by Brian Peterson and Jimmy Jarl, but no biological collections were made.

"Cave at San Francisco"—This cave was visited in 1966 but it was not mapped and its exact location is unknown.

Sótano de San Francisco—This impressive pit is located in the village of San Francisco. The steep-sided arroyo leading to the cave carries a small, swift stream during the rainy season. The 3 x 4.5 m entrance drops 102 m to a 21 m long, 4.5 m wide pool full of human fecal matter. A 2 m drop is then encountered, and then a 12 m long pool after 7 m of dry ground. At the end of the second pool is an unentered pit, estimated to be between 170 and 245 m deep. This pit could lead to an extensive system. The cave was first entered by John Fish in August 1966 and again in November 1966 at which time he drew a sketch map (Fish, 1966). The pit was mapped to the top of the second drop in May 1972 by Mike McEachern and Ron Ralph. The water temperature was 14.5°-15°C.

Sótano de San Francisco n. 2—This pit is located 1 km south of San Francisco in a 12 m diameter dolina. The pit follows a vertical bedding plane down to a water filled passage, 43 m below the surface. This passage goes 7 m, turns left, goes another 11 m, and ends in a 5 m long, muddy room. The water temperature was 12°C. The cave was partially mapped in January 1969 by William Elliott and David Honea. The map was completed in May 1972 by William Elliott and Mike McEachern.

Cueva de Sierra Blanca—This cave is located 10.5 km south of San Francisco, about 1 km up a canyon from the La Puente road. The 10 m wide, 5 m high entrance leads into a 24 m long, 10 m wide room, then another room of the same dimensions. Two walking passages extend from the second room, one for 46 m to a breakdown choke, the other to a 3 m diameter room and then to a smaller entrance. The cave was visited in September 1968 but was not mapped nor investigated biologically.

Sótano de Super-Macho—This small, 14 m blind pit was visited in January 1969. It is located in the Los Sotanos Unidos area.

"Small cave at Valle de los Fantasmas"—This cave was visited in 1966, but its exact location is unknown.

"Sink at Valle de los Fantasmas"—This was visited in 1966, but its exact location is unknown.

"Sótano at Valle de los Fantasmas"—This pit was visited in 1966, but its exact location is unknown.

Cueva de la Virgen—This cave is located 2.5 km southeast of Cueva de la Puente. It is reported by the local people to flow during wet weather. Presumably, it is a resurgence for Cueva de la Puente. Past the 24 m high, 6 m wide entrance, the passage slopes upward for about 61 m to a water filled passage which retains the passage dimensions of 24 m in height and 12 m in width. The cave has not been mapped nor studied biologically. It was explored in November 1968 by Duane Faith, Jim McIntire, Bill Ramsel, and Joe Sumbera.

This report is not a complete summary of the taxa that have been collected in this region. Several new species await description, particularly among the millipedes, spiders, and crickets. Terrestrial isopods have been collected in Cueva de la Puente and Cueva de la Laguna and are being studied by Dr. George A. Schultz.

It is most interesting to note that of the 98 species listed in this report (93 of them invertebrates), only two may be considered troglobites (one millipede and one carabid beetle). This contrasts sharply with the nature of the cave fauna of the Sierra de Guatemala, which has a rather high number and percentage of cave-adapted forms (about 18% of the invertebrates) (Mitchell, 1969; Reddell and Mitchell, 1971; Reddell and Elliott, 1973a). The troglobite fauna of the Valle de los Fantasmas region (about 2% of the invertebrates) also contrasts strongly with that of the Sierra de El Abra (about 9% of the invertebrates) (Reddell and Mitchell, 1971; Reddell and Elliott, 1973a). The troglobite fauna of the Valle de los Fantasmas region (about 2% of the invertebrates) also contrasts strongly with that of the Sierra de El Abra (about 9% of the invertebrates) (Reddell and Mitchell, 1971; Reddell and Elliott, 1973a), a lowland, semi-tropical area where one would expect the lowest number and percentage of cave adapted species, according to Mitchell’s hypothesis (1969). In addition, there are no aquatic troglobites in the Valle de los Fantasmas region, whereas aquatic species make up 50% and 27% of the invertebrate troglobites in the Sierra de El Abra and Sierra de Guatemala, respectively. Furthermore, the cave fauna of the Valle de los Fantasmas region appears to have few affinities with those of the other two regions, and perhaps has had a much different history of colonization. Although little is known of the relative ages of cave systems in these three areas, we find it tempting to speculate that climatic changes in such a high altitude area as Valle de los Fantasmas may have been much more drastic than in the two lower areas we are comparing, especially during the Pleistocene. Severe changes may have served not only to wipe out epigean forms but incipient cave forms as well.

The cave names given in the following checklist are those accepted as standard by the Association for
Mexican Cave Studies. Troglobites are indicated by an asterisk.

We wish to express our appreciation to the following people who have assisted in the collecting or made specimens available to us: Miles Abernathy, James Baldwin, Sam Billings, Martha Burk, Glenn Campbell, Sharon Cathey, Joe Cepeda, John A.L. Cooke, Jonathan Davis, Duane Faith, John Fish, Gordon Graves, Russell Harmon, Keith Heuss, David Honea, Jimmy Jarl, Charlie Jennings, Jerry Johnson, Danny Kiser, Charlie Loving, Susie Loving, Ann Lucas, Pam Lynn, Mike McEachern, David McKenzie, Jim McIntire, Mac McLaughlin, Robert Mitchell, Brian Peterson, Ron Ralph, Bill Ramsel, Richard M. Smith, and Joe Sumbera.

We wish to thank the following systematists for their identification of the taxa included in this report: R.K. Allen, mayflies; D.M. Anderson, beetles; T.C. Barr, Jr., beetles; A. Brindle, earwigs; G.W. Byers, crane flies; R.W. Carlson, ichneumonid wasps; O.L. Cartwright, beetles; N.B. Causey, millipedes; K.C. Christiansen, collemboles; D.R. Davis, moths; O.S. Flint, caddis flies, damselflies, and dragonflies; R.C. Froeschner, hemipterans; R.J. Gagné, flies; G.E. Gates, earthworms; W.J. Gertsch, spiders; C.J. and M.L. Goodnight, harvestmen; A.B. Gurney, earwigs; L.H. Herman, beetles; H.F. Howden, beetles; T.H. Hubbell, crickets; L.V. Knutson, flies; J.D. Lynch, frogs; T.R. Mollhagen, bats; W.B. Muchmore, pseudoscorpions; R. Newcomer, salamanders; D.R. Smith, ants; P.J. Spangler, beetles; T.J. Spilman, beetles; G.C. Steyskal, flies; S. Szerlip, hemipterans; R.E. White, beetles; W.W. Wirth, flies.

**PHYLUM ANNELIDA**

**CLASS CLITELLATA**

Order Oligochaeta

Family Lumbricidae

*Dendrobaena rubida* (Savigny) (det. G.E. Gates)
Records—Cueva de la Puente.
Comment—This species is probably of European origin.

*Octolasion tyrtaeum* (Savigny) (det. G.E. Gates)
Records—Sótano de la Golondrina, Sótano de Nopales, and Sótano de Ojo de Agua.
Comment—This species is probably of European origin.

**PHYLUM ARTHROPODA**

**CLASS ARACHNIDA**

Order Scorpionida

Family Vejovidae

*Vejovis* sp. *granulatus* Pocock (det. W.J. Gertsch)
Records—Sótano de Carlos.
Comment—This probably represents an undescribed species.

Order Chelonethida

Family Cheliferidae

*Mexichelifer reddelli* Muchmore
Records—Cueva de Carnicerías.

Family Chernetidae

Undetermined genus and species
Records—Cueva de Cinquenta y Ocho.
Comment—A single protonymph was collected in the dark zone.

Order Araneae

Suborder Mygalomorphae

Family Barychelidae

*Zygopelma* sp. (det. W.J. Gertsch)
Records—Sótano de Puerto de los Lobos.

Family Caponiidae

*Orthonops lapanus* Gertsch and Mulaik (det. W.J. Gertsch)
Records—Sótano at Valle de los Fantasmas.

Family Clubionidae

*Phrurotimpus* sp. (det. W.J. Gertsch)
Records—Cueva de la Puente.
Comment—This species is probably an accidental.

Suborder Araneomorphae

Family Agelenidae

*Tegenaria selva* Roth (det. W.J. Gertsch)
Records—Sótano de Abernathy, Sótano de las Arañas, Cueva de los Caballos, Sótano de la Golondrina, Cueva de la Laguna, Cueva de las Moscas, Sótano de Puerto de los Lobos, and Sótano de Ojo de Agua.

Family Caponiidae

*Orthonops lapanus* Gertsch and Mulaik (det. W.J. Gertsch)
Records—Sótano at Valle de los Fantasmas.

Family Clubionidae

*Phrurotimpus* sp. (det. W.J. Gertsch)
Records—Cueva de la Puente.
Comment—This species is probably an accidental.
Family Linyphiidae
   *Eperigone* sp. (det. W.J. Gertsch)
   Records—Sótano de Puerto de los Lobos.

Family Nesticidae
   *Nesticus pallidus* Emerton (det. W.J. Gertsch)
   Records—Cueva de la Laguna, Sótano de la Golondrina, Cueva de la Puente, Sótano de San Francisco, and Sótano at Valle de los Fantasmas.

Family Pholcidae
   *Coryssocnemis abernathyi* Gertsch
   Records—Sótano de Abernathy, Cueva de los Caballos, Sótano de la Golondrina, and Cueva de las Moscas.

   *Metagonia punctata* Gertsch (det. W.J. Gertsch)
   Records—Cueva de Carniceras, Cueva de Entrada Chica, Cueva de la Puente, and Sótano at Valle de los Fantasmas.

   *Modisimus* sp. (det. W.J. Gertsch)
   Records—Sótano at Valle de los Fantasmas.

   *Psilochorus concinnus* Gertsch (det. W.J. Gertsch)
   Records—Cueva de Cinquenta y Ocho.

Family Symphytognathidae
   *Maymena chica* Gertsch (det. W.J. Gertsch)
   Records—Cueva de los Caballos, Cueva de Cinquenta y Ocho, and Cueva de la Puente.

Order Opilionida

Family Cosmetidae
   *Cynorta jamesoni* Goodnight and Goodnight
   Records—Sótano de Puerto de los Lobos.

Family Phalangodidae
   *Karas parvus* Goodnight and Goodnight
   Records—Sótano de Puerto de los Lobos.

   *Strongylodesmus potosianus* (Chamberlin) (det. N.B. Causey)
   Records—Sumidero de Fantasmas.

   *Tiphallus frivolus* Causey (det. N.B. Causey)
   Records—Sótano de Nopales.

Family Stylodesmidae
   *Bolivaresmus* sp. (det. N.B. Causey)
   Records—Cueva de la Puente.
   Comment—This is apparently a new species.

   *Ceratesmus* sp. (det. N.B. Causey)
   Records—Cueva de Cinquenta y Ocho.
   Comment—This is apparently a new species.

Family Xystodesmidae
   *Rhysodesmus* sp. (det. N.B. Causey)
   Records—Sumidero de Fantasmas.

Order Diplura

Family Campodeidae
   Unidentified genus and species (det. W.R. Elliott)
   Records—Cueva de los Caballos.
   Comment—A single specimen was taken in the dark zone.

Family Collembola

Family Entomobryidae
   *Pseudosinella reddelli* Christiansen (det. K. Christiansen)
   Records—Cueva de Cinquenta y Ocho, Sótano de la Golondrina, Sótano de Ojo de Agua, and Cueva de la Puente.

Order Ephemeroptera

Family Leptophlebiidae
**Neochoroterpes mexicanus** Allen (det. R.K. Allen)  
Records—Cueva de la Puente.  
Comment—Nymphs were taken in 19°C stagnant water.

**Order Odonata**

**Family Coenagrionidae**  
*Argia* sp. (det. O.S. Flint)  
Records—Cueva de la Puente and Sótano de San Francisco.  
Comment—Nymphs were taken from water in both caves.

**Family Cordulegasteridae**  
*Cordulegaster diadema* Selays (det. O.S. Flint)  
Records—Cueva de la Puente.  
Comment—One nymph was collected from 19°C stagnant water.

**Order Dermaptera**

**Family Forficulidae**  
*Ancistrogaster* sp. ct. *toltecus* (Scudder) (det. A.B. Gurney and A. Brindle)  
Records—Cueva de la Puente.  
Comment—This is apparently a new species.

**Family Hemiptera**

**Family Belostomatidae**  
*Abedus immensus* Menke (det. R.C. Froeschner)  
Records—Cueva de la Laguna and Cueva de la Puente.  
Comment—A male with eggs on its back was taken in a stagnant pool in Cueva de la Puente.

**Family Dipsocoridae**  
Unidentified genus and species (det. S. Szerlip)  
Records—Cueva de la Puente.

**Family Gerridae**  
*Gerris remigis* Say (det. R.C. Froeschner)  
Records—Sótano de San Francisco n. 2.  
Comment—This common species was abundant in the 12°C water at the bottom of the cave.

**Family Veliidae**  
*Microvelia ? beameri* McKinstry (det. S. Szerlip)  
Records—Cueva de la Puente.  
*Rhagovelia varipes* Champion (det. S. Szerlip)  
Records—Cueva de la Puente.

**Order Coleoptera**

**Family Cantharidae**  
*Discodon* sp. (det. T.J. Spilman)  
Records—Cueva de la Puente.

**Family Carabidae**  
*Agonum (Platynus)* sp. (det. T.C. Barr)  
Records—Sótano de la Golondrina and Cueva de la Puente.  
Comment—This species may be a troglophile or trogloxene.

*Amara* sp. (det. T.C. Barr)  
Records—Sótano de la Golondrina.  
Comment—This is probably an accidental.

*Bembidion* sp. (det. T.C. Barr)  
Records—Sótano de San Francisco n. 2.  
Comment—This is probably an accidental.

*Colpodes* sp. (det. T.C. Barr)  
Records—Sótano de Puerto de los Lobos.

*Mexaphaenops fishi* Barr (det. T.C. Barr)  
Records—Small cave at Valle de los Fantasmas and Sótano de la Golondrina.  
Comment—This is an apparent troglobite.

? *Mexisphodrus* sp. (det. T.C. Barr)  
Records—Sumidero de Fantasmas, Sótano de la Golondrina, Sótano del Pájaro, Cueva de la Puente, Sótano de Puerto de los Lobos, Sótano de Super-Macho, and Sótano at Valle de los Fantasmas.  
Comment—This troglobilie species may actually belong in the genus *Colpodes*.

**Family Chrysomelidae**  
*Heikertingerella* sp. (det. R.E. White)
Records—Sótano de San Francisco n. 2.
Comment—This accidental species was taken in the twilight zone of the entrance pit.

Family Elateridae
Aeolus sp. (det. T.J. Spilman)
Records—Sumidero de Fantasmas.

Family Elmidae
Cyloepus sp. (det. P.J. Spangler)
Records—Cueva de la Puente.

Family Lampyridae
Unidentified genus & species (det. D.M. Anderson)
Records—Sótano de Puerto de los Lobos.
Comment—Only larvae of this family were collected.

Family Ptilodactylidae
Ptilodactyla sp. (det. T.J. Spilman)
Records—Cueva de la Puente.

Family Scarabaeidae
Ancognatha manca LeConte (det. H.F. Howden)
Records—Cueva de la Puente.
Comment—This species is common in México and is accidental in the cave.

Aphodius sp. (det. H.F. Howden)
Records—Cueva de los Caballos.
Comment—A single specimen was collected in the entrance area, where it may have been feeding on dung.

Ataenius cognatus LeConte (det. O.L. Cartwright)
Records—Sumidero de Fantasmas.

Diplotaxis sp. (det. O.L. Cartwright)
Records—Sótano de Puerto de los Lobos.

Family Silphidae
Silpha cayennensis Sturm. (det. T.J. Spilman)
Records—Cueva de la Puente.

Family Staphylinidae
Aleocharinae genus et sp. (det. L.H. Herman)
Records—Cueva de la Puente.

Carpelimus sp. (det. L.H. Herman)
Records—Cueva de la Puente.

Deleaster trimaculata Fall (det. L.H. Herman)
Records—Cueva de la Puente.

Homaeotarsus sp. (det. L.H. Herman)
Records—Cueva de la Puente.

Neomedon sp. (det. L.H. Herman)
Records—Cueva de la Puente.

Staphylinus sp. (det. L.H. Herman)
Records—Cueva de la Puente.

Stilicolinea condei Jarrige (det. L.H. Herman)
Records—Cueva de la Puente and Cave at San Francisco.
Comment—This troglophile species ranges north into Texas.

Family Tenebrionidae
Eleodes sp. (det. T.J. Spilman)
Records—Cueva de los Caballos and Cueva de Cinquenta y Ocho.
Comment—Specimens were collected at the dark edge of the twilight zone in Cueva de los Caballos and in the entrance of Cueva de Cinquenta y Ocho.

Eleodes sp. nr. rotundicollis Eschschoitz (det. T.J. Spilman)
Records—Cueva de Carnicerías.

Eleodes sp. nr. solieri Champion (det. T.J. Spilman)
Records—Sótano at Valle de los Fantasmas.

Eleodes sallei Champion (det. T.J. Spilman)
Records—Sótano de Abernathy, Cueva de Cinquenta y Ocho, Sótano de la Golondrina, Cueva de las Moscas, Sótano de Nopales, Sótano de Ojo de Agua, Sótano del Pájaro, Sótano de Puerto de los Lobos, and Sótano de Super-Macho.
Comment—This species is a trogloxene. One specimen was collected in the dark zone of Cueva de Cinquenta y Ocho.

Eleodes solieri Champion (det. T.J. Spilman)
Records—Sumidero de Fantasmas.

Order Trichoptera
Family Calamoceratidae
Phylloicus sp. (det. O.S. Flint)
Records—Cueva de la Puente.

Family Philopotamidae
Wormaldia sp. (det. O.S. Flint)
Records—Cueva de la Puente.
Comment—A single female was collected in the dark zone.

Family Psychomyiidae
Polycentrepus sp. (det. O.S. Flint)
Records—Cueva de la Puente.
Comment—One larva was collected in 19°C stagnant water.

Order Lepidoptera
Family Tineidae
Tinea sp. (det. D.R. Davis)
Records—Cueva de la Laguna.

Order Diptera
Family Calliphoridae
Calliphora vicina R.-D. (det. R.J. Gagné)
Records—Sótano de San Francisco.
Comment—One adult was collected at the bottom of the entrance pit near a pool laden with human fecal matter.

Phaenicia sp. (det. R.J. Gagné)
Records—Sótano de San Francisco.
Comment—A single larva was taken from a pool laden with fecal matter at the bottom of the entrance pit.

Family Cecidomyiidae
Lestodiplosis sp. (det. R.J. Gagné)
Records—Cueva de la Puente.

Family Chironomidae
Unidentified genus and species (det. W.W. Wirth)
Records—Sótano de Ojo de Agua.

Family Dolichopodidae
Chrysotus sp. (det. G.C. Steyskal)
Records—Sótano de San Francisco n. 2.
Peloroepeodes cornutus Van Duzee (det. G.C. Steyskal)
Records—Cueva de la Puente.

Family Empididae
Drapetis sp. (det. G.C. Steyskal)
Records—Sótano at Valle de los Fantasmas.

Family Mycetophilidae
Unidentified genus and species (det. R.J. Gagné)
Records—Cueva de la Puente.
Rymosia sp. (det. R.J. Gagné)
Records—Cueva de los Caballos and Cueva de Cinquenta y Ocho.

Family Sciaridae
Bradysia sp. (det. R.J. Gagné)
Records—Cueva de la Puente.

Family Sphaeroceridae
Leptocera sp. (det. G.C. Steyskal)
Records—Cueva de Cinquenta y Ocho and Sótano de San Francisco n. 2.

Family Tipulidae
Epiphragma (Epiphragma) sp. (det. G.W. Byers)
Records—Sótano de San Francisco.
Comment—This may be a new species.
Limonia (Dicranomyia) sp. (det. G.W. Byers)
Records—Sótano de la Golondrina.

Order Hymenoptera

Family Formicidae
Pheidole sp. (det. D.R. Smith)
Records—Sótano de San Francisco n. 2.
Comment—Accidental; the head and thorax of a worker were collected at the bottom of the entrance pit.
Tapinoma sp. (det. D.R. Smith)
Records—Sumidero de Fantasmas.

Family Ichneumonidae
Orthocentrus sp. (det. R.W. Carlson)
Records—Cueva de la Puente.
Comment—This is probably a parasite of fungus gnats (Mycetophilidae).

PHYLUM CHORDATA

CLASS AMPHIBIA

Order Urodela

Family Ambystomidae
Ambystoma tigrinum (Green) (det. R. Newcomer, W.R. Elliott)
Records—Sótano de Abernathy, Sótano de la Golondrina, and Sótano de Puerto de los Lobos.

Family Plethodontidae
Pseudoeurycea sp. (det. J.R. Reddell)
Records—Sótano de Abernathy, Sótano de la Golondrina, Sótano de Puerto de los Lobos, and Sótano de Ojo de Agua.


Comment—This species is frequently found on the walls of entrance pits.

Order Anura

Family Leptodactylidae
Syrrophus longipes (Baird) (det. J.D. Lynch)
Records—Sótano de Puerto de los Lobos.

Comment—A single frog collected from Sótano de la Golondrina may be this species.

CLASS MAMMALIA

Order Chiroptera

Family Phyllostomatidae
Artibeus sp. (det. T.R. Mollhagen)
Records—Cueva de la Puente.

Comment—A colony of perhaps several hundred Leaf-nose bats roosts near the smaller, upper entrance. Other than one dead bat seen at the bottom of Sótano de Ojo de Agua, bats
have not been observed in any other cave in the Valle de los Fantasmas Region.

LITERATURE CITED

