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## TABLE OF CONTENTS

PREFACE . . . . .	1
GATES, G.E., On Some Earthworms from Mexican Caves . . . . .	3
PECK, S.B., New and Poorly Known <i>Ptomaphagus</i> from Mexican Caves (Coleoptera; Leiodidae; Catopinae) . . . . .	9
ROWLAND, J.M., <i>Agastoschizomus lucifer</i> , a New Genus and Species of Cavernicole Schizomid (Arachnida, Schizomida) from Mexico . . . . .	13
MOLLHAGEN, T., Checklist of Bats in Caves in the Regions of the Sierra de Guatemala and Sierra de El Abra, Northeastern Mexico . . . . .	19
CAUSEY, N.B., Millipedes in the Collections of the Association for Mexican Cave Studies (Diplopoda) . . . . .	23
GOODNIGHT, C.J., M.L. GOODNIGHT, Opilionids (Phalangida) of the Family Phalangodidae from Mexican Caves . . . . .	33
GERTSCH, W.J., A Report on Some Mexican Cave Spiders . . . . .	47
BARR, T.C., JR., A New Species of <i>Mexaphaenops</i> from Tamaulipas, México (Coleoptera: Carabidae) . . . . .	113
ROWLAND, J.M., New Species of Schizomids (Arachnida, Schizomida) from Mexican Caves . . . . .	117
GERTSCH, W.J., Three New Species of Ricinuleids from Mexican Caves (Arachnida, Ricinulei) . . . . .	127
REDDELL, J.R., R.W. MITCHELL, A Checklist of the Cave Fauna of Mexico. I. Sierra de El Abra, Tamaulipas and San Luis Potosí . . . . .	137
REDDELL, J.R., R.W. MITCHELL, A Checklist of the Cave Fauna of Mexico. II. Sierra de Guatemala, Tamaulipas . . . . .	181
REDDELL, J.R., A Checklist of the Cave Fauna of Mexico. III. New Records from Southern Mexico . . . . .	217
WILEY, S., R.W. MITCHELL, A Bibliography of the Mexican Eyeless Characin Fishes of the Genus <i>Astyanax</i> . . . . .	231

The original edition of this book was accompanied by a loose sheet of errata. The corrections have been made in this reprint.





# STUDIES ON THE CAVERNICOLE FAUNA OF MEXICO

ASSOCIATION FOR MEXICAN CAVE STUDIES

BULLETIN 4

REPRINT



EDITED BY

JAMES R. REDDELL AND ROBERT W. MITCHELL







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**BULLETIN 4**

**STUDIES ON THE  
CAVERNICOLE FAUNA OF MEXICO**

EDITED BY

**JAMES R. REDDELL**

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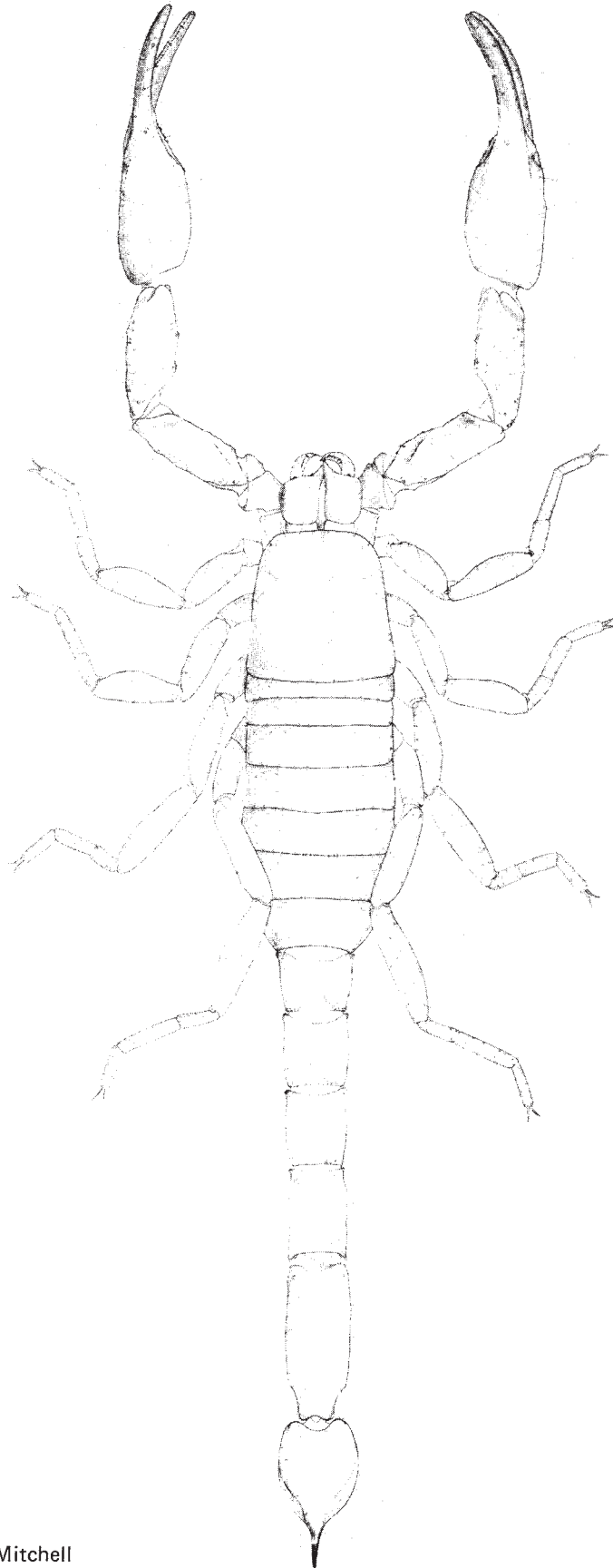
DR. FEDERICO BONET

Outstanding biospeleologists  
and pioneers in the study of the Mexican cave fauna.



TABLE OF CONTENTS

PREFACE . . . . .	1
GATES, G.E., On Some Earthworms from Mexican Caves . . . . .	3
PECK, S.B., New and Poorly Known <i>Ptomaphagus</i> from Mexican Caves (Coleoptera; Leiodidae; Catopinae) . . . . .	9
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*Typhlochactas rhodesi* Mitchell



## PREFACE

Intensive collecting during the past eight years in the caves of Mexico has revealed the presence of hundreds of undescribed taxa, many in the most carefully studied areas. The recent interest in Mexico by European bio-speleologists has encouraged us to publish this compilation of papers so that the names of new taxa may be made available. It will also aid future collectors in indicating areas of interest or areas which have been neglected.

The karst regions of the high mountains of Mexico constitute one of the most exciting frontiers remaining to the speleologist, regardless of whether he is an explorer, geologist, or biologist. Prior to 1962, exploration of the caves of Mexico had been limited almost entirely to large horizontal systems within a few miles of major highways. The organization of the Association for Mexican Cave Studies in 1962 led to the exploration of the karst regions of the higher and less accessible mountain regions. It has been in these areas that some of the most remarkable new species of cave animal have been found.

The work of Candido Bolívar y Pieltaín and Federico Bonet in the early 1940's revealed the remarkable nature of the cavernicole fauna of Mexico. Most of their field efforts, however, ceased before 1950, and for more than 10 years the active exploration and study of Mexican caves was at a standstill. In 1960 a trip to the karst region of Xilitla, San Luis Potosí, by R. W. Mitchell, F. E. Abernethy, W. L. Rhodes, and others revealed the presence of great pits in the high mountains of Mexico. This, in part, inspired trips to Mexico in 1962

by spelunkers from the University of Texas at Austin. After preliminary trips to the Sierra de El Abra in San Luis Potosí, a lengthy trip was made by T. R. Evans, Terry Raines, James Reddell, and William H. Russell to the Tequila area of Veracruz and the Xilitla area of San Luis Potosí. This trip confirmed the presence of extensive karst development and large, deep systems in the higher mountain regions. Casual biological collections in these caves contained interesting new species and an active program of collection was then initiated by the Association for Mexican Cave Studies. This compilation of papers is a direct result of this program.

Reddell (*Assoc. Mex. Cave Stud. Bull.*, 3) has summarized the history of Mexican cave biology in a preliminary bibliography and checklist published earlier this year. Included were 926 taxa, of which 97 were listed as troglobites (i.e., species restricted to a cave habitat and showing apparent modifications for that habitat, such as loss or reduction of eyes and pigment and elongation of appendages). Ten of the troglobites listed were undescribed forms. Most of the species recorded from Mexico are known from one or only a few caves and many are known by only a single specimen. This collection of papers, including as it does only a few groups of animals and by no means all of the available material within those taxa, adds more than 200 species to the known cave fauna of Mexico. Of these, 103 are newly described species and 18 are newly described troglobites.

The cave fauna of Mexico includes some

remarkable animals. Among the first to be studied were the blind fishes of the genus *Astyanax*. This genus has been of great significance to the study of the genetics and evolution of troglobites because of the ability of the eyeless fishes to interbreed with their surface ancestor which inhabits local epigeal waters.

The collections of Bolívar, Bonet, and their associates included such remarkable troglobites as an eyeless crab, *Potamocarcinus (Typhlopseudothelphusa) mocinoi* (Rioja), known only from Chiapas; a very primitive aquatic oniscoid isopod, *Typhlotricholigioides aquaticus* Rioja; a blind catfish, *Prietella phreatophila* Carranza; and three cavernicolous species of ricinuleid, *Cryptocellus boneti* Bolívar in Grutas de Cacahuamilpa, Guerrero; *C. osorioi* Bolívar in Cueva de Los Sabinos, San Luis Potosí, and *C. pelaezi* Coronado in Cueva de Taninul n. 1, San Luis Potosí.

As a result of the collecting efforts of the Association for Mexican Cave Studies, other remarkable species have been added to the cave fauna of Mexico and the ranges of some of the known species have been better delineated. Perhaps the most amazing discovery in Mexico has been that of the first eyeless scorpions in the world. Three species, all in the genus *Typhlochactas* Mitchell, have now been described. Other remarkable discoveries include huge populations of ricinuleids and three additional cavernicolous species, two species of eyeless mygalomorph spider, and the first troglobitic planarians in Mexico.

The results of part of the AMCS collections are included here. It is particularly interesting to note that many new species have appeared in the Sierra de El Abra. This was one of the first regions to be studied in Mexico and the continued discovery of new taxa is an indication of the paucity of information available on even the most intensely studied karst regions. With the opening of new regions of the Sierra Madre Oriental by major east-west highways and with an interest in the high karst regions of southern Mexico, many hundreds of new species can be expected in the near future.

Most of the material reported here is from

four areas in Mexico: the Sierra de Guatemala of Tamaulipas, the Sierra de El Abra of Tamaulipas and San Luis Potosí, the Orizaba region in Veracruz, and the state of Chiapas. Additional species are reported from northern Mexico (Nuevo León and Coahuila), the Xilitla-Jalpan region of San Luis Potosí and Querétaro, and the classic karst region of Cacahuamilpa in Guerrero. Of all of these regions, only the Sierra de Guatemala and the Sierra de El Abra are covered with any degree of completeness, and even here many new species remain to be described.

Two things cannot be emphasized too strongly in prefacing this collection: only a small percentage of collected material is reported on in this series of papers, and many hundreds of species remain to be discovered in Mexico. It is hoped that this volume will encourage further collection in Mexico.

It is appropriate here to express our appreciation to many people who have cooperated the past few years. We wish to thank the authors of the papers included herein for providing us with manuscripts with only the shortest of notice.

Although a large number of people have helped in the collection of specimens, a few deserve special recognition. Therefore, we wish to express our very deep gratitude to William Elliott, John Fish, David McKenzie, Terry Raines, and William Russell.

We also wish to express our particular appreciation to T. C. Barr, Jr., Nell B. Causey, W. J. Gertsch, and T. H. Hubbell for their continued enthusiasm, encouragement, and assistance during the entire duration of our efforts in Mexico.

We wish to express our thanks to the following people who have all made a significant contribution to the publication of this volume: Craig Bitinger, Steve Bitinger, Mel and Paulette Brownfield, Connie Clark, William Elliott, David Honea, Leslie Lawrence, Jan Lewis, Logan McNatt, Rexell Mitchell, Peter Strickland, Ann Sturdivant, Ellen Wray, and Suzanne Wiley. Finally, a special expression of appreciation goes to Terry Raines who, besides printing the volume, has helped in every way possible.

James R. Reddell and Robert W. Mitchell

## ON SOME EARTHWORMS FROM MEXICAN CAVES

By G. E. Gates

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The endemic megadrile fauna of Mexico, as known today, comprises but thirteen species (*cf.* Gates, 1970), four of which have not been found outside of the caves in which they were first secured. As one further result of the interest and efforts of J. Reddell and his spelunking associates, a fourteenth and a fifteenth species herein are added to the list. Together with those previously named, the six cave forms strongly hint at existence of an interesting but largely unknown autochthonous earthworm fauna.

If supposedly vigorous exotics, accidentally imported by man since the Spanish invasion, are (as some thought did happen elsewhere) exterminating the natives, the latter may have found in caves—especially if relatively free of human disturbances—a temporary refuge. However, several exotics already have been obtained from Mexican caves as indicated below.

If extermination really is under way, we can be thankful for the intervention of the speleologists who have provided material of *Balanteodrilus*, *Eodrilus* and of the little known American genus now to be considered.

**Systematics.** The genus was defined in the classical system (Stephenson, 1930, p. 851) as follows: "Male pores on xviii; two pairs of prostatic pores, on xvii and xix. Spermathecal pores, two pairs, in furrows 7/8 and 8/9. Two or three esophageal gizzards. Calciferous glands absent. Micronephridial."

Each of those genital characters is common in four different families and being liable to intrageneric variation can have but limited systematic significance and then mostly at the species level. Of the somatic characters, which should have been very much more important, one is negative, another is too vague and generalized to be of real value (as Bahl showed in the twenties), and the third is not invariable as a good genus-defining character should be. Material available in the past, extremely limited as to numbers, poorly preserved or even macerated, of course could not have provided much of the information that now is needed. Indeed, the best possible field-preserved material may not enable full characterization of the very important nephridial structure. Accordingly, the following generic precis is offered only as a temporary first approximation.

Digestive system, with gizzards in region of v-viii, but without calciferous and supra-intestinal glands, intestinal typhlosoles and caeca. Circulatory system, with complete

OCTOCHAETIDAE

*Trigaster* Benham, 1886

dorsal and ventral trunks, paired latero-esophageal trunks median to the hearts, a supra-esophageal trunk in x-xiii, posterior lateroparietal trunks (opening into dorsal trunk in xiii?) but without a subneural. Hearts, latero-esophageal, in some of x-xiii. Excretory system, meroc, all nephridia small and avesculate, (numerous astomate and Y-shaped nephridia in region of ii-iv opening into the pharynx, remainder of system exoc and comprising small Y-shaped nephridia,

without funnels even mesially and posteriorly?). Setae, four pairs per segment. Dorsal pores, present.

Quadriprostatic, quadrithecal (with spermathecae in viii, ix?). Female pores, paired. Reproductive pores all minute and superficial. Ovaries, fan-shaped, with several egg-strings. Holandric, seminal vesicles at least in xii. Male gonoducts, concealed within the parietes.

**Distribution.** Mexico, Cuba, Puerto Rico, St. Thomas.

Key to species of *Trigaster*

1. Gizzards, two . . . . . 2  
Gizzards, three . . . . . 5
2. Seminal grooves in xvii-xix . . . . . 3  
Seminal grooves in xviii-xx . . . . . 4
3. Pigment red, spermathecal pores equatorial,  
spermathecae diverticulate . . . . . *cavernicola*  
Pigment none, spermathecal pores at or near 7/8-8/9,  
spermathecae adiverticulate . . . . . *tolteca*
4. Last hearts in xii, genital tumescences in xi, xii,  
xiii but across 22/23 . . . . . *vallesensis*  
Last hearts in xiii, genital tumescences segmental  
in xxii, xxiii . . . . . *reddelli*
5. Prostomium tanylobous, pigment dense, red . . . . . *rufa*  
Prostomium not tanylobous, unpigmented or not red . . . . . 6
6. Spermathecae adiverticulate and with pores in AB,  
gizzards in vii-ix . . . . . *lankesteri*  
Spermathecae diverticulate and with pores at or  
close to mV, gizzards in v-vii . . . . . *intermedia*

**Remarks.** *Trigaster* and other meronephric genera of the classical Trigastriinae or Diplocardiinae were transferred to the Octochaetidae and the holonephric *Diplocardia* and *Zapotecia* to the Acanthodrilidae. The transfers have been criticized because the two enlarged families are polyphyletic. The criticism probably is correct. However, the classical subfamilies and families also were polyphyletic and much worse were in part undefinable morphologically, being based on certain esoteric postulates and the phylogenetic trees that could be erected thereon.

American species of *Eodrilus*, *Diplocardia* and *Zapotecia* now are in the Acanthodrilidae

along with *Plutellus* and *Pontodrilus*. *Megascolides* now is in the Octochaetidae along with *Dichogaster*, *Trigaster*, etc. *Dichogaster* is a large complex, second in size in the classical system, to *Pheretima*. *Plutellus* and *Megascolides* are classical congeries from which American species will have to be removed when revision becomes possible. *Eodrilus* also is a classical congeries much in need of drastic revision (cf. Gates, 1967).

***Trigaster reddelli*, new species**

San Luis Potosí, Valles, 20 km N, in mud-

bank slightly above a large pool and 300 feet below entrance to the cave, Sótano de Yerbániz; January 31, 1969, 0-0-1. D. Honea, T.R. Mollhagen, R.W. Mitchell, W.H. Russell, per J. Reddell. July 31, 1969, 0-1-0. Wm. Elliott. February 17, 1970, 0-2-0. Suzanne Wiley and Wm. Elliott, per J. Reddell.

**External characteristics.** Size, 97-204 by 8-11 mm (acelitellates), 146 by 12 mm. Segments, 218, 222, 229 (acelitellates), 215. Secondary annulation, a presetal furrow in iv, also along with a postsetal secondary from v to clitellum, posteriorly segments short and with only faint traces of secondary furrows. Color, white. Prostomium, broad, prolobous (?) to slightly pro-epilobous. Peristomium, with a variable number of rugosities none of which reach  $\frac{1}{2}$ . Anus, terminal, a vertical slit between two semilunar valves. Setae, present from ii but lacking in last several segments, probably small (scarcely protuberant from epidermis and not reaching into coelom),  $AB < CD$ , behind the clitellum  $AB \text{ ca.} = \frac{1}{2}CD < BC < AA, DD > \text{to} = \frac{1}{2}C$ . First dorsal pore, at 11/12 (1, clitellate), 12/14 (3).

Seminal grooves, slightly concave mesially, about at A, between equators of xviii and xx, at bottom laterally of a longitudinal depression. Penial setae, two protrude to the outside from each end of a seminal groove but male and prostatic pores were not recognized. Quadri-thecal, pores at A and 7/8, 8/9. Female pores, in a white, (non-clitellar?) presetal portion of xiv, perhaps a trifle closer to each other than to A. Clitellum, annular, dark brown, (xiii?)-xviii, 13/14 not obliterated, dorsal pores occluded, setae retained. Genital tumescences, unpaired, reaching slightly lateral to B, in xxii, xxiii (the clitellate), primarily presetal, xxiii (1 acelitellate).

**Internal anatomy.** Septa, 5/6-12/13 muscularized, 12/14 slightly thickened but translucent. Diagonal muscle bands, numerous in xviii-xx. Longitudinal muscle band at mD, if present unrecognized even after staining with picric acid. Pigment, none recognized in sections through the body wall.

Gizzards, well developed, in v, vi (3). Esophagus, widened in x-xii or xiii and there with numerous closely crowded, villiform pro-

tuberances but no lamellae, behind that region almost valvular. Calciferous gland, none. Intestinal origin, in xvii (3). Typhlosole, none (3), a strap-shaped, slight thickening of gut roof at mD ca.  $\frac{1}{2}$  mm wide, more or less obviously recognizable in anterior portions of the intestine. Chloragogen, if at all present on dorsal trunk and segmental connectives must be thin (as compared, for instance, with conditions in *Diplocardia*).

Dorsal blood vessel, single throughout, bifurcating under the brain. Ventral trunk, complete, bifurcating over subpharyngeal ganglia, branches passing dorsally along with the nervous commissures. Latero-esophageal trunks, median to segmental connectives. Posterior lateroparietals, recognizable only from xx anteriorly, apparently joining dorsal trunk on anterior face of 13/14. Subneural trunk, none. Hearts, of ix lateral, of x-xiii latero-esophageal (3), segmental connectives in v-vi traceable to ventral trunk.

Excretory system, meroc. Nephridia, small, closed (?), numerous, compact clusters in region of iii, iv (opening into the pharynx?), then in two lines per segment, extending from near the nerve cord almost to mD, on or from posterior faces of septa in an anterior portion of the intestinal region, perhaps 40 or more per segment, posteriorly seemingly also on anterior faces of septa (?), length decreasing posteriorly, funnels not found even on those nearest the nerve cord.

Holandric. Seminal vesicles, acinous, in ix, xii. Male gonoducts, not seen, presumably well within the parietes. Prostates, 3-4 mm long, rather tongue-shaped but not flattened, confined to own segments, xviii, xx, lumen single, small, eccentric. Ducts, at first glance seemingly much shorter than the glands, possibly slightly muscular but no sheen recognized. Follicles of a, b/xviii, xx, each with at least one reserve seta. Penisetal shafts, yellowish, almost straight except for a softer terminal portion bent at an angle or even curved into a circle, ornamentation unrecognized. Size, 1.551 by 0.0357 (functional), 0.752 by 0.0357 mm (reserve). Associated with one functional shaft were three reserves of decreasingly smaller sizes.



Spermathecae, small, under gut, adiverticulate. Duct, much shorter than ampulla, with at least two longitudinal rows of empty intramural chambers. Ovaries, fan-shaped, as are testes of acelitellates. Ventral setae of spermathecal segments, with nearly straight shaft, bluntly rounded tip, ornamented with numerous transverse rows or irregularly interrupted circles (to as many as 17) of short serrations. Size, 0.5828 by 0.037 mm.

**Reproduction.** Iridescence on male funnels indicated that spermatogenesis had been under way but no sperm were found in the spermathecae of the clitellate individual. In absence of evidence to the contrary, amphimixis is anticipated.

**Ingesta.** Included were many various-sized pieces of black organic matter, presumably of wood.

**Abnormality.** Aberrant metamerism was recognized in the region of the 54th and 100th segments of one worm.

**Parasites.** Numerous, small spheroidal cysts, ca. 1/2 mm thick are in many segments from clitellum to hind end of body, sometimes as many as 25 in a segment. Small pseudonavicellae cysts, each containing 8 spheroidal bodies were associated with penisetal follicles of one worm.

**Remarks.** A pair of thin but opaque wings is attached to the middle of the esophagus in vii. A similar pair in viii seemingly is nearer to 8/9.

A single nephridium seemed to have a swelling that might be a funnel but no identifiable structure was recognized under the microscope. Field-preserved material is unlikely to provide satisfactory preservation for much nephridial structure. Complete absence of nephridial funnels throughout the entire soma would parallel conditions in the Indian genus *Octochaetona* Gates, 1962.

**Systematics.** The single trigaster previously recorded from continental North America, *T. tolteca* Eisen, 1900, is known from a single type that was abnormal and "in an indifferent

state of preservation." The description was based on a study of cross sections of a bisected half of the anterior end and of longitudinal sections of the other half. In spite of one obvious error in the description and a possibility of several others we must proceed on an assumption that Eisen's location of the seminal groove of the normal side in xvii-xix and of the last hearts in xii, is correct. Seminal grooves then were located as in West Indian species of the genus, and also just as in most quadriprostatic acanthodrilid and octochaetid species.

Location of seminal grooves in xviii-xx on each of six specimens contra-indicates individual abnormality. A genetically determined origin of the location, according to our present knowledge, requires the Valles worms to be distinguished systematically not only from the previous Mexican trigaster but also from all others. Existence of similar divergences from usual groove locations within the genus *Diplocardia* Garman, 1888, also confined to North America, provides a precedent for distinction at species level, at least for the present and until the excretory systems of the various species have been adequately characterized.

#### **Trigaster vallesensis, new species**

San Luis Potosí, Valles, 20 km N, in mud-bank slightly above a large pool and 300 feet below entrance to cave, Sótano de Yerbaníz, January 31, 1969, 1-1-1 D. Honea, T.R. Mollhagen, R.W. Mitchell, W.H. Russell, per J. Reddell.

**External characteristics.** Size, to 83 by 7 mm. Segments, 158 (posterior amputee?), 202, 207. Color, white. Prostomium, epilobous. Setae, AB<CD, BC<AA.

Seminal grooves, concave laterally, between equators of xviii, xx, in a rather deeply depressed region. Quadriethecal, pores, at A and 7/8, 8/9. Female pores, in a white and non-

clitellar, presetal portion of xiv. Clitellum, annular, xiii/2-xviii (except a very short posterior strip), lacking ventrally in xiii, xviii, intersegmental grooves (including 13/14, 17/18) obliterated, dorsal pores occluded, setae retained. Genital tumescences, unpaired, in AA the whole length of segments, xi, xii, xiii (3 specimens), across 22/23, reaching into mBC, in a posterior half of xxii and an anterior half of xxiii.

**Internal anatomy.** Similar to that of the preceding species except as noted.

Last hearts, in xii (3).

Spermathecae, large, duct much shorter than ampulla, rather thick but without obvious muscular sheen, large lumen, vertically ridged inner wall. Diverticula, sessile, at ental end of duct, with more or less of a flattened berry shape, one on each side of duct (left and right?).

Copulatory and penial setae, not found, probably lacking.

**Systematics.** The species is easily distinguished from *T. reddelli* externally by the preclitellar genital tumescences and internally by the diverticulate spermathecae and absence of hearts in xiii.

**Remarks.** Intrageneric variation re segmental location of prostate glands in *Diplocardia*, intraspecific variation in location of prostates and prostate-like glands in some ocherodrilids and moniligastriids led the author to postulate a polyprostatic stage in the ancestry of several families. Additional support now is provided by the two new Mexican trigasters. The polyprostatic stage from which deletions could be made in various ways obviates the unexplained shifts of sets of organs from one group of segments to a neighboring group that was involved in the classical theory.

*Eodrillus mexicanus* Gates, 1967?

San Luis Potosí. Xilitla, 710 m, Cueva del Salitre, in pool, July 20, 1969, 0-4-0. 5 km N of Xilitla, Cueva de la Porra, in stream, July

19, 1969, 0-4-0. S. and J. Peck and W. Elliott.

**External characteristics.** Size, ca. 60 by 4 mm. Color, white (alcohol preservation). Prostomium, always unrecognizable (buccal cavity protruded).

**Internal anatomy.** Intestinal origin, in xvi (4). Hearts, of vi-ix lateral, last pair in xiii (4).

**Remarks.** Each specimen was more or less gelatinized. Last hearts of several specimens at first seemed to be in xii but in each case hearts of xiii probably had broken away and no longer were in position.

Spines (in a circle?) at tip of one penial seta were of such uniform size and shape as to seem quite natural though resulting from disintegration at the ental end must be recognized as a possibility.

The intestinal origin and the tubular prostates require reference of the species either to the Acanthodrilidae or the Octochaetidae. Inability to recognize nephridia in any part of the body of any specimen militates against identification. However, such other anatomy as is distinguishable is so similar to that of *E. mexicanus* as to indicate strong probability of belonging to that species.

*Eodrillus* sp.

Tamaulipas, 13½ km NW of Gómez Farías, Cueva de la Capilla (Cueva de la Perra), El Porvenir, 7,000 feet, in pool, July 2, 1969, 0-14-0. S. Peck and R. Norton.

**External characteristics.** Size, to 70 by 2.5 mm. Prostomium, prolobous. Setae, AB ca. = CD, AA ca. = BC.

**Internal anatomy.** Intestinal origin, in xvi.

Penial setae, straight, slender tip narrowing but not pointed nor filamentous, follicles just reaching into coelomic cavities.

Spermathecae, erect, coelomic portion 1+ to 2 mm long.

**Remarks.** Hearts of each specimen were empty and could not be traced to any major trunk. The last pair may have been in xii. Nephridia may be holoic as only a single mass

was recognized on any side of any segment but definite structure therein was not distinguishable.

Spermathecae are so like those of the previous species as to suggest a possibility of the worms belonging in *Eodrilus* if not also to *E. mexicanus*.

LUMBRICIDAE

*Eisenia rosea* (Savigny, 1826)

Tamaulipas. 21 km NW of Gómez Farias, Sótano de la Joya de Salas, Joya de Salas, June 3, 1965, 2-0-3. D. McKenzie, J. Fish, O. Knox per J. Reddell.

*Octolasion tyrtaeum* (Savigny, 1826)

San Luis Potosi. Sótano de Ojo de Agua, San Francisco, at elevation of 9500 feet, November 30, 1968, 0-1-0. W. Elliott, J. Jarl. Sótano de Nopales, 5 km S of San Francisco, November 29, 1968, 0-0-2. J. Jarl. Sótano de la Linja, La Linja, April 1, 1969, 0-0-1. W. Elliott, J. Fish, M. Abernathy, T. Albert, Sótano de la Golondrina, Valle de los Fantasma, November 29, 1968, 0-0-1. W. Elliott, J. Jarl, S. Cathey, M. Burk. (All specimens of this species received from J. Reddell).

**Remarks.** *E. rosea* and *O. tyrtaeum* are European exotics accidentally imported since the Spanish invasion. Both species are widely distributed in the United States and Canada and have occasionally been secured in caves of several states. The anthropochorous lumbricids have been accused of competing with the natives in areas into which they were accidentally introduced and the competition has even been suspected of resulting in extermination of the natives.

MEGASCOLECIDAE

*Pheretima diffringens* (Baird, 1869)

Oaxaca, 10 km SE of Huautla de Jiménez, Sótano de San Agustín, December 28, 1966, 1-0-0. T. Raines per J. Reddell.

San Luis Potosí, 5 km N Xilitla, Sótano de Tlamaya, Tlamaya, rimstone pools 1000 feet below entrance, July 2, 1965, 0-0-1. J. Fish, T. Raines per J. Reddell.

**Remarks.** This species originated in the Orient, perhaps somewhere in China. Pheretimas have been thought to be specially vigorous and successful in colonizing areas in which they have been introduced accidentally by man. *P. diffringens* is common in some of the southern states.

OCNERODRILIDAE

*Eukerria saltensis* (Beddard, 1895)

Tamaulipas, 8½ km NE of Antiguo Morelos, Cueva de la Florida, under rocks in very moist, insectivorous bat guano about 1500 feet from entrance, March 19, 1969, 0-0-1. J. Reddell.

**Remarks.** *E. saltensis* is supposed to have originated somewhere in southern South America, but has been rather widely distributed by man. The species had not hitherto been reported from Mexico.

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NEW AND POORLY KNOWN *PTOMAPHAGUS* FROM MEXICAN CAVES  
(COLEOPTERA; LEIODIDAE; CATOPINAE)

By Stewart B. Peck

Department of Biology, Carleton University, Ottawa, Canada

This paper describes a new species of *Ptomaphagus* from caves in the Sierra de El Abra, and redescribes the inadequately known species, *P. spelaeus*, previously known only from the type specimens taken in Grutas de Caca-huamilpa, Guerrero. The El Abra material was partially gathered during my 2½ month collecting trip to Mexico in the summer of 1969. I wish to thank James Peck and Russell Norton for assisting on this trip, and the many individuals and institutions that provided financial assistance. The remaining specimens were collected by various participants in the Association for Mexican Cave Studies program, all of whom are collectively thanked. Mr. Jorge Hendrichs of Mexico City kindly provided specimens of *P. spelaeus*. Specimens of both species are deposited in the collections of the Museum of Comparative Zoology, Harvard University; American Museum of Natural History, New York; Field Museum of Natural History, Chicago; National Museum of Natural History, Washington, D.C.; Mr. Hendrichs; Escuela Nacional de Ciencias Biológicas, Instituto Politécnico Nacional, México, D.F.; as well as in my own. More complete discussion of phylogeny, biology, and distribution will appear later in my revision of the genus for the New World. The format of the description and the characters used are

those that will appear in the revision.

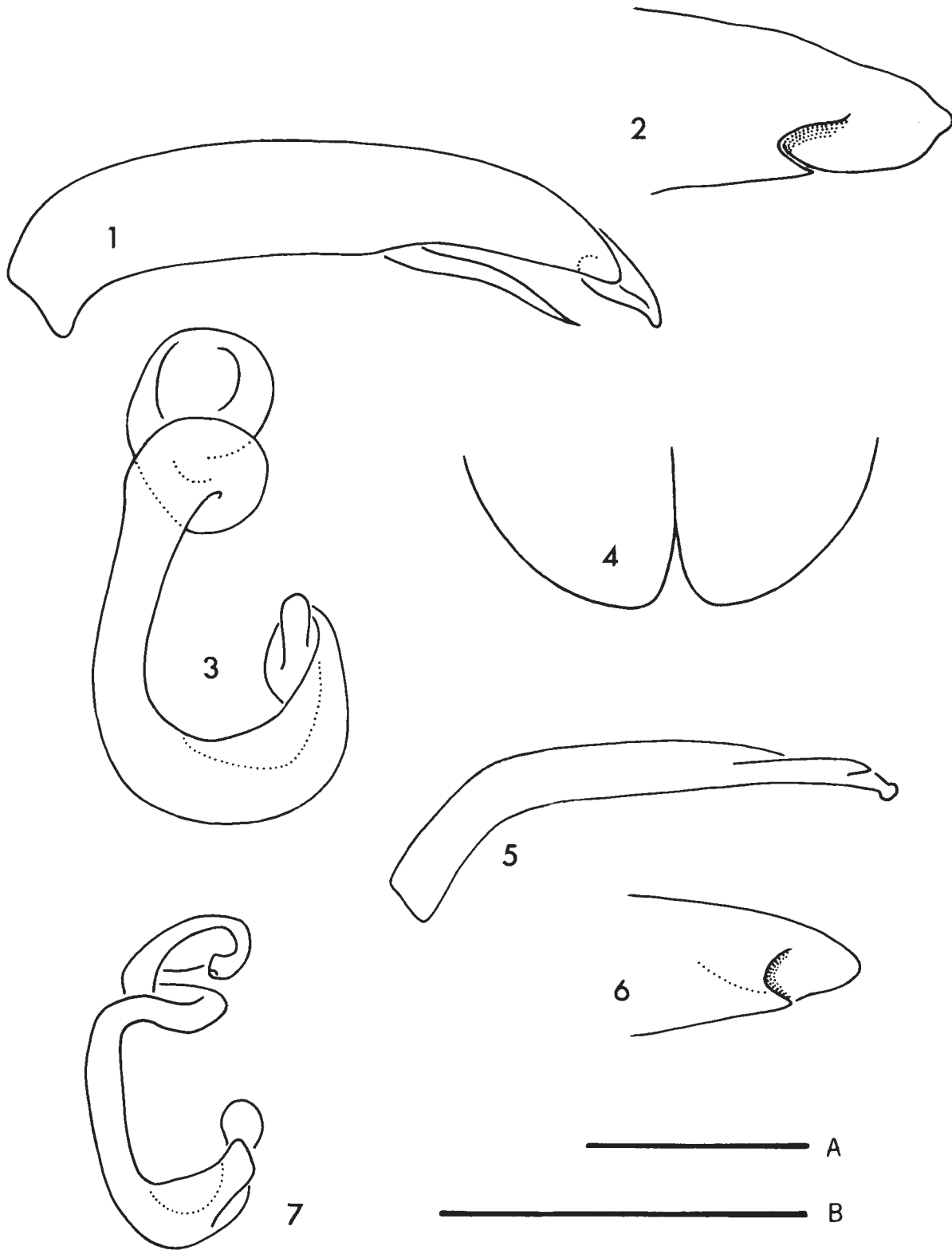
***Ptomaphagus elabra*, new species**

Figures 1-3

Holotype male and allotype female in MCZ (no. 31895). Type locality: México, Tamaulipas, Cueva de El Pachón, 7½ km NE of Antigua Morelos. Type data: 10.vii.1969, S. and J. Peck leg., vampire guano. Paratypes, 117 with same data.

**Diagnosis.** The species is known only from caves at low elevations in the states of Tamaulipas and San Luis Potosí. Its large eyes, short antennae, relatively short and thick aedeagus, and shape of the spermatheca serve to characterize it.

**Description.** Length 2.6 - 3.2 mm. Width 1.2 - 1.5 mm. Color dark brown. Head finely punctured. Eyes normal, their diameter 2.7 times the distance from their anterior margin to antennal base. Antennae short, stout, flattened; not reaching pronotal base when laid back; club darker; segments gradually increasing in width from base to apex; segments II-V longer than wide, VI and VIII-X transverse; VII quadrate. Pronotum widest at base; 1.4 times as wide as long; sides gently diverging; hind margin sinuous; pubescence abun-



Figs. 1-3. *Ptomaphagus elabra*, new species. 1. Lateral view aedeagus. 2. Dorsal view of aedeagus tip. 3. Dorsal view of spermatheca.

Figs. 4-7. *Ptomaphagus spelaeus*. 4. Female elytral tips. 5. Lateral view aedeagus. 6. Dorsal view aedeagus tip. 7. Dorsal view spermatheca. Scale line A is 0.3 mm for figs. 1, 2, 5, 6. Scale line B is 0.3 mm for figs. 3, 7.

dant. Elytra elongate; 1.5 times as long as wide at base; widest one-third behind base; apex weakly rounded-oblique in female. Wings normal observed in flight in Las Grutas de Quintero. Mesosternum with low keel, not distinct. Legs medium; mesotibiae bent outward; metatibiae slightly bent inward. Aedeagus (fig. 1) relatively short and stout, slightly curved; tip fairly blunt in lateral view, in dorsal view (fig. 2) more blunt, with terminal button. Spiculum gastrale long and thin half enclosed by genital plates, which are not anteriorly elongated. Spermatheca (fig. 3) with fairly straight and thin central shaft; anterior end with shaft bent posteriorly, then ventrally and curving to anterior flattened end; posterior end somewhat laterally flattened, thin in dorsal view.

**Variation.** Variation is noticed in slide mounts of the aedeagus in which the tip is rotated to appear more broad.

**Etymology.** The name *elabra* is used as a noun in apposition. It refers to the Sierra de El Abra which contains most of the caves from which the species is known.

**Distribution.** The species is known only from lowland caves in and near the Sierra de El Abra, a north-south trending low range in the Mexican states of Tamaulipas and San Luis Potosí. I have seen 475 specimens from the following 19 localities:

México. San Luis Potosí: Cueva Chica (2½ km NE El Pujal), 1. Cueva de Puente de Dios (30 km SSW Valles), 3. Cueva de Los Sabinos (12½ km NE Valles), 3. Cueva de Taninul n. 1 (13½ km SE Valles), 1. Cueva de Valdosa (10½ km SE Valles), 9. Sótano de Manuel (3 km NE El Pujal), 1. Sótano de Pichijumo (8 km NE Valles), 2. Sótano del Tigre (14 km NE Valles), 9. Sótano de la Tinaja (10½ km NE Valles), 9. Ventana Jabalí (20 km E Valles), 27.

Tamaulipas: Bee Cave (19 km NW Limón), 13. Cueva de la Florida (8½ km NE Antigua Morelos), 19. Cueva del Nacimiento del Río Frío (7 km S Gómez Farías), 31. Cueva de El Pachón (7½ km NE Antigua Morelos), 119. Cueva de los Vampiros (20 km NW Limón), 23. Grutas de El Puente (9 km SE Ocampo), 6. Grutas de Quintero (Quintero, 13 km SW

Mante), 178. Sótano de Gómez Farías (2½ km SW Gomez Farías), 2. Sótano de Santa Elena (9 km SE Antigua Morelos), 19 on vampire guano.

*Ptomaphagus spelaeus* (Bilimek)

Figures 4-7

*Choleva spelaea* Bilimek 1867:902. Type in Museum Vienna, not seen. Type locality: México, Guerrero, Grutas de Cacahuamilca.

*Choleva cacahuamilpensis* Herrera 1891: 218 Type repository unknown, not seen. Type locality: México, Guerrero, Grutas de Cacahuamilpa. NEW SYNONYM.

*Dissochaetus spelaea*, Jeannel 1922:41

*Ptomaphagus (Adelops) spelaeus*, Jeannel 1936:93; 1949:98.

**Note on deposition of type.** Although Jeannel has stated the type of the species is in Vienna, D. F. Janczyk of the Zoologische Abteilung, Naturhistorisches Museum Wien, has searched the collection and cannot find it (*in lit.*).

**Diagnosis.** The species is characterized by the shape of the spermatheca, the aedeagus tip which is bluntly pointed in dorsal view and with a ventral button in lateral view, the rounded female elytral tips, medium antennae, large eyes, and cave habitat in west-central Mexico.

**Redescription.** Length 2.6 - 3.2 mm. Width 1.2 - 1.5 mm. Color dark brown. Head with eyes large and prominent, their horizontal diameter 2.7 times width of eye margin-antennal socket space. Antennae slightly lighter in color at base, medium length, scarcely surpassing pronotal hind margin when laid back, segment II 5/12 as wide as long, III ½ as wide as long, IV and V slightly longer than wide, VI VII wider than long, VIII 5/12 as wide as long. Pronotum with sides slightly converging behind, widest at middle, 1.8 times as wide at base as long, hind margin sinuous. Elytra 1.5 times as long as wide at base, sutural angles and hind margin rounded in males and females (fig. 4), pruinose at tip along suture in females. Fully winged. Legs medium, metatibiae

bent inward. Mesosternal carina medium, notch distinct. Aedeagus thin, curved with terminal ventral button in lateral view (fig.5), tip bluntly rounded in dorsal view (fig. 6). Genital plate half enclosing spiculum. Spermatheca as in fig. 7.

**Field notes.** From the type locality, Grutas de Cacahuamilpa, Bilimek reported that the beetles ran rapidly over cave flowstone. Herrera found one near "agua bendita." I visited this cave in 1969 but could not collect. It has been commercialized and is heavily visited by tourists. The commercialization may have altered conditions so that the beetles no longer live there. James Reddell (*in lit.*) found none in a collecting visit to the cave in 1965. In Grutas de Acuitlapán 18 were collected in the first gallery and 12 in the second gallery.

**Distribution.** I have examined the following material: México: Guerrero: Gruta de Acuitlapán (12 km E Taxco), 1 (9. iv.1968, W. Calvert), 30(2.vi. 1963, C. Bolívar, J. Hendrichs, J. Urquijo). Resumidero del Río San Gerónimo, near Michapa, 1(18.x.1942, C. Bolívar, D. Pelaez).

**Distributional comments.** Though I have not seen material from the type locality for comparison, there is no doubt that the above collections represent the species. The type cave, and the two listed above, are all near one another in the same karst region. These caves possess the same general fauna. Several other caves exist in the vicinity (Fish, 1966) and probably contain the species. Based upon distributional data, there is no doubt that Herrera's species is a synonym.

#### CONCLUSIONS

Neither of the above species show any morphological adaptations for cave life. They are, however, known only from caves. Ecologically they could be classified as obligate troglophiles. If future collecting shows the species to exist in non-cave habitats, they must be shifted to classification of a facultative troglophile. Speleologists in the future may make contributions to this distributional and habitat question by setting baited pitfall

traps for these beetles in the vegetation outside of cave entrances in both geographic areas. As a trap a large can buried with its mouth flush to the ground will be suitable. To attract the beetles a piece of bait (human dung has been found to be the best) may be suspended in a gauze bag in the can above a solution of about 50% ethylene glycol (mixed with water) as a preservative.

In the Mexican cave fauna the above two troglophilic species can be listed together with *P. cavernicola*, here recorded for the first time from Grutas del Palmito, Bustamante, Nuevo León, where I collected 45 specimens in 1964, and from Cueva de la Boca, Santiago, Nuevo León, where I collected 50 specimens in 1969 and 15 in 1971. The only published troglobitic *Ptomaphagus* known from Mexico is the highly modified *P. troglomexicanus* Peck (1968). This was described from one specimen but is now known from 49 specimens which I collected in the type cave (Cueva de la Capilla), in Cueva Chica de la Perra, and in Cueva de la Mina. All three caves are at most 6 air km in distance from each other in the Sierra de Guatemala in southern Tamaulipas.

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*AGASTOSCHIZOMUS LUCIFER*, A NEW GENUS AND SPECIES OF CAVERNICOLE  
SCHIZOMID (ARACHNIDA, SCHIZOMIDA) FROM MEXICO<sup>1</sup>

By J. Mark Rowland

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A number of specimens of a remarkable new schizomid have recently been collected by members of the Association for Mexican Cave Studies in three caves of the Sierra de El Abra, San Luis Potosí, Mexico. This schizomid like most others is eyeless, but more importantly it shows a definite elongation of limbs with respect to typical surface species. While this is not by any means proof of an obligate cavernicolous existence, it is, nonetheless, the most extreme case of what appears to be cave adaptation. Further surface collections in the area of the caves may help to clarify the ecological classification of this cavernicole.

While there are many differences between this and other schizomids, the most obvious is that of its size, it being twice as large as any other Mexican species. The African *Megaschizomus mossambicus* (Lawrence) attains a length of 8 millimeters, while specimens of this new schizomid measure over 11 millimeters. Other important characteristics include the tarsal-basitarsal spurs of the pedipalp, the slender femur and elongated trochanter of leg IV, and the unusual nature of the fixed digit of the chelicera.

In a morphologically consistent and conservative group, where 90 percent of the world species are well contained in one genus, such a unique animal certainly deserves generic distinction.

**Agastoschizomus**, new genus

Body large, nearly 12 millimeters.

**Cephalothorax.** Carapace: produced anteromesally into a large process; posterior third constricted dorsally, expanding laterally; with no eyes or eye spots; posterior margin reaching between legs II and III. Mesopeltidium: lateral plates large, closely associated near midline. Metapeltidium: completely to partially divided by median longitudinal suture. Posterior sternum: oblong, one fifth as wide as long.

**Abdomen.** Terga: I-V with two posterior, submarginal setae; VI-IX with four posterior, submarginal setae. Sterna: II and III with dense, scattered setation; IV-IX with several setae arranged in an anterior and a posterior row. Segments X-XII: semi-telescopic, XII more than twice as long as X and XI together.

<sup>1</sup>Supported in part by grant funds awarded by the International Center for the Arid and Semi-Arid Land Studies (ICASALS), Texas Tech University.



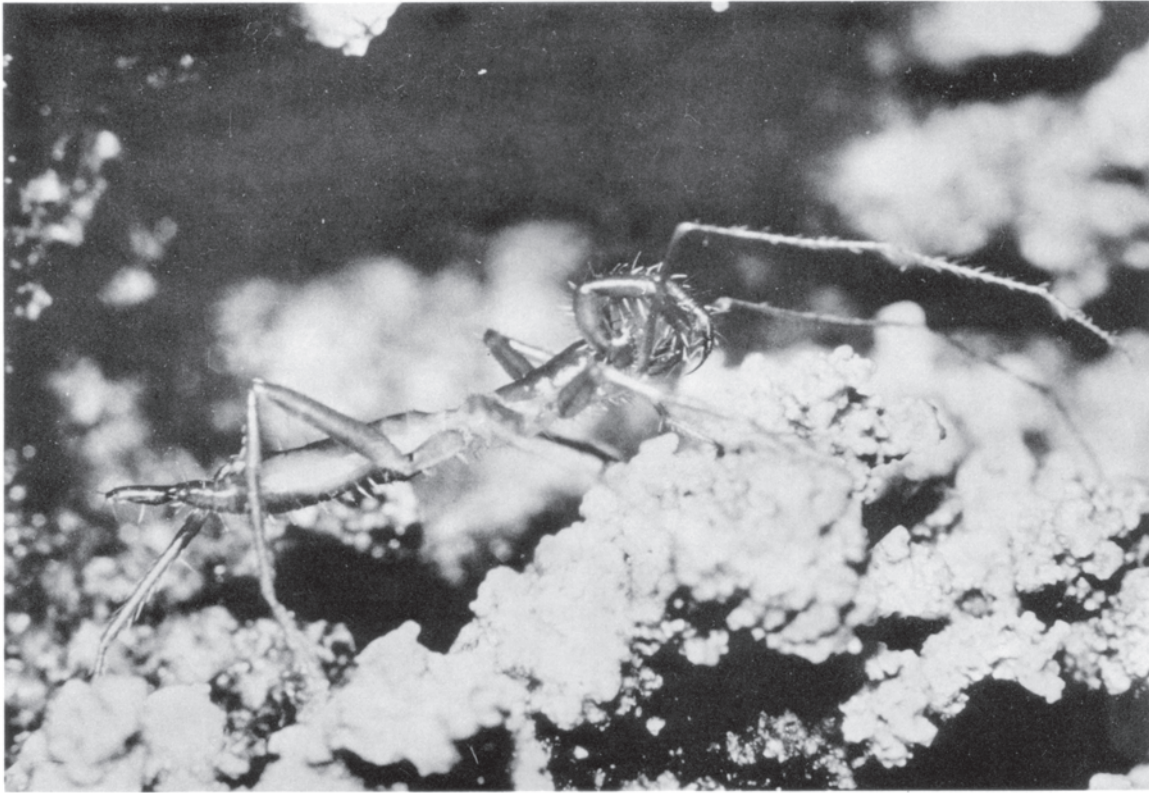


Fig. 1. Male *Agastoschizomus lucifer*, Sótano de Yerbaniz



Fig. 2. Female *Agastoschizomus lucifer*, Sótano de Yerbaniz

Flagellum: mature male of a single segment; female and immature of four well articulated segments, the first the longest.

**Chelicerae.** First segment: with several distal and ventral setae; fixed digit with simple spike like teeth, no row of closely associated setae on mesal aspect. Second segment (moveable finger): with a few blunt, rounded teeth on the mesal aspect of the inner margin.

**Pedipalps.** Short, stout with several small and large setae; tarsus-basitarsus with strong, subapical spurs; claw stout.

**Legs.** Coxae with dense setation; relative lengths I-IV-III-II; trochanter of IV elongated, femur not greatly expanded basally, not different in form than II or III.

**Agastoschizomus lucifer**, new species

Figures 1-8

This description is based on the holotype male, the allotype female, the paratype male, and the paratype female, all in 80% ethyl alcohol.

**Males.** Total length (from anterior margin of first cheliceral segment to end of flagellum), 10.16-10.56 mm.

**Cephalothorax.** Carapace: with seven setae, six paired and one median; gently convex, less so posteriorly; antero-mesal cone directed diagonally down; no indication of eye spots. Mesopeltidium: plates acutely triangular, pointing nearly diagonally toward midline, the free lateral plates separated by less than one sixth of their length. Metapeltidium: with a median longitudinal suture, sometimes not separating the lateral plates entirely; lateral plates with a large central depression; both plates narrow mesally expanding laterally. Anterior sternum: triangular, pointing caudad, the point much elongated, apex reaching to base of coxa II; with 10-11 setae. Posterior sternum: with two setae.

**Abdomen.** Terga: I chevron shaped, located midway between metapeltidium and II; II-IX similar. Sterna: II more than three times larger than III; IV-IX similar. Segments X-XII: progressively larger, X with six setae,

XI with nine setae, XII with 14 setae. Flagellum: elongate, cylindrical, less than one third as wide as long, with 17 large and five small and several minute setae.

**Chelicerae.** First segment, lateral aspect: a vertical group of six long setae flanking moveable finger; two long setae arising just below and behind moveable finger; a group of four setae arranged basally on fixed digit and in close association with a ventral row of 12 similar setae; a singular seta arising in the posterior and ventral thirds of first segment. First segment, mesal aspect: A vertical group of six long setae flanking moveable finger as in lateral aspect; a group of 11 setae along anterior margin, originating just below large dorsal seta; a group of two setae located in middle upper half of first segment; trichoid structures with no distal expansion. First segment, fixed digit: with two stout teeth, the dorsal tooth about half as large as ventral tooth. Second segment (moveable finger): mesal aspect bearing a row of 11 curled setae oriented along its length, near the outer margin; the inner margin bearing a row of eight blunt, rounded teeth along the middle one third of its length.

**Pedipalps.** Trochanter only slightly produced distally; patella narrow proximally, expanded distally, strongly armed ventrally with three mesal and three lateral stout spines; tibia without subapical spur, but ventral aspect with 4-5 lateral and 2-3 mesal stout spines; tarsus-basitarsus with two equal, subapical spurs, one mesal and one lateral, spurs half the length of the tarsal claw; tarsal claw longer than tarsus-basitarsus; length of segments given in Table I.

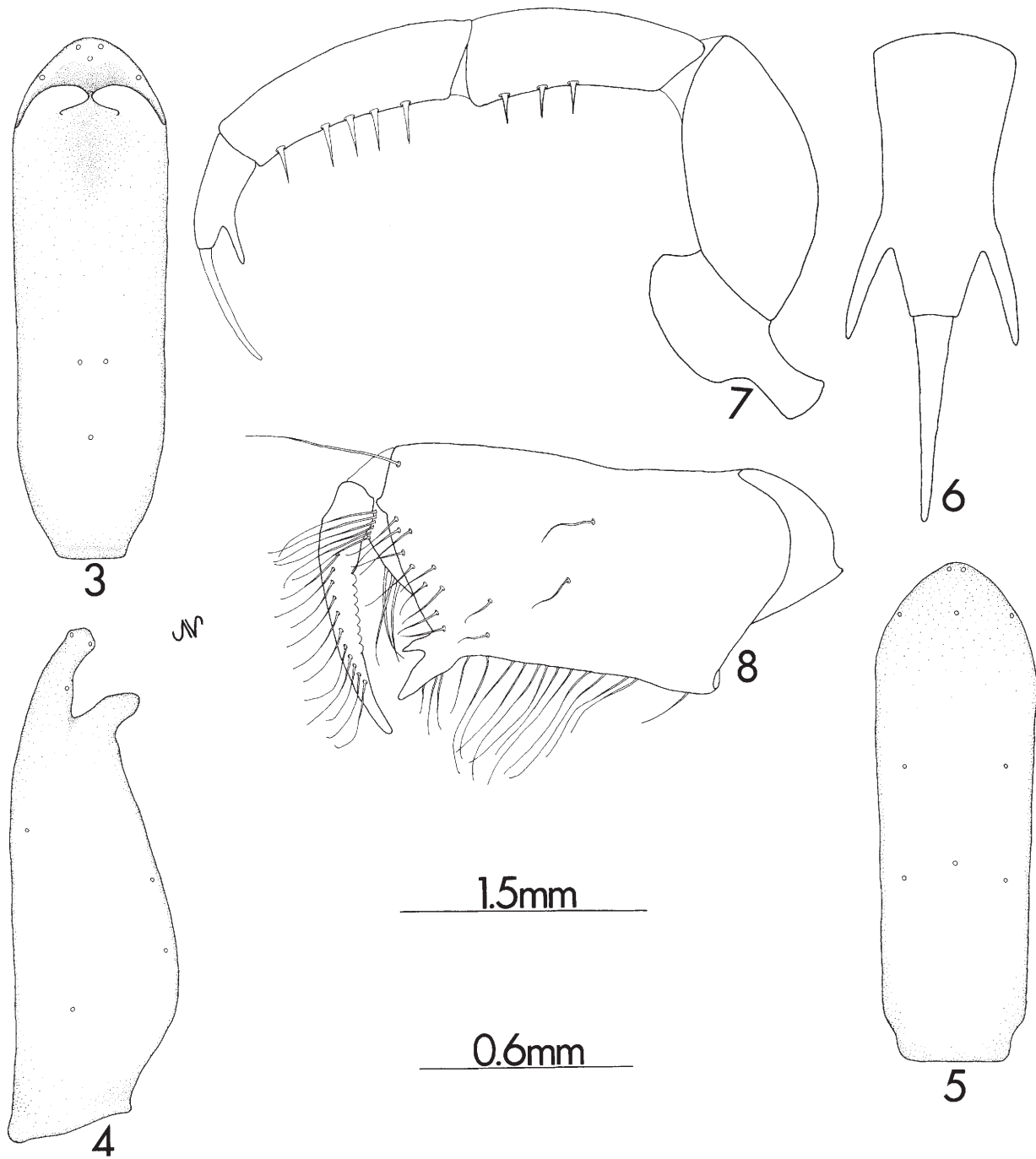
**Legs.** I antenniform, about half again as long as body; length of segments given in Table I.

The females differ from the description of the males as follows:

**Females.** Total length, 10.61-11.24 mm.

**Abdomen.** Flagellum: four well articulated segments; first segment annulated near middle; but not articulated; with 18 large and 11 small setae.

**Type locality.** Male holotype: Sótano de la Tinaja, 10 km NNE Ciudad Valles, San Luis



Figs. 3-8. *Agastoschizomus lucifer*, new species, male: 3, flagellum, ventral aspect; 4, flagellum, lateral aspect; 5, flagellum, dorsal aspect; 6, tarsus-basitarsus and claw, frontal aspect; 7, pedipalp, lateral aspect; 8, chelicera, mesal aspect. The 1.5 mm scale refers to Fig. 7. The 0.6 mm scale refers to all others.



Potosí, Mexico, J. Fish, D. McKenzie, 9 April 1966. Female allotype and female paratype: Sótano de Yerbaniz, 22.5 km N Ciudad Valles, San Luis Potosí, Mexico, W. Elliott, 28 March 1970. Male paratype: Sótano de Yerbaniz, 22.5 km N Ciudad Valles, San Luis Potosí,

Mexico, W. Elliott, J. Shepperd, 8 January 1971.

**Other localities.** San Luis Potosí: Sótano de Matapalma, 21 km N Ciudad Valles, R. W. Mitchell, F. E. Abernathy, T. Albert, 29 May 1969, immature.

Table 1.

MALES.

	Pedipalp mm	I mm	II mm	III mm	IV mm
Coxa	1.03-1.21	.80- .91	.91-1.14	.81- .95	.66-.70
Trochanter	.70- .80	.93- .98	.43- .43	.49- .52	1.19-1.26
Femur	1.18-1.24	3.36-3.51	2.46-2.66	2.41-2.62	3.18-3.34
Patella	1.21-1.29	—	1.32-1.40	1.13-1.20	1.51-1.54
Tibia	1.24-1.28	3.99-4.14	1.69-1.86	1.68-1.72	2.61-2.68
Basitarsus		3.24-3.38q	1.18-1.30	1.41-1.45	1.75-1.83
Tarsus	.59- .66	1.97-2.10	1.11-1.16	1.17-1.17	1.30-1.33

FEMALES.

	Pedipalp mm	I mm	II mm	III mm	IV mm
Coxa	1.26-1.39	.97- .98	.99-1.08	1.02-1.04	.74- .85
Trochanter	.83-1.10	.95-1.01	.60- .63	.61- .68	1.45-1.50
Femur	1.41-1.61	3.48-3.76	2.46-3.01	2.54-2.90	3.32-3.62
Patella	1.37-1.68	—	1.38-1.56	1.11-1.43	1.57-1.77
Tibia	1.43-1.63	3.80-4.16	1.75-1.97	1.74-1.92	2.62-2.86
Basitarsus		2.90-3.30	1.25-1.33	1.51-1.54	1.75-2.10
Tarsus	.66- .71	2.04-2.16	1.08-1.20	1.15-1.33	1.19-1.34

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CHECKLIST OF BATS IN CAVES IN THE REGIONS OF THE  
SIERRA DE GUATEMALA AND SIERRA DE EL ABRA,  
NORTHEASTERN MEXICO

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There has been no organized attempt to intensively survey the bat fauna of the numerous caves of the Sierra de Guatemala or the Sierra de El Abra or the surrounding areas. Instead, collections made were largely incidental to expeditions through the areas, general cave collection, and state surveys (e. g. Alvarez, 1963; Dalquest, 1953). Recently Reddell (1971) has collected published records into a bibliography which includes the most complete checklist of bats as well as other animals in Mexican caves. Included in the revised list here are several unpublished records, additional literature records, and some nomenclatorial changes which should aid in making Reddell's effort current for southwestern Tamaulipas and southeastern San Luis Potosí.

Unless otherwise noted, the locality records are taken from Reddell (1971). Of particular note among the new records is that of *Plecotus mexicanus* G. M. Allen in Tamaulipas, a new taxon for that state's reported fauna. New locality records represented by specimens in the mammal collection of The Museum of Texas Tech University, Lubbock, are indicated by (TT).

Additional literature records are chiefly those of Goodwin (1954) and Jones and

Alvarez (1964). These papers report bat remains taken from owl pellets found in caves. While some of the bat remains in the pellets are not of species commonly associated with caves, most of the remains are, and therefore provide useful records.

The literature often reveals several locations and names for the same cave. Reddell (1971) has already eliminated less commonly used cave names so the synonymies included herein are few. Reddell and Mitchell (1971a; 1971b) include locations of caves collected in their surveys. Many accurate locations and cave maps are already available in trip reports and preceding bulletins of the Association for Mexican Cave Studies.

The species below are listed in the order of Miller and Kellogg (1955). Forman et. al. (1968) have shown cause for including the vampires (family Desmodontidae) in the family Phyllostomidae. In the genus *Pteronotus*, I follow Handley (1966) rather than Villa (1966) in the use of *parnellii* over *rubiginosa* as a specific name.

I thank James R. Reddell for making available some of the specimens cited herein. Suzanne Wiley helped cross-check literature references.

FAMILY EMBALLONURIDAE

*Balantiopteryx plicata* Peters. – SAN LUIS POTOSI: Cueva de Los Sabinos.

FAMILY PHYLLOSTOMIDAE

*Pteronotus parnellii* (Gray). – SAN LUIS POTOSI: Cueva Chica (TT); Cueva del Nacimiento del Río Coy; Cueva de Taninul No. 1 (TT). TAMAULIPAS: cave at Aserradero del Paraíso (Goodwin, 1954); cave near Nacimiento del Río Sabinas; cave at Ojo de Agua; Cueva de la Florida; Cueva de El Pachón; Cueva de Los Troncones.

*Pteronotus psilotus* (Dobson). – SAN LUIS POTOSI: Cueva del Nacimiento del Río Coy.

*Pteronotus davyi* Gray. – SAN LUIS POTOSI: Cueva Chica (TT); Cueva del Nacimiento del Río Coy. TAMAULIPAS: Cueva de la Florida; Cueva de Los Troncones.

*Mormoops megalophylla* Peters. – SAN LUIS POTOSI: Cueva Chica; Cueva del Nacimiento del Río Coy. TAMAULIPAS: Cueva de Los Troncones; Grutas de Quintero.

*Micronycteris megalotis* (Gray). – SAN LUIS POTOSI: Cueva de El Nilo. TAMAULIPAS: Grutas de Quintero.

*Glossophaga soricina* (Pallas). – SAN LUIS POTOSI: cave near Xilitla; Cueva de Los Sabinos (TT). TAMAULIPAS: cave at Ojo de Agua; Cueva de la Boca; Cueva de la Florida; Cueva de El Pachón; Grutas de Quintero.

*Anoura geoffroyi* Gray. – TAMAULIPAS: Cueva de la Mina.

*Choeronycteris mexicana* Tschudi. – TAMAULIPAS: Cueva La Mula.

*Leptonycteris nivalis* (Saussure). – TAMAULIPAS: cave near Jiménez; Cueva de la Mina (TT).

*Carollia perspicillata* (Linnaeus). – SAN LUIS POTOSI: cave near Xilitla. TAMAULIPAS: Cueva de Los Troncones.

*Artibeus jamaicensis* Leach. – SAN LUIS POTOSI: Cueva Chica; Cueva de Corinto; Cueva de la Curva; Cueva del Nacimiento del Río Coy; Cueva de Los Sabinos; Cueva de Taninul No. 1. (TT). TAMAULIPAS: cave at Aserradero del Paraíso (Goodwin, 1954); cave near Nacimiento del Río Sabinas; Cueva del Abra; Cueva de El Pachón; Grutas de Quintero.

*Artibeus lituratus* Olfers. – SAN LUIS POTOSI: caves near Xilitla; Cueva del Lobo; Cueva del Nacimiento del Río Coy. TAMAULIPAS: cave near Nacimiento del Río Sabinas; Grutas de Quintero.

*Artibeus aztecus* Andersen. – TAMAULIPAS: cave at Rancho del Cielo; cave at Rancho del Cielo (de la Torre, 1954).

**Comments.** In a review of the small *Artibeus*, Davis (1969) apparently treats the specimens of *A. cinereus toltecus* reported by de la Torre (1954) as being of this taxon. There are many caves in the vicinity of Rancho del Cielo so these records are not synonymized.

*Enchisthenes hartii* (Thomas). – TAMAULIPAS: cave at Aserradero del Infiernillo (Goodwin, 1954).

*Centurio senex* Gray. – TAMAULIPAS: cave at Aserradero del Infiernillo (Goodwin, 1954).

*Desmodus rotundus* (E. Geoffroy St. Hilaire). – SAN LUIS POTOSI: cave near El Pujal; Cueva del Aire; Cueva de la Barranca; Cueva Chica (TT); Cueva de la Curva; Cueva de Huichihuyan; Cueva del Nacimiento del Río Coy; Cueva de Los Sabinos. TAMAULIPAS: cave near Jiménez; cave near Nacimiento del Río Sabinas; cave 70 km S. Ciudad Victoria; cave near El Pachón (de la Torre, 1954); Cueva del Abra; Cueva de El Pachón; Cueva de la Sepultura; Cueva de Los Troncones; Cueva La Esperanza; Cueva La Mula; Grutas de Quintero.

*Diphylla ecaudata* Spix. – SAN LUIS POTOSI: Cueva del Jobo; Cueva de Potrerillos; Cueva de Los Sabinos. TAMAULIPAS: cave near El Pachón (de la Torre, 1954); Cueva de El Pachón; Cueva de la Sepultura; Grutas de Quintero.

FAMILY NATALIDAE

*Natalus stramineus* Gray. — SAN LUIS POTOSI; Cueva Chica; Cueva del Nacimiento del Río Coy; Cueva de Taninul No. 1 (TT). TAMAULIPAS: cave near Jiménez; cave near Ojo de Agua; Cueva de la Esperanza; Cueva de la Florida (TT); Cueva de El Pachón; Grutas de Quintero; Cueva del Abra.

FAMILY VESPERTILIONIDAE

*Myotis nigricans* (Schinz). — SAN LUIS POTOSI: cave near El Salto; TAMAULIPAS: cave near Ojo de Agua; cave near Nacimiento del Río Sabinas; Cueva de El Puente; Cueva del Nacimiento del Río Frio.

*Eptesicus fuscus* (Palisot de Beauvois). — TAMAULIPAS: cave at Aserradero del Paraíso (Goodwin, 1954); Grutas de Quintero.

*Lasiurus cinereus* (Palisot de Beauvois). — TAMAULIPAS: cave at Aserradero del Paraíso (Goodwin, 1954).

*Plecotus mexicanus* G. M. Allen. — TAMAULIPAS: Cueva Chica de la Perra (TT).

**Comments.** On 15 January 1971, James R. Reddell and William R. Elliott captured a male and female of this species in Cueva Chica de la Perra, located ca. 8 mi. NW of Gómez Farías, in the Sierra de Guatemala at an altitude of approximately 7,000 ft. The literature reveals no other examples of *P. mexicanus* taken in Tamaulipas. Handley (1959) reports the nearest records from 22 mi. SSE of Monterrey, Nuevo León, and Santa Rosa, Guanajuato. Both are in excess of 150 miles from the present locality. The bats were found hanging together about 50 feet from the nearest of five entrances to the cave, but in a small chamber where no light reached. No other bats were seen to occupy the cave at this time. The specimens (TT 12, 563-4) are preserved in spirits.

*Antrozous pallidus* (Le Conte). — SAN LUIS POTOSI: small cave at El Salto (Jones and Alvarez, 1964). TAMAULIPAS: cave at Aserradero del Paraíso (Goodwin, 1954).

FAMILY MOLOSSIDAE

*Tadarida brasiliensis* (I. Geoffroy-Saint-Hilaire). — SAN LUIS POTOSI: Ventana Jabalí. TAMAULIPAS: Cueva del Abra; Cueva La Mula.

**Comments.** Carter and Davis (1961) and Dalquest and Roth (1970) have questioned the presence of *T. brasiliensis* in Cueva del Abra.

*Tadarida laticaudata* E. Geoffroy. — TAMAULIPAS: cave near Río Sabinas; Cueva del Abra.

*Tadarida aurispinosa* (Peale). — SAN LUIS POTOSI: cave at El Salto (Jones and Alvarez, 1964). TAMAULIPAS: Cueva del Abra.

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MILLIPEDES IN THE COLLECTION OF THE ASSOCIATION  
FOR MEXICAN CAVE STUDIES (DIPLOPODA)

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The first taxonomic studies on the diplopods of Mexican caves were made by R. V. Chamberlin (1942a, 1942b, 1943), who worked on the collections of A. S. Pearse from Yucatán caves and of Bolívar and Bonet from caves in the highlands. Causey published (1963, 1964a, 1964b, 1966, 1969) taxonomic studies in this field, basing them on the rich collections made first by James Reddell and his associates and later by the Association for Mexican Cave Studies. There are numerous taxa still to be described from this collection.

FAMILY STYLODESMIDAE

The Styloidesmidae are represented in Mexican caves by more genera and species than any other family in the class Diplopoda. They are also common in epigeal sites in many parts of Mexico. I am unable to find any characters in specimens from caves which might be considered adaptations to the cavernicolous habitat.

SUBFAMILY STYLODESMINAE, NEW

Styloidesmoid millipedes characterized by having the stink glands open through cones on

the upper margin of the low, wide paranota.

Genus *Bolivaresmus* Chamberlin

*Bolivaresmus* Chamberlin, 1942a, p. 10. Loomis, 1968, p. 46.

Type-species. *B. sabinus* Chamberlin, 1942.

**Species.** 2. They cannot be separated by somatic characters. Both the inner and the outer branches of the gonopods are simple in *sabinus* and bifid in *monasticus*. In each species, the solenomerite opens through an additional prong on the outer branch.

**Range.** Caves in eastern San Luis Potosí.

*Bolivaresmus sabinus* Chamberlin

*B. sabinus* Chamberlin, 1942a, p. 10-11, figs. 14-17; 1943, p. 65. Loomis, 1968, p. 46.

**Type locality.** Cueva de Los Sabinos, 12½ km NE of Valles, San Luis Potosí.

**Range.** Caves in the southern extension of the Sierra de El Abra in the vicinity of Valles.

**New records and collections.** San Luis Potosí: Cueva de Los Sabinos, female. Sótano del Arroyo, 2,000 feet from entrance, 12 km NE of Valles, female. Cueva Chica, 2½ km NE of El Pujal, female. Sótano de Pichijumo, 8 km NE of Valles, male, female. Sótano del



Tigre, 14 km NE of Valles, female. Sótano de la Tinaja, 10½ km NE of Valles, male, female. Cueva de Valdosa, 10½ km SE of Valles, male, female. Sótano de Yerbaniz, 21 km N of Valles, female. Records based only on females should be confirmed by male specimens.

**Deposition.** Male and female from Sótano del Tigre and female from Cueva de Los Sabinos, U.S. National Museum.

***Bolivaresmus monasticus*, new species**

Figure 1

**Diagnosis.** Characterized especially by the gonopods, of which each of the two branches is deeply bifid.

**Holotype.** Male, length 6.5 mm, width 1.4 mm, 20 segments. Pore cones are on caudal angles of paranota of segments 5, 7, 10, 13. Head down to level of antennae and metatergites above and down sides of body to legs are blackish; sternites, legs, antennae, remainder of head, and prozonites are whitish. Under magnification surface of metatergites is yellowish with minute black dots, and the usual minute short setae are covered by a layer of yellowish soil.

Antennae are moderately long and clavate. A shallow antennal furrow is on head. Article 4 of legpair 3 is slightly swollen.

Antero-lateral margin of collum is flattened and divided into 10 equal areas by shallow radial sulci; no crenations are present. Remainder of collum is moderately convex. Body is moderately arched and paranota are horizontal. Lateral margin of second paranota has 3 shallow lobes, other nonporiferous paranota have 2 shallow lobes, poriferous paranota have 1, and anal segment has 5. A deep incision is on caudal margin of metatergites at junction with each paranotum. Nodules on dorsum are not prominent; on head there are 2 transverse series of 4 and 6; remaining metatergites have each 3 transverse series of 4 nodules, which form 4 longitudinal series; in addition there are 2 less distinct nodules at junction of paranota and metatergites.

Gonopods have the usual large coxal region. Telopodites are elongated, subparallel,

each with an expanded basal process and an elongated, deeply bifid acropodite; each branch of acropodite is also bifid, and all prongs are widely separated; each prong of outer branch has several minute apical pieces; solenomerite opens on outer branch from a short piece (Fig. 1).

**Type locality and specimen.** Cueva de Llana, 3 km W of Micos (28 km NW of Valles), Municipio de Valles, San Luis Potosí; male holotype collected 3 July 1970 by Wm. Russell and D. McKenzie. This cave is in the southern extension of the Sierra de Nicolás Pérez. It is some 15 miles west and across a valley from the nearest cave in which *B. sabinus* has been collected.

**Etymology.** *Monasticus*, meaning monkish, refers to the village of Los Micos.

**Genus *Gibberdesmus*, new**

Stylodesmids unique in having conspicuous unpaired medial pegs on metatergites of segments 2-19. Pores are either absent or present; when present, they open through white cones on either 4 (5, 10, 13, 16) or 5 (5, 7, 10, 13, 15) segments. Head is covered by collum. Collum bears 10 shallow antero-lateral lobes, second paranota 3 lateral lobes, nonporiferous paranota 3, poriferous paranota 1, and segment 20 bears 5 marginal lobes. Except on anal segment, lobes are mostly equal. Caudal margin of metatergites is incised once or twice at junction with paranota; frequently incisions are obscured by soil particles. Dorsum is moderately arched and paranota are horizontal. Body is loose jointed. Metatergites are finely spiculose, brown, and under magnification have a honeycombed pattern of dark brown on a yellow background. Prozonites are whitish. Collum sometimes has a few indistinct tubercles; metatergites bear a few indistinct tubercles, sometimes forming 2 longitudinal rows on either side of the pegs. Length is between 9 mm and 5 mm.

Coxa of gonopods is large; telopodite is elongated, directed ventrad, contiguous with its homologue along midline, and divided distad into a short inner branch and a longer



outer branch. Inner branch is bifid; its outer prong is the solenomerite. Outer branch is deeply bifid in *analogous*; in other species outer branch has several minute spines and lobes on apical region.

**Type-species.** *G. egenus*, new species.

**Number of species.** 4. On the basis of geographical distribution and gonopod structure the genus is diphyletic; *analogous* represents one line of evolution and the other species another.

**Range.** Caves in the Sierra Madre Oriental in the states of San Luis Potosí, Tamaulipas, Querétaro.

**Note.** In the past, the distribution of pores has been widely used as a key character for separating the genera of the Stylodesmidae. The occurrence of these 4 closely related species with varied pore arrangement suggests that a redefinition of some genera may be necessary.

**Gibberdesmus egenus**, new species

Figures 2-8

**Diagnosis.** Resembles *analogous* in absence of pore cones, but is more closely related to *gelidus* in form of gonopods, which are characterized by relatively short medial branch and presence of several minute spines on apical region of ectal branch.

**Holotype.** Male, length 7.3 mm, width 2.4 mm, 20 segments. Metatergites above and below to legs and head down to antennae are medium brown; all other parts of body are whitish. Collum covers head. Collum has 10 equal, shallow antero-lateral lobes, segment 2 has 3 equal, deeper lateral lobes, segments 3-19 have 2 and anal segment has 5 marginal lobes, of which middle one is largest. No notches are visible in caudal margin of metatergites, but metatergites are abruptly longer at junction with paranota. Medial pegs (Fig. 2) of segments 2-14 are directed slightly forward, pegs of 15 and 16 are directed up, and pegs of 17-19 are directed a little caudad; pegs are longer than they are thick; peg of segment 19 (fig. 3) extends a little behind segment 20; apex of peg of segment 2 is rounded; most

other pegs are slightly notched at apex. Between pegs and paranota there are 2 longitudinal rows of indistinct tubercles, 3 in upper row and 2 in lower one; a few similar tubercles are on convex region of collum.

Coxa of gonopods is large, and telopodite is contiguous with its homologue along mesial margin; mesial branch is divided into 2 unequal prongs, of which larger one is the solenomerite; outer branch is longer, sigmoidally curved, and bears distally several minute spines (figs. 4-8).

**Female paratype.** Length 7.5 mm, width 2.4 mm, 20 segments. Color and other somatic characters are essentially as in holotype.

**Type locality and specimens.** Cueva de la Mina, 7 km NW of Gómez Farías, Tamaulipas. 2 males, including holotype, female, immature specimens of 19 and 18 segments, collected 24 March 1967, 3 June 1967, 27 Jan. 1968, 9 March 1969 by R. Mitchell *et.al.*

**Other record and specimens.** Tamaulipas: Crystal Cave, Rancho del Cielo, 5 km NW of Gómez Farías; male, female collected 4 June 1964.

**Deposition.** Holotype and female paratype from Crystal Cave, U.S. National Museum.

**Variations.** The details of the minute spines of the outer branch of the gonopods may vary slightly on different specimens from the same site and even on the two gonopods of a single individual. The lobes of the collum of the holotype are rounded, while in some specimens they are square. Likewise, there are small individual variations in the size of the lateral lobes and in the length of the pegs.

**Etymology.** *Egenus*, meaning destitute, refers to the absence of pore cones.

**Gibberdesmus gelidus**, new species

Figure 9

**Diagnosis.** Characterized by distribution of pore cones (segments 5, 7, 10, 13 and 15). Closely related to *egenus* in form of gonopods, differing in that unbranched region of mesial branch is longer and minute subapical processes of outer branch are larger.

**Holotype.** Male, length 10 mm, width 2

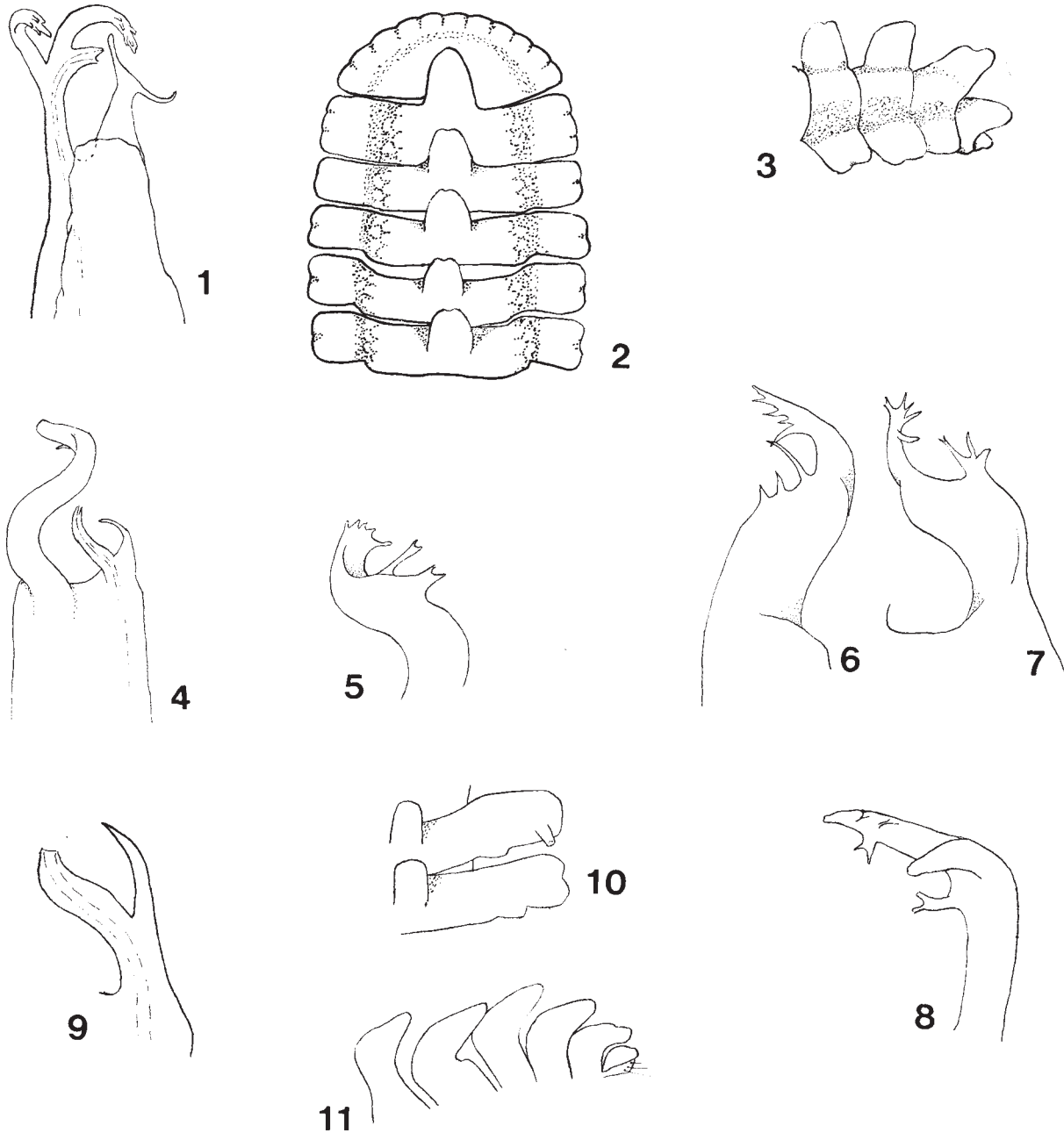


Fig. 1. *Bolivaresmus monasticus*, new species, right gonopod, caudal view, holotype.

Figs. 2-8. *Gibberdesmus egenus*, new genus and new species. 2. Collum and first 4 segments, holotype. 3. Hind end of body, holotype. 4. Left gonopod, caudal view, holotype. 5. Outer branch of gonopod, submesial view, holotype. 6, 7. Outer branches of gonopods of paratype. 8. Outer branch of gonopod of another paratype.

Fig. 9. *Gibberdesmus gelidus*, new species, mesial branch of right gonopod of holotype.

Figs. 10-11. *Gibberdesmus obscurus*, new species. 10. Right paranota of segments 10 and 11, holotype, 11. Pegs of segments 15-19, holotype.

mm. Color is as in *egenus*. Marginal lobes of collum are shallow; poriferous paranota have only one lateral lobe anterior to pore cone, which is on caudal angle; lobation of other paranota is as in *egenus*. Medial pegs are of moderate length for genus; most pegs are rounded and notched at apex; peg of segment 19 extends a little beyond anal segment. Between pegs and paranota there are 2 longitudinal rows of indistinct tubercles, 3 in upper row and 1 in lower one. Caudal margin of metatergites is not notched, but is uneven at junction with paranota.

Gonopods are much as in *egenus*, differing in details mentioned in diagnosis (fig. 9).

**Type locality and specimens.** Cueva del Nacimiento del Río Frío, 7 km S of Gómez Farías. Tamaulipas, 7 males, including holotype, and 6 females collected 18 April 1965, 26 March 1967, and 11 March 1969 by R. Mitchell *et al.*

**Other record and specimens.** *Tamaulipas*: Sótano de Gómez Farías, 2½ km S of Gómez Farías; 3 females, immature of 18 segments collected 2 June 1964 by J. Reddell *et al.*

**Deposition.** Holotype and female paratypes from both caves, U.S. National Museum.

**Variations.** On most of the paratypes from the type locality, the lobes of the collum are rounded, but on 3 they are squarish. On all of the specimens from the Sótano de Gómez Farías the lobes are so shallow and indistinct they can be overlooked. In these same specimens the apex of the pegs and the margins of the lobes are blackish rather than brown.

**Etymology.** *Gelidus*, meaning frosty, refers to the Río Frío.

***Gibberdesmus obscurus*, new species**

Figures 9, 10

**Diagnosis.** Characterized by distribution of pore cones (segments 5, 10, 13 and 16) and by slightly longer medial pegs.

**Holotype.** Female, length 9 mm, width 1.9 mm. Metatergites are brown, spiculate, and have the usual accumulation of clay. Lobes of collum are very shallow on anterior margin and deeper at sides. Lobes of lateral margins of

paranota are deeper and typical for genus, that is 3 lobes are on segment 2, 2 on non-poriferous segments, 1 on poriferous segments, and 5 on anal segment. Resembles *analogous* in that caudal margins of most metatergites have 2 unequal but mostly obscured notches adjacent to each paranotum. Pegs of segments 2-14 are cylindrical and most have a small notch at apex; pegs of 15-19 are somewhat conical (fig. 11); peg of 19 does not extend beyond segment 20; anterior pegs slope forward, middle pegs are upright, and posterior pegs are turned caudad (fig. 10). No distinct tubercles are visible either on collum or metatergites.

**Type locality and specimen.** San Miguel, 16 km W of Aguismón, San Luis Potosí. Male holotype collected Sept. 1967 by J. Fish and W. Russell. I am unable to determine from the collection data whether this specimen came from a cave.

**Etymology.** The name refers to the indistinct lobation across the anterior margin of the collum.

***Gibberdesmus analogous*, new species**

Figures 12, 13

**Diagnosis.** Similar to *egenus* in absence of pores; characterized by gonopods, of which ectal branch is deeply bifid and free of spines.

**Holotype.** Male, mutilated, with head and segments 1-4 missing and paranota remaining on only segments 5-10, 12, and 15-19; probable length 5 mm, width 1.6 mm. Metatergites are brown, spiculate, and have the usual accumulation of clay. Pegs of anterior segments turn slightly forward and those of posterior segments slightly caudad; peg of segment 19 is smaller than peg of 18 and does not reach as far back as segment 20 does; posterior pegs are slightly notched at apex. Paranota have 2 lateral lobes; anal segment has 5 marginal lobes; caudal margins of most metatergites have 2 unequal notches adjacent to each paranotum, and some have a medial notch on dorsum (fig. 12). Lobation of first 4 segments is unknown.

Ectal branch of telopodite of gonopods is deeply bifid and prongs are curved; mesial

branch is also 2-pronged, with external prong serving as solenomerite (fig. 13).

**Type locality and specimen.** Pinal de Amoles, Querétero; under rock in large grassy dolina. Male holotype collected 10 July 1967 by J. Reddell *et al.*

Genus *Yucodesmus* Chamberlin

*Yucodesmus* Chamberlin, 1942b, p. 178. Loomis, 1968, p. 53.

**Type-species.** *Y. viabilis* Chamberlin, 1942.

**Species.** 5.

**Range.** Caves and cenotes of Yucatán.

*Yucodesmus hoctunanus*, new species

Figures 14, 15

**Diagnosis.** Characterized by reflected proximal process of gonopods and presence of 4 lateral lobes on all nonporiferous segments between 6-18.

**Holotype.** Male, fragment consisting of head and segments 1-13, width 1.3 mm. Body color is pale, with a slight trace of tan. No dirt adheres to body surface. Head lacks tubercles. Antennae are typical for genus; antennal furrow is moderate. Antero-lateral rim of collum is as in *Y. viabilis*, horizontal, without nodules, divided by shallow radial sulci into 12 shallow crenations, of which the one at each end is smaller than intervening ones. Convex area of collum is densely granular, and there are the usual transverse rows of 4 and 6 large tubercles. Body is moderately arched and paranota are almost horizontal. On segments 3-13 there are 4 longitudinal series of large tubercles, with 3 in each series on each segment; numerous smaller tubercles are between and below large tubercles and on base of paranota. Paranota are wide, with 3 equal lateral lobes on segments 2-4 and on poriferous segments (5, 7, 9, 10, 12, 13) and 4 on nonporiferous segments (6, 8, 11). Pore tubes project between lobes 2 and 3, but actually each pore tube covers a lobe; unequal lobes are on caudal margin of paranota (fig. 14). Lateral lobes are smaller and deeper than lobes on

collum.

Gonopods (fig. 15) resemble those of *Y. viabilis* in that proximal process is bent sharply caudad.

**Paratype.** Female, immature, 19 segments, length 5.5 mm, width, 1.1 mm. Pores are on segments 5, 7, 9, 10, 12, 13, 15, 16. Segments 1-4 and all poriferous segments have 3 lateral lobes; beginning with segment 6 all nonporiferous segments have 4 lateral lobes. Anal tergite is divided into 5 lobes.

**Type locality and specimens.** Hochtún Cave, Hochtún, Yucatán; male holotype, female paratype collected March 1969 by T. Raines. U.S. Nat. Mus., both specimens.

**Note.** This is not *Y. alienus*, the species which Chamberlin tentatively assigned to Hochtún Cave. It suggests that, as he suspected, the holotype of the species is from some other Yucatán cave.

The number of lateral lobes on segment 19 of adult specimens is unknown.

SUBFAMILY STENOTODESMINAE, NEW

Stylodesmoid millipedes characterized by absence of pore cones, the pores opening directly on upper surface of the small, high paranota.

Genus *Stenotodesmus*, new

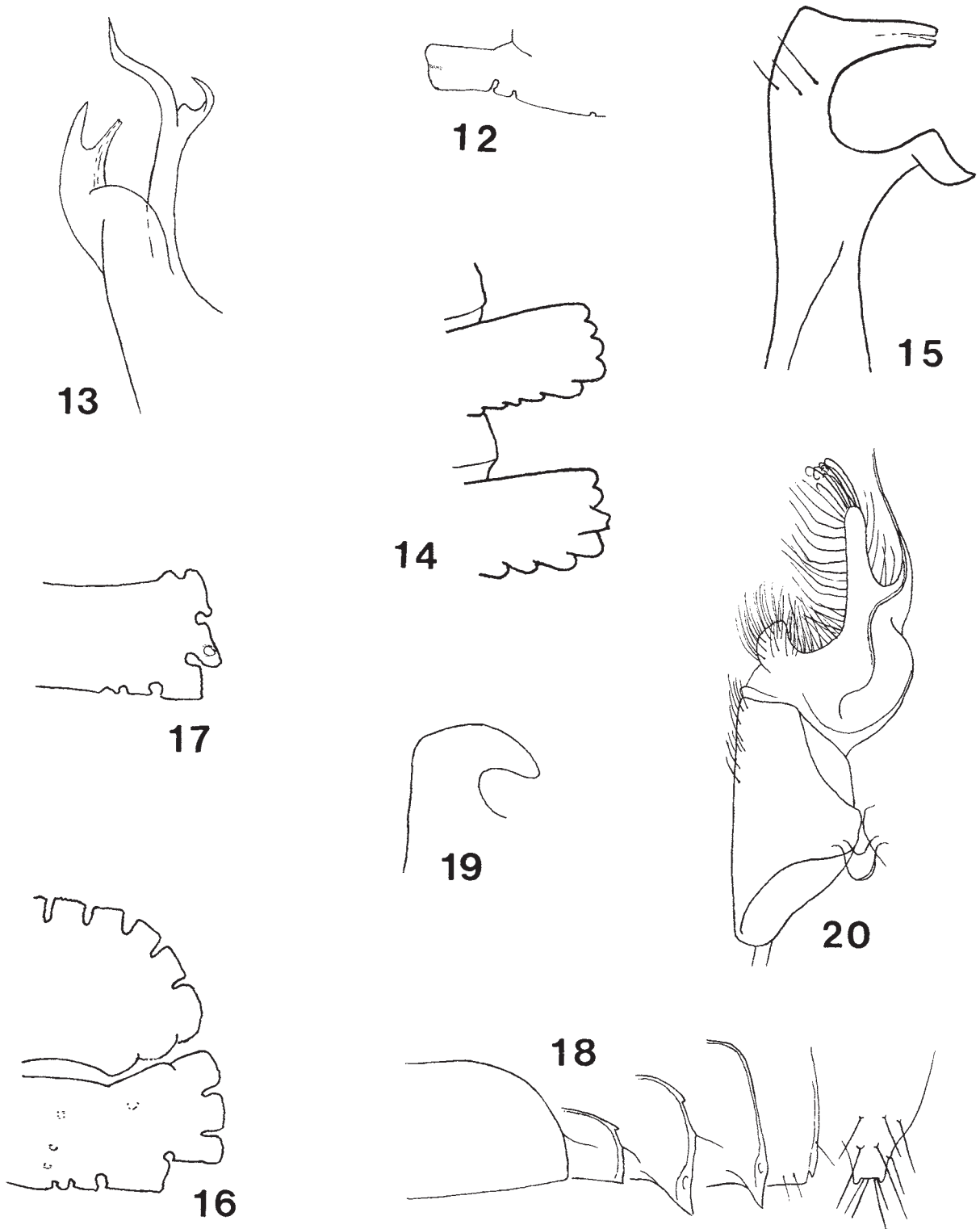
Characterized by loose body, squarish marginal lobes, normal pore formula, and on the minutely tuberculate metatergites 2 or 3 transverse rows of larger tubercles which do not form longitudinal rows.

**Type species.** *S. amarus*, new.

*Stenotodesmus amarus*, new species

Figures, 16, 17

**Holotype.** Female, length 11 mm, width 1.3 mm. Metatergites and head down to antennae are entirely covered with minute brown and white angular tubercles, which blend into a bone color, except on margins, which are darker; remainder of body is whitish. Dorsum is slightly convex. Head is slightly visible anterior



Figs. 12-13. *Gibberdesmus analagus*, new species. 12. Segment 10, holotype. 13. Right gonopod, anterior view, male holotype.

Figs. 14-15. *Yucodesmus hoctunanus*, new species. 14. Segments 11 and 12, holotype. 15. Right gonopod, caudal view, holotype.

Figs. 16-17. *Stenotodesmus amarus*, new genus and new species. 16. Collum and segment 2. 17. Segment 12.

Figs. 18-20. *Unculabes crispus*, new genus and new species. 18. Outer region of segments 1, 2, 5, 15, 19, 20. 19. Lateral view of hook on mentum of male paratype. 20. Left gonopod, mesial view, paratype.



to collum. Antennae are moderately long; articles 5 and 6 are thickest, and each has a setose area on its distal margin. Collum (fig. 16) has 10 squarish lobes separated by deep, wide incisions on antero-lateral margin, and on each side of the bent caudal margin there are 2 shallow incisions. On paranota of segment 2 there are 3 subequal lateral lobes and 3 unequal caudal lobes. Remaining lobes tend to be alike (fig. 17) with 2 subequal lateral lobes and caudal margin unequally lobed; on segment 20 there are 5 lobes, of which middle one is largest. Pores open on flat surface near lateral margin of second lateral lobe of paranota 5, 7, 9, 10, 12, 13, 15-19. Inconspicuous tubercles of uneven size are in 3 transverse series of 6, 6, 6 on caudal half of body; on anterior metatergites, they are less numerous and less distinct. Legs are slender, 2 distal articles extend beyond paranota, and coxa are a little farther apart than in the Stylodesminae. Sterna are asetose. Mesial margins of anal valves are not raised.

**Type locality and specimen.** Sótano de Tlamaya, 5 km N of Xilitla, San Luis Potosí; about 850 feet below entrance on silt bank; female holotype collected 26 November 1964 by T. Raines and B. Bell.

**Deposition.** U. S. National Museum, holotype.

**Note.** This unusual millipede is of interest because it so closely resembles the Stylodesminae, the dominant polydesmoids in the collection of the A.M.C.S. It clearly is not one of them, for it has retained the primitive pore formula and narrower body. It is unfortunate that only one specimen has been taken in the several collections which have been made in the Sótano de Tlamaya. This cave has at least 3 other troglobitic millipede species: *Mexicambala russelli*, *Unculabes crispus*, and *Glomeroïdes caecus*.

**Etymology.** *Amarus*, meaning harsh, refers to the minute angular nodules which thickly cover the metatergites.

#### FAMILY ONISCODESMIDAE

##### Genus *Bonetesmus*

*Bonetesmus* Chamberlin, 1942a, p. 11, Loo-

mis, 1968, pp. 28, 111.

**Type-species.** *B. verus* Chamberlin.

##### *Bonetesmus verus* Chamberlin

*B. verus* Chamberlin, 1942a, p. 11, figs. 18-20.

In the male, coxae of legpairs 6 and 7 are acute and directed forward. Setae on dorsal surface of metatergites of segments 17 and 18 are in a scattered arrangement.

**Type locality.** Grutas de Atoyac, Veracruz.

**New collections and record.** Veracruz: Grutas de Atoyac, male, female. Cueva de Sala de Agua Grande, 10 km E of Yanga, male, female.

**Deposition.** U.S. National Museum, male and female topotypes.

##### *Bonetesmus novenus*, new species

**Diagnosis.** Distinguished from *B. verus* in that no coxae of male are acutely produced, dorsal setae on posterior segments tend to be in transverse rows rather than scattered, and body is smaller.

**Holotype.** Male, length 10 mm, 19 segments. Metatergites of segment 2 are enlarged laterad and general form of body is as in *B. verus*. Dorsal surface is covered with a thick layer of yellowish mud through which some of palmately branched setae protrude. Legs and antennae are whitish. Dorsal surface of metatergite of segment 18 bears some 9 transverse rows of setae. Antennae are slender. Legs are slender, long, and bent under body. No stink pore openings are visible.

As in *B. verus*, tibio-tarsus of gonopods is relatively stout, curved forward, long, subparallel and slightly overlapped with its homologue at apex; on its mesial surface is a slender, shorter, weaker prefemoral branch. Tibio-tarsus is solenomerite, with opening at apex.

**Type locality and specimen.** Cueva del Ojo de Agua Grande, 12 km NE Cordoba, Veracruz; male holotype collected 22 August 1965 by Reddell *et al.*

**Deposition.** U. S. National Museum, holotype.

**Etymology.** *Novenus*, meaning nine each, refers to the transverse series of setae on metatergite 18.

FAMILY RHACHODESMIDAE

Genus *Strongylodesmus* Saussure

*Strongylodesmus*, Loomis, 1968, p. 40.

**Type-species.** *S. cyaneus* Saussure

***Strongylodesmus harrisoni***, new species

**Diagnosis.** Resembles *S. potosianus* (Chamberlin) in the form of the gonopods; differs in that the apex of the telopodite is acutely produced and the 2-pronged process which bears the solenomerite is smaller.

**Holotype.** Male, length 43 mm, width 4 mm, depigmented except for a slight trace of green. Body is loose jointed. Paranota of all except last 5-6 segments are smooth, high, squarish, with lateral margins rounded, smooth and an obscure tooth on the anterior angle. Body narrows toward caudal end, and paranota of last 5-6 segments are smaller, turned caudad, and somewhat raised. A row of small nodules is on caudal margin of metatergites behind middle of body. Pore formula is normal. No processes are on third coxae.

Gonopods are narrowly produced at apex, deeply excavated over much of mesial surface, and bear on mesial surface a 2-pronged process from which seminal canal passes.

**Female paratype.** Length 44 mm, width 4.3 mm.

**Type locality and specimens.** Cueva del Rancho del Cielo No. 7, 5 km NW of Gómez Farías, Tamaulipas; 4 males, including holotype, and 2 females collected 27 August 1966 by R. W. Mitchell.

**Other records.** *Tamaulipas*: Sinkholes and caves in the vicinity of Gómez Farías, including the following: Crystal Cave, Rancho del Cielo, 5 km NW of Gómez Farías; Cueva de la Capilla, 13½ km NW of Gómez Farías; Cueva de la Mina, 7 km NW of Gómez Farías; Harrison Sinkhole, Rancho del Cielo, 5 km NW of Gómez Farías; Cueva del Infiernillo, 8 km W of Gómez Farías; Cueva del Remolino, 8½ km W of Gómez Farías; 2,000 Meter Cave, 19 km NW of Gómez Farías.

**Deposition.** U. S. National Museum, holotype, male and female paratypes from Cueva del Rancho

del Cielo No. 7, and 2,000 Meter Cave.

**Variation.** In living animals, the body color is pale to medium green. The color fades quickly in preservative. The gonopods vary in the thickness of the apex and the length and weight of the 2 pronged process. The greatest variation in gonopods is in the specimens from 2,000 Meter Cave.

**Etymology.** Named for Mr. Frank Harrison, the late owner of El Rancho del Cielo.

Genus ***Unculabes***, new

Depigmented rhachodesmids with a normal pore formula, sparsely setose metatergites, and small paranota with acute caudal angles. Male has a hook or a tubercle on the mentum of the gnathochilarium, but lacks special leg processes. Gonopods have a large mesial seminal fossa and a long flagelloid solenomerite.

**Type-species.** *U. crispus*, new.

**Number of species.** 2. Although very similar they are easily separated by the difference in the mentum.

**Range.** Caves in San Luis Potosí.

***Unculabes crispus***, new species

Figures 18-20

**Diagnosis.** Characterized by the hook on the mentum of the gnathochilarium of the male.

**Holotype.** Male, length 36 mm, greatest body width 2.7 mm. Head and dorsal surface of anterior one-third of body are pale red, the pigment diminishing almost completely behind middle of body; remainder of body is white. Exoskeleton is thin. Metatergites are smooth; indistinct transverse furrows are on metatergites 5 through 18. Collum is slightly narrower than segment 2; ratio of length to width of collum is 2/5. Caudal angle of segment 2 is a right angle; on segment 3 through 19 the posterior angle is acute, becoming more so behind; posterior angle of segment 19 is minute (fig. 18); lateral margins of paranota are slightly uneven, especially on segments 2 through 5. Head is thickly setose below and slightly setose above antennae. Metatergites are sparsely setose; collum has 2 transverse rows of setae; setae on anal segment are prominent.

Pores, which are on segments 5, 7, 9, 10, 12, 13, 15-18, open on upper surface of narrow marginal thickening. Sterna are setose. Hook on mentum is stout, bent forward, and minutely setose (fig. 19). Legs are 4.8 mm long. Antennae are 5.7 mm long.

Gonopods have a moderately coxal region and a simple telopodite, thickly setose on most surfaces but not in the deep mesial fossa; they are loosely connected by a small hinge (fig. 20).

**Female paratype.** Paranota of segment 6 through 18 are slightly smaller than in the male.

**Type locality and specimens.** Sótano de Huitzmolotitla, 2 km SW of Tlamaya, which is 10 km NE of Xilitla, San Luis Potosí; many specimens of both sexes, among them the male holotype, were collected 29 January 1964 by Terry Raines and Tommy Phillips. They were so abundant 2 miles from the cave entrance that the mud banks were white.

**Other record.** SAN LUIS POTOSI: Sótano Tlamaya, 5 km N of Xilitla, male, female.

**Deposition.** Holotype and 2 paratypes of both sexes, U.S. National Museum.

**Etymology.** *Crispus*, means curley, refers to the bent setae on the apex of the gonopods.

#### **Unculabes versatilis**, new species

**Diagnosis.** Characterized by the mound on the mentum of the gnathochilarium.

**Holotype.** Male, length 38 mm, width 2.9 mm. Body is depigmented, narrow, loosely jointed, closely resembling *crispus*, except that paranota are a little larger, and on the mentum of the chilarium there is a small mound instead of a hook.

**Type locality and specimens.** Cueva de Potrerillos, 1½ km W of Ahuacatlán, San Luis Potosí; 2 males and one female were collected 25 November 1967 by John Fish and T. R. Evans.

**Other Record.** SAN LUIS POTOSI: Cueva del Llano del Conejo, near Xilitla, male, female.

**Deposition:** U. S. National Museum, holotype, female and male paratypes from Cueva del Llano del Conejo.

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**OPILIONIDS (PHALANGIDA) OF THE FAMILY  
PHALANGODIDAE FROM MEXICAN CAVES**

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The opilionids reported upon in this study were collected over a period of years by Mr. James Reddell and Dr. Robert Mitchell and their associates in the many caves which they studied. Many of their general observations have been recorded in the publications of the Association for Mexican Cave Studies.

Due to the generosity and hard work of these cave explorers, we were privileged to study the opilionids which they have collected. In this paper, we have described only the members of the family Phalangodidae which were collected. It is only in this family, at least in Mexico, that true cave-adapted forms are found. Members of the family Cosmetidae were also collected, and they shall be considered in another paper.

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 Department of Biology of Texas Tech University, Lubbock, Texas.

**SUBORDER LANIATORES THORELL  
PHALANGODIDAE SIMON  
PHALANGODINAE ROEWER**

**KAROS GOODNIGHT AND GOODNIGHT**

*Karos* Goodnight and Goodnight, 1951, Amer. Mus. Novitates, no. 1491, p. 3. Goodnight and Goodnight, 1953, Amer. Mus. Novitates, no. 1610, p. 21.

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 without conspicuous median armature, but at times with tubercles. 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.

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.

**Genotype.** *Karos barbarikos*, Goodnight and Goodnight, 1951, from Chapulhuacán, Hidalgo, May 10, 1942.

For this present study of *Karos*, specimens were studied from many different localities. After careful consideration, we decided that species within the genus are difficult to define, and may represent a single species with many variations; but because of the geographical isolation of the individual populations, it appeared best to recognize these rather striking variations as individual species. To delineate the species, we have used such characteristics as the nature of the eye tubercle, general size relationships, number of tarsal segments, general appearance of the dorsum as well as the presence or lack of lateral tubercles. We feel that a study of the descriptions and the drawings will affirm our decision to consider these distinctive species at this time.

**Karos depressus**, new species

Figures 4 - 5

**Female holotype.** Total length of body, 3.6 mm. Cephalothorax, 1.2 mm. Width of body at widest portion, 2.5 mm.

	I	II	III	IV
Trochanter	3.6mm	0.5mm	0.6mm	0.6mm
Femur	1.8	2.6	2.6	3.1
Patella	0.6	1.1	1.1	0.9
Tibia	1.4	2.5	2.5	2.4
Metatarsus	1.4	2.2	2.2	3.0
Tarsus	<u>1.2</u>	<u>2.2</u>	<u>2.2</u>	<u>1.4</u>
Total	10.0mm	11.1mm	11.2mm	11.4mm

Cephalothorax smooth. Eye tubercle very low, almost lacking, widely separated from anterior margin. Dorsal scute with five poorly defined areas. First area without a median line, dorsum smooth. Scute shaped as in figure with lateral projections in the region of the second and fifth areas. A small median spine

on the third and fourth areas. Each free tergite with a row of tubercles; a projection on the lateral margins of each free tergite. Anal operculum covered with small tubercles. Spiracles partially hidden by fourth coxae. Coxae covered with granulations; a row of small teeth on anterior and posterior margins of each of the third coxae. Maxillary lobe of each second coxa without a downward pointing spine.

All segments of the legs except the metatarsi and tarsi covered with tubercles. Tarsal segments: 4-8-6-6. Distitarsus of tarsus of first leg with two segments, second with three.

Palpus: trochanter, 0.5 mm long; femur, 1.2; patella, 0.8; tibia, 0.8; and tarsus, 0.7. Total length, 4.0 mm. Palpus armed retro-laterally as in figure. Femur and patella with two apical median spines.

Chelicera normal, a slight dorsal elevation on the proximal segment, a few small spines on this elevation.

Color of dorsum light reddish brown; appendages yellowish.

**Male.** Not available.

**Type locality.** Female holotype and female paratype from Cueva de Llano de Conejo, Xilitla, San Luis Potosí, April 3, 1969. Collected by T. R. Evans.

**Karos graciosus**, new species

Figures 10-13

**Male holotype.** Total length of body, 2.2 mm. Cephalothorax, 0.6 mm. Width of body at widest portion, 1.8 mm.

	I	II	III	IV
Trochanter	0.2mm	0.2mm	0.3mm	0.2mm
Femur	1.1	1.6	1.4	1.8
Patella	0.4	0.5	0.6	0.5
Tibia	0.9	1.4	1.2	1.4
Metatarsus	1.0	1.1	1.3	1.6
Tarsus	<u>0.9</u>	<u>1.8</u>	<u>1.0</u>	<u>1.1</u>
Total	4.5mm	6.6mm	5.8mm	6.6mm

Cephalothorax covered with fine granulations. Eye tubercle rounded, low, clearly re-

moved from anterior margin of cephalothorax. Abdomen with five poorly defined areas. First area without a median line. A row of tubercles across each area. These are larger and spinose on the third and fourth areas. Lateral projections on either side in the region between the first and second areas and on the fifth area. Each free tergite with a row of hair-tipped tubercles, enlarged into a projection at the lateral margin of each tergite. Anal operculum with small tubercles in rows. Each free sternite with a row of tubercles. First free sternite with a pair of lateral projections near the distal end of the fourth coxae. Spiracles hidden by fourth coxae. Coxae thickly covered with tubercles. Maxillary lobe of each second coxae without a downward pointing spine.

All segments of the legs except metatarsi and tarsi covered with small tubercles. Fourth femora curved; second femora with slightly swollen bases. Tarsal segments: 4-6-6-6. Distitarsus of tarsus of first leg with two segments, second with three.

Palpus: trochanter, 0.3 mm long, femur, 0.8; patella, 0.6; tibia, 0.6; and tarsus, 0.6. Total length, 2.9 mm. Palpus armed retrolaterally as in figure, femur and patella with a median apical spine.

Chelicera normal, not enlarged.

Color light reddish brown; appendages yellowish.

**Female.** Total length of body, 3.5 mm. Cephalothorax, 0.8 mm. Width of body at widest portion, 2.6 mm. Similar in appearance to male but lacking enlarged second femora.

**Type locality.** Male holotype from Cueva de Poca Ventana, 1 km W of Xilitla, San Luis Potosí, January, 1968. Collected by T. Raines. Female paratype from Milliped Cave, 8 km W of Huautla, Oaxaca, June, 1965. Collected by W. Russell. Female paratype with reduced eyes from Cueva del Ahuate #2, Xilitla, San Luis Potosí, June 8, 1964. Collected by J. Reddell and D. McKenzie. Male paratype from Cueva Arriba de Agua Buena, Agua Buena, San Luis Potosí, August 6, 1966. Collected by J. Reddell.

### **Karos parvus, new species**

Figures 8 - 9

**MALE HOLOTYPE.** Total length of body, 3.2 mm. Cephalothorax, 0.8 mm. Width of body at widest portion, 1.8 mm.

	I	II	III	IV
Trochanter	0.3mm	0.3mm	0.4mm	0.4mm
Femur	0.9	1.7	1.3	1.9
Patella	0.4	0.7	0.5	0.7
Tibia	1.3	1.4	1.1	1.4
Metatarsus	0.8	1.8	1.3	2.1
Tarsus	<u>0.7</u>	<u>1.7</u>	<u>0.7</u>	<u>0.7</u>
Total	4.4mm	7.6mm	5.3mm	7.2mm

Cephalothorax smooth. Eye tubercle low, removed from anterior margin; a tubercle over each eye. Abdomen with five areas, the first without a median line; all areas tuberculate. A lateral projection on either side of the abdomen in the region of the first area. Each free tergite with a row of tubercles. Anal operculum thickly covered with tubercles. Each free sternite with a row of small tubercles. Spiracles partially hidden by the fourth coxae. All coxae with tubercles which are heaviest on the fourth coxae. Maxillary lobe of each second coxa without a downward pointing spine.

Proximal segments of the legs tuberculate; metatarsi and tarsi covered with hair. Tarsal segments: 4-7-6-6. Distitarsus of tarsus of first leg with two segments, second with three.

Palpus: trochanter, 0.3 mm long; femur, 0.7; patella, 0.5; tibia, 0.5; and tarsus, 0.4. Total length, 2.3 mm. Femur with a median apical spine; tibia and tarsus with a row of spines on either side.

Chelicera normal, not enlarged.

Dorsum dark reddish brown with dusky mottlings; appendages lighter.

**Female.** Total length of body, 2.4 mm. Cephalothorax, 0.7 mm. Width of body at widest portion, 1.9 mm. Similar in appearance to male.

**Type locality.** Male holotype from Cueva de El Pachon, 7½ km NE of Antiguo Morelos, Tamaulipas, June 6, 1967. Collected by J. Reddell. Immature form from Sótano

Puerto de los Lobos, San Francisco, San Luis Potosí, September 14, 1968. Collected by W. Elliott. Male paratype from Grutas de Quintero, 13 km SW of Mante, Tamaulipas, November, 1968. Collected by R. Harmon. One male and two female paratypes from Cueva de Llanura, 3 km W of Micos, 28 km NW of Valles, San Luis Potosí, July 31, 1970. Collected by W. Russell and D. McKenzie.

**Karos projectus**, new species

Figures 1 - 3

**Male holotype.** Total length of body, 4.5 mm. Cephalothorax, 1.1 mm. Width of body at widest portion, 2.7 mm.

	I	II	III	IV
Trochanter	0.2mm	0.3mm	0.4mm	0.4mm
Femur	1.1	1.8	1.3	2.0
Patella	0.4	0.7	0.4	0.8
Tibia	0.8	1.4	1.2	1.8
Metatarsus	1.2	1.7	1.4	2.0
Tarsus	<u>0.7</u>	<u>1.3</u>	<u>0.8</u>	<u>0.8</u>
Total	4.4mm	7.2mm	5.5mm	7.8mm

Cephalothorax smooth except for a few low tubercles; a pair of small spines on the cephalothorax behind the eye tubercle. Eye tubercle rounded, well removed from anterior margin of the cephalothorax, with a small spine over each eye. Abdomen with five areas, first area without a median line, boundaries of areas indistinct. Dorsum covered with low tubercles and with a prominent lateral projection on either side in the region of the first and second areas. Each free tergite with a row of hair-tipped tubercles. Anal operculum with scattered hair-tipped tubercles. Each free sternite with a row of hair-tipped tubercles. Spiracles hidden by fourth coxae. All coxae covered with tubercles; fourth coxa enlarged

and with lateral spine at its distal end. Maxillary lobe of each second coxa without a downward pointing spine.

Legs covered with hair and small tubercles which are larger on the proximal segments of the fourth leg. Tarsal segments: 4-9-6-6. Distitarsus of tarsus of first leg with two segments, second with three.

Palpus: trochanter, 0.3 mm long; femur, 0.7; patella, 0.4; tibia, 0.5; and tarsus, 0.5. Total length, 2.4 mm. Palpus armed as in figure; femur and patella with median lateral spine. Tibia and tarsus each with four spines on either side.

Chelicera normal.

Color of dorsum reddish brown.

**Female.** Not available.

**Type locality.** Cueva de Poca Ventana, 1.5 km W of Xilitla, San Luis Potosí, Mexico, January, 1968. Collected by T. Raines.

**Karos rugosus**, new species

Figures 6 - 7

**Male holotype.** Total length of body, 3.0 mm. Cephalothorax, 0.7 mm. Width of body at widest portion, 2.0 mm.

	I	II	III	IV
Trochanter	0.2mm	0.2mm	0.3mm	0.2mm
Femur	1.0	1.4	1.1	1.4
Patella	0.5	0.6	0.5	0.6
Tibia	0.8	1.2	1.1	1.4
Metatarsus	0.9	1.5	1.2	1.9
Tarsus	<u>0.8</u>	<u>1.6</u>	<u>1.0</u>	<u>1.0</u>
Total	4.2mm	6.5mm	5.2mm	6.5mm

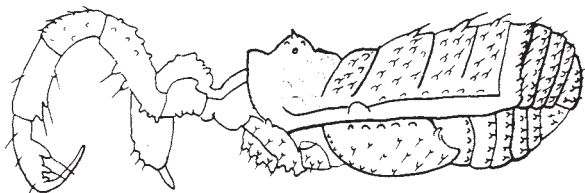
Cephalothorax covered with fine granulations. Eye tubercle small, rounded, removed from the anterior margin of the cephalothorax. Abdomen with five distinct areas; first area without a median line. Entire dorsum covered

Figs. 1-3. *Karos projectus*, new species. 1. Lateral view of male holotype; 2. Prolateral view of trochanter and base of femur of fourth leg of male holotype; 3. Dorsal view of male holotype.

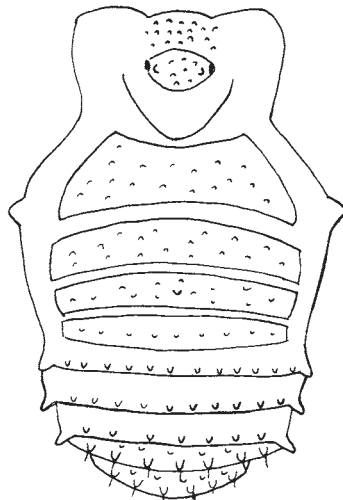
Figs. 4-5. *Karos depressus*, new species. 4. Dorsal view of female holotype; 5. Lateral view of female holotype.

Figs. 6-7. *Karos rugosus*, new species. 6 Dorsal view of male holotype; 7. Lateral view of male holotype.

Figs. 8-9. *Karos parvus*, new species. 8. Lateral view of male holotype; 9. Dorsal view of male holotype.



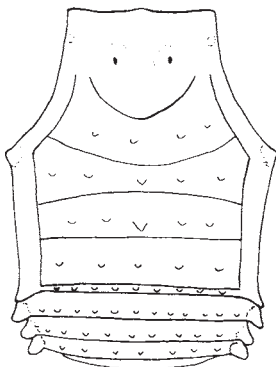
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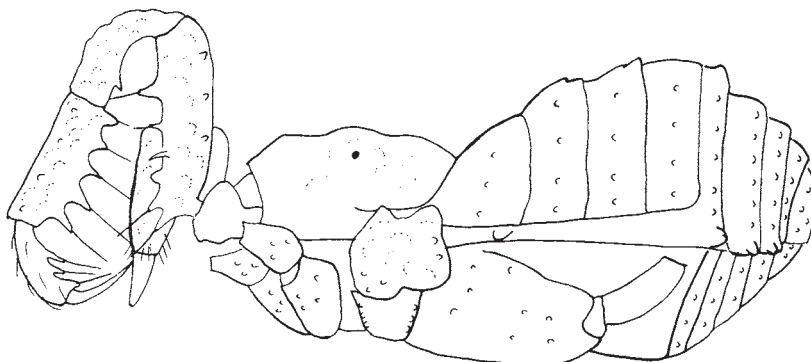
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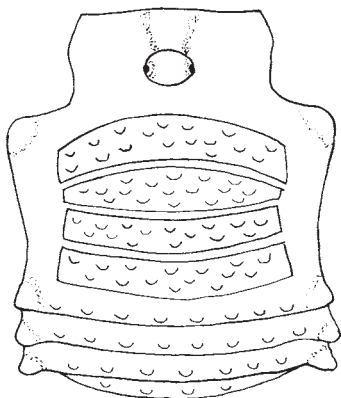
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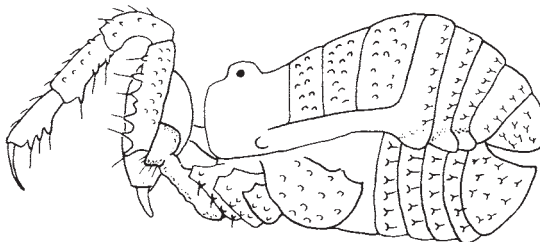
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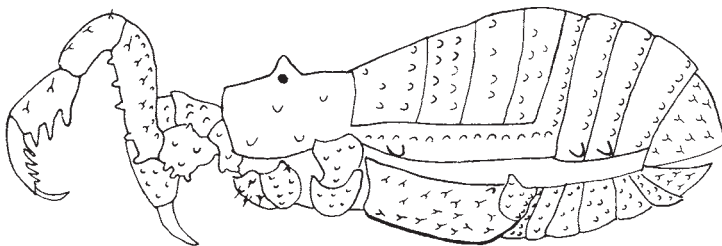
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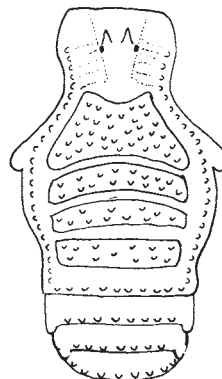
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8



9



with hair-tipped tubercles. Dorsal scute shaped as in figure with a prominent lateral projection in the region of the first area. Each free tergite with a row of hair-tipped tubercles. Anal operculum thickly covered with tubercles. Each free sternite with a row of tubercles. Spiracles hidden by fourth coxae. Coxae thickly covered by hair-tipped tubercles. Maxillary lobe of each second coxa without a downward pointing spine.

All legs with trochanters, femora and tibiae covered with tubercles; third and fourth femora curved. Tarsal segments: 4-7-6-6. Distitarsus of tarsus of first leg with two segments, second with three.

Palpus: trochanter, 0.3 mm long; femur, 0.7; patella, 0.6; tibia, 0.6; and tarsus, 0.5. Total length, 2.7 mm. Palpus armed laterally as in figure. Femur and patella each with a median apical spine.

Chelicera slightly enlarged.

Color of dorsum dark reddish brown; distal portion of legs lighter.

**Female.** Total length of body, 2.7 mm. Cephalothorax, 0.8 mm. Width of body at widest portion, 2.2 mm. Similar to male but with the chelicera and third and fourth femora of legs reduced in size.

**Type locality.** Cueva de Ojo de Agua de Tlilapan, Tlilapan, Veracruz, August 4, 1967. Collected by J. Reddell, J. Fish, and T. R. Evans.

#### HOPLOBUNUS BANKS

*Hoplobunus* Banks, 1900, Jour. New York Ent. Soc., vol. 8, p. 200. Cambridge, 1904, Biologia Centrali-Americana, Arachnids, vol. 2, p. 585. Roewer, 1912, Arch. Naturgesch., vol. 78, sect. A, no. 3, p. 149; 1923, Die Weberknechte der Erde, p. 112. Goodnight and Goodnight, 1942, Amer. Mus. Novitates,

no. 1211, p. 1; 1945, Amer. Mus. Novitates, no. 1281, p. 3; 1953, Amer. Mus. Novitates, no. 1610, p. 20; 1967, Amer. Mus. Novitates, no. 2301, p. 1.

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 variable.

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

#### *Hoplobunus boneti* (Goodnight and Goodnight) Figures 18-19

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

**Male.** Total length of body, 4.9 mm. Cephalothorax, 1.5 mm. Width of body at widest portion, 2.6 mm.

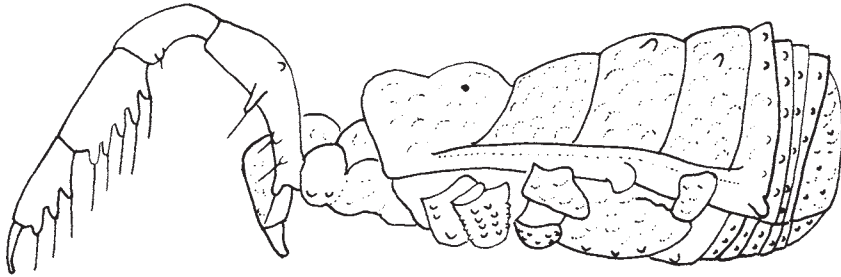
	I	II	III	IV
Trochanter	0.5mm	0.6mm	1.6mm	0.7mm
Femur	3.8	7.3	5.2	10.7
Patella	1.0	1.0	1.2	1.1
Tibia	3.2	6.4	4.7	4.5
Metatarsus	5.6	8.0	6.4	9.4
Tarsus	<u>2.8</u>	<u>9.0</u>	<u>2.8</u>	<u>4.0</u>
Total	16.9mm	32.3 mm	21.9mm	30.4mm

Figs. 10-13. *Karos graciosus*, new species. 10. Lateral view of male holotype; 11. Ventral view of fourth coxa and first and second free sternites of male holotype; 12. Prolateral view of tibia of second femur of male holotype; 13. Dorsal view of male holotype.

Figs. 14-16. *Pellobunus mexicanus*, new species. 14. Dorsal view of male holotype; 15. Prolateral view of fourth femur of male holotype. 16. Lateral view of male holotype.

Fig. 17. *Hoplobunus inops*, new species, lateral view of male holotype.

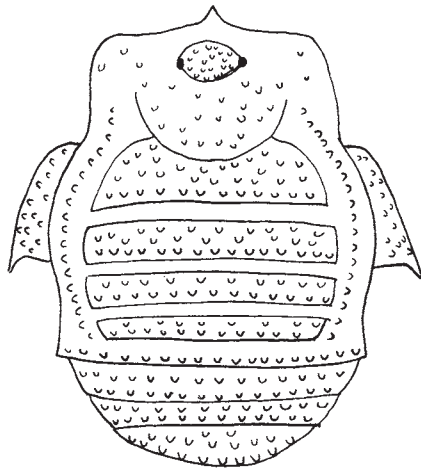




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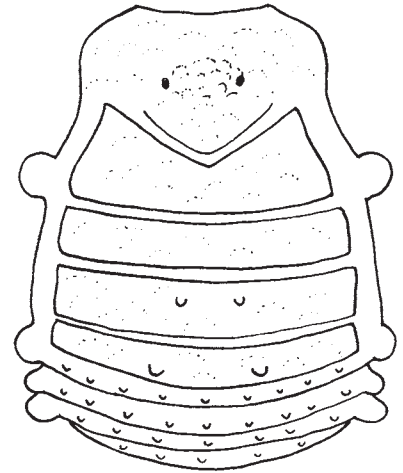
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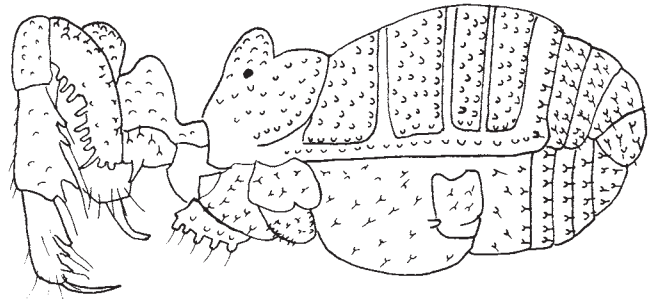
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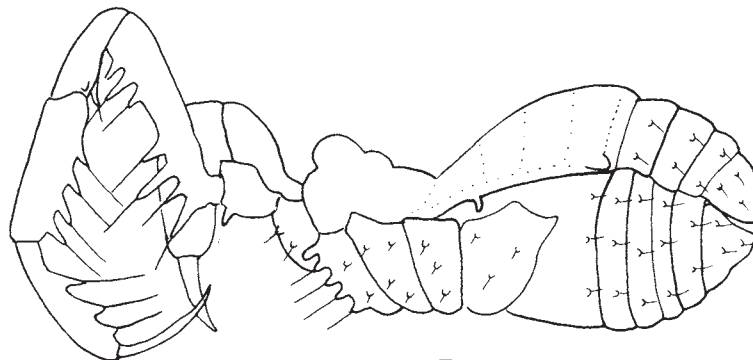
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17

Cephalothorax with small tubercles. Eye tubercle tuberculate, with a prominent spine at the apex; located on the anterior margin of the cephalothorax. Abdomen with five areas, first area without a median line. A row of hair-tipped spines across each area; a lateral row of tubercles along each side of dorsum. Each free tergite with a row of tubercles. Anal operculum covered with tubercles. Each free sternite with a row of tubercles. Spiracles visible. First, second, and third coxae covered with tubercles; fourth coxae covered with tubercles and with a pair of spines at the distal portion. Maxillary lobe of each second coxa without a downward pointing spine.

Except for metatarsi and tarsi, all segments of legs with rows of spines which are especially prominent on fourth leg. Tarsal segments: 6 or 7-20-7-8. Distitarsus of tarsus of first leg with two segments, second with three.

Palpus: trochanter, 0.6 mm long; femur, 1.9; patella, 1.0; tibia, 1.2; and tarsus, 1.3. Total length, 6.0 mm. Femur with median apical spine; retrolateral surface armed as in figure.

Chelicerae of male greatly enlarged.

General coloration of dorsum is reddish brown; the color tends to be lighter in some forms.

**Female.** Total length of body, 7.0 mm. Cephalothorax, 2.0 mm. Width of body at widest portion, 4.0 mm. Similar in appearance to male, but lacking the enlarged chelicerae and heavy spination of the legs.

**Relationships.** Some specimens of this species showed a greater degree of adaptation to the cave environment than did others. In such specimens the color was much lighter, and the eyes were totally without a retina.

**Records.** Cueva de Los Sabinos, 12½ km NE of Valles, San Luis Potosí, April 3, 1942 (male holotype and female paratype), collected by C. Bolivar, F. Bonet, B. Osorio, and D. Pelaez; January 27, 1969 (three males, two females), collected by J. Reddell, T. Mollhagen, T. Albert, and R. Smith. El Sotano de Yerbaniz, 22.5 kilometers north of Ciudad Valles, San Luis Potosí, January 7, 1970 (one female, one male), collected by S. Wiley. Sótano de Soyate, 14 km NE of Valles, San

Luis Potosí, July 6, 1969 (one female from 650 feet below surface), collected by W. Elliott; Sótano de Matapalma, 20½ km N of Valles, San Luis Potosí, May 29, 1969 (one immature specimen), collected by R.W. Mitchell, F.E. Abernathy, and T. Albert. Cueva de Valdosa, 10½ km SE of Valles, San Luis Potosí, November 24, 1967 (one male), collected by J. Reddell and S. Fowler. Sótano del Tigre, 14 km NE of Valles, San Luis Potosí, November 24, 1967 (one male, three females), collected by J. Fish and Jane Reddell; February 1, 1968 (two males, one female), collected by J. Reddell and R. Mitchell. Sótano de la Tinaja, 10½ km NE of Valles, San Luis Potosí, January 28, 1969 (one female), collected by J. Reddell, T. Mollhagen, T. Albert, and R. Smith; September 1, 1966 (one female), collected by R. Mitchell; November 30, 1968 (one male, four females), collected by G. Ediger; March 13, 1969 (two males, two females), collected by R. Mitchell. Sótano de Pichijumo, 8 km NE of Valles. San Luis Potosí, June 1, 1968 (one female, one male, one immature), collected by J. Reddell; June 1, 1968 (one female) collected by F. Abernathy; June 26, 1969 (two females) collected by J. Reddell, T. Mollhagen, T. Albert, and R. Smith. Cueva Pinta, 14 km NE of Valles, San Luis Potosí, January 31, 1969 (two females), collected by W. Russell. Sótano de El Venadito, 16½ km SE of Antiguo Morelos, Tamaulipas, January 29, 1969 (one male, two females), collected by J. Reddell. Sótano de Yerbaniz, 21 km N of Valles. San Luis Potosí, January 9, 1970 (one female, one immature), collected by W. Elliott and S. Wiley; February 17, 1970 (one male, one female, five immature), collected by R. Mitchell. La Cueva de la Curva, 9 km E of Valles, San Luis Potosí, May 31, 1969 (one immature), collected by R. Mitchell.

#### **Hoplobunus inops**, new species

Figure 17

**Male holotype.** Total length of body, 4.3 mm. Cephalothorax, 0.9 mm. Width of body at widest portion, 3.3 mm.

	I	II	III	IV
Trochanter	0.5mm	0.5mm	0.6mm	0.6mm
Femur	4.5	9.0	6.0	8.6
Patella	0.9	8.7	1.2	1.5
Tibia	3.9	7.8	4.6	5.5
Metatarsus	5.4	7.1	6.6	8.9
Tarsus	<u>3.0</u>	<u>9.8</u>	<u>3.5</u>	<u>4.8</u>

Total 18.2 mm 42.9mm 22.5mm 29.9mm

Cephalothorax smooth without tubercles with a slight elevation posterior to the eye. Eye tubercle small rounded, on anterior margin without eyes. Dorsum with five areas, smooth; first area without a median line; boundaries of areas indistinct. Free tergites, anal operculum and free sternites all smooth. Spiracles visible. First coxae with a ventral row of spines. Maxillary lobe of each second coxa without a downward pointing spine.

Legs smooth, with scattered hairs. Tarsal segments long, numbering: 8-15-8-8. Distitarsus of tarsus of first leg with two segments, second with three.

Palpus: trochanter, 0.6 mm long; femur, 1.7; patella, 1.1; tibia, 1.2; and tarsus, 1.2. Total length, 5.8 mm. Retrolaterally, palpus armed with hair-tipped spines as in illustration; prolaterally, femur and patella each with a median apical spine.

Chelicera normal in size, not enlarged.

Color of dorsum yellowish.

**Female.** Nearly identical in size and appearance with male.

**Type locality.** Male holotype from Sótano de la Joya de Salas, 21 km NW of Gómez Farías, Tamaulipas, November 25, 1966. Collected by O. Knox and E. Alexander. Two female paratypes from Cueva de la Mina, 7 km NW of Gómez Farías, Tamaulipas, August 17, 1968. Collected by R. W. Mitchell.

**Relationships.** The light color, lack of eyes, and general adaptation to a cave life distinguish this species from other members of the genus.

*Hoplobunus mexicanus* (Roewer)

Figure 20

*Haehnelia mexicana* Roewer, 1915, Arch.

Naturgesch, vol. 81, sect. A, no. 3, p. 21; 1923, Die Weberknechte der Erde, p. 114.

**Female.** Total length of body, 10.5 mm. Cephalothorax, 3.3 mm long. Width of body at widest portion, 6.7 mm.

	I	II	III	IV
Trochanter	1.1mm	1.3mm	2.2mm	2.7mm
Femur	6.2	10.2	7.8	10.9
Patella	1.9	2.5	2.7	2.9
Tibia	4.6	8.5	5.8	7.7
Metatarsus	7.7	13.0	10.1	13.6
Tarsus	<u>2.9</u>	<u>7.2</u>	<u>4.5</u>	<u>5.4</u>

Total 24.4mm 42.7mm 33.1mm 43.2mm

Cephalothorax with scattered tubercles. Eye tubercle on anterior margin, with a prominent dorsal spine, and scattered small tubercles. Abdomen with five areas, first area without a median line; scute with a few small tubercles, a lateral row of tubercles on each side, a prominent pair of spines on the third area. Free tergites smooth, except for scattered hairs. Anal operculum with scattered hairs and small tubercles. Each free sternite with a row of small tubercles and hairs. Spiracles large, visible. Coxae with scattered fine tubercles and hairs, a row of larger tubercles on the first coxae; each third coxa with an anterior and posterior row of teeth. Maxillary lobe of each second coxa without a median spine.

Femora of legs with tubercles, much larger on the third and fourth femora; remainder of legs with scattered hairs. Tarsal segments: 6-13-7-7. Distitarsus of tarsus of first leg with two segments, second with three.

Palpus: trochanter, 1.6 mm long; femur, 4.3; patella, 2.1; tibia, 2.6; and tarsus, 2.5. Total length, 13.1 mm. Trochanter with prominent ventral spine. Femur with five or six prominent ventral spines, the proximal one the largest; patella with ventral spine. Tibia ventrally with five spines on either side. Palpus with two spines on either side.

Chelicera enlarged, distal segment much enlarged.

Color of dorsum reddish brown; appendages except for femur and legs lighter in color.

**Records.** Cueva de la Capilla, 13½ km

NW of Gómez Farías, Tamaulipas, January 28, 1968 (two females), collected by J. Reddell, J. George, F. Rose, and R. Mitchell, Cueva Arriba del Presidente, 1½ km N of Huautla, Oaxaca, August 12, 1967 (one female), collected by J. Reddell and J. Fish.

**Hoplobunus robustus**, new species

Figure 21

**MALE HOLOTYPE.** Total length of body, 7.7 mm. Cephalothorax, 3.2 mm. Width of body at widest portion, 5.1 mm.

	I	II	III	IV
Trochanter	1.3mm	1.4mm	2.2mm	1.9mm
Femur	8.5	17.0	13.6	18.4
Patella	2.5	3.2	3.2	3.2
Tibia	6.0	15.2	8.5	11.4
Metatarsus	12.2	21.0	17.0	22.6
Tarsus	<u>2.6</u>	<u>8.0</u>	<u>6.0</u>	<u>7.4</u>
Total	33.1mm	65.8mm	50.5mm	64.9mm

Cephalothorax smooth. Eye tubercle a prominent cone with a long dorsal spine on the anterior margin of the cephalothorax. Abdomen with five distinct areas. First area without a median line. Third area with a pair of large divergent median spines; fourth and fifth areas with a transverse row of tubercles. Dorsal scute with a lateral row of tubercles on either side. Each free tergite with a transverse row of small tubercles. Anal operculum mostly smooth with only a few small tubercles. Each free sternite with a transverse row of very small tubercles. Spiracles clearly visible. Each first coxa with a ventral row of spines; third coxae with anterior and posterior rows of teeth. Maxillary lobe of each second coxa without a downward pointing spine.

Leg segments smooth except for rows of hairs. Third and fourth femora each with a

distal row of spines. Third trochanter somewhat enlarged. Tarsal segments: 8-12-7-7. Distitarsus of tarsus of first leg with two segments, second with three.

Palpus: trochanter, 1.8 mm long; femur, 6.0; patella, 3.4; tibia, 4.0; and tarsus, 2.7. Total length, 17.9 mm. Palpus long, armed as in figure. Prolaterally the armature of the tibia and tarsus resembles the retrolateral side as shown in the figure.

Chelicera with proximal segment with a few dorsal tubercles. Distal segment greatly enlarged with a few scattered hairs.

Dorsum very dark. Cephalothorax mottled with dark and lighter reddish brown. Abdomen very dark brown almost black in some specimens. Free sternites and anal operculum very dark. Coxae and appendages lighter reddish brown.

**Female.** Total length of body, 8.8 mm. Cephalothorax, 2.6 mm. Width of body at widest portion, 5.6 mm. Similar to male but with chelicera much reduced.

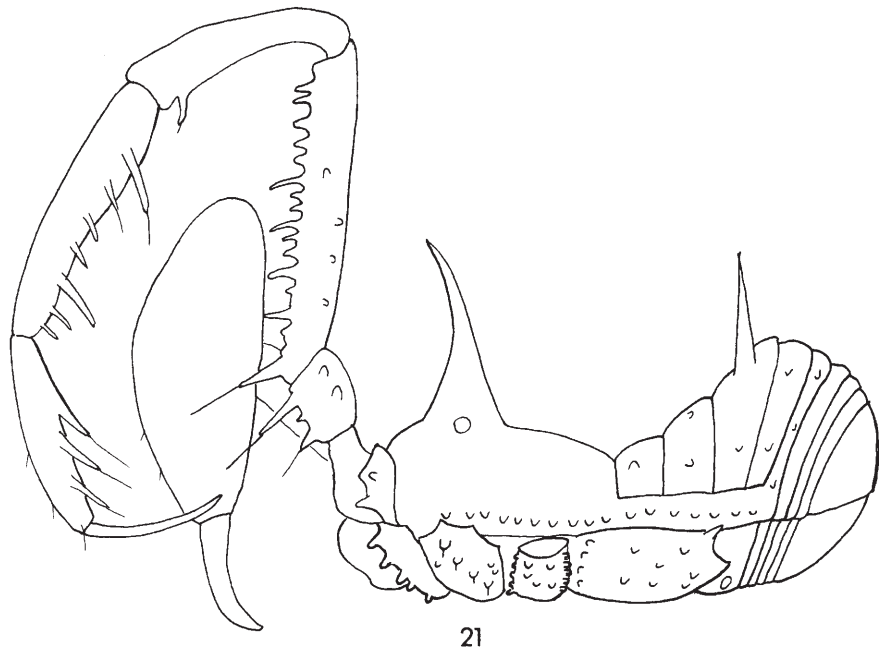
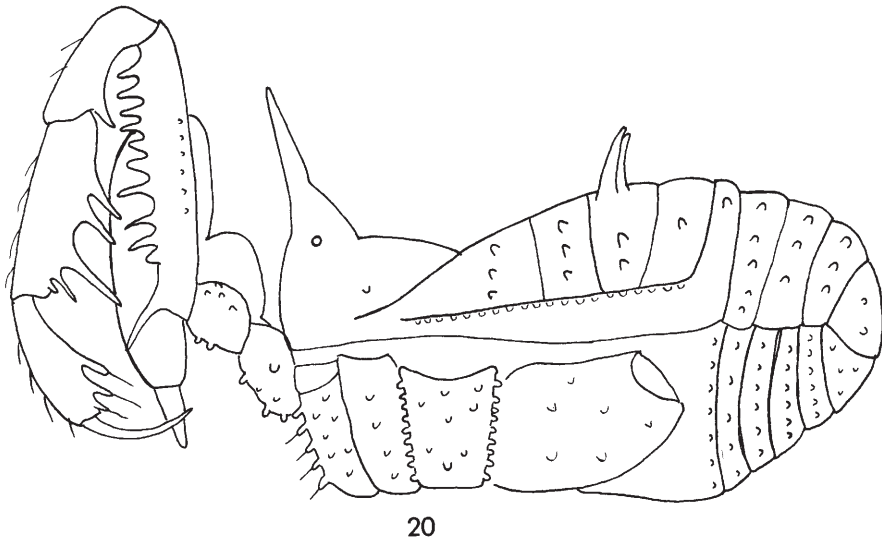
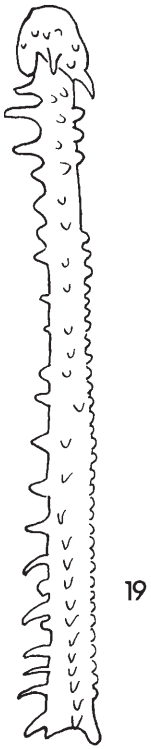
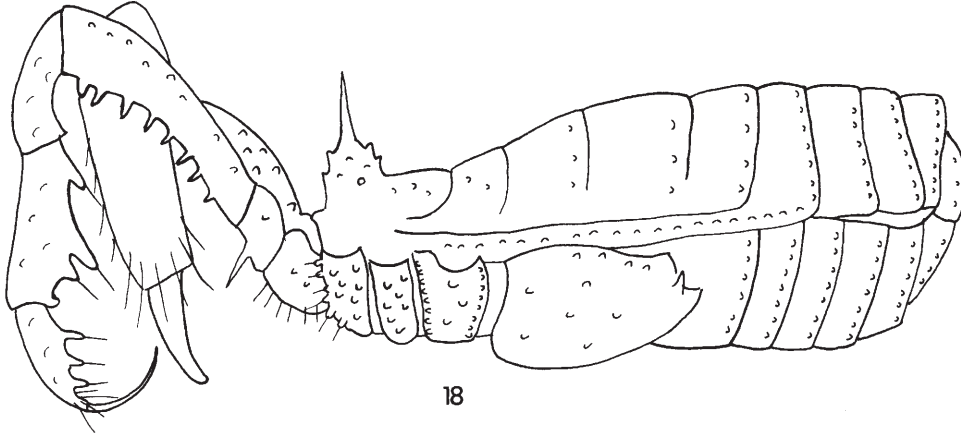
**Type locality.** Male holotype, two male paratypes, female paratypes, and three immatures from Cueva de la Cascada, Tequila, Veracruz, August 6, 1967. Collected by J. Reddell, J. Fish, and T. R. Evans.

Paratypes from Sótano del Relicario, 3 km N of Tequila, Veracruz, August 7, 1967 (two females, one immature), collected by J. Reddell and T. R. Evans. Cueva de Opilionida, 1½ km N of Tequila, Veracruz, August 5, 1967 (two males, two females), collected by J. Reddell and T. Evans. Sótano del Sphodrini, Tequila, Veracruz, August 6, 1967 (one male, one female), collected by J. Reddell and T. Evans. Szontecomostoc, 5 km N of Tequila, Veracruz, August 5, 1967 (one female), collected by J. Reddell, J. Fish, and T. Evans. Sótano de Humo, San Andres, Veracruz, June, 1964 (two females), collected by T. Raines.

Figs. 18-19. *Hoplobunus boneti* (Goodnight and Goodnight) 18. Lateral view of male; 19. Prolateral view of fourth trochanter and femur of male.

Fig. 20. *Hoplobunus mexicanus* (Roewer), lateral view of male.

Fig. 21. *Hoplobunus robustus*, new species, lateral view of male holotype.





## PELLOBUNUS BANKS

*Pellobunus* Banks, 1905, Proc. Ent. Soc. Washington, vol. 7, p. 21. Roewer, 1912, Arch. Naturgesch., vol. 78, sect. A, no. 3, p. 146 (in part); 1923, Die Weberknechte der Erde, p. 111. Goodnight and Goodnight, 1947, Amer. Mus. Novitates, no. 1340, p. 20; 1953, Amer. Mus. Novitates, no. 1610, p. 28.

Phalangodids with a common eye tubercle, usually removed from the anterior margin of the cephalothorax, without a median spine. Surface smooth or with small granulations above. Abdominal scute with five areas, first without a median line. Tarsi of third and fourth legs simple, with untoothed double claws. Femur of first leg normal, not elongate or heavily spined. Tarsus of first leg with four segments; distitarsus of first tarsus with two segments, second with three. Metatarsi not divided into astragali and calcanea. Maxillary lobe of second coxa without a ventral projection. Secondary sexual characteristics of the male variable, usually not very evident.

**Genotype.** *Pellobunus insularis* Banks, known from Panama.

This present description represents the first record of this genus in Mexico.

***Pellobunus mexicanus*, new species**

Figures 14-16

**Male holotype.** Total length of body, 5.1 mm. Cephalothorax, 1.6 mm long. Width of body at widest portion, 3.3 mm.

	I	II	III	IV
Trochanter	3.0mm	0.8mm	0.8mm	0.8mm
Femur	2.7	4.5	3.4	4.8
Patella	0.9	0.9	0.8	1.1
Tibia	2.3	2.3	2.7	3.7
Metatarsus	3.6	4.8	4.2	5.3
Tarsus	<u>1.8</u>	<u>4.9</u>	<u>2.3</u>	<u>2.6</u>
Total	14.3mm	18.2mm	14.2mm	18.3mm

Cephalothorax thickly covered with tubercles. Eye tubercle rounded, on the anterior margin of the cephalothorax, thickly covered with

tubercles; eyes slightly reduced. Abdomen with five distinct areas, the first without a median line. All areas thickly covered with tubercles. Lateral margin of the scute with a row of tubercles. Each free tergite with a row of tubercles. Anal operculum thickly covered with tubercles. Each free sternite with a row of tubercles. Spiracles visible but partially hidden by coxae. Coxae covered with tubercles; prominent row of tubercles on the anterior and posterior margins of the third coxae. Maxillary lobes of second coxae without downward pointing spine.

All segments of the legs but the metatarsi and tarsi covered by tubercles; spinose on fourth femora. Tarsal claws of the third and fourth legs double, not toothed. Tarsal segments: 5-12-6-6. Distitarsus of tarsus of first leg with two segments, second with three.

Palpus: trochanter, 0.5 mm long; femur, 1.5; patella, 0.9; tibia, 1.1; and tarsus, 0.9. Total length, 4.9mm. Trochanter with a ventral spine; femur and patella, tuberculate; tibia and tarsus with three spines on each side.

Cehlicera somewhat enlarged.

Dorsum light reddish brown. Legs lighter yellowish.

**Female.** Total length of body, 4.8 mm. Cephalothorax, 1.6 mm long. Width of body at widest portion, 1.6 mm. Similar in appearance to male but without enlarged tubercles on fourth femur.

**Type locality.** Male holotype and female paratypes from Grutas del Palmito, 7 km SW of Bustamante, Nuevo León, October, 1966. Collected by T. Raines and C. Tracy. Additional paratypes collected at the same locality on March 18, 1967 by R. Remington.

Paratypes from Sótano de El Tigre, 25 km SW of Jalpan, Queretaro, July 11, 1967, collected by J. Fish.

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## A REPORT ON SOME MEXICAN CAVE SPIDERS<sup>1</sup>

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Curator Emeritus, American Museum of Natural History, New York

The rich spider fauna of Mexican caves has been little exploited by arachnologists. In 1867 Dominik Bilimek described two species, as yet not identified with certainty by subsequent workers, from a miscellaneous series of cave animals from Las Grutas de Cacahuamilpa in Guerrero. A study of considerable arachnid material from twenty-one caves in Yucatán (Chamberlin and Ivie, 1938) represents so far the most important contribution to the arachnid cave fauna of Mexico. Most of the twenty-five species of this report show no special cave adaptation and some are known from or expected to occur in suitable habitats outside as well as in caves. A few of these spiders are cave adapted as shown by their pallid coloration and the partial or complete loss of eyes. Most interesting of these latter are the eyeless oonopid, *Wanops coecus*, and pholcid, *Anopsicus pearsei*, the first troglobitic spiders known to Mexico. Since that time only a few scattered references are available on this interesting fauna. Earlier this year all the known published records were summarized by James Reddell (1971) in a preliminary checklist and bibliography of Mexican cave biology. Of the 58 taxa of this report, some were represented only by generic names and comprise more than single species. One of

the aims of the present study is to make available specific names for many of these inadequately known taxa.

The cave habitat provides a variety of conditions attractive to many kinds of spiders. Some are transients that take temporary refuge but are more at home in outside situations. Most of the species considered in this paper are troglaphiles that, although in various degrees partial to caves, find their needs met in suitable outside situations. Relatively few are obligative cavernicoles isolated in single caves or cave systems. These troglobites have been able to or forced to accommodate to the special conditions of cave existence, have been changed in various ways, and are now entirely committed to cave living. Although eyeless spiders are known from special habitats outside of caves, eyeless cave spiders are presumed to be obligate cavernicoles. The list of such troglobites from Mexico has been enlarged to the following thirteen species from six families:

Dipluridae:

*Euagrus cavernicola*, new species  
Caves of Tamaulipas

Theraphosidae:

*Aphonopelma stygia*, new species  
Cueva de los Potrerillos, San Luis

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Potosí

Oonopidae:

*Wanops coecus* Chamberlin and Ivie  
Balaam Canche Cave, Yucatán

*Matta*, new species

Cueva de Ojo de Agua de Tlilapan,  
Veracruz

Leptonetidae:

*Leptoneta isolata*, new species

Grutas de García, Nuevo León

*Leptoneta capilla*, new species

Cueva de la Capilla, Tamaulipas

Pholcidae:

*Pholcophora (Anopsicus) pearsei*  
Chamberlin and Ivie

Oxolodt Cave, Yucatán

*Pholcophora gruta*, new species

Grutas de Juxtlahuaca, Guerrero

*Metagonia tlamaya*, new species

Sótano de Tlamaya, San Luis Potosí

*Metagonia pura*, new species

Cueva de la Capilla, Tamaulipas

*Metagonia atoyacae*, new species

Grutas de Atoyac, Veracruz

Agelenidae:

*Cicurina mina*, new species

Caves of Tamaulipas

*Cicurina coahuila*, new species

Cueva de los Lagos, Coahuila

The following preliminary report on the cave spiders of Mexico was prompted by the need for use of specific names in work being carried on by others dealing with taxonomic and other phases of research. Some of the material was given to me many years ago by Drs. C. Bolívar y Pieltain and Federico Bonet of the Instituto Politecnico in Mexico City. During the past few years intensive survey work has been done on Mexican caves by Mr. James Reddell of Austin, Texas, and Professor Robert Mitchell of Texas Tech University in Lubbock. I am indebted to these workers and to the many colleagues and students who have contributed to the project. All the material is deposited in the collection of the American Museum of Natural History in New York.

## Suborder Mygalomorphae

Although many mygalomorph spiders live in cave entrances and even in their deeper recesses, few have become cave adapted types. Simon (1892) described two diplurids (*Accola caeca* and *cavicola*) from caves in the Philippines, where he found them spinning their webs among the stalactites. One of these, *caeca*, was reported as being blind—"les yeux sont tout a fait oblitérés." These tiny six-eyed diplurids shun the light, live in ground litter in humid tropical regions, and often show eye modifications. In 1929 Fage described a new eyeless spider of the family Barychelidae from Gruta Bellamar in Cuba under the name *Troglothele coeca*. In both these spiders the lack of eyes would seem to be good evidence for regarding them as troglobites.

Two additional mygalomorph spiders are described below from Mexican caves.

## Family Dipluridae

Species of *Euagrus* are the most abundant mygalomorph spiders of Mexico and many live in caves where they are darkly pigmented and have the eyes fully developed. It is perhaps not surprising that the following one of these sedentary spinners of sheet webs should have become adapted to a cave existence.

### *Euagrus cavernicola*, new species

**Diagnosis.** Totally blind troglobite representative of genus without trace of eye tubercle or eyes, readily differentiated from other species as follows: coloration whitish to amber, with brown pigment present only in fangs of chelicerae; legs much longer and thinner than usual with fourth leg 4.5 times as long as carapace; greatly elongated, flexible lateral spinnerets much longer than abdomen (5.9 mm/3.3 mm); promargin of chelicera with 15 teeth.



**Etymology.** Specific name from Latin *cavernicola*, living in caves.

**Subadult female from Cueva de la Capilla.** Total length, 6 mm. Carapace, 3.3 mm long, 2.7 mm wide. Abdomen, 4.2 mm long, 2.6 mm wide.

Entire spider whitish, with faint yellowish cast, covered with dusky setae and spines. Fangs of chelicerae brown.

Carapace elongate oval, evenly rounded on sides, narrowly truncated in front and behind, covered evenly with subprocumbent dusky hairs. Pars cephalica elongate, triangular, with faintly marked cephalic grooves; cervical groove an inconspicuous pit situated back about three-fifths distance to posterior margin. Eyes and eye tubercle completely lacking, without trace of original position. Sternum subcordate, 1.75 mm long, 1.5 mm wide, covered evenly with erect dark setae, with only faint traces of marginal sigilla opposite coxae. Endite, 1.1 mm long, 0.75 mm wide, with erect setae and few scattered cuspules. Labium, 0.25 mm long, 0.75 mm wide. Chelicerae about 1.5 mm long, moderately geniculate, as seen from above about one-third as long as carapace; promargin of furrow with even row of 15 brown teeth of which five are larger; retromargin unarmed, flanked by line of hairs.

Leg formula, 4312. Legs longer and thinner than usual in genus: first leg 3.5 times, fourth leg 4.5 times as long as carapace; fourth tibia slightly longer than carapace. Legs clothed with fine setae and few longer spines except on posterior pairs. Paired claws of tarsi with single straight row of eight to 10 fine teeth; unpaired claws with single denticle at base. Palpal claw with row of about 12 fine teeth.

Abdomen suboval, covered evenly with fine dusky hairs and long suberect setae. Spinnerets four, subapical in position; median spinnerets one-segmented, 0.75 mm long; lateral spinnerets three-segmented, with measurements from base to apical segments, 1.8 mm, 1.9 mm, and 2.2 mm, respectively, totalling 5.9 mm; lateral spinnerets thin and flexible and much longer than abdomen.

**Type Data.** Subadult female holotype from Cueva de la Capilla, El Porvenir, 13½ km NW of Gómez Farías, Tamaulipas, México, May 16, 1971 (R. Mitchell, F. Abernathy, A. Sturdivant, S. Wiley).

**Distribution.** Known only from caves of La Sierra de Guatemala, Tamaulipas.

**Other Records.** *Tamaulipas*: Harrison Sinkhole, Rancho del Cielo, 5 km NW of Gómez Farías, January 12, 1971 (J. Cooke, M. Brownfield, W. Elliott), seven immature.

	I	II	III	IV	Palp
Femur	3.10	3.00	3.00	3.70	2.10
Patella	1.60	1.50	1.35	1.45	1.10
Tibia	2.60	2.35	2.60	3.50	1.65
Metatarsus	2.35	2.50	3.00	4.00	—
Tarsus	1.85	1.90	1.90	2.20	1.25
Total	11.50	11.25	11.80	14.85	7.60

Cueva de la Mina, 7 km NW of Gómez Farías, March 9, 1969 (J. Reddell), one immature. Cueva de la Capilla, January 13, 1971 (J. Reddell, R. Mitchell, and group), one immature; January 28, 1968 (J. Reddell, R. Mitchell, F. Rose, J. George), two immature.

## Family Theraphosidae

### *Aphonopelma stygia*, new species

**Diagnosis.** Essentially blind, presumably troglobite species, first in family, with eye tubercles obsolete and eyes represented by trivial corneal projections, differentiated from

other species by these features and pale amber coloration.

**Etymology.** Specific name from Latin *stygius*, stygian, infernal.

**Immature female holotype.** Total length, 6 mm. Carapace, 2.5 mm long, 2.25 mm wide. Abdomen, 3.3 mm long, 2.1 mm wide.

Carapace oval, widely rounded in front and on sides, smooth, shining, with scattered dusky hairs and thick bands of fine setae on frontal margin. Pars cephalica triangular, with faintly marked cephalic grooves; cervical groove a trivial transverse depression situated back two-thirds distance to posterior margin. Ocular area smooth, without evident tubercle, with trivial indication of lateral eyes forming

wide group near clypeal margin. Sternum, 1.25 mm long, 1.35 mm wide, suboval, with erect dark hairs and faint trace of marginal sigilla. Labium, 0.45 mm long, 0.65 mm wide. Endite, 1 mm long, 0.7 mm wide, subparallel, with suberect hairs and patch of about 25 cuspules at base. Labium with 10 similar cuspules at apex. Chelicerae, 1.5 mm long, more than half as long as carapace; promargin of furrow with eight sharp subequal teeth; retro-margin with five denticles near tip of fang and flanked by line of hairs.

Fourth legs missing but leg formula probably 4132. Legs clothed with fine hairs and setae and with one to five short, bulbous setae

	I	II	III	IV	Palp
Femur	2.50	1.90	2.30	—	1.80
Patella	1.35	1.00	1.10	—	1.00
Tibia	2.35	1.65	2.30	—	1.60
Metatarsus	1.90	1.40	1.70	—	—
Tarsus	1.75	1.50	1.50	—	1.50
Total	10.85	7.45	9.40	—	5.90

on dorsa of tarsi. First tarsus and half of metatarsus scopulate below; second and third tarsi scopulate and few scopular hairs on ends of their metatarsi. Paired claws essentially smooth, without obvious denticles at base. Retrolateral surface of palpal endite and facing prolateral surface of first coxa essentially smooth.

Abdomen suboval covered thickly with coarse dusky hairs. Four spinnerets apical in position; median spinnerets one-segmented, 0.2 mm long; lateral spinnerets three-segmented, with measurements of base to apical segments, 0.5 mm, 0.3 mm, and 0.4 mm, respectively, totaling 1.2 mm.

**Type Data.** Immature holotype of uncertain sex from Cueva de los Potrerillos, 1½ km W of Ahuacatlán, San Luis Potosí, México, July 12, 1967 (J. Reddell, J. Fish, W. Russell).

## Suborder Araneomorphae

### Family Leptonetidae

#### Genus *Leptoneta* Simon

This family of pale, minute spiders with fine, long legs, more than any other one, is identified with cave habitats and most of the known species have been described from caves. Some species are known to live outside of caves in ground detritus of many types in mesic situations. Most European species have the eyes reduced in size and, even though none seems to be eyeless, several are regarded as being restricted to caves. The following species are the first to be described from Mexico and include eyeless forms and others with eyes reduced in size. Although some seem to share some characters of the genus *Paraleptoneta*, here all are referred to the typical genus *Leptoneta*. The males are readily recognized by features of the eyes, comparative leg lengths and the details of the

palpus, which present numerous characters of shape, size and spination. The females offer differences in the first two categories of features but are more difficult to separate. The epigynum is of the haplogyne type with a simple bursa on each side leading by way of a coiled tube to a small oval terminal receptacle placed near the midline.

**Leptoneta isolata**, new species

FIGURES 9-11

**Diagnosis.** Pale, essentially eyeless troglodyte with legs of medium length; epigynum (fig. 11); tarsus of male palpus (fig. 10) with rounded accessory lobe on retrolateral side.

**Etymology.** Specific name from Latin *inso-latus*, separated, isolated.

**Female.** Total length, 2.7 mm. Carapace, 1 mm long, 0.8 mm wide. Abdomen, 1.7 mm long, 1 mm wide.

Cephalothorax and appendages dull to bright orange in color, without contrasting markings except for dark cervical groove and thin brown seam around sternum and brown chelicerae. Abdomen whitish.

Structure typical: carapace elongate oval, only moderately narrowed in front to demark scarcely apparent pars cephalica, highest in front of cervical groove; clypeus broad 0.15 mm high, essentially straight in front, declining steeply forward; eyes obsolete except for trivial corneal indications of anterior four; cheliceral armature: promargin with nine, retromargin with three denticles; abdomen suboval, as high as broad.

First leg: femur, 2.35 mm, patella, 0.3 mm, tibia, 2.5 mm, metatarsus, 2.1 mm, tarsus, 1.25 mm; total, 8.5 mm. First femur 2.3 times, first leg 8.5 times as long as carapace. First metatarsus with 2-2-0 ventral spines.

Epigynum (fig. 11) with openings on each corner to coiled tube ending in elongate oval receptacle.

**Male.** Total length, 2.5 mm. Carapace, 1 mm long, 0.8 mm wide. Abdomen, 1.5 mm long, 0.9 mm wide.

Coloration and structure like those of female.

First leg: femur, 2.3 mm, patella, 0.3 mm, tibia, 2.6 mm, metatarsus, 2.2 mm, tarsus, 1.2 mm; total 8.6 mm. First femur 2.3 times, first leg 8.6 times as long as carapace. Palpus: femur, 0.4 mm, patella, 0.12 mm, tibia, 0.29 mm, tarsus, 0.3 mm.

Male palpus (figs. 109-110) of typical design as follows: femur about four times as long as broad; patella oval, with erect spine at apex; tibia not fully three times as broad as long, widest at apex and drawn out to spur bearing thin spine on retrolateral side; tarsus pinched at center, with slender principal branch and short retrolateral lobe; bulb large, suboval, its ventral depth twice depth of tarsus.

**Type Data.** Male holotype and three males, six females and immature from Grutas de García, Nuevo León, México, June 14, 1942 (C. Bolívar, F. Bonet, Maldonado, Osorio, Peláez).

**Distribution.** Known only from above cave.

**Other Record.** *Nuevo León:* Grutas de García, September 19, 1942 (C. Bolívar), three males, four females.

**Leptoneta pecki**, new species

FIGURES 7-8

**Diagnosis.** Small, pale, short-legged species related to *isolata*; tarsus of male palpus (fig. 7) with small accessory lobe.

**Etymology.** Named for Dr. Stewart B. Peck.

**Female.** Total length, 1.6 mm. Carapace, 0.7 mm long, 0.52 mm wide. Abdomen, 0.9 mm long, 0.6 mm wide.

Cephalothorax and legs pale yellow; eyes very narrowly ringed with black and with black pigment behind anterior median eyes; abdomen white.

Structure typical: eyes present, reduced in size, with front eyes contiguous and posterior eyes separated from anterior lateral by one diameter of latter; clypeus sloping, 0.15 mm high, equal to three diameters of anterior median eye; cheliceral armature: promargin with seven, retromargin with four denticles.

First leg: femur, 1.3 mm, patella, 0.21 mm,

tibia, 1.4 mm, metatarsus, 1.3 mm, tarsus, 0.72 mm; total, 4.93 mm. First femur 1.8 times, first leg seven times as long as carapace. First femur with single median spine on pro-lateral surface; first tibia with 1-2-1-2 ventral spines.

**Male.** Total length, 1.5 mm. Carapace, 0.6 mm long, 0.5 mm wide. Abdomen, 0.8 mm long, 0.6 mm wide.

Coloration and structure like those of female.

First leg: femur, 1.1 mm, patella, 0.21 mm, tibia, 1.2 mm, metatarsus, 0.95 mm, tarsus, 0.64 mm; total, 4.10 mm. First femur 1.8 times, first leg about seven times as long as carapace. Palpus: femur, 0.3 mm, patella, 0.11 mm, tibia, 0.16 mm, tarsus, 0.21 mm.

Male palpus (figs. 7-8): femur four times as long as wide; patella suboval; tibia slightly more than twice as long as broad, with prolateral spur bearing straight spine; tarsus nearly three times as long as broad, pinched at center, with pointed principal branch and rounded accessory spur on prolateral side; bulb oval, twice as deep as depth of tarsus.

**Type Data.** Male holotype and male and two females from Grutas de San Bartolo, 16 km SW of Monterrey, Nuevo León, México, June 21, 1969 (S. and J. Peck).

**Distribution.** Known only from above cave.

#### *Leptoneta capilla*, new species

FIGURES 1-2

**Diagnosis.** Pale, eyeless troglobite with long legs and elongated elements of male palpus; tarsus of male palpus (fig. 1) with simple, apically rounded principal branch without accessory lobe.

**Etymology.** Specific name from Spanish *capilla*, a hood; named for Cueva de la Capilla.

**Female.** Total length, 2 mm. Carapace, 0.85 mm long, 0.65 mm wide. Abdomen, 1.2 mm long, 0.8 mm wide.

Coloration and structure like those of *isolata*. Ocular area without trace of eyes; linear cervical groove only faintly apparent; midline of carapace with row of about six suberect hairs; cheliceral armature: promargin with

nine, retromargin with four close-set denticles.

First leg: femur, 2.2 mm, patella, 0.25 mm, tibia, 2.3 mm, metatarsus, 1.8 mm, tarsus, 1.25 mm; total, 7.8 mm. First femur 2.6 times, first leg about 9.2 times as long as carapace. Palpus: femur, 0.5 mm, patella, 0.2 mm, tibia, 0.36 mm, tarsus, 0.26 mm; total, 1.32 mm.

**Male.** Total length, 1.85 mm. Carapace, 0.85 mm long, 0.7 mm wide. Abdomen, 1 mm long, 0.7 mm wide.

Coloration and structure essentially like those of female.

First leg: femur, 2.5 mm, patella, 0.25 mm, tibia, 2.6 mm, metatarsus, 2.1 mm, tarsus, 1.3 mm; total, 8.75 mm. First femur about three times, first leg about eight times as long as carapace. Palpus: femur, 0.8 mm, patella, 0.4 mm, tibia, 0.4 mm, tarsus, 0.4 mm; total, 2 mm.

Male palpus (figs. 1-2) longer than that of *isolata* with following features: femur about eight times as long as wide; patella nearly four times as long as wide, narrow at base; tibia four times as long as broad, with pointed lobe bearing thin spine on retrolateral side; tarsus four times as long as broad, narrowed at middle, with apically rounded principal branch lacking accessory lobe; bulb elongated, its depth about three times that of tarsus.

**Type Data.** Male holotype, four males and five females from Cueva de la Capilla, 13½ km NW of Gómez Farías, El Porvenir, Tamaulipas, México, January 13, 1971 (J. Reddell, R. Mitchell, and group).

**Distribution.** Known only from above cave.

**Other Records.** *Tamaulipas*: Cueva de la Capilla, 7,100 feet, El Porvenir, 13½ km NW of Gómez Farías, July 2, 1969 (S. Peck, R. Norton), male, female; January 28, 1968 (J. Reddell, R. Mitchell, F. Rose, J. George), penultimate male.

#### *Leptoneta delicata*, new species

FIGURES 3-4

**Diagnosis.** Pale species resembling *capilla* but with eyes present but reduced in size and



with legs of medium length; male palpus with enlarged, laterally directed tibial spur and elongated tarsus without lateral enlargement (figs. 3-4).

**Etymology.** Specific name from Latin *delicatus*, dainty.

**Female.** Total length, 1.9 mm. Carapace, 0.8 mm long, 0.7 mm wide. Abdomen, 1.1 mm long, 0.85 mm wide.

Cephalothorax and appendages pale yellow; eyes of female narrowly ringed with black; abdomen white.

Structure typical: like that of *isolata*; eyes on moderately elevated tubercle, reduced in size, with those of anterior row subcontiguous and posterior pair elongate, separated from anterior lateral eye by more than diameter; clypeus broad, 0.17 mm high, equaling three full diameters of anterior lateral eye; cheliceral armature: promargin with eight, retromargin with three denticles; abdomen suboval, as high as broad.

First leg: femur, 1.9 mm, patella, 0.22 mm, tibia, 1.95 mm, metatarsus, 1.4 mm, tarsus, 1.2 mm; total, 6.67 mm. First femur 2.4 times, first leg eight times as long as carapace. First femur with weak spine in distal half on prolateral side; first tibia with 1-1-1-1 ventral spines.

**Male.** Total length, 2 mm. Carapace, 0.8 mm long, 0.7 mm wide. Abdomen, 1.2 mm long, 0.8 mm wide.

Coloration and structure like those of female. Eyes evanescent, without pigment, smaller than those of female, with posterior pair separated from larger anterior lateral by nearly two diameters of posterior eye.

First leg: femur, 1.88 mm, patella, 0.22 mm, tibia, 2 mm, metatarsus, 1.45 mm, tarsus, 1.25 mm; total, 6.8 mm. First femur 2.3 times, first leg 8.5 times as long as carapace. Palpus: femur, 0.72 mm, patella, 0.31 mm, tibia, 0.32 mm, tarsus, 0.45 mm; total, 1.8 mm.

Male palpus (figs. 3-4) with elements elongated: femur about seven times as long as wide, slightly enlarged at distal end; patella two and one-half times as long as wide; tibia three times as long as wide, broadened and provided at apex with conspicuous, laterally

directed process bearing short spine; tarsus about four times as long as wide, pinched to rounded element at middle and gradually narrowed to apex, without accessory lobe; bulb suboval, with long embolus.

**Type Data.** Male holotype and female from Iron Mine at road, 2 km E of Pinal de Amoles, Querétaro, México, July 17, 1969 (S. Peck).

**Distribution.** Known only from above specimens.

### *Leptoneta reclusa*, new species

FIGURES 12-13

**Diagnosis.** Pale species related to *capilla* but readily separated by shorter legs and presence of reduced eyes; tarsus of male palpus (fig. 12) with prominent, laterally directed process.

**Etymology.** Specific name from Latin *recludere*, to close off, a recluse.

**Male.** Total length, 2.2 mm. Carapace, 0.82 mm long, 0.72 mm wide. Abdomen, 1.2 mm long, 0.85 mm wide.

Cephalothorax and legs dusky yellow, without contrasting markings; eyes with faint outline of dark pigment; abdomen gray.

Structure like that of *isolata*; carapace typical with cervical groove a trivial linear depression and line of fine setae going forward to eyes; eyes present but reduced in size, with anterior cluster of four strongly recurved and separated from posterior pair by diameter of anterior lateral; clypeus broad and high, 0.2 mm, equaling about three times length of front eye cluster; cheliceral armature: promargin with nine, retromargin with seven denticles; abdomen suboval, covered with fine, procumbent hairs.

First leg: femur, 2.25 mm, patella, 0.25 mm, tibia, 2.2 mm, metatarsus, 1.7 mm, tarsus, 0.6 mm; total, 7 mm. First femur 2.7 times, first leg 8.5 times as long as carapace. First femur with seven procumbent spines along prolateral surface; first tibia with four paired or single ventral spines. Palpus: femur, 0.55 mm, patella, 0.2 mm, tibia, 0.23 mm, tarsus, 0.33 mm; total, 1.41 mm.

Male palpus (figs. 12-13) with following



features: femur five times as long as wide, slightly thickened toward apex; patella two and one-half times as long as broad; tibia slightly more than twice as long as broad, broader at apex and produced to angle bearing thin spine; tarsus about four times as long as broad, essentially straight, apically rounded, without accessory lobes, set with fine bristles on prolateral side; bulb suboval, twice as high as height of tarsus.

**Type Data.** Male holotype from Cueva de Chorros de Agua, 20 km W of Montemorelos, Nuevo León, México, June 19-25, 1969 (S. and J. Peck), from bait trap in dark zone at guano.

**Distribution.** Known only from above specimen.

***Leptoneta rainesi*, new species**

FIGURES 5-6

**Diagnosis.** Small, dusky, stocky species with short legs; tarsus of male palpus (fig. 6) slender, rounded at apex and without accessory lobe.

**Etymology.** Named for Mr. Terry Raines.

**Female.** Total length, 1.6 mm. Carapace, 0.55 mm long, 0.5 mm wide. Abdomen, 1 mm long, 0.8 mm wide.

Cephalothorax and appendages dusky yellow; eyes narrowly ringed with black and anterior four eyes enclosing black patch; abdomen gray, with purplish cast.

Structure typical: carapace broadly oval, only moderately longer than broad, with cervical groove faintly apparent; eyes large, well

pigmented, set on moderate elevation, with oval posterior pair separated from anterior lateral by narrow diameter of posterior eye; clypeus broad, 0.11 mm high, equaling slightly more than two diameters of lateral eye; cheliceral armature: promargin with seven, retromargin with four denticles; abdomen suboval.

First leg: femur, 0.85 mm, patella, 0.15 mm, tibia, 0.9 mm, metatarsus, 0.75 mm, tarsus, 0.55 mm; total, 3.20 mm. First femur 1.5 times, first leg 5.8 times as long as carapace. First femur with two weak spines at middle on prolateral side; first tibia with single, weak submedian spine.

**Male.** Total length, 1.6 mm. Carapace, 0.65 mm long, 0.52 mm wide. Abdomen, 0.9 mm long, 0.7 mm wide.

Coloration and structure essentially like those of female. Carapace darker and dusky on margins; abdomen mostly purple.

First leg: femur, 0.98 mm, patella, 0.19 mm, tibia, 1 mm, metatarsus, 0.9 mm, tarsus, 0.6 mm; total, 2.32 mm. First femur 1.5 times, first leg 3.5 times as long as carapace. Palpus: femur, 0.4 mm, patella, 0.2 mm, tibia, 0.15 mm, tarsus, 0.26 mm; total, 1.01 mm.

Male palpus (figs. 5-6) with following features: femur four times as long as wide; patella thin, cylindrical segment two and one-half times as long as wide; tibia twice as long as wide, with short retrolateral spur bearing thin spine; tarsus three and one-half times as long as broad, pinched at middle, narrowly rounded at apex, without accessory lobes; bulb large, suboval, more than half as deep as

Figs. 1-2. *Leptoneta capilla*, new species. 1. Male palpus, retrolateral view. 2. Tibia and tarsus of male palpus, dorsal view.

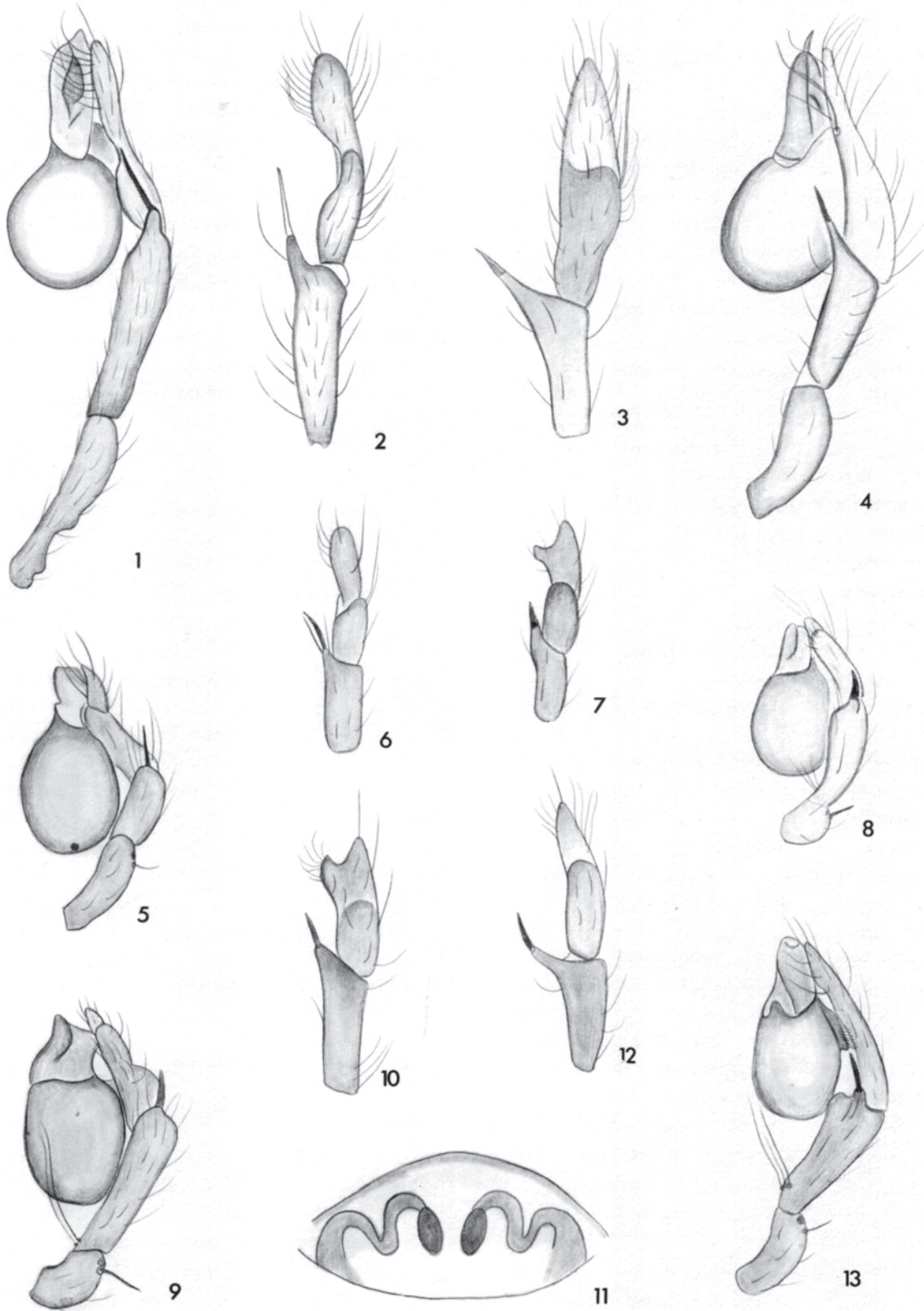
Figs. 3-4. *Leptoneta delicata*, new species. 3. Tibia and tarsus of male palpus, dorsal view. 4. Male palpus, retrolateral view.

Figs. 5-6. *Leptoneta rainesi*, new species. 5. Male palpus, retrolateral view. 6. Tibia and tarsus of male palpus, dorsal view.

Figs. 7-8. *Leptoneta pecki*, new species. 7. Tibia and tarsus of male palpus, dorsal view. 8. Male palpus, retrolateral view.

Figs. 9-11. *Leptoneta isolata*, new species. 9. Male palpus, retrolateral view. 10. Tibia and tarsus of male palpus, dorsal view. 11. Epigynum, ventral view.

Figs. 12-13. *Leptoneta reclusa*, new species. 12. Tibia and tarsus of male palpus, dorsal view. 13. Male palpus, retrolateral view.



depth of tarsus.

**Type Data.** Male holotype and female from Cueva de El Pachón, 7½ km NE of Antiguo Morelos, Tamaulipas, México, July 10, 1969 (S. and J. Peck, R. Norton).

**Distribution.** Caves of Tamaulipas.

**Other Records.** *Tamaulipas:* Cueva de los Vampiros, 20 km NW of Limón, May 27, 1968 (J. Reddell), male. Cueva Bonita, 36 km SW of Victoria, July 18, 1967 (J. Fish), male.

### Family Oonopidae

Genus *Wanops* Chamberlin and Ivie

*Wanops coecus* Chamberlin and Ivie

*Wanops coecus* Chamberlin and Ivie, 1938, p. 125, figs. 1, 2.

**Record.** *Yucatán:* Balaam Canche Cave, Chichén Itzá, June 10, 1936, one male taken 95 m inside cave.

Genus *Matta* Crosby

*Matta* new species

**Record.** *Veracruz:* Cueva de Ojo de Agua de Tlilapan, Tlilapan, immature female (J. Reddell).

### Family Pholcidae

The pholcids are generalized, haplogyne spiders with long legs, that spin irregular webs in dark places under ground detritus, in openings in the ground, in caves and buildings. The cave habitat seems to be an especially attractive one inasmuch as many pholcids live in the entrance areas and some penetrate deep into areas of total darkness. The Mexican fauna is large and consists mainly of undescribed species of which about 50 are considered here from Mexican caves. A few of these species are blind troglobites and others have eye and body modifications that suggest they may be obligative cavernicoles. Most of the species, however, must be classified as troglaphiles.

### Genus *Coryssonemis* Simon

This American genus of large, strongly marked species is well represented in Mexican caves. One of the species, *Coryssocnemis simoni* O.P.-Cambridge, with its type locality at Omilteme, Guerrero, occurs in caves and outside situations from Hidalgo and Querétaro into southern Mexico as recorded below. All the species are classified as troglaphiles. Three of the new species described below are atypical in having much longer, thinner legs than other species and show eye and palpal distinctions that set them apart from the norm. Until the limits of the pholcid genera are more explicitly defined, they are kept in *Coryssocnemis*.

*Coryssocnemis simoni* O. P.- Cambridge

*Coryssocnemis simoni* O.P.-Cambridge, 1898, p. 237. F.P.-Cambridge, 1902, p. 371.

**Records.** *Queretaro:* Sótano de Tejamanil, Tejamanil, August 9, 1966 (J. Fish), female; August 9, 1966 (D. McKenzie, J. Reddell), female, immature. Iron mine at road, 2 km E of Pinal de Amoles, July 17, 1969 (S. Peck), female. Sótano de El Tigre, 25 km SW of Jalpan, July 11, 1967 (J. Fish), female. Sótano de la Lagunita, 1½ km E of Río Blanco, July 9, 1967 (J. Reddell), female. Cueva del Puerto del León, 6½ km SE of Río Blanco, July 9, 1967 (J. Reddell, J. Fish, W. Russell), immature. *Hidalgo:* Cueva de Puerto de la Zorra, August 11, 1966 (J. Reddell, J. Fish), female, immature.

### *Coryssocnemis abernathyi*, new species

FIGURES 19-22

**Diagnosis.** Large, strongly marked species related to *simoni*, separated by following features: femora and tibiae of legs with many brown rings; male chelicera (fig. 20) with projection of distinctive shape; epigynum (fig. 22) with three rounded angles at apex; male palpus as shown in fig. 21.

**Etymology.** Named for Mr. Miles Aber-

nathy.

**Female.** Total length, 8.5 mm. Carapace, 3 mm long, 2.5 mm wide. Abdomen, 5.5 mm long, 4 mm wide.

Carapace pale yellow, with median longitudinal dark brown stripe from eye area to posterior margin and continued forward but paler to clypeal margin, and pair of brown spots on each side of pars thoracica; sternum light brown, with narrow dark brown marginal seam; chelicerae, endites and labium dark brown; legs yellowish, with femora and tibiae marked with many brown rings, about 10 on each segment, and metatarsi and tarsi unmarked light brown; abdomen bluish.

Structure similar to that of *simoni*. Eye tubercle of medium height; anterior eye row slightly procurved, with four eyes nearly touching and median eyes about half diameter of lateral eyes; posterior eye row moderately procurved, with median eyes separated by full diameter and touching lateral eyes. Clypeus, 1.1 mm, as high as nearly four diameters of anterior lateral eye. Abdomen large, produced behind spinnerets to rounded, conical projection like that of *simoni*.

First leg: femur, 12 mm, patella, 1.3 mm, tibia, 12 mm, metatarsus, 15 mm, tarsus, 5 mm; total, 45.3 mm. First femur four times, first leg 15 times as long as carapace.

Epigynum (fig. 22) large, protruding process with three slight, rounded angles at apex.

**Male.** Total length, 7 mm. Carapace, 3.3 mm long, 3 mm wide. Abdomen, 4.5 mm long, 3.2 mm wide.

Coloration and structure like those of female. Chelicera (fig. 20) with prominent, outwardly projecting lobe below base, otherwise smooth and set with fine black hairs.

First leg: femur, 17.5 mm, patella, 1.3 mm, tibia, 15.7 mm, metatarsus, 23 mm, tarsus, 6.5 mm; total, 64 mm. First femur 5.3 times, first leg about 20 times as long as carapace.

Male palpus (fig. 21) with small femoral spur at base and apically thin tarsal process bearing small lateral appendage.

**Type Data.** Male holotype and female from Sótano de Abernathy, W of Valle de los Fantasma, San Luis Potosí, México, January 30, 1969 (W. Elliott, D. Honea, M. Abernathy).

**Distribution.** Caves of San Luis Potosí and Tamaulipas.

**Other Records.** *San Luis Potosí:* Sótano de la Golondrina, Valle de los Fantasma, November 29, 1968 (W. Elliott, J. Jarl, S. Cathey, M. Burk), male, two females. Unnamed 30-foot-long cave, 1 km S of San Francisco, November 28, 1968 (W. Elliott, J. Jarl), two males. *Tamaulipas:* Cueva Chica de la Perra, 13½ km NW of Gómez Farías, January 15, 1971 (J. Reddell, W. Elliott), male.

### **Coryssocnemis placidus**, new species

FIGURES 28-29

**Diagnosis.** Near relative of *abernathyi* but readily distinguished as follows: carapace with submarginal, broken band instead of spots; femora and tibiae of legs with single subapical ring instead of series; legs shorter with first femur 3.3 times as long as carapace; epigynum (fig. 28) with apical corners prominent.

**Etymology.** Specific name from Latin *placidus*, placid.

**Female.** Total length, 6.5 mm. Carapace, 3.5 mm long, 3 mm wide. Abdomen, 5 mm long, 4 mm wide.

Coloration and structure like that of *abernathyi* except as follows: pars cephalica with submarginal band of spots; legs reddish brown, with femora and tibiae with single broad, subapical dark ring. Abdomen with rounded, conical projection.

First leg: femur, 11.7 mm, patella, 1.2 mm, tibia, 10 mm, metatarsus, 14 mm, tarsus, 3.7 mm; total, 40.6 mm. First femur 3.3 times, first leg 11.6 times as long as carapace.

Epigynum (figs. 28-29) with apical corners larger than those of *abernathyi*.

**Type Data.** Female holotype from Cueva de Agua de Tlilapan, Tlilapan, Veracruz, México, August 8, 1967 (J. Reddell).

**Distribution.** Caves of Veracruz.

**Other Records.** *Veracruz:* Sótano de Sphodrini, Tequila, August 8, 1967 (J. Reddell, T. R. Evans), one immature. Cueva de Opilionida, 1½ km N of Tequila, August 5, 1967 (J. Reddell, T. R. Evans),



immature female. Sótano de Oztoatlicholua, 1 km W of Tequila, June 1963 (D. McKenzie), one immature from 700-foot-deep shaft.

**Coryssocnemis pecki**, new species

FIGURES 14-18

**Diagnosis.** Large species with high, globose abdomen, related to *simoni*, separated by following features: legs uniform in color; epigynum (figs. 15, 17) of distinctive form; male chelicerae (fig. 14) with sharp, inwardly directed spurs; male palpus (fig. 16) like that of *abernathyi* but with tip of tarsal process of different form.

**Etymology.** Named for Dr. Stewart Peck.

**Female.** Total length, 7 mm. Carapace, 3 mm long, 2.7 mm wide. Abdomen, 4 mm long, 3.3 mm wide.

Carapace orange brown but pars thoracica somewhat dusky and with whitish margins; chelicerae, endites and labium dusky brown; sternum yellowish brown with narrow brown seam; legs yellowish to orange brown, with faint pale rings at end of femora and tibiae; abdomen whitish to pale blue.

Structure similar to that of *simoni*. Posterior eye row essentially straight. Abdomen subglobose, without prominent projecting lobe.

First leg: femur, 16 mm, patella, 1.3 mm, tibia, 14.5 mm, metatarsus, 20 mm, tarsus, 5.5 mm; total, 57.3 mm. First femur 5.3 times, first leg 19 times as long as carapace.

Epigynum (figs. 15, 17) with small, rounded lobe in front and truncated behind at genital groove.

**Male.** Total length, 8 mm. Carapace, 3.5 mm long, 3 mm wide. Abdomen, 4.5 mm

long, 4 mm wide.

Coloration and structure like those of female. Chelicerae (fig. 14) widely rounded in lateral view and with sharp, curved, inwardly directed spurs on frontal face in distal half of segment.

First leg: femur, 18 mm, patella, 1.5 mm, tibia, 16 mm, metatarsus, 23 mm, tarsus, 5.5 mm; total, 64 mm. First femur 5.4 times, first leg 18 times as long as carapace.

Male palpus (fig. 16) similar to that of *abernathyi*, with tiny femoral spur at apex and tarsal process drawn to fine point.

**Type Data.** Male holotype and two males and six females from Cueva de Arcotete, 6 km E of San Cristobal, Chiapas, México, August 15, 1969 (S. and J. Peck).

**Distribution.** Caves of Chiapas.

**Other Record.** *Chiapas*: Cueva Rancho Nuevo, 10 km E of San Cristobal, August 13, 1969 (S. and J. Peck), three immature.

**Coryssocnemis facetus**, new species

FIGURE 27

**Diagnosis.** Atypical member of genus with simple epigynum (fig. 27) consisting of semi-circular plate and longer, thinner legs than other species.

**Etymology.** Specific name from Latin *facetus*, elegant, fine.

**Female.** Total length, 5.3 mm. Carapace, 2.3 mm long, 2.3 mm wide. Abdomen, 3.2 mm long, 2.5 mm wide.

Cephalothorax and appendages bright orange; carapace with dusky longitudinal stripe from eyes to posterior margin, pale on sides, and eye group black; sternum light brown with dark seam; legs without rings or contrasting markings.

Figs. 14-18. *Coryssocnemis pecki*, new species. 14. Male chelicerae, frontal view. 15. Epigynum, retrolateral view. 16. Left male palpus, retrolateral view. 17. Epigynum, ventral view. 18. Male chelicera, retrolateral view.

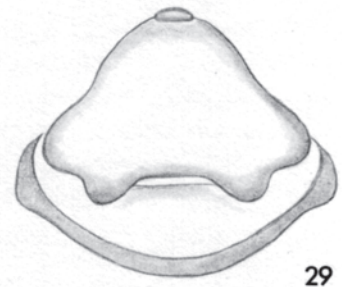
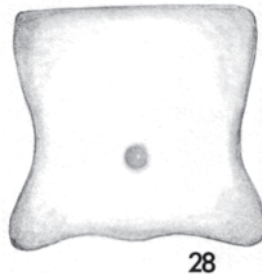
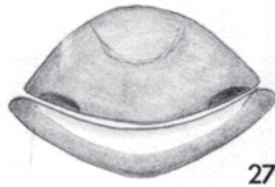
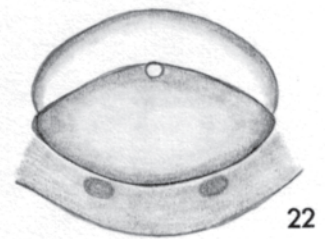
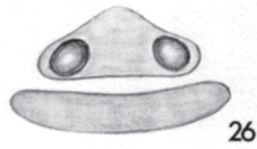
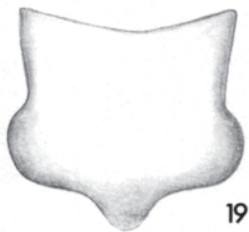
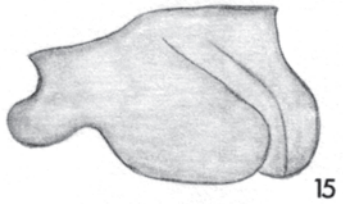
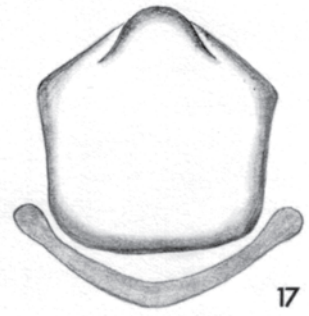
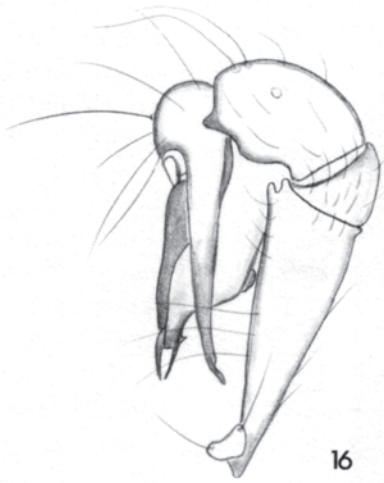
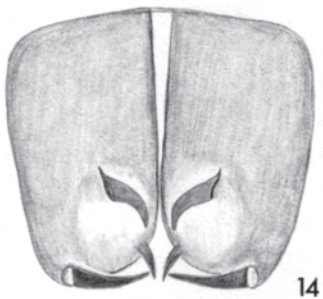
Figs. 19-22. *Coryssocnemis abernathyi*, new species. 19. Epigynum, frontal view. 20. Left male chelicera, retrolateral view. 21. Left male palpus, retrolateral view. 22. Epigynum, ventral view.

Figs. 23-26. *Coryssocnemis clarus*, new species. 23. Left male chelicera, retrolateral view. 24. Left male palpus, retrolateral view. 25. Epigynum, posterior view. 26. Epigynum, dorsal view.

Fig. 27. *Coryssocnemis facetus*, new species. Epigynum, ventral view.

Figs. 28-29. *Coryssocnemis placidus*, new species. 28. Epigynum, frontal view. 29. Epigynum, ventral view.





Anterior median eyes one-third diameter of anterior lateral eyes; posterior eye row moderately procurved, with median eyes separated by long diameter; clypeus, 0.9 mm, as high as nearly five diameters of anterior lateral eye. Abdomen elongate oval, of medium height.

First leg: femur, 17 mm, patella, 1 mm, tibia, 16.5 mm, metatarsus, 28 mm, tarsus, 4.5 mm; total, 67 mm. First femur seven times, first leg 29 times as long as carapace.

Epigynum as shown in fig. 27.

**Type Data.** Female holotype from Cueva Chica del Camino, at Kilometer 1112 on Tuxtla Gutiérrez Highway, Chiapas, México, August 19, 1967 (J. Reddell, J. Fish, T. R. Evans).

#### *Coryssocnemis clarus*, new species

FIGURES 23-26

**Diagnosis.** Atypical, long-legged species with ovate abdomen, readily distinguished as follows: epigynum (fig. 25) with rounded angle on each side; chelicera of male (fig. 23) with toothed spur; male palpus (fig. 24) with rounded lobe at apex of femur and thin tarsal process.

**Etymology.** Specific name from Latin *clarus*, clear.

**Female.** Total length, 4.2 mm. Carapace, 1.7 mm long, 1.7 mm wide. Abdomen, 3.5 mm long, 2.7 mm wide.

Carapace pale yellow, with dusky central stripe from eyes to posterior declivity and eye tubercles black; labium and endites dusky; sternum with dusky patch in middle but pale on margins; chelicerae dark brown; legs yellowish brown with faint pale apical rings on femora and tibiae.

Eye turret of medium height; front eye row recurved with lower edges of large lateral eyes cutting top edge of contiguous median eyes, which are separated by nearly two diameters from lateral eyes; posterior eye row straight with median eyes separated by two narrow diameters from contiguous lateral eyes; clypeus, 0.8 mm, as high as six diameters of anterior lateral eyes.

First leg: femur, 12.3 mm, patella, 0.7 mm, tibia, 13.2 mm, metatarsus, 16 mm, tarsus, 2 mm; total, 44.2 mm. First femur seven times, first leg 26 times as long as carapace.

Epigynum (figs. 25-26) of distinctive form.

**Male.** Total length, 3.2 mm. Carapace, 1.75 mm long, 1.75 mm wide. Abdomen, 1.8 mm long, 1.3 mm wide.

Coloration and structure like those of female. Chelicera (fig. 23) with curved spur above middle of face, armed with short spinules.

First leg: femur, 13.2 mm, patella, 0.7 mm, tibia, 13 mm, metatarsus, 21.5 mm, tarsus, 3 mm; total, 51.4 mm. First femur 7.5 times, first leg 29 times as long as carapace.

Male palpus (fig. 24) atypical, with rounded lobe at apex of femur similar to that of *pecki* and thin tarsal process lightly curved at end.

**Type Data.** Male holotype from Cueva del Nacimiento del Río Frio, 7 km S of Gómez Farías, Tamaulipas, México, February 17, 1970 (J. A. L. Cooke), on soil in twilight zone.

**Distribution.** Known only from above cave.

**Other Records.** *Tamaulipas:* Cueva del Nacimiento del Río Frio, March 11, 1969 (J. Reddell, S. Fowler), male; April 18, 1965 (J. Fish, J. Reddell), female, two immature.

#### *Coryssocnemis iviei*, new species

FIGURES 30-33

**Diagnosis.** Atypical member of genus readily distinguished by following features: epigynum (fig. 33) with truncate or rounded process in front, often showing extruded globular elements; male chelicera (fig. 31) with sharp spur near distal end of segment; male palpus (fig. 30) with rounded lobe at distal end of femur.

**Etymology.** Named for the late Mr. Wilton Ivie.

**Female.** Total length, 3 mm. Carapace, 1.2 mm long, 1.2 mm wide. Abdomen, 1.8 mm long, 1.4 mm wide.

Cephalothorax and appendages dusky yel-

low; eyes ringed with black and with dusky shadings on entire carapace and clypeus; sternum dusky; abdomen bluish gray.

Anterior median eyes small, one-third diameter of large anterior lateral eyes; posterior median eyes separated by one and one-half diameters.

First leg: femur, 6.8 mm, patella, 0.5 mm, tibia, 6.8 mm, metatarsus, 9.5 mm, tarsus, 1.7 mm; total, 25.3 mm. First femur 5.6 times, first leg 21 times as long as carapace.

Epigynum (fig. 33) with short, rounded or truncated lobe projecting forward and sometimes with pair of bulbous elements (eggs?) extruded in front of genital groove as shown in figure 32.

**Male.** Total length, 2.8 mm. Carapace, 1.4 mm long, 1.4 mm wide. Abdomen, 1.4 mm long, 1 mm wide.

Chelicera (fig. 31) with sharp spur near apex of segment. Eyes of posterior row essentially straight; anterior median eyes smaller than those of female, one-fourth diameter of anterior lateral eyes.

First leg: femur, 8.3 mm, patella, 0.6 mm, tibia, 8.3 mm, metatarsus, 11.5 mm, tarsus, 1.7 mm; total, 30.4 mm. First femur six times, first leg 22 times as long as carapace.

Male palpus (fig. 30) similar to that of *clarus*, with broad lobe at apex of femur and thin tarsal process, ended in small side point.

**Type Data.** Male holotype from Cueva de El Ocote, 3 km N of El Ocote, Hidalgo, Mexico, April 20, 1963 (W. J. Gertsch, W. Ivie).

**Distribution.** Caves of northeastern Mexico.

**Other Records.** *Hidalgo:* Cueva de El Ocote (small roadside cave), 3 km N of El Ocote (24 km NE of Jacala), August 18, 1964 (J. and W. Ivie), two males, two females, immature; August 11, 1966 (J. Fish, J. Reddell), female, immature; July 16, 1969 (S. and J. Peck), male. *San Luis Potosí:* Cueva de Potrerillos, 1½ km W of Ahuacatlán, July 12, 1967 (J. Reddell, J. Fish, P. Russell), four males, six females; November 25, 1967 (J. Fish, T. R. Evans), female. *Querétaro:* Cueva de Tejamanil, Tejamanil, August 9, 1966 (D. McKenzie, J. Reddell), male. Cueva del Judio, 1½ km S of Pinal de Amoles, July 10, 1967 (J. Reddell, J. Fish, P. Russell),

female. Sótano de El Tigre, 25 km SW of Jalpan, July 11, 1967 (J. Fish), female.

#### Genus *Physocyclus* Simon

This genus has many species in Mexico and they are common in caves. For the most part they seem to be little modified by the cave habitat and all are classified as troglophiles. Most are quite large pholcids with globose abdomens and fairly long legs.

The coloration and structure of the species described below are typical of the genus. The base color varies from whitish to yellow and the carapace usually has the grooves dusky and small dusky submarginal spots on each side of the pars thoracica. The legs are pale with dark rings of varying distinctness on the femora and tibiae. The abdomen is usually grayish and may be plain or marked with a pattern of bluish spots on the dorsum. The carapace is of medium height, has the cephalic grooves and linear median groove deeply impressed and the pars cephalica is moderately elevated above the pars thoracica. The eye group occupies about half the width of the carapace at that point. The anterior median eyes are fairly large and the triads are moderately separated. The first eye row is gently procurved; the posterior eye row is moderately recurved; and the median ocular quadrangle is broader than long and narrowed in front with the anterior median eyes much smaller. The clypeus is inclined steeply downward and equals about twice the length of the ocular group. The legs are long and thin, are longer in males, but not excessively long for the family. The males resemble the females closely except for the cheliceral modifications, which present spurs, or horns, on the side of each and have the front face set with a pattern of conical elevations, each bearing a fine hair. The side of each chelicera has a stridulatory apparatus, a band of fine grooves, presumed to be sound producing and activated by a rounded process at the base of the femur in position to rub the grooves. The male palpi are of distinctive form for the genus and present differences in the embolus,

which assumes different shapes in most of the species. The female epigynum consists of a series of sclerotized bands and has in front a pair of processes usually distinctive for each species. Identification in the genus *Physocyclus* is largely a study of the genital structure of each sex, and the following descriptions exclude the common features of all species.

*Physocyclus tanneri* Chamberlin

*Physocyclus tanneri* Chamberlin, 1921, p. 245.

**Records.** *Sonora*: Cueva del Tigre, 22 km E of Carbo, June 22, 1966 (V. Roth), male, two females. Cueva Higuera, 13 km SE of San Miguel de Horcasitas, October 4, 1966 (V. Roth), males, females, immature.

*Physocyclus enaulus* Crosby

*Physocyclus enaulus* Crosby, 1926, p. 1.

**Records.** *Chihuahua*: Cueva de los Muchachos, July 30, 1966 (J. Fish, T. Raines, J. Reddell), male, female, immature. *Coahuila*: Cueva de los Lagos, November 15, 1964 (J. Reddell, B. Martin), male, female. Cueva del León, 48 km NW of Musquíz, December 28, 1967 (J. Reddell, W. Russell, W. Calvert), numerous males, females.

*Physocyclus hoogstraali* Gertsch and Davis  
Figures 64–65

*Physocyclus hoogstraali* Gertsch and Davis, 1942, p. 7, fig. 45.

**Records.** *Nuevo León*: Grutas de García, September 19, 1942 (C. Bolívar), male.

Grutas de San Bartolo, 16 km S of Santa Catarina, February, 1966 (W. Russell, D. McKenzie), immature. Cueva de la Herradura, 8 km E of Hermanas, July 18, 1965 (J. Fish, T. Raines, J. Reddell), male, female, immature. Cueva de las Animas, 56 km E of Monclova, February 21, 1966 (J. Reddell, W. Bell), two males, immature. Cueva del Diablo (Bat Cave), Sabinas Hidalgo, June 14, 1940 (Hoogstraal), female holotype, two females (Gertsch, 1942).

*Physocyclus globosus* (Taczanowski)

*Pholcus globosus* Taczanowski, 1873, p. 105. *Physocyclus globosus*: F.P.-Cambridge, 1902, p. 368. Chamberlin and Ivie, 1938, p. 130.

**Record.** *Yucatán*. San Bulha Cave, Merida, July 13 (Chamberlin and Ivie, 1938), two lots from stones and debris on floor and walls.

*Physocyclus reddelli*, new species

FIGURES 34-38

**Diagnosis.** Typical species with shorter cheliceral spurs on male than those of *hoogstraali* and distinctive epigynum (fig. 37) and male palpus (fig. 36).

**Etymology.** Named for Mr. James Reddell.

**Female.** Total length, 5.3 mm. Carapace, 2.2 mm long, 2 mm wide. Abdomen, 3.7 mm long, 3.3 mm wide.

Carapace and appendages mostly dull yellow; pars cephalica, depressed grooves and middle of clypeus dusky brown; pars thoracica with three small dusky submarginal spots on each side; sternum, labium and endites with dusky pattern; legs pale yellow, with faint dusky rings at apices of femora and

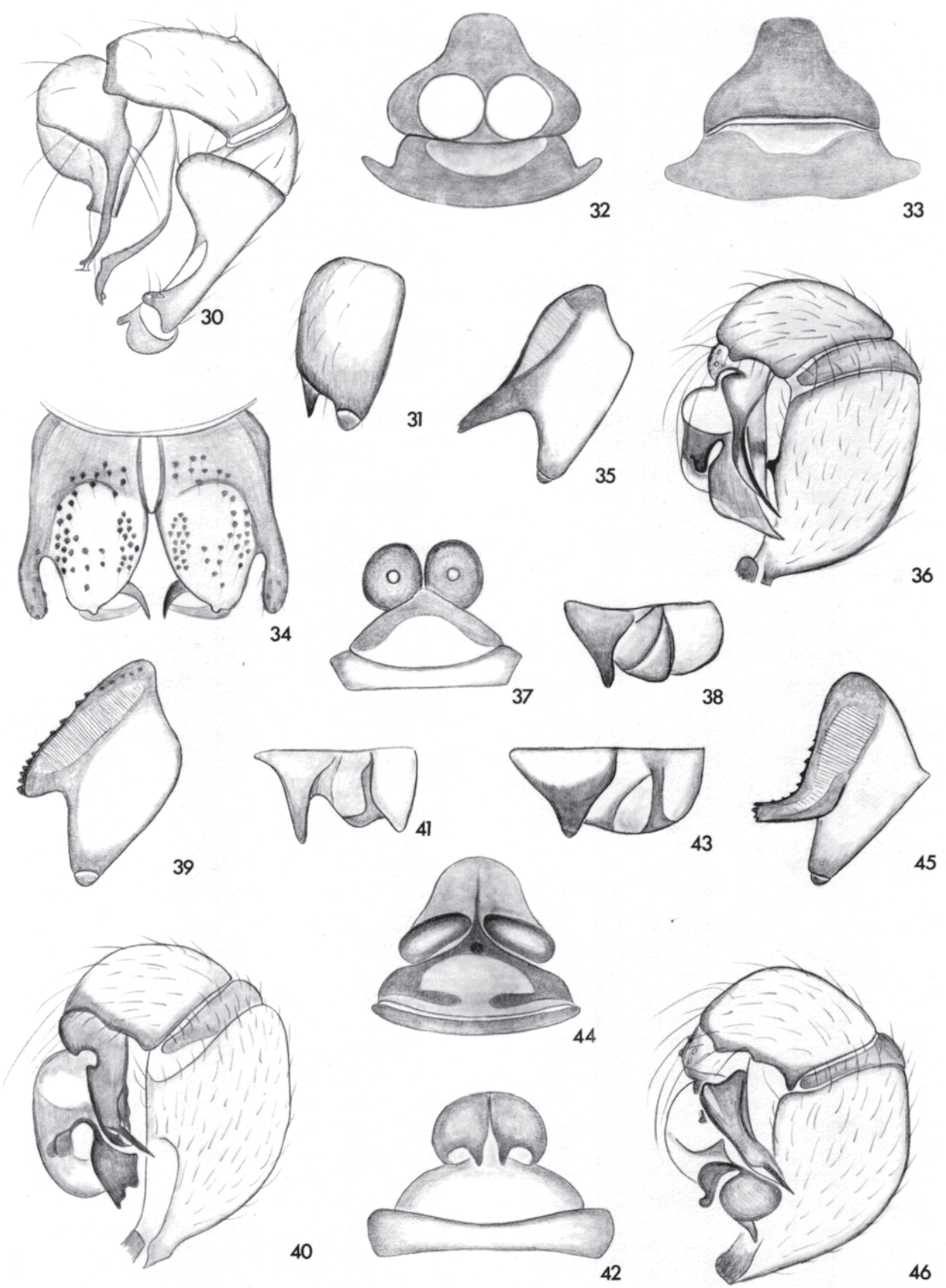
Figs. 30-33. *Coryssocnemis iviei*, new species. 30. Left male palpus, retrolateral view. 31. Left male chelicera, retrolateral view. 32. Epigynum, ventral view, with extruded eggs? 33. Epigynum, ventral view.

Figs. 34-38. *Physocyclus reddelli*, new species. 34. Male chelicerae, frontal view. 35. Left male chelicera, retrolateral view. 36. Left male palpus, retrolateral view. 37. Epigynum, ventral view. 38. Epigynum, retrolateral view.

Figs. 39-42. *Physocyclus merus*, new species. 39. Left male chelicera, retrolateral view. 40. Left male palpus, retrolateral view. 41. Epigynum, retrolateral view. 42. Epigynum, ventral view.

Figs. 43-46. *Physocyclus pedregosus*, new species. 43. Epigynum, retrolateral view. 44. Epigynum, ventral view. 45. Left male chelicera, retrolateral view. 46. Left male palpus, retrolateral view.







at bases and apices of tibiae; abdomen gray, with pattern of bluish spots on middle of dorsum and dusky patch below at base.

First leg: femur, 9 mm, patella, 0.75 mm, tibia, 9.5 mm, metatarsus, 14 mm, tarsus, 2.2 mm; total, 35.45 mm. First femur four times, first leg 16 times as long as carapace.

Epigynum as shown in ventral and lateral views (figs. 37-38).

**Male.** Total length, 4.7 mm. Carapace, 2.5 mm long, 2.2 mm wide. Abdomen, 2.5 mm long, 2.2 mm wide.

Chelicerae of male in frontal and lateral views (figs. 34-35).

First leg: femur, 10.7 mm, patella, 0.8 mm, tibia, 11 mm, metatarsus, 16 mm, tarsus, 2.2 mm; total, 50.7 mm. First femur four times, first leg 25 times as long as carapace.

Male palpus (fig. 36) with embolus a flat pointed blade.

**Type Data.** Male holotype, female and immature specimens from Grutas de Xoxafi, 5 km N of Lagunillas, Hidalgo, México, August 19, 1965 (J. Reddell, J. Fish, W. Bell).

**Distribution.** Caves of eastern Mexico.

**Other Records.** *Querétaro:* Sótano de Dos Arañas Grandes, 1½ km E of Río Blanco, July 9, 1967 (J. Reddell, J. Fish), male, female, immature. *San Luis Potosí:* Cueva Segunda, El Guayalote, July 17, 1967 (J. Reddell, W. Russell, J. Fish), female.

#### **Physocyclus merus, new species**

FIGURES 39-42

**Diagnosis.** Typical, well marked species with rounded cheliceral spur of male near middle of segment, related to *enaulus* but readily recognized by epigynum (fig. 42) with sharp, brown horns and male palpus (fig. 40) with distinctive embolus.

**Etymology.** Specific name from Latin *merus*, pure, unmixed.

**Female.** Total length, 5.3 mm. Carapace, 2 mm long, 2 mm wide. Abdomen, 3.3 mm long, 2.5 mm wide.

Epigynum (figs. 41-42) as shown in ventral and lateral views.

**Male.** Total length, 5.7 mm. Carapace,

2.7 mm long, 2.7 mm wide. Abdomen, 3.2 mm long, 2.8 mm wide.

Chelicera of male (fig. 39) with rounded, toothed spur placed near middle of segment.

Male palpus (fig. 40) with embolus of distinctive shape.

**Type Data.** Male holotype and male and two females from Sumidero de Matehuala, 5 km E of Matehuala, San Luis Potosí, México, August 3, 1966 (D. McKenzie, J. Reddell).

**Distribution.** Known only from above specimens.

#### **Physocyclus pedregosus, new species**

FIGURES 43-46

**Diagnosis.** Typical species with shorter cheliceral spurs on male than those of *hoogstraali*, distinctive epigynum (fig. 44) and male palpus (fig. 46).

**Etymology.** Specific name from Spanish *pedregosus*, stony.

**Female.** Total length, 6.7 mm. Carapace, 2.7 mm long, 2.8 mm wide. Abdomen, 4.5 mm long, 3.8 mm wide.

Base color of carapace pale yellow, without distinctive darker pattern; legs yellowish to light brown, with usual dusky rings scarcely apparent; abdomen gray.

Epigynum (fig. 44) as shown in ventral and lateral views.

**Male.** Total length, 5.8 mm. Carapace, 2.7 mm long, 2.7 mm wide. Abdomen, 3.3 mm long, 2.8 mm wide.

Chelicera of male (fig. 45) curved upward as seen in lateral view.

Male palpus (fig. 46) with embolus a rounded sclerite and thin apical spur.

**Type Data.** Male holotype and five females from Pedregoso Circle Cave, 32 km SE of Cuatro Ciénegas, Coahuila, México, December 30, 1967 (J. Reddell, W. Russell).

#### **Physocyclus bicornis, new species**

FIGURES 66-69

**Diagnosis.** Small, well marked species with

two spurs on each chelicera of male (fig. 66), distinctive epigynum (fig. 68) and male palpus (fig. 67) as shown.

**Etymology.** Specific name from Latin *bis*, twice, *cornu*, horn, two horned.

**Female.** Total length, 4.4 mm. Carapace, 1.4 mm long, 1.4 mm wide. Abdomen, 3 mm long, 2.5 mm wide.

Base color of cephalothorax and appendages dull orange, with typical dusky pattern distinct; abdomen gray, with faint dusky spots and epigynal ridges dark brown.

Epigynum (fig. 68) with small sharp horns in front.

**Male.** Total length, 3.8 mm. Carapace, 1.5 mm long, 1.5 mm wide. Abdomen, 3.2 mm long, 2.5 mm wide.

Chelicera (fig. 66) with prominent, apically pointed apophysis at middle and below it small, sharp secondary spur; frontal face without conical elevations.

Male palpus (fig. 67) with broad embolus as shown.

**Type Data.** Male holotype, four females and immature from Grutas de Juxtlahuaca, 6½ km N of Colotlipa, Guerrero, January 16, 1941 (C. Bolívar, F. Bonet).

**Distribution.** Known only from above cave.

**Other Record.** *Guerrero:* Grutas de Juxtlahuaca, August 15, 1966 (J. Fish, J. Reddell), two males, female, immature.

#### ***Physocyclus modestus*, new species**

FIGURES 47-49

**Diagnosis.** Strongly marked, near relative of *bicornis* with single small subapical spur on male chelicera; epigynum (fig. 49) with small apical horns and male palpus with quadrate embolus of distinct form.

**Etymology.** Specific name from Latin *modestus*, moderate.

**Female.** Total length, 3.2 mm. Carapace, 1.3 mm long, 1.3 mm wide. Abdomen, 1.8 mm long, 1.5 mm wide.

Base color of carapace and appendages orange, with typical dusky pattern well marked; abdomen gray, with pattern of blue spots covering most of dorsum and sides.

Epigynum as shown in figure 49.

**Male.** Total length, 3.4 mm. Carapace, 1.6 mm long, 1.6 mm wide. Abdomen, 1.8 mm long, 1.5 mm wide.

Chelicera (fig. 48) with prominent, dark brown apophysis on side margin drawn apically to small spur and lacking conical elevations on front.

Male palpus (fig. 47) with quadrate embolus of distinctive form.

**Type Data.** Male holotype, female and immature from Grutas de Cacahuamilpa, Guerrero, México, September 2, 1966 (J. and W. Ivie).

**Distribution.** Caves and outside stations in Guerrero.

**Other Record.** *Guerrero:* Grutas de Cacahuamilpa, March 4, 1963 (W. J. Gertsch, W. Ivie), penultimate male in entrance zone; 11 km S of Chilpancingo, July 29, 1956 (W. J. Gertsch, V. Roth), males and females.

#### ***Physocyclus validus*, new species**

FIGURES 50-52

**Diagnosis.** Near relative of *bicornis* with single, prominent median spur on male chelicera (fig. 54), epigynum (fig. 52) without horns in front and male palpus (fig. 51) with long, curved embolus.

**Etymology.** Specific name from Latin *validus*, strong.

**Female.** Total length, 4.5 mm. Carapace, 1.7 mm long, 1.7 mm wide. Abdomen, 3.2 mm long, 2.5 mm wide.

Epigynum (fig. 52) with brown band in front of genital groove and central impressed spot but lacking horns.

**Male.** Total length, 3.7 mm. Carapace, 1.7 mm long, 1.7 mm wide. Abdomen, 2.2 mm long, 1.5 mm wide.

Chelicera (fig. 50) with prominent, toothed horn at center of segment but without accessory horn below.

Male palpus (fig. 51) with unusually thin tarsal process and long, curved embolus.

**Type Data.** Male holotype, males, females and immature from Cueva de la Finca, Coquimatlán, Colima, México, January 20, 1943

(F. Bonet).

**Distribution.** Caves and outside situations from Colima to Puebla.

**Other Records.** *Colima*: 14½ km S of Colima, July 29, 1964 (W. J. Gertsch, J. Woods), males, females. *Guerrero*: 19 km S of Iguala, July 29, 1956 (V. Roth, W. J. Gertsch), males, females. *Puebla*: Matamoros de Izúcar, September 1, 1966 (J. and W. Ivie), male.

**Physocyclus lautus**, new species

FIGURE 61

**Diagnosis.** Small relative of *bicornis* with distinctive epigynum (fig. 61).

**Etymology.** Specific name from Latin *lautus*, elegant.

**Female.** Total length, 2.85 mm. Carapace, 1.35 mm long, 1.2 mm wide. Abdomen, 1.5 mm long, 1.25 mm wide.

Cephalothorax and appendages dull yellow, with typical dusky pattern well marked; abdomen gray, with many small dusky spots.

Epigynum (fig. 61) with inconspicuous, barely discernible horns in front and behind on genital margin a pair of rounded projections.

**Type Data.** Female holotype from Cueva de la Finca, Coquimatlán, Colima, January 20, 1943 (F. Bonet).

**Distribution.** Known only from above specimen.

Genus *Modisimus* Simon

This distinctive American genus is usually

easily recognized by the prominently elevated eye turret. The anterior median eyes are minute in most species and obsolete in many. The curvature of the posterior eye row is variable, rarely recurved, and most often with a degree of procurvature. The epigyna of the females are rounded, truncated, transverse plaques that present few characters except vague color patterns. The chelicerae of the males bear short spinules that sometimes are grouped in distinctive fashion. The male palpi are all of similar design but present differences in the size and position of the femoral spurs and differences in the tarsal processes.

**Modisimus boneti**, new species

FIGURES 74-76

**Diagnosis.** Typical species of genus with elevated ocular turret, readily separated by following characters: anterior median eyes minute, placed between upper edges of large lateral eyes; epigynum (fig. 74) drawn to weak point behind; chelicera of male with thin spinules scattered over front face; male palpus as shown in figure 76.

**Etymology.** Named for Dr. Federico Bonet of the Instituto Politécnico in Mexico City.

**Female.** Total length, 3.7 mm. Carapace, 1.3 mm long, 1.2 mm wide. Abdomen, 2.6 mm long, 2 mm wide.

Cephalothorax dull yellow, with dusky clypeus, blackish cervical and cephalic grooves; eye turret dusky brown and eye tubercles ringed with black; sternum and coxae dusky brown; labium and endites blackish; legs brown, with pale rings at ends of

Figs. 47-49. *Physocyclus modestus*, new species. 47. Left male palpus, retrolateral view. 48. Left male chelicera, retrolateral view. 49. Epigynum, ventral view.

Figs. 50-52. *Physocyclus validus*, new species. 50. Left male chelicera, retrolateral view. 51. Left male palpus, retrolateral view. 52. Epigynum, ventral view.

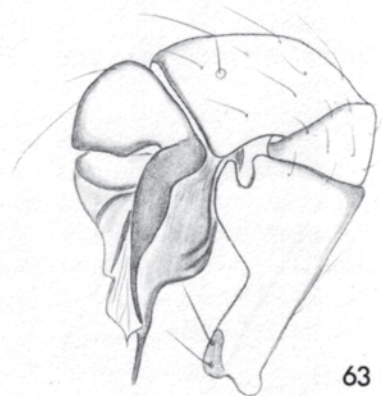
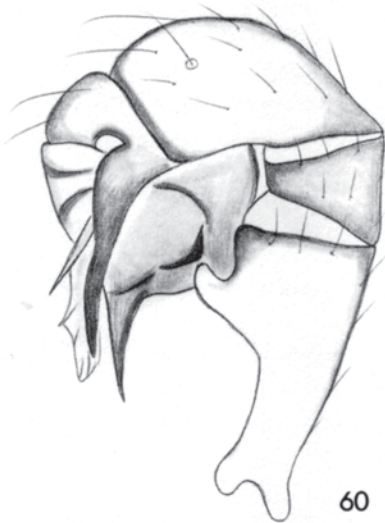
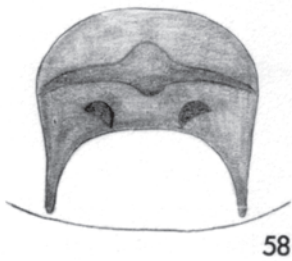
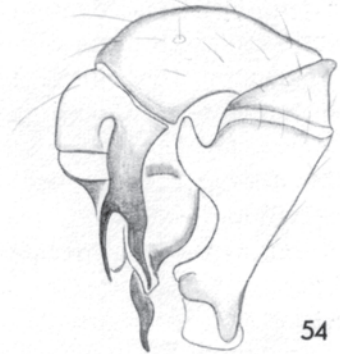
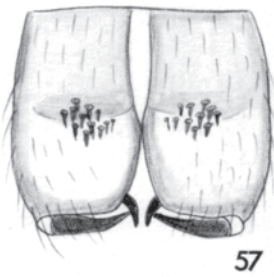
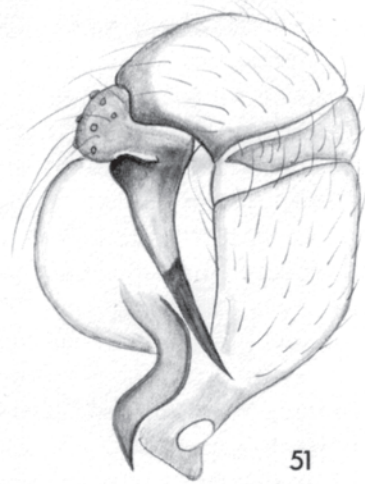
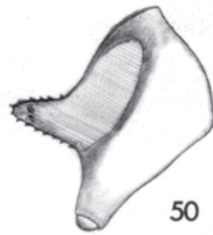
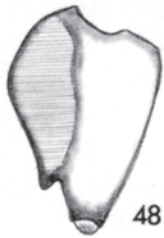
Figs. 53-55. *Modisimus reddelli*, new species. 53. Epigynum, ventral view. 54. Left male palpus, retrolateral view. 55. Male chelicerae, frontal view.

Fig. 56. *Modisimus pusillus*, new species. Epigynum, ventral view.

Figs. 57-60. *Modisimus mitchelli*, new species. 57. Male chelicerae, frontal view. 58. Epigynum, ventral view. 59. Left male chelicera, retrolateral view. 60. Left male palpus, retrolateral view.

Fig. 61. *Physocyclus lautus*, new species. Epigynum, ventral view.

Figs. 62-63. *Modisimus mckenziei*, new species. 62. Epigynum, ventral view. 63. Left male palpus, retrolateral view.





femora and tibiae. Abdomen pale green, reticulated in gray, with pale median longitudinal narrow stripe and lateral stripe.

Carapace subtriangular; clypeus wide, produced forward and rounded at apex; cephalic sutures deep and cervical groove a deep linear depression running back nearly to posterior margin. Eye turret prominent, as high as rest of carapace; front eye row procurved, with lateral eyes separated by radius and tiny middle eyes present above upper edges of lateral eyes; posterior eye row moderately procurved, with median eyes separated by diameter. Clypeus very high, 0.7 mm, equal to about six diameters of anterior lateral eye.

First leg: femur, 8.5 mm, patella, 0.6 mm, tibia, 9 mm, metatarsus, 13.8 mm, tarsus, 1.7 mm; total, 33.6 mm. First femur 6.5 times, first leg 25 times as long as carapace.

Epigynum (fig. 74) a broad, transverse plate drawn to small point behind.

**Male.** Total length, 3.1 mm. Carapace, 1.3 mm long, 1.3 mm wide. Abdomen, 2 mm long, 1.6 mm wide.

Structure like that of female. Front face of chelicera covered thickly with short, fine spinules.

First leg: femur, 9.5 mm, patella, 0.65 mm, tibia, 0.5 mm, metatarsus, 14.7 mm, tarsus, 1.7 mm; total, 36.05 mm. First femur seven times, first leg 28 times as long as carapace.

Male palpus (fig. 76) typical of genus, with principal distinctions in the tarsal process.

**Type Data.** Male holotype from Cueva Chica, 2½ km NE of El Pujal, San Luis Potosí, México, June 5, 1967 (R. Mitchell).

**Distribution.** Caves of San Luis Potosí and Tamaulipas.

**Other Records.** *San Luis Potosí:* Cueva

Chica, El Pujal, April 4, 1942 (C. Bolívar, F. Bonet), males, females, immature; March 12, 1940 (W. Bridges), males, females; March 20, 1940 (Bishop), female from deepest point in cave; March 26, 1964 (T. Raines, D. McKenzie, B. Bell), female; May 23, 1971 (W. Elliott), female; June 5, 1967 (R. Mitchell), male, four females; July 22, 1969 (S. and J. Peck), two males, immature. *Tamaulipas:* Cueva de la Florida, 7½ km NE of Antiguo Morelos, May 28, 1968 (J. Reddell), male and female from main passage and bat domes; March 10, 1969 (J. Reddell, S. Fowler, B. Cook), immature.

### **Modisimus rainesi**, new species

FIGURES 70-72

**Diagnosis.** Slightly smaller, near relative of *boneti* with lower ocular turret and shorter legs, easily recognized by following features: Epigynum (fig. 72) with posterior margin straight; chelicera of male with small comb of setae on frontal face; male palpus as shown in figures 70-71.

**Etymology.** Named for Mr. T. Raines.

**Female.** Total length, 2.7 mm. Carapace, 1.1 mm long, 1.2 mm wide. Abdomen, 1.8 mm long, 1.6 mm wide.

Coloration and structure like those of *boneti*. Abdomen quite uniform green. Ocular turret of medium height; anterior lateral eyes separated by full diameter; anterior median eyes present or obsolete; posterior eye row essentially straight, with median eyes separated by diameter; clypeus of medium height, 0.55 mm, equal to about five diameters of anterior lateral eye.

Figs. 64-65. *Physocyclus hoogstraali* Gertsch and Davis. 64. Left male palpus, retrolateral view. 65. Left male chelicera, retrolateral view.

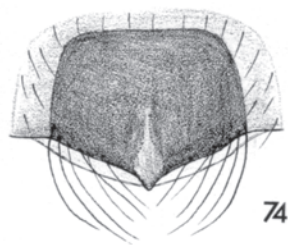
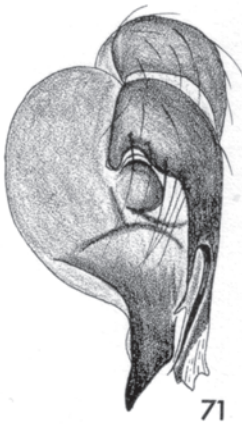
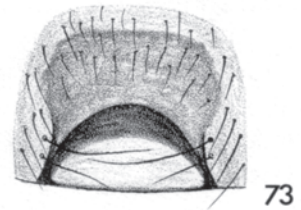
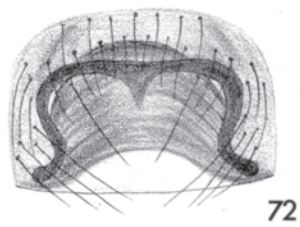
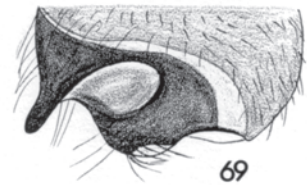
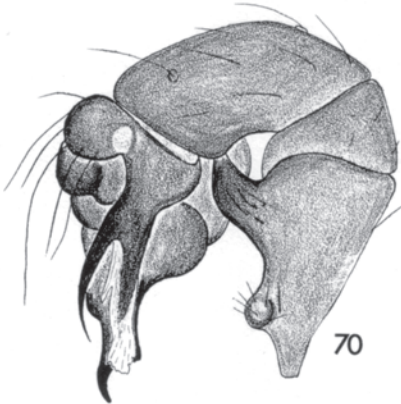
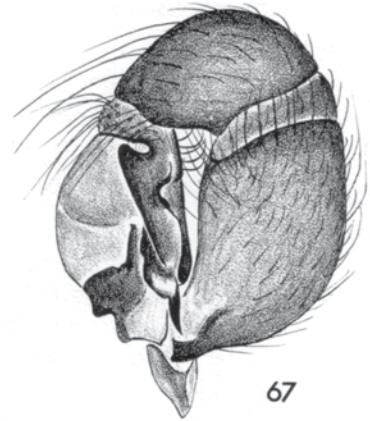
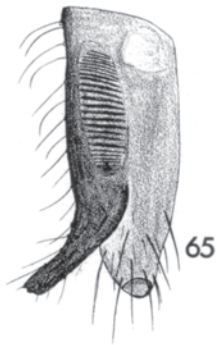
Figs. 66-69. *Physocyclus bicornis*, new species. 66. Left male chelicera, retrolateral view. 67. Left male palpus, retrolateral view. 68. Epigynum, ventral view. 69. Epigynum, retrolateral view.

Figs. 70-72. *Modisimus rainesi*, new species. 70. Left male palpus, retrolateral view. 71. Left male palpus, frontal view. 72. Epigynum, ventral view.

Fig. 73. *Modisimus pusillus*, new species, Epigynum, ventral view.

Figs. 74-76. *Modisimus boneti*, new species. 74. Epigynum, ventral view. 75. Bulb of left male palpus, frontal view. 76. Left male palpus, retrolateral view.





First leg: femur, 6.5 mm, patella, 0.5 mm, tibia, 6.8 mm, metatarsus, 9.2 mm, tarsus, 1.7 mm; total, 24.7 mm. First femur six times, first leg 22 times as long as carapace.

Epigynum (fig. 72) with posterior edge straight and with sclerotized pattern as shown.

**Male.** Total length, 2.7 mm. Carapace, 1.1 mm long, 1.2 mm wide. Abdomen, 1.8 mm long, 1.5 mm wide.

Chelicera with thin scattered spinules on frontal face but with series of four or five forming small but conspicuous black comb at middle. Ocular turret of medium height; clypeus, 0.62 mm high, equal to about six diameters of an anterior lateral eye; posterior eye row gently recurved.

First leg: femur, 8.5 mm, patella, 0.6 mm, tibia, 8.5 mm, metatarsus, 11.5 mm, tarsus, 1.8 mm; total, 30.9 mm. First femur about eight times, first leg 28 times as long as carapace.

Male palpus (fig. 70) differing from that of *boneti* as shown.

**Type Data.** Male holotype from Cueva de la Boca, 5 km NE of Santiago, Nuevo León, México, January 27, 1967 (T. Raines).

**Distribution.** Known only from Cueva de la Boca.

**Other Records.** *Nuevo León:* Cueva de la Boca, July 13, 1942 (C. Bolívar, Maldonado, B. Osorio, D. Peláez), five males, female; May 1, 1966 (J. Fish, E. Alexander), male, two females, immature; December 4, 1969 (T. Raines), two males, two females; June 17, 1944 (F. Bonet), three females; June 20, 1969 (S. and J. Peck), male, female.

**Modisimus reddelli**, new species

FIGURES 53-55

**Diagnosis.** Pallid species related to *boneti*, readily separated by following features: ocular turret of medium height; anterior median eyes obsolete; epigynum (fig. 53) as shown; chelicera of male (fig. 55) with small comb of few spinules at middle of frontal face.

**Etymology.** Named for Mr. James Reddell.

**Female.** Total length, 2 mm. Carapace,

1.1 mm long, 1.15 mm wide. Abdomen, 1.7 mm long, 1.5 mm wide.

Cephalothorax and appendages uniform yellowish brown; eye tubercles black; abdomen whitish.

Structure similar to that of *boneti*. Eye turret of medium height; anterior lateral eyes separated by radius; anterior median eyes obsolete, represented by single pale vestige; posterior eye row moderately procurved with median eyes separated by diameter. Clypeus high, 0.58 mm, equal to about five diameters of anterior lateral eye.

First leg: femur, 7 mm, patella, 0.5 mm, tibia, 7.3 mm, metatarsus, 10.8 mm, tarsus, 1.7 mm; total, 27.3 mm. First femur about six times, first leg 25 times as long as carapace.

Epigynum as shown in figure 53.

**Male.** Total length, 2.7 mm. Carapace, 1.1 mm long, 1.15 mm wide. Abdomen, 1.7 mm long, 1.5 mm wide.

Front face of chelicera (fig. 55) with small, rounded process at middle set with three black spinules.

First leg: femur, 7.3 mm, patella, 0.5 mm, tibia, 7.7 mm, metatarsus, 11.5 mm, tarsus, 1.7 mm; total, 28.7 mm. First femur 6.7 times, first leg 26 times as long as carapace.

Male palpus (fig. 54) with thick femoral spur near base and bifid tarsal process.

**Type Data.** Male holotype and female from Cueva Bonita, 30 km SW of Victoria, Tamaulipas, México, June 19, 1967 (J. Fish).

**Distribution.** Known only from above material.

**Modisimus mitchelli**, new species

FIGURES 57-60

**Diagnosis.** Near relative of *boneti* with prominently elevated ocular turret, readily separated by following features: epigynum (fig. 58) truncated behind; chelicera of male (fig. 57) with rounded enlargement at middle of frontal face armed with patch of black spinules; male palpus (fig. 60) with distinctive femoral spur.

**Etymology.** Named for Professor Robert

W. Mitchell of Texas Tech University.

**Female.** Total length, 2.75 mm. Carapace, 1.15 mm long, 1.2 mm wide. Abdomen, 1.7 mm long, 1.5 mm wide.

Coloration and structure similar to those of *boneti*. Abdomen bright green, reticulated with gray. Ocular turret prominent; anterior lateral eyes close together, separated by less than radius; anterior median eyes present or obsolete, represented by pair of or single black points; posterior eye row moderately procurved, with median eyes separated by about their diameter; clypeus high, 0.7 mm, equal to about seven diameters of anterior lateral eye.

First leg: femur, 6.3 mm, patella, 0.5 mm, tibia, 6.7 mm, metatarsus, 9.7 mm, tarsus, 2.1 mm; total, 25.3 mm. First femur 5.5 times, first leg 22 times as long as carapace.

Epigynum (fig. 58) a sclerotized plaque with dusky pattern.

**Male.** Total length, 2.8 mm. Carapace, 1.2 mm long, 1.2 mm wide. Abdomen, 1.7 mm long, 1.3 mm wide.

Chelicera (figs. 57, 59) with rounded enlargement at middle of front face bearing cluster of about 15 black spinules. Eye triads more widely separated; anterior lateral eyes separated by two-thirds their diameter; posterior median eyes separated by one and one-half diameters.

First leg: femur, 8.5 mm, patella, 0.6 mm, tibia, 8.7 mm, metatarsus, 14 mm, tarsus, 2.5 mm; total, 34.3 mm. First femur seven times, first leg 28 times as long as carapace.

Male palpus (fig. 60) of typical design, with distinctive features on tarsal process.

**Type Data.** Male holotype from Cueva de la Capilla, 13½ km NW of Gómez Farías, El Porvenir, Tamaulipas, January 13, 1971 (J. Reddell, R. Mitchell, and group).

**Distribution.** Caves of Tamaulipas.

**Other Records.** *Tamaulipas:* Cueva de la Capilla, El Porvenir, January 13, 1971 (J. Reddell, R. Mitchell, and group), three males, four females, immature; January 28, 1968 (J. Reddell, R. Mitchell, F. Rose, J. George), male, two females. Cueva de la Miná, 7 km NW of Gómez Farías, June 3, 1967 (R. Mitchell), female; March 24, 1967

(R. Mitchell), two males; June 3, 1967 (R. Mitchell), male, two females; July 1, 1969 (S. Peck, R. Norton), female, immature; March 9, 1969 (J. Reddell), female; January 27, 1968 (J. Reddell, R. Mitchell, F. Rose, J. George), female, immature. Harrison Sinkhole, Rancho del Cielo, March 25, 1967 (R. Mitchell), male, female, immature; January 12, 1971 (J. Cooke, M. Brownfield, W. Elliott), male, three females, immature. Crystal Cave, Rancho del Cielo, January 10, 1971 (J. Reddell, J. Cooke, S. Wylie, V. Tipton), female, immature. Cueva del Infiernillo, San José, June 4, 1967 (R. Mitchell), three females, immature. Cueva Chica de la Perra, 7,000 feet, 13½ km NW of Gómez Farías, July 2, 1969 (S. Peck, R. Norton), male immature. Sótano de la Joya de Salas, 21 km NW of Gómez Farías, January 23, 1965 (D. McKenzie), four males, female; November 25, 1966 (O. Knox, E. Alexander), two males, two females. Cueva de Rancho del Cielo #3, Rancho del Cielo, July 4, 1967 (S. and J. Peck), male, immature. Sótano de El Porvenir, El Porvenir, January 13, 1971 (W. Elliott, J. Cooke), two males, two females. Sótano de El Refugio, 20 km SW of Gómez Farías, July 14, 1967 (J. Fish), male, two females, immature.

#### ***Modisimus mckenziei*, new species**

FIGURES 62-63

**Diagnosis.** Small, dusky species related to *boneti*, separated by following features: eye turret of medium height and anterior median eyes obsolete; epigynum (fig. 62) of distinctive form; male palpus as shown in figure 63.

**Etymology.** Named for Mr. David McKenzie.

**Female.** Total length, 2.3 mm. Carapace, 0.8 mm long, 0.84 mm wide. Abdomen, 1.6 mm long, 1.1 mm wide.

Cephalothorax and appendages dusky brown; eye tubercles black; abdomen gray, marked thickly with dusky spots.

Eye turret of medium height; anterior lateral eyes separated by about third of their diameters; anterior median eyes obsolete; posterior eye row moderately procurved, with



median eyes separated by nearly their diameter; clypeus, 0.6 mm, about as high as six diameters of anterior lateral eye.

First leg: femur, 4.2 mm, patella, 0.3 mm, tibia, 4.3 mm, metatarsus, 6.4 mm, tarsus, 1.4 mm; total, 16.6 mm. First femur five times, first leg 20 times as long as carapace.

Epigynum (fig. 62) subtriangular in form.

**Male.** Total length, 1.6 mm. Carapace, 0.75 mm long, 0.75 mm wide. Abdomen, 0.9 mm long, 0.6 mm wide.

Chelicera with small patch of black spinules just above middle of frontal face, longer than those of *mitchelli* and nearer inner margin. Abdomen greenish.

First leg: femur, 4.3 mm, patella, 0.3 mm, tibia, 4.6 mm, metatarsus, 6.4 mm, tarsus, 1.3 mm; total, 16.9 mm. First femur about six times, first leg 22 times as long as carapace.

Male palpus (fig. 63) with heavy femoral spur and distinctive tarsal process.

**Type Data.** Male holotype and female from Sótano del León, Gómez Farías, Tamaulipas, México, May 20, 1971 (W. Elliott).

#### **Modisimus pusillus**, new species

FIGURE 56

**Diagnosis.** Small, pale species related to *boneti*, readily recognized by following features: eyes close together, with anterior lateral eyes separated by their radius; epigynum (fig. 56) constricted on sides.

**Etymology.** Specific name from Latin *pusillus*, tiny, puny.

**Female.** Total length, 1.8 mm. Carapace, 0.65 mm long, 0.73 mm wide. Abdomen, 1.3 mm long, 1.1 mm wide.

Cephalothorax and appendages dull orange; carapace with faint radiating dusky streaks and eyes ringed with black; abdomen whitish.

Eye turret of medium height; anterior lateral eyes separated by radius and anterior median eyes vestigial, represented by trivial black specks; posterior eye row faintly procurved, with median eyes separated by their diameter; clypeus of medium height, 0.4 mm, equal to about five diameters of an anterior

lateral eye.

First leg: femur, 3.5 mm, patella, 0.3 mm, tibia, 3.7 mm, metatarsus, 5 mm, tarsus, 1.4 mm; total, 13.9 mm. First femur 5.2 times, first leg 21 times as long as carapace.

Epigynum as shown in figure 56.

**Type Data.** Female holotype from Grutas de García, Nuevo León, México, June 14, 1942 (F. Bonet, B. Osorio, D. Pelaez).

**Distribution.** Known only from above specimen.

#### Genus *Psilochorus* Simon

This is the largest pholcid genus of North America and comprises many mostly small, eight-eyed, long-legged spiders that always have the anterior median eyes present. In cave adapted species all the eyes are reduced in size.

The typical structural features for the species described below are the following: The carapace is subround, convex, with the clypeus prominent and rounded at apex. The cervical groove is a deep linear depression and the cephalic grooves are prominent. The eight eyes are in a close-set group on an elevation of medium size and consist of two triads of large eyes and the pair of small anterior median eyes. The front eye row is slightly procurved or essentially straight and the posterior row is moderately recurved or straight. The epigyna of the females are often of distinctive form but some species present trivial sclerotized bands in front and behind the genital orifice offering little for separating the species. In *diablo* and *tellezi* the sternum is produced behind to a pointed spur possibly associated with the mating process. Identification of males is made easy by presence of distinctive spurs on the chelicerae and by details of the male palpus.

#### *Psilochorus cordatus* (Bilimek)

*Pholcus cordatus* Bilimek, 1867, p. 907.

*Pholcus cacahuamilpensis* Herrera, 1892, p. 41.

**Discussion.** The species described as *cordatus* by Bilimek is of quite uncertain position but the name is tentatively assigned to a *Psilochorus* known from Grutas de Cacahuamilpa.

**Records.** *Guerrero:* Grutas de Cacahuamilpa, September 2, 1966 (J. and W. Ivie), two males, 10 females; October 24, 1942 (C. Bolívar, D. Peláez), male; August 24, 1965 (J. Reddell, J. Fish, W. Bell), immature.

***Psilochorus diablo*, new species**

FIGURES 77-81

**Diagnosis.** Small, pale species, with eyes reduced in size, possible troglobite, with following features: sternum of female (fig. 79) with prominent process projecting downward from between posterior coxae; male chelicera (fig. 78) with sharp spur near apex; male palpus (fig. 77) with tarsal process of distinctive form.

**Etymology.** Specific name from Spanish *diablo*, devil, named for Cueva del Diablo.

**Female.** Total length, 2 mm. Carapace, 0.8 mm long, 0.8 mm wide. Abdomen, 1.2 mm long, 1.2 mm wide.

Cephalothorax and appendages pale yellow; eyes narrowly ringed with black; abdomen whitish.

Front eye row moderately recurved, with lower edges of four eyes touching; anterior median eyes small, about one-third diameter of anterior lateral eye; posterior eye row gently recurved; posterior median eyes separated by long diameter. Sternum (fig. 79) with prominent, downwardly projecting process set at apex with stiff hairs, placed between posterior coxae, somewhat variable in length among the specimens.

First leg: femur, 3 mm, patella, 0.3 mm, tibia, 2.7 mm, metatarsus, 3.2 mm, tarsus, 0.7 mm; total, 9.9 mm. First femur 3.7 times, first leg 12 times as long as carapace.

Epigynum (fig. 80) a broad, downwardly projecting process.

**Male.** Total length, 1.6 mm. Carapace, 0.7 mm long, 0.7 mm wide. Abdomen, 0.9 mm long, 0.75 mm wide.

Posterior eye row essentially straight. Cheli-

cera (fig. 78) with small, sharp spur near apex of segment. Sternum without projection.

First leg: femur, 4 mm, patella, 0.3 mm, tibia, 4.2 mm, metatarsus, 4.6 mm, tarsus, 0.9 mm; total, 14 mm. First femur about six times, first leg 20 times as long as carapace.

Male palpus (fig. 77) with slender femoral spur and distinctive bulbal features.

**Type Data.** Male holotype from Cueva del Diablo, 1 km W of Salaires, 35 km N of Parral, Chihuahua, México, July 17, 1956 (V. Roth, W. J. Gertsch).

**Distribution.** Known only from Cueva del Diablo.

**Other Records.** *Chihuahua:* Cueva del Diablo, July 23, 1947 (W. J. Gertsch), male, two females from mouth of cave, two females from total darkness inside entrance; July 17, 1956 (V. Roth, W. J. Gertsch), male, two females, immature; September 21, 1965 (J. Reddell, J. Fish), male, three females.

***Psilochorus fishi*, new species**

FIGURES 84-86

**Diagnosis.** Small, pale species similar to *russelli* but distinguished as follows: legs shorter, with first femur only 3.7 times as long as carapace; epigynum (fig. 86) distinctly trilobed behind; chelicera of male (fig. 85) with sharp spur above middle of front face.

**Etymology.** Named for Mr. John Fish.

**Female.** Total length, 2 mm. Carapace, 0.85 mm long, 0.9 mm wide. Abdomen, 1.2 mm long, 1 mm wide.

Cephalothorax and appendage pale orange; eyes ringed with black and grooves on carapace and face of clypeus dusky; abdomen dull white.

Anterior median eyes small, one-third diameter of large anterior lateral eyes; posterior median eyes separated by nearly one and one-half diameters.

First leg: femur, 3.2 mm, patella, 0.35 mm, tibia, 3.3 mm, metatarsus, 3.7 mm, tarsus, 1.1 mm; total, 11.65 mm. First femur 3.7 times, first leg 13.7 times as long as carapace.

Epigynum (fig. 86) a transverse, sclerotized band with three weak lobes at genital groove.



**Male.** Total length, 1.8 mm. Carapace, 0.8 mm long, 0.8 mm wide. Abdomen, 1.1 mm long, 0.9 mm wide.

Chelicera (fig. 85) with sharp spur projecting out of face just above middle.

First leg: femur, 3 mm, patella, 0.35 mm, tibia, 2.7 mm, metatarsus, 3.1 mm, tarsus, 1 mm; total, 10.15 mm. First femur 3.7 times, first leg 12.7 times as long as carapace.

Male palpus (figs. 84-84a) with tarsal process turned to right angle.

**Type Data.** Male holotype, and three males and 18 females, from Grutas de Xoxafi, 5 km N of Lagunillas, Hidalgo, México, August 19, 1965 (J. Reddell, J. Fish, W. Bell).

**Distribution.** Known only from above collection.

#### *Psilochorus tellezi*, new species

FIGURES 82-83

**Diagnosis.** Small long-legged species readily recognized by lobate epigynum (fig. 83) and presence on sternum (fig. 82) of short, conical process.

**Etymology.** Named for Mr. C. Tellez of Mexico City.

**Female.** Total length, 1.5 mm. Carapace, 0.7 mm long, 0.7 mm wide. Abdomen, 1 mm long, 0.8 mm wide.

Cephalothorax and appendages dusky yellow; eyes ringed with black; abdomen whitish.

Anterior median eyes small, one-third diameter of large lateral eyes; posterior median eyes separated by their diameter. Sternum with small conical projection on posterior margin (fig. 82), set with several long hairs.

First leg: femur, 5.8 mm, patella, 0.3 mm, tibia, 6 mm, metatarsus, 7.7 mm, tarsus, 1.5 mm; total, 2.13 mm. First femur eight times, first leg 30 times as long as carapace.

Epigynum as shown in figure 83.

**Type Data.** Female holotype from Resumidero del Río San Gerónimo, Michapa, Guerrero, México, October 18, 1942 (C. Bolívar, C. Tellez).

#### *Psilochorus russelli*, new species

FIGURES 87-89

**Diagnosis.** Small, pale species, readily distinguished by following features: first femur of female 5.3 times as long as carapace; epigynum (fig. 89) a simple structure; chelicera of male (fig. 88) a small rounded spur bearing trivial spine located near apex of segment; male palpus (fig. 87) with thin tarsal process.

**Etymology.** Named for Mr. William Russell.

**Female.** Total length, 2 mm. Carapace, 0.75 mm long, 0.8 mm wide. Abdomen, 1.2 mm long, 0.9 mm wide.

Cephalothorax and appendages pale yellow; eyes ringed with black and clypeus with dusky smudge; abdomen dull white.

Anterior median eyes very small, one-fourth diameter of large lateral eyes; posterior median eyes separated by about long diameter.

First leg: femur, 4 mm, patella, 0.6 mm, tibia, 4 mm, metatarsus, 4.7 mm, tarsus, 0.8 mm; total, 14.1 mm. First femur 5.3 times, first leg 18 times as long as carapace.

Epigynum (fig. 89) broadly rounded, sclerotized band without external features.

**Male.** Total length, 1.7 mm. Carapace, 0.75 mm long, 0.75 mm wide. Abdomen,

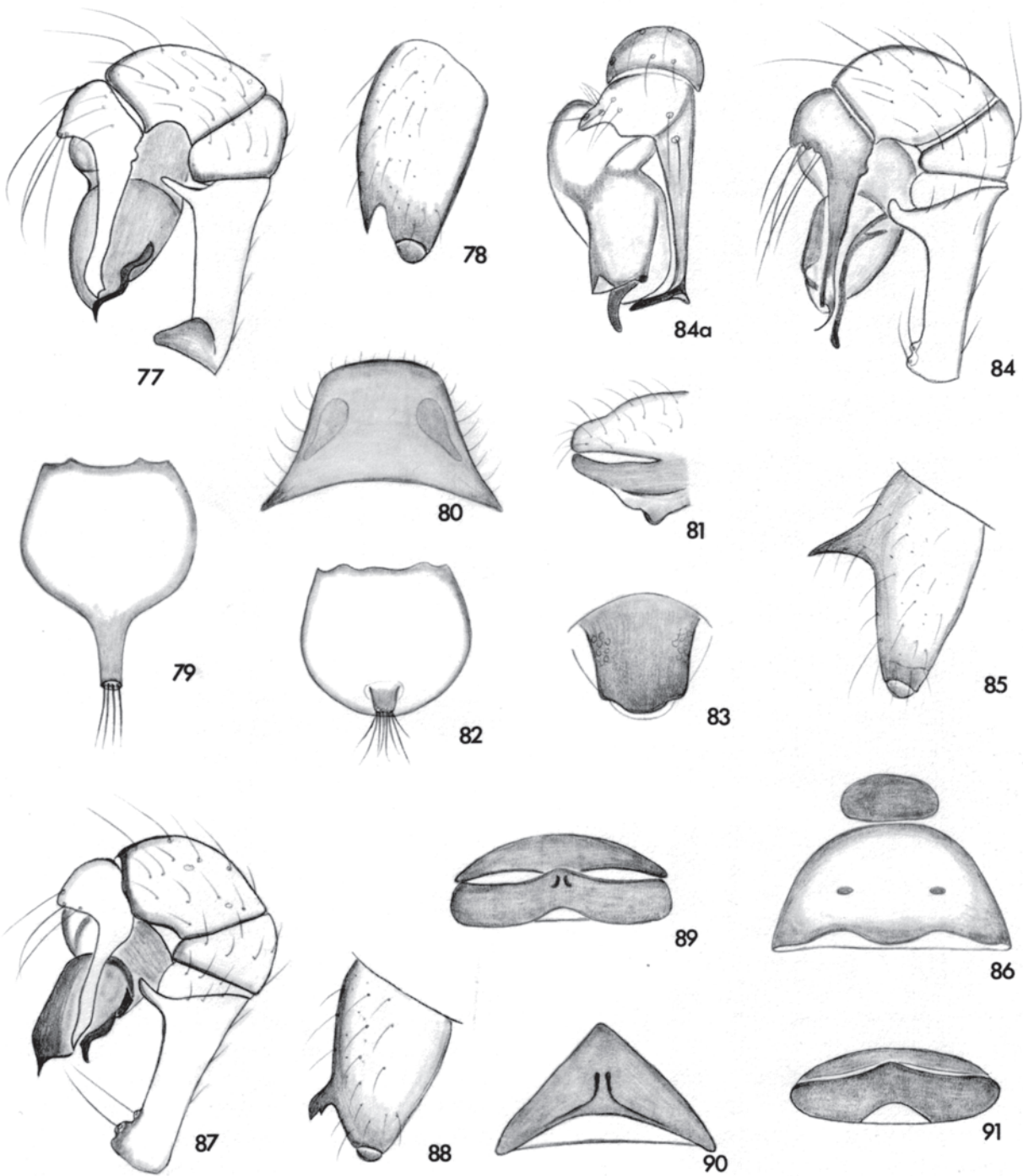
Figs. 77-81. *Psilochorus diablo*, new species. 77. Left male palpus, retrolateral view. 78. Left male chelicera, retrolateral view. 79. Sternum of female, ventral view. 80. Epigynum, posterior view. 81. Epigynum, retrolateral view.

Figs. 82-83. *Psilochorus tellezi*, new species. 82. Sternum of female, ventral view. 83. Epigynum, ventral view.

Figs. 84-86. *Psilochorus fishi*, new species. 84. Left male palpus, retrolateral view. 84a. Left male palpus, frontal view. 85. Left male chelicera, retrolateral view. 86. Epigynum, ventral view.

Figs. 87-89. *Psilochorus russelli*, new species. 87. Left male palpus, retrolateral view. 88. Left male chelicera, retrolateral view. 89. Epigynum, ventral view.

Figs. 90-91. *Psilochorus delicatus*, new species. 90. Epigynum, posterior view. 91. Epigynum, ventral view.



1.1 mm long, 0.9 mm wide.

Chelicera (fig. 88) with small rounded spur near distal end of segment provided with small spine.

First leg: femur, 5 mm, patella, 0.7 mm, tibia, 5.3 mm, metatarsus, 6.3 mm, tarsus, 1.3 mm; total, 18.6 mm. First femur about seven times, first leg about 25 times as long as carapace.

Male palpus (fig. 87) with thin femoral spur and slender, apically slightly curved tarsal process.

**Type Data.** Male holotype, and eight males and 16 females, from Cueva del Pedregoso, 32 km SE of Cuatro Ciénegas, Coahuila, México, December 30, 1967 (J. Reddell, W. Russell, W. Calvert).

**Distribution.** Caves of Coahuila.

**Other Records.** *Coahuila*: Pedregoso Circle Cave, 32 km SE of Cuatro Ciénegas, December 30, 1967 (J. Reddell, W. Russell), male. Pedregoso Pipe Cave, 32 km SE of Cuatro Ciénegas, December 29, 1967 (J. Reddell, W. Russell, W. Calvert), three females.

#### ***Psilochorus delicatus*, new species**

FIGURES 90-91

**Diagnosis.** Small, pale species, probable troglobite, readily distinguished by epigynum (fig. 90).

**Etymology.** Specific name from Latin *delicatus*, dainty.

**Female.** Total length, 1.7 mm. Carapace, 0.7 mm long, 0.68 mm wide. Abdomen, 1 mm long, 0.7 mm wide.

Cephalothorax and appendages whitish, with yellowish tinge; eye tubercles black; abdomen white.

Structure typical: anterior eye row moderately procurved, with upper edges of eyes forming straight line; anterior median eyes small, equal in size to radius of lateral eye, touching each other, separated from lateral eyes by two-thirds their diameter; posterior eye row straight, with median eyes separated by long diameter. Clypeus, 0.21 mm, equal in height to three diameters of anterior lateral eye.

First leg: femur, 3.4 mm, patella, 0.25 mm, tibia, 3.6 mm, metatarsus, 4 mm, tarsus, 1 mm; total, 12.25 mm. First femur about five times, first leg 17.5 times as long as carapace.

Epigynum (figs. 90-91) a simple, transverse elevation produced to subtriangular shape in posterior view.

**Type Data.** Female holotype and two immature from Cueva de los Riscos, Sierra de India, 6.5 km S of Mapimí, Durango, México, August 1964 (W. Russell).

**Distribution.** Known only from above specimens.

#### *Genus Pholcophora* Banks

The generic name *Pholcophora* is tentatively used for the shorter-legged and often six-eyed pholcids related to *Psilochorus*, heretofore placed in *Spermophora*, *Pholcophorina* and *Anopsicus*. In this series the legs are typically of medium length but they grade downward to very short. The eight eyes are all present in the genotype of *Pholcophora americana* of the northwestern United States, but in Mexico many species have lost the anterior median eyes. In addition to losing these eyes, the curvature of the posterior row is often strongly affected to form straight or strongly procurved rows. The six-eyed *Spermophora speophila* and the blind *Anopsicus pearsei* described by Chamberlin and Ivie from Yucatán caves seem clearly to belong in this genus. The species of *Pholcophora* are characterized by their small size, by global to oval abdomens, and differ little from those of *Psilochorus*, of which they may ultimately be regarded merely as a subgenus. The epigyna of the females are simple sclerotized bands or plaques with little to distinguish the species. The chelicerae of the males bear distinctive spurs and their palpi present differences in the various elements.

#### *Pholcophora texana* Gertsch

*Pholcophora texana* Gertsch, 1935, p. 12.

**Record.** *Nuevo León*: Grutas de San Bartolo, 16 km S of Santa Catarina, February 1963 (W. Russell, D. McKenzie), female.

*Pholcophora speophila* (Chamberlin and Ivie)

*Spermophora speophila* Chamberlin and Ivie, 1938, p. 130, figs. 15, 16.

**Records.** *Yucatán*: Chac Mol Cave, Tohil, June 27, 1936, female holotype; Gongora Cave, Oxkutzcab, immature females from mouth and interior.

*Pholcophora pearsei* (Chamberlin and Ivie)

*Anopsicus pearsei* Chamberlin and Ivie, 1938, p. 130, figs. 17, 18.

**Record.** *Yucatán*: Oxolodt Cave, Kaua, June 18, 1936, female holotype, female and immature paratypes.

#### ***Pholcophora troglodyta*, new species**

FIGURES 92-94

**Diagnosis.** Small species with legs of medium length and small eyes, readily separated by following features: epigynum (fig. 94) a short plate; chelicera of male (fig. 93) with fairly long, sharp spur; male palpus (fig. 92) with tarsal process rounded at apex.

**Etymology.** Specific name from Latin *troglodyta*, cave dweller, used in apposition.

**Female.** Total length, 2.1 mm. Carapace, 0.9 mm long, 0.8 mm wide. Abdomen, 1.25 mm long, 1.1 mm wide.

Cephalothorax and appendages dull yellow; eyes narrowly ringed with black; abdomen whitish.

Carapace round, with cervical groove distinct linear depression and pars cephalica low; eye tubercle of medium height occupying one-half width of carapace at that point; six small eyes in two well separated triads, with posterior eye row straight; anterior lateral eyes separated by slightly more than long diameter; posterior median eyes separated by one

and one-half diameters.

First leg: femur, 2.5 mm, patella, 0.25 mm, tibia, 3 mm, metatarsus, 3.3 mm, tarsus, 0.8 mm; total, 9.85 mm. First femur 2.8 times, first leg about 11 times as long as carapace.

Epigynum (fig. 94) a small, sclerotized plaque, narrowed and rounded behind.

**Male.** Total length, 1.6 mm. Carapace, 0.7 mm long, 0.65 mm wide. Abdomen, 0.9 mm long, 0.7 mm wide.

Coloration and structure like those of female except as noted. Eyes smaller, with space between triads wider. Chelicera (fig. 93) with sharp spur projecting outward from middle of frontal face.

First leg: femur, 2.3 mm, patella, 0.25 mm, tibia, 2.4 mm, metatarsus, 3.2 mm, tarsus, 0.8 mm; total, 8.95 mm. First femur about three times, first leg 12.6 times as long as carapace.

Male palpus (fig. 92) with short femoral spur and broad, apically enlarged and rounded tarsal process.

**Type Data.** Male holotype from Grutas de Atoyac, Atoyac, Veracruz, México, August 6, 1969 (S. and J. Peck).

**Distribution.** Known only from Grutas de Atoyac.

**Other Records.** *Veracruz*: Grutas de Atoyac, Atoyac, November 13, 1941 (C. Bolívar, F. Bonet), two females; May 30, 1941 (C. Bolívar, F. Bonet), male, two females; August 22, 1965 (J. Reddell, J. Fish, W. Bell), three females; August 6, 1969 (S. and J. Peck), eight females.

#### ***Pholcophora mitchelli*, new species**

FIGURE 98

**Diagnosis.** Small species with legs of medium length, small eyes on well separated triads, readily separated from other species by following features: first femur 2.7 times as long as carapace; epigynum (fig. 98) of distinctive form.

**Etymology.** Named for Professor Robert Mitchell of Texas Tech University.

**Female.** Total length, 2.3 mm. Carapace,



0.9 mm long, 0.8 mm wide. Abdomen, 1.4 mm long, 1.1 mm wide.

Cephalothorax and appendages dull yellow; eyes narrowly ringed with black; abdomen whitish.

Structure like that of *troglydyta*. Anterior lateral eyes separated by slightly more than long diameter; posterior median eyes separated by about two diameters; posterior eye row essentially straight.

First leg: femur, 2.4 mm, patella, 0.35 mm, tibia, 2.7 mm, metatarsus, 2.7 mm, tarsus, 0.7 mm; total, 8.85 mm. First femur 2.7 times, first leg 9.8 times as long as carapace.

Epigynum (fig. 98) a simple transverse plaque in front and behind genital groove.

**Type Data.** Female holotype and five females from Cueva de la Virgen de Guadalupe, 48 km SW of Soto de la Marina, Tamaulipas, México, October 31, 1970 (W. Russell, G. and J. Ediger).

#### **Pholcophora gruta**, new species

FIGURES 95-96, 137-138

**Diagnosis.** Pale, eyeless species readily separated by following features: female with small, curved spur on each side of pars thoracica, epigynum (fig. 138) a simple transverse band; chelicera of male (fig. 95) with thin spur at middle of chelicera; male palpus (fig. 96) with heavy femoral spur and wide, apically truncated tarsal process.

**Etymology.** Specific name from Spanish *gruta*, grotto, cave.

**Female.** Total length, 2 mm. Carapace, 1 mm long, 0.8 mm wide. Abdomen, 1.1 mm long, 0.9 mm wide.

Cephalothorax and appendages pale yellow; abdomen whitish, with pale hairs.

Structure typical of genus as shown in figure 137. Ocular tubercle rounded, of medium distinctness, occupying half width of carapace; eyes essentially obsolete, scarcely visible as pale vestiges on each side; posterior margin of pars thoracica with small curved spur on each side. Abdomen subglobose.

First leg: femur, 4 mm, patella, 0.35 mm, tibia, 4.2 mm, metatarsus, 5.3 mm, tarsus,

1.2 mm; total, 15.05 mm. First femur four times, first leg 15 times as long as carapace. Tibia and patella of fourth leg, 3.7 mm.

Epigynum (fig. 138) a small, sclerotized, transverse band above genital groove.

**Male.** Total length, 1.9 mm. Carapace, 0.95 mm long, 0.85 mm wide. Abdomen, 1 mm long, 0.8 mm wide.

Coloration and structure essentially like those of female. Ocular tubercle narrower, occupying half width of carapace; eyes larger, with convex lenses more apparent. Posterior margin of pars cephalica broadly rounded, without side angles. Legs mostly lost; tibia and patella of fourth leg, 3.6 mm. Chelicera (fig. 95) with sharp spur at middle of frontal face.

Male palpus (fig. 96) of distinctive form.

**Type Data.** Female holotype and other female from Grutas de Juxtlahuaca, 6½ km N of Colotlipa, Guerrero, México, January 16, 1941 (C. Bolívar, F. Bonet).

**Distribution.** Known only from above cave.

**Other Records.** *Guerrero:* Grutas de Juxtlahuaca, August 15, 1966 (J. Fish, J. Reddell), male.

#### **Pholcophora bolivari**, new species

FIGURE 97

**Diagnosis.** Near relative of *troglydyta* but distinct in following features: legs longer and thinner, with first femur 3.5 times as long as carapace; epigynum (fig. 97) of distinctive form.

**Etymology.** Named for Dr. C. Bolívar y Pieltain of the Instituto Politécnico in Mexico City.

**Female.** Total length, 2.4 mm. Carapace, 0.9 mm long, 0.9 mm wide. Abdomen, 1.5 mm long, 1.1 mm wide.

Cephalothorax and appendages dusky orange; eyes narrowly ringed with black; abdomen whitish.

Structure like that of *troglydyta*. Anterior lateral eyes separated by slightly more than long diameter; posterior median eyes separated by slightly more than long diameter; posterior eye row gently recurved.



First leg: femur, 3.2 mm, patella, 0.35 mm, tibia, 3.5 mm, metatarsus, 3.6 mm, tarsus, 0.7 mm; total, 11.35 mm. First femur 3.5 times, first leg 12.6 times as long as carapace.

Epigynum (fig. 97) an inconspicuous plate with groove at each corner near genital groove.

**Type Data.** Female holotype from Cueva de los Cuarteles, Aldama, Tamaulipas, México, December 6, 1945 (C. Bolívar, F. Bonet, J. Alvarez).

**Distribution.** Known only from Cueva de los Cuarteles.

**Other Record.** *Tamaulipas*: Cueva de los Cuarteles, Aldama, December 1948 (C. Bolívar), female.

***Pholcophora elliotti*, new species**

FIGURE 101

**Diagnosis.** Small, short-legged species with triads of small eyes close together, separated by following features: first femur only 1.6 times as long as carapace; epigynum (fig. 101) of distinctive form.

**Etymology.** Named for Mr. William Elliott.

**Female.** Total length, 2 mm. Carapace, 0.7 mm long, 0.6 mm wide. Abdomen, 1.3 mm long, 0.8 mm wide.

Cephalothorax and appendages dusky yellow; eyes narrowly ringed with black; abdomen whitish.

Structure like that of *troglodyta*. Anterior lateral eyes separated by two-thirds their diameter; posterior median eyes separated by slightly more than long diameter; posterior eye row slightly procurved.

First leg: femur, 1.1 mm, patella, 0.21 mm, tibia, 1.2 mm, metatarsus, 1.1 mm, tarsus, 0.45 mm; total, 4.06 mm. First femur 1.6 times, first leg 5.8 times as long as carapace.

Epigynum as shown in figure 101.

**Type Data.** Female holotype from Sótano de las Piedras, northeast of Ciudad Valles, San Luis Potosí, México, July 15, 1969 (S. Peck, W. Elliott).

**Distribution.** Caves of San Luis Potosí.

**Other Records.** *San Luis Potosí*: Cueva de Taninul #1, June 5, 1967 (R. Mitchell),

female; March 17, 1967 (R. Mitchell), two females.

***Pholcophora bispinosa*, new species**

FIGURES 105-107

**Diagnosis.** Near relative of *troglodyta* but distinct in following features: epigynum (fig. 105) of distinctive form; chelicera of male with short spur on frontal face below principal spur; male palpus (fig. 107) with small femoral spur in apical position and broad, apically truncated tarsal process.

**Etymology.** Specific name from Latin *bispinosus*, with two spines.

**Female.** Total length, 2.9 mm. Carapace, 1.2 mm long, 1.1 mm wide. Abdomen, 1.9 mm long, 1.6 mm wide.

Cephalothorax and appendages dusky orange; eyes narrowly ringed with black; abdomen whitish.

Structure in close agreement with that of *troglodyta*. Anterior lateral eyes separated by their diameter; posterior median eyes separated by one and one-half diameters; posterior eye row gently procurved.

First leg: femur, 2.75 mm, patella, 0.45 mm, tibia, 2.85 mm, metatarsus, 2.8 mm, tarsus, 1 mm; total, 9.85 mm. First femur 2.3 times, first leg eight times as long as carapace.

Epigynum (fig. 105) an oval, transverse band.

**Male.** Total length, 2.1 mm. Carapace, 1 mm long, 0.9 mm wide. Abdomen, 1.3 mm long, 1 mm wide.

Coloration and structure like those of female. Chelicera (fig. 106) with sharp, outwardly directed principal spur just below base of segment and below in apical half a small, sharp spur.

First leg: femur, 2.7 mm, patella, 0.4 mm, tibia, 2.7 mm, metatarsus, 2.9 mm, tarsus, 0.8 mm; total, 9.5 mm. First femur 2.7 times, first leg 9.5 times as long as carapace.

Male palpus (fig. 107) of distinctive form as shown.

**Type Data.** Male holotype from Cueva de Arcotete, 6 km S of San Cristobal, Chiapas,

México, August 15, 1969 (S. and J. Peck).

**Distribution.** Caves of Chiapas.

**Other Records.** *Chiapas*: Cueva de Arcotete, August 15, 1969 (S. and J. Peck), three males, 15 females, immature. Cueva Rancho Nuevo, 10 km E of San Cristobal, August 13, 1969 (S. and J. Peck), male, two females; July 16-August 3, 1969 (S. and J. Peck), male.

**Pholcophora evansi**, new species

FIGURES 102-104

**Diagnosis.** Near relative of *troglogyta* but distinct in following features: eye triads more widely spaced and posterior row moderately procurved; epigynum (fig. 102) a narrowly oval plaque with dark markings at each corner; chelicera of male with long, sharp spur placed well above middle of segment; male palpus (fig. 103) of distinctive form.

**Etymology.** Named for Mr. T. R. Evans.

**Female.** Total length, 2 mm. Carapace, 1 mm long, 0.95 mm wide. Abdomen, 1.2 mm long, 1 mm wide.

Cephalothorax and appendages dusky orange; eyes narrowly ringed with black; abdomen whitish.

Structure in close agreement with that of *troglogyta*. Triads of eyes more widely separated; anterior lateral eyes separated by one and one-half diameters; posterior median eyes separated by two diameters; posterior eye row moderately procurved.

First leg: femur, 2.8 mm, patella, 0.35 mm,

tibia, 3 mm, metatarsus, 3.3 mm, tarsus, 0.75 mm; total, 10.2 mm. First femur 2.8 times, first leg 10 times as long as carapace.

Epigynum (fig. 102) an oval, transverse plate, broadly rounded behind and with dark markings at each corner.

**Male.** Carapace, 1 mm long, 0.9 mm wide.

Coloration and structure like those of female. Eye triads somewhat closer together. Chelicera (fig. 104) with sharp spur projecting outward from above middle of frontal face.

First leg: femur, 2.35 mm, patella, 0.35 mm, tibia, 2.4 mm, metatarsus, 2.75 mm, tarsus, 0.7 mm; total, 8.55 mm. First femur 2.3 times, first leg 8.5 times as long as carapace.

Male palpus as shown in figure 103.

**Type Data.** Male holotype from Grutas de Zapaluta, 6½ km SE of Zapaluta, Chiapas, México, August 20, 1967 (J. Reddell, J. Fish, T. R. Evans).

**Distribution.** Caves of Chiapas.

**Other Records.** *Chiapas*: Grutas de Zapaluta, August 20, 1967 (J. Reddell, J. Fish, T. R. Evans), nine females. Cueva del Tío Ticho, 1½ km S of Comitán, August 21, 1967 (J. Reddell, J. Fish, T. R. Evans), two females.

**Pholcophora exigua**, new species

FIGURES 99-100

**Diagnosis.** Tiny, white, cave-adapted species with appearance of juvenile, probable troglobite, with following features: epigynum

Figs. 92-94. *Pholcophora troglodyta*, new species. 92. Left male palpus, retrolateral view. 93. Left male chelicera, retrolateral view. 94. Epigynum, ventral view.

Figs. 95-96. *Pholcophora gruta*, new species. 95. Left male chelicera, retrolateral view. 96. Left male palpus, retrolateral view.

Fig. 97. *Pholcophora bolivari*, new species, epigynum, ventral view.

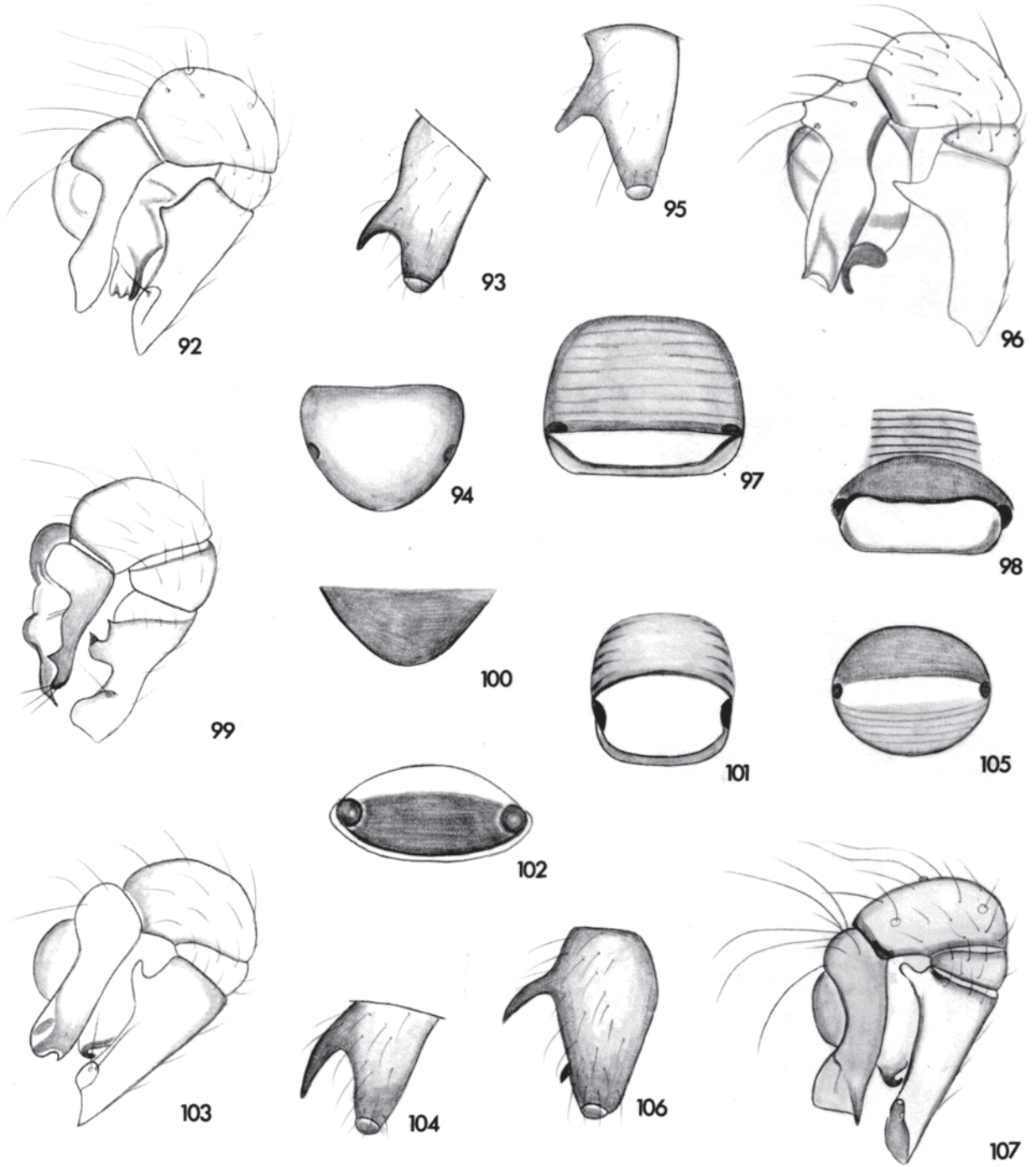
Fig. 98. *Pholcophora mitchelli*, new species, epigynum, ventral view.

Figs. 99-100. *Pholcophora exigua*, new species. 99. Left male palpus, retrolateral view. 100. Epigynum, ventral view.

Fig. 101. *Pholcophora elliotti*, new species, epigynum, ventral view.

Figs. 102-104. *Pholcophora evansi*, new species. 102. Epigynum, ventral view. 103. Left male palpus, retrolateral view. 104. Left male chelicera, retrolateral view.

Figs. 105-107. *Pholcophora bispinosa*, new species. 105. Epigynum, ventral view. 106. Left male chelicera, retrolateral view. 107. Left male palpus, retrolateral view.



(fig. 100) a simple plaque widely rounded behind; chelicera of male without distinctive spur; male palpus (fig. 99) with distinctive design as shown.

**Etymology.** Specific name from Latin *exiguus*, small.

**Female.** Total length, 1.5 mm. Carapace, 0.65 mm long, 0.7 mm wide. Abdomen, 1 mm long, 0.7 mm wide.

Cephalothorax and appendages whitish, with faint yellowish tinge; eye tubercles black; abdomen white.

Structure somewhat atypical; eye triads on low, rounded elevation only 0.1 mm above pars thoracica; anterior lateral eyes separated by their radius; anterior median eyes obsolete; posterior median eyes moderately procurved, with median eyes separated by their diameter. Clypeus, 0.27 mm, equal in height to four diameters of anterior lateral eye.

First leg: femur, 2.5 mm, patella, 0.25 mm, tibia, 2.5 mm, metatarsus, 3 mm, tarsus, 0.7 mm; total, 8.95 mm. First femur 3.8 times, first leg about 14 times as long as carapace.

Epigynum as shown in figure 100.

**Male.** Total length, 1.2 mm. Carapace, 0.5 mm long, 0.5 mm wide. Abdomen, 0.7 mm long, 0.63 mm wide.

Coloration and structure like those of female. Chelicera without distinctive spur.

First leg: femur, 2.6 mm, patella, 0.25 mm, tibia, 3.2 mm, metatarsus, 3.5 mm, tarsus, 0.7 mm; total, 10.25 mm. First femur five times, first leg 20 times as long as carapace.

Male palpus (fig. 99) with sharp femoral spur near base of segment and tarsal process armed with pointed extension near end.

**Type Data.** Male holotype and three females from Cueva de los Riscos, Sierra de la India, 6½ km S of Mapimí, Durango, México, August 1964 (W. Russell).

#### Genus *Metagonia*

The American genus *Metagonia*, comprising small, lucifugous six-eyed pholcids lacking the anterior median eyes, is strongly represented in Mexican caves with a few described and

numerous undescribed species. The cave habitat has strongly affected these pale, long-legged spiders and produced several eyeless troglobites and other prospective ones. Two species from Yucatán caves (*Metagonia maya* and *viabilis* of Chamberlin and Ivie) are closely allied to the following series but their third species, *yucatanana*, with apically conical abdomen, belongs in a different group. The species described below are closely allied types, probably derived from a single stock, that share many characters and differ mainly in the genital structures of both sexes.

The typical structures for the series described below are the following: a general pallid coloration with darker pattern entirely absent or consisting of trivial spotting of carapace or ringing of legs, the same in both sexes unless otherwise noted; the carapace is sub-round, convex, with prominent, projecting, rounded clypeus and the cervical groove is a trivial linear depression; the general structure of both sexes is similar and there are few secondary sexual characters; the chelicerae of the males are provided with a curved row of about eight to 20 small spinules on the front face and there is weak development of a basal lobe in some species; the posterior row of eyes is quite strongly recurved to lie nearly in a transverse line with the anterior median eyes; the eyes are sometimes absent but usually present in two separated triads and the eyes are most often of small size; the legs are very long and thin, especially the apical segments, and the first leg is 17 or more times as long as the carapace; in this series the abdomen is elongate oval, quite high, but not produced behind into a rounded or pointed projection. The genitalia deserve special mention because of various unique features. The male palpi feature a voluminous bulb with long, pale, finger-like embolus with a tiny pore near the apex adjacent to the long spine at the tip; the tarsus is quite remarkably developed into a complicated appendage consisting of a hinged process lying at rest in a groove on the femur and a principal process bearing at apex a series of spurs forming an apical fringe. The details of this fringe provide the prime characters for separating the



species. The epigynum of the female is of the haplogyne type with genital groove behind and more or less apparent pattern of internal features of constant form visible from the ventral aspect.

The following species are most readily diagnosed by close comparison of the features of the epigyna and male palpi. The epigyna are illustrated in ventral view and show patterns distinctive for every species. In resting state the epigynum is a quite prominent rounded lobe but it contains erectile tissue that allows it to swell to an inflated protuberance. The left palpus of the male is illustrated in retro-lateral view and in a few cases a prolateral view of the tarsal process is given.

#### *Metagonia tinaja*, new species

FIGURES 119-121

**Diagnosis.** Typical species with pallid coloration and small eyes; posterior median eyes separated by two diameters; prolateral fringe of tarsal process with coarse teeth; epigynum as shown in figure 121.

**Etymology.** Specific name from Spanish *tinaja*, an earthen jar, used in apposition; named for Sótano de la Tinaja.

**Female.** Total length, 2.6 mm. Carapace, 1 mm long, 0.9 mm wide. Abdomen, 1.6 mm long, 1.2 mm wide.

Cephalothorax and appendages whitish to pale yellow; pars thoracica with faint dusky smudge; eyes narrowly ringed with black; abdomen white.

Ocular tubercle of medium development, bearing two triads of small eyes occupying two-thirds width of carapace at that point; anterior lateral eyes separated by about three diameters; posterior median eyes separated by two diameters.

First leg: femur, 5.3 mm, patella, 0.45 mm, tibia, 5.5 mm, metatarsus, 8.5 mm, tarsus, 1.5 mm; total, 21.25 mm. First leg 21 times as long as carapace. Tibia and patella of fourth leg, 4.25 mm.

Epigynum as shown in figure 121.

**Male.** Total length, 2.7 mm. Carapace, 1.1 mm long, 1 mm wide. Abdomen, 1.6 mm

long, 1.1 mm wide.

First leg: femur, 8.3 mm, patella, 0.5 mm, tibia, 8.5 mm, metatarsus, 14.5 mm, tarsus, 2 mm; total, 33.8 mm. First leg 33 times as long as carapace, much longer than in other species. Tibia and patella of fourth leg, 6 mm.

Palpus as shown in figures 119-120.

**Type Data.** Male holotype from Sótano de la Tinaja, 10½ km NE of Valles, San Luis Potosí, México, February 18, 1970 (J. A. L. Cooke).

**Distribution.** Caves near Valles in San Luis Potosí.

**Other Records.** *San Luis Potosí:* Sótano de la Tinaja, 10½ km NE of Valles, September 1, 1966 (R. Mitchell), one immature; April 1, 6, 1946 (B. Dontzin, E. Ruda), male, female, immature; March 13, 1969 (J. Reddell), two immature; November 30, 1968 (T. Evans, G. Ediger), female; December 24, 1963 (D. McKenzie), female; April 9, 1966 (J. Fish, D. McKenzie), male, female, immature; February 18, 1970 (J. A. L. Cooke), two males, four females, immature, from flood debris on mud slope 1,500 feet from entrance. Sótano del Arroyo, 12 km NE of Valles, November 26, 1963 (J. Reddell), female; September, 1966 (R. Mitchell), immature; November 26, 1965 (J. Reddell, J. Fish), two females, two immatures; December 25, 1962 (J. Reddell), two males, seven females, immature. Cueva de Los Sabinos, 12½ km NE of Valles, May 21, 1944 (F. Bonet), immature; April 3, 1942, female. Sótano de Yerbaniz, 21 km N of Valles, January 31, 1969 (D. Honea, T. Mollhagen), female, immature; February 17, 1970, female, immature; January 9, 1971 (W. Elliott, J. Sheppard), three females, immature. Sótano del Tigre, 14 km NE of Valles, November 28, 1964 (D. McKenzie), female; February 1, 1963 (J. Reddell, R. Mitchell), 10 females, immature; February 18, 1960, male.

#### *Metagonia tlamaya*, new species

FIGURES 110-111, 125

**Diagnosis.** Pale, eyeless species related to *tinaja*; prolateral fringe of tarsal process with straight line of coarse teeth; epigynum as

shown in figure 125.

**Etymology.** Specific name from Sótano de Tlamaya, used in apposition.

**Female.** Total length, 2 mm. Carapace, 0.9 mm long, 0.8 mm wide. Abdomen, 1.2 mm long, 0.8 mm wide.

Eye tubercle reduced in size and eyes completely obsolete.

First leg: femur, 5 mm, patella, 0.3 mm, tibia, 5.3 mm, metatarsus, 8 mm, tarsus, 1.3 mm; total, 20.1 mm. First leg about 22 times as long as carapace. Tibia and patella of fourth leg, 5.7 mm.

Epigynum as shown in figure 125.

**Male.** Total length, 1.8 mm. Carapace, 0.8 mm long, 0.75 mm wide. Abdomen, 1 mm long, 0.8 mm wide.

First leg: femur, 4.7 mm, patella, 0.3 mm, tibia, 4.7 mm, metatarsus, 7 mm, tarsus, 1.5 mm; total, 18.2 mm. First leg 22.7 times as long as carapace.

Male palpus as shown in figures 110-111.

**Type Data.** Male holotype from Sótano de Tlamaya, San Luis Potosí, México, November 25, 1964 (T. Raines, B. Bell).

**Distribution.** Known only from Sótano de Tlamaya.

**Other Records.** *San Luis Potosí:* Sótano de Tlamaya, November 25, 1964 (T. Raines, B. Bell), two females; July 2, 1965 (T. Raines, J. Fish), male, female.

distinct in having three curved hooks on pro-lateral face of fringe of tarsal process.

**Etymology.** Specific name from Spanish *capilla*, hood, church, used in apposition, named for Cueva de la Capilla.

**Male.** Total length, 4 mm. Carapace, 1.7 mm long, 1.7 mm wide. Abdomen, 2.5 mm long, 1.7 mm wide.

Dorsal view of carapace and abdomen as shown in figure 113. Carapace gray, with dusky patches on clypeus and near posterior margin of pars thoracica; eyes ringed with black; legs pale yellow, with brown patellae and brown rings at ends of tibiae; sternum with narrow brown seam on sides; abdomen gray, with dusky subintegumental spots.

Eyes large, with triads occupying two-thirds width of carapace at that point; front eyes separated by about two diameters; posterior median eyes separated by their short diameter.

First leg: femur, 12.5 mm, patella, 0.7 mm, tibia, 12 mm, metatarsus, 20 mm, tarsus, 2.5 mm; total, 47.7 mm. First leg 28 times as long as carapace. Tibia and patella of fourth leg, 7.75 mm.

Male palpus as shown in figures 112, 114.

**Type Data.** Male holotype from Cueva de la Capilla, 13½ km NW of Gómez Farías, Porvenir, Tamaulipas, México, January 13, 1971 (J. Reddell, R. Mitchell, and group).

### *Metagonia capilla*, new species

FIGURES 112-114

**Diagnosis.** Well marked, large-eyed species (fig. 113) related to *tinaja*; posterior median eyes separated by short diameter; male palpus

### *Metagonia amica*, new species

FIGURES 115-116, 136

**Diagnosis.** Similar to *tinaja*; posterior median eyes separated by long diameter; epigynum (fig. 136) with oval plate near posterior edge; prolateral fringe of tarsal process with fine teeth.

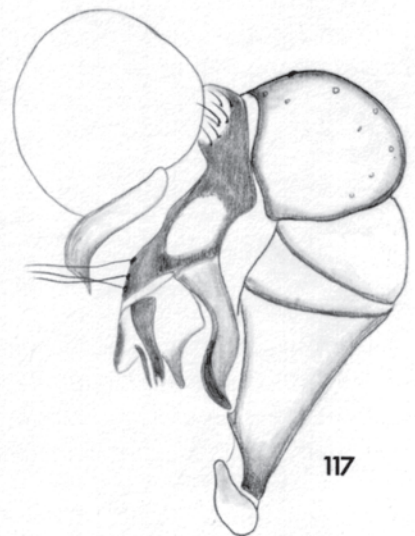
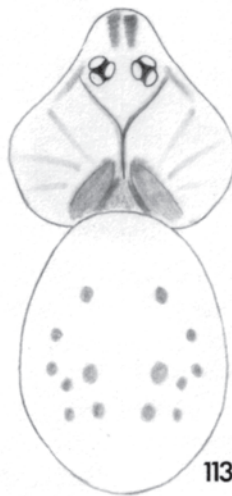
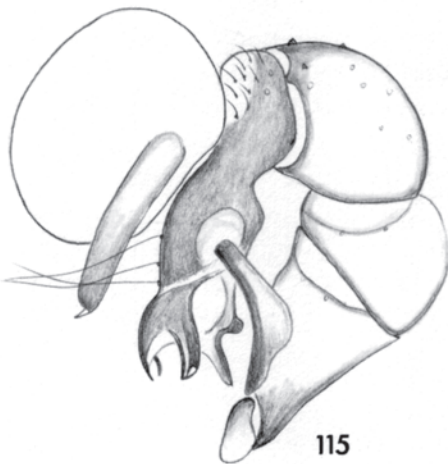
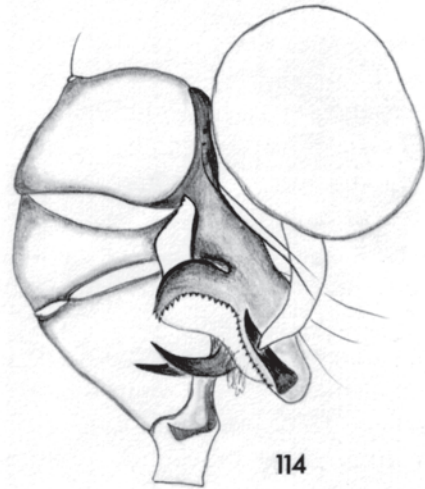
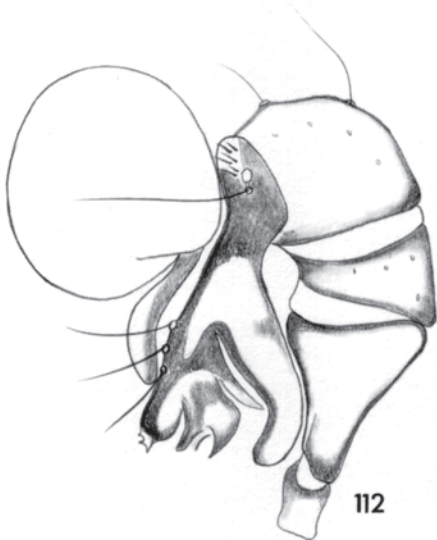
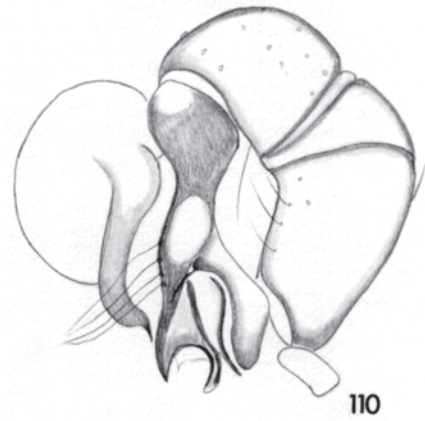
Figs. 108-109. *Metagonia pura*, new species. 108. Left male palpus, retrolateral view. 109. Tip of tarsal process, prolateral view.

Figs. 110-111. *Metagonia tlamaya*, new species. 110. Left male palpus, retrolateral view. 111. Tip of tarsal process, prolateral view.

Figs. 112-114. *Metagonia capilla*, new species. 112. Left male palpus, retrolateral view. 113. Carapace and abdomen, dorsal view. 114. Left male palpus, prolateral view.

Figs. 115-116. *Metagonia amica*, new species. 115. Left male palpus, retrolateral view. 116. Tip of tarsal process, prolateral view.

Fig. 117. *Metagonia pachona*, new species, left male palpus, retrolateral view.



**Etymology.** Specific name from Latin *amicus*, friendly.

**Female.** Total length, 2.3 mm. Carapace, 0.9 mm long, 0.8 mm wide. Abdomen, 1.4 mm long, 0.9 mm wide.

Cephalothorax and appendages white to pale yellow; carapace with dusky smudge on pars thoracica; eyes distinctly ringed with black; abdomen whitish.

Anterior lateral eyes separated by not fully two diameters; posterior median eyes separated by about long diameter.

First leg: femur, 4.3 mm, patella, 0.3 mm, tibia, 4.6 mm, metatarsus, 7 mm, tarsus, 1.4 mm; total, 17.6 mm. First leg 19 times as long as carapace. Tibia and patella of fourth leg, 3.2 mm.

Epigynum as shown in figure 136.

**Male.** Total length, 2 mm. Carapace, 0.8 mm long, 9.75 mm wide. Abdomen, 1.2 mm long, 0.9 mm wide.

First leg: femur, 4.8 mm, patella, 0.3 mm, tibia, 5.2 mm, metatarsus, 8 mm, tarsus, 1.5 mm; total, 19.8 mm. First leg 24 times as long as carapace.

Male palpus as shown in figures 115-116.

**Type Data.** Male holotype from Cueva de El Jobo, El Jobo, San Luis Potosí, México, December 8, 1945 (C. Bolívar, F. Bonet).

**Distribution.** Caves in San Luis Potosí.

**Other Record.** *San Luis Potosí:* Cueva de Poca Ventana, 1 km W of Xitlitla, January 1969 (T. Raines), female arbitrarily assigned to this species.

#### **Metagonia punctata**, new species

FIGURES 118, 127

**Diagnosis.** Well marked species related to *tinaja* with large eyes; posterior median eyes separated by diameter; epigynum with pair of small, dark spurs on posterior margin; distal fringe of tarsal process squared, with enclosed semilunar lamina.

**Etymology.** Specific name from Latin *punctatus*, with small spots.

**Female.** Total length, 2.9 mm. Carapace,

1.1 mm long, 1 mm wide. Abdomen, 1.7 mm long, 1.1 mm wide.

Cephalothorax and appendages white to pale yellow, marked as follows: carapace with pale brown, round maculation on pars thoracica and eye tubercles blackish; patellae of legs brown and junctures of coxae, tibiae and metatarsus with brown rings or flecks; sternum all pale. Abdomen whitish, with three pairs of dark spots usually visible through integument on dorsum.

Eyes large, on elevated tubercles, group occupying full width of head; anterior lateral eyes separated by two diameters; posterior median eyes separated by their diameter.

First leg: femur, 6 mm, patella, 0.5 mm, tibia, 6.3 mm, metatarsus, 8.7 mm, tarsus, 1.5 mm; total, 23 mm. First leg 21 times as long as carapace. Tibia and patella of fourth leg, 4.3 mm.

Epigynum as shown in figure 127.

**Male.** Total length, 2.8 mm. Carapace, 1.2 mm long, 1 mm wide. Abdomen, 1.6 mm long, 1.2 mm wide.

First leg: femur, 8.6 mm, patella, 0.5 mm, tibia, 9.2 mm, metatarsus, 13 mm, tarsus, 1.3 mm; total, 32.6 mm. First leg 27 times as long as carapace. Tibia and patella of fourth leg, 5.3 mm.

Male palpus as shown in figure 118.

**Type Data.** Male holotype, and two females, from Cueva de Carnicerías, San Francisco, San Luis Potosí, México, August 4, 1966 (J. Reddell, D. McKenzie).

**Distribution.** Known only from caves in San Luis Potosí.

**Other Records.** *San Luis Potosí:* Cueva de las Rusias, August 5, 1966 (J. Reddell, J. Fish), female, immature. Cueva de Entrada Chica, Valle de los Fantasmás, August 4, 1966 (J. Fish), female. Sótano de Valle de los Fantasmas, November 1966 (J. Fish, J. Davis), female.

#### **Metagonia secreta**, new species

FIGURE 139

**Diagnosis.** Pale species similar to *tinaja*; epigynum (fig. 139) with distinctive pattern of



suboval inner receptacle and marginal marking near posterior edge.

**Etymology.** Specific name from Latin *secretus*, secret.

**Female.** Total length, 2.2 mm. Carapace, 0.8 mm long, 0.9 mm wide. Abdomen, 1.4 mm long, 1.05 mm wide.

Cephalothorax and appendages whitish to pale yellow; carapace with fine dusky smudge on pars thoracica; eyes narrowly ringed with black; abdomen white.

Ocular tubercle of medium size occupying two-thirds of width of carapace at that point; anterior eyes separated by three diameters; posterior median eyes separated by about two diameters. Tibia and patella of fourth leg, 3.75 mm; other legs mostly missing.

Epigynum as shown in figure 139.

**Type Data.** Female holotype from Cueva del Nacimiento del Río Frío, 7 km S of Gómez Fárías, Tamaulipas, México, April 18, 1965 (J. Fish, J. Reddell).

**Distribution.** Known only from above specimen.

#### **Metagonia pura**, new species

FIGURES 108-109, 122

**Diagnosis.** Pale, eyeless species related to *tlamaya* and *tinaja*; prolateral fringe of tarsal process with curved line of fine teeth; epigynum small (fig. 122) with lightly curved posterior margin and distinctive pattern of internal features.

**Etymology.** Specific name from Latin *purus*, pure, clean.

**Female.** Total length, 2.9 mm. Carapace, 0.8 mm long, 0.7 mm wide. Abdomen, 1.1 mm long, 0.85 mm wide.

Cephalothorax whitish; legs with faint yellow tinge; abdomen white.

Eye tubercle reduced and eyes completely obsolete.

First leg: femur, 4.7 mm, patella, 0.35 mm, tibia, 5 mm, metatarsus, 7.8 mm, tarsus, 1.5 mm; total, 19.35 mm. First leg 24 times as long as carapace. Tibia and patella of fourth leg, 4.1 mm.

Epigynum as shown in figure 122.

**Male.** Total length, 1.85 mm. Carapace, 0.8 mm long, 0.7 mm wide. Abdomen, 1.15 mm long, 0.95 mm wide.

First leg: femur, 4.7 mm, patella, 0.3 mm, tibia, 5 mm, metatarsus, 8 mm, tarsus, 1.5 mm; total, 19.5 mm. First leg about 24 times as long as carapace. Tibia and patella of fourth leg, 3.7 mm.

Male palpus as shown in figures 108-109.

**Type Data.** Male holotype from Cueva de la Capilla, 13½ km NW of Gómez Fárías, El Porvenir, Tamaulipas, México, January 28, 1968 (J. Reddell, R. Mitchell, F. Rose, J. George).

**Distribution.** Known only from Cueva de la Capilla.

**Other Records.** *Tamaulipas*: Cueva de la Capilla, El Porvenir, January 13, 1971 (J. Reddell, R. Mitchell, and group), three females, immature; May 16, 1971 (R. Mitchell, F. Abernathy, A. Sturdivant, S. Wiley), male, female; July 2, 1969 (S. Peck, R. Norton), female.

#### **Metagonia atoyacae**, new species

FIGURES 123, 129

**Diagnosis.** Pale, eyeless species related to *tlamaya*, *pura* and others of the *tinaja* group; epigynum (fig. 123) small, with curved posterior margin; fringe of tarsal process of male palpus very broad, with complicated design (fig. 129).

**Etymology.** Named for Grutas de Atoyac.

**Female.** Total length, 2.2 mm. Carapace, 0.85 mm long, 0.8 mm wide. Abdomen, 1.4 mm long, 1.1 mm wide.

Cephalothorax whitish; legs with faint yellow tinge; abdomen white.

Ocular tubercle a prominent transverse ridge half as wide as head at that point but eyes completely obsolete, without trace of pigment or eye position.

First leg: femur, 4.75 mm, patella, 0.35 mm, tibia, 4.85 mm, metatarsus, 8 mm, tarsus, 1.5 mm; total, 19.45 mm. First leg 23 times as long as carapace. Tibia and patella of fourth leg, 3.75 mm.

Epigynum as shown in figure 123.

**Male.** Total length, 2.4 mm. Carapace, 0.9 mm long, 0.85 mm wide. Abdomen, 1.5 mm long, 1 mm wide.

First leg: femur, 5.5 mm, patella, 0.4 mm, tibia, 5.7 mm, metatarsus, 9.7 mm, tarsus, 1.5 mm; total, 22.8 mm. First leg 25 times as long as carapace.

Male palpus as shown in figure 129.

**Type Data.** Male holotype from Grutas de Atoyac, Atoyac, Veracruz, México, November 13, 1941 (C. Bolívar, F. Bonet).

**Distribution.** Known only from Grutas de Atoyac.

**Other Records.** Veracruz: Grutas de Atoyac, Atoyac, April 30, 1944 (J. Alvarez, C. Tellez), female; July 19, 1953 (C. J. Goodnight), five females; August 22, 1965 (J. Reddell, J. Fish, W. Bell), four females; August 6, 1969 (S. and J. Peck), four females, immature.

#### ***Metagonia pachona*, new species**

FIGURES 117, 124

**Diagnosis.** Pale species with very small eyes, possible troglobite, related to *tinaja*; posterior median eyes separated by two and one-half diameters; epigynum (fig. 124) with V-shaped figures; male palpus as shown in figure 117.

**Etymology.** Specific name from Spanish *pachon*, used in the feminine, a kind of dog.

**Female.** Total length, 2.6 mm. Carapace, 1 mm long, 0.95 mm wide. Abdomen, 1.6 mm long, 1.4 mm wide.

Cephalothorax and appendages whitish to pale yellow; eyes narrowly ringed with black; abdomen white.

Ocular tubercle of medium development

and eyes small; anterior lateral eyes separated by about three diameters; posterior median eyes separated by two and one-half diameters.

First leg: femur, 5.3 mm, patella, 0.45 mm, tibia, 5.6 mm, metatarsus, 10.3 mm, tarsus, 1.7 mm; total, 23.35 mm. First leg 23 times as long as carapace. Tibia and patella of fourth leg, 4.15 mm.

Epigynum as shown in figure 124.

**Male.** Total length, 2 mm. Carapace, 0.8 mm long, 0.75 mm wide. Abdomen, 1.3 mm long, 1 mm wide.

First leg: femur, 8.2 mm, patella, 0.35 mm, tibia, 5.7 mm, metatarsus, 9.3 mm, tarsus, 1.7 mm; total, 25.25 mm. First leg 31 times as long as carapace. Tibia and patella of fourth leg, 4.1 mm.

Male palpus as shown in figure 117.

**Type Data.** Male holotype from Cueva de El Pachón, 7½ km NE of Antiguo Morelos, Tamaulipas, September 1, 1946 (C. J. Goodnight).

**Distribution.** Known only from Cueva de El Pachón.

**Other Records.** *Tamaulipas*: Cueva de El Pachón, March 12, 1969 (J. Reddell, S. Fowler), two females, immature; July 10, 1969 (S. and J. Peck, R. Norton), female, immature; June 8, 1967 (J. Reddell), male, two females; November 25, 1967 (J. Reddell, S. Fowler), female; December 7, 1945 (C. Bolívar, F. Bonet), four males, immature.

#### ***Metagonia serena*, new species**

FIGURES 128, 130

**Diagnosis.** Well marked species with large eyes related to *tinaja*; posterior median eyes

Fig. 118. *Metagonia punctata*, new species, left male palpus, retrolateral view.

Figs. 119-121. *Metagonia tinaja*, new species. 119. Tip of tarsal process, prolateral view. 120. Left male palpus, retrolateral view. 121. Epigynum, ventral view.

Fig. 122. *Metagonia pura*, new species, epigynum, ventral view.

Fig. 123. *Metagonia atoyacae*, new species, epigynum, ventral view.

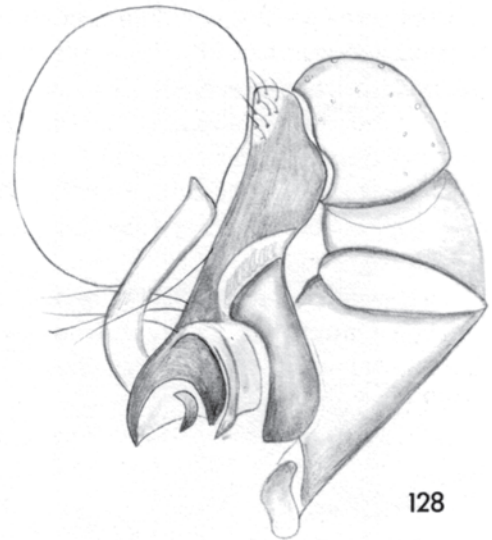
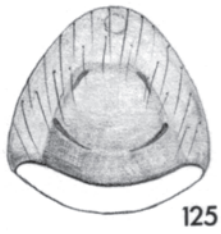
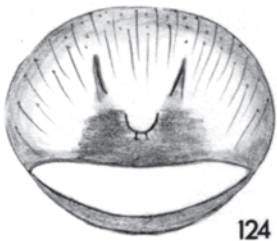
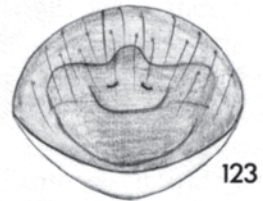
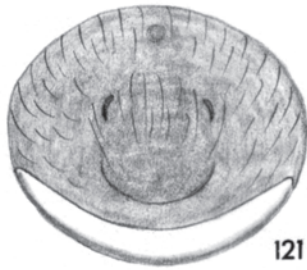
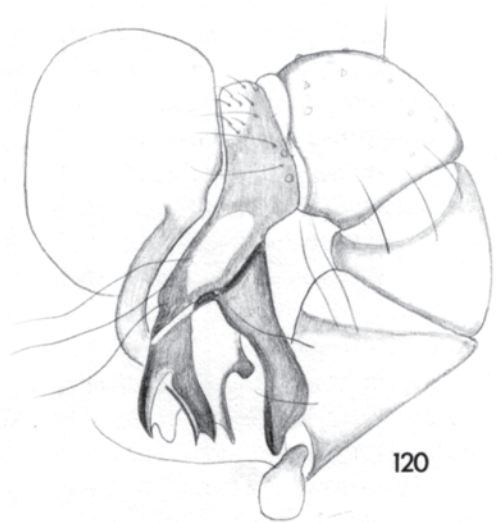
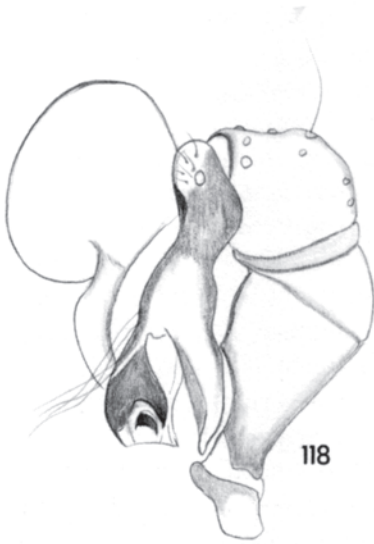
Fig. 124. *Metagonia pachona*, new species, epigynum, ventral view.

Fig. 125. *Metagonia tlamaya*, new species, epigynum, ventral view.

Fig. 126. *Metagonia coahuila*, new species, epigynum, ventral view.

Fig. 127. *Metagonia punctata*, new species, epigynum, ventral view.

Fig. 128. *Metagonia serena*, new species, left male palpus, retrolateral view.



separated by slightly more than diameter; epigynum as shown in figure 130; retrolateral fringe of tarsal process broad (fig. 128).

**Etymology.** Specific name from Latin *serenus*, clear, serene.

**Female.** Total length, 3.1 mm. Carapace, 1.2 mm long, 1.1 mm wide. Abdomen, 1.9 mm long, 1.4 mm wide.

Cephalothorax and legs pale to bright yellow; carapace with pale brown patch on pars cephalica; eyes narrowly ringed with black; patellae pale brown; joints of coxae and legs with dusky lines; abdomen whitish to pale yellow.

Ocular tubercle of medium development, bearing large eyes and occupying two-thirds width of carapace at that point; anterior lateral eyes separated by about two and one-half diameters; posterior median eyes separated by slightly more than long diameter.

First leg: femur, 6.5 mm, patella, 0.6 mm, tibia, 7 mm, Metatarsus, 10.6 mm, tarsus, 1.7 mm; total, 26.4 mm. First leg 22 times as long as carapace. Tibia and patella of fourth leg, 5.2 mm.

Epigynum as shown in figure 130.

**Male.** Total length, 2.4 mm. Carapace, 1 mm long, 0.9 mm wide. Abdomen, 1.4 mm long, 1 mm wide.

Chelicera with distinct, rounded lobe at base and series of about 15 spinules from base to apex on frontal face.

First leg: femur, 6.8 mm, patella, 0.55 mm, tibia, 7.5 mm, metatarsus, 11.3 mm, tarsus, 1.7 mm; total, 27.85 mm. First leg 28 times as long as carapace. Tibia and patella of fourth leg, 5 mm.

Male palpus as shown in figure 125.

**Type Data.** Male holotype from Grutas de García, Nuevo León, México, September 19, 1942 (C. Bolívar).

**Distribution.** Known only from Grutas de García.

**Other Records.** *Nuevo León:* Grutas de García, September 19, 1942 (C. Bolívar), female; June 19, 1942 (C. Bolívar, F. Bonet), five females, immature; June 6, 1966 (J. Reddell, A. Smith), female.

### **Metagonia candela**, new species

FIGURES 131-132

**Diagnosis.** Well marked species with large eyes, related to *tinaja*; posterior median eyes separated by their long diameter; epigynum (fig. 132) with narrowly pointed projection over genital groove; male palpus (fig. 131) with distinctive tarsal process.

**Etymology.** Specific name from Spanish *candela*, a candle, used in apposition.

**Female.** Total length, 3.1 mm. Carapace, 1.1 mm long, 1 mm wide. Abdomen, 2 mm long, 1.6 mm wide.

Cephalothorax and legs pale yellow; carapace with pale brownish patch on pars thoracica; eyes narrowly ringed with black; patellae of legs pale brown; abdomen whitish.

Ocular tubercle of medium prominence; anterior lateral eyes separated by two full diameters; posterior median eyes separated by their long diameter.

First leg: femur, 6.5 mm, patella, 0.5 mm, tibia, 7 mm, metatarsus, 10 mm, tarsus, 1.8 mm; total, 25.8 mm. First leg 23 times as long as carapace. Tibia and patella of fourth leg, 4.7 mm.

Epigynum as shown in figure 132.

**Male.** Total length, 2.6 mm. Carapace, 1.1 mm long, 1 mm wide. Abdomen, 1.5 mm long, 1.2 mm wide.

First leg: femur, 7.2 mm, patella, 0.5 mm, tibia, 7.3 mm, metatarsus, 10.3 mm, tarsus, 1.7 mm; total, 27 mm. First leg about 25 times as long as carapace. Tibia and patella of fourth leg, 4.7 mm.

Male palpus as shown in figure 131.

**Type Data.** Male holotype from Cueva del Carrizal, near La Candela, Nuevo León, México, July 16, 1942 (C. Bolívar, F. Bonet).

**Distribution.** Known only from Gruta del Carrizal.

**Other Records.** *Nuevo León:* Cueva del Carrizal, July 16, 1942 (C. Bolívar), two males, six females, immature; July 13, 1963 (W. Russell), female, immature.



**Metagonia placida**, new species

FIGURES 133-134

**Diagnosis.** Well marked species with fairly large eyes, related to *tinaja*; posterior median eyes separated by long diameter; epigynum (fig. 134) produced into rounded lobe overhanging genital groove; male palpus (fig. 133) with complicated fringe on tarsal process.

**Etymology.** Specific name from Latin *placidus*, placid, quiet.

**Female.** Total length, 3.2 mm. Carapace, 1.2 mm long, 1.1 mm wide. Abdomen, 2 mm long, 1.5 mm wide.

Cephalothorax and appendages pale yellowish; carapace with faint brownish patch on pars thoracica; eyes narrowly ringed with black; patellae brownish; abdomen whitish, with occasional indistinct dusky spots on dorsum.

Ocular tubercle of medium prominence; anterior lateral eyes separated by nearly two and one-half diameters; posterior median eyes separated by long diameter.

First leg: femur, 5.2 mm, patella, 0.5 mm, tibia, 5.35 mm, metatarsus, 8.2 mm, tarsus, 1.6 mm; total, 20.9 mm. First leg 17 times as long as carapace. Tibia and patella of fourth leg, 4.3 mm.

Epigynum as shown in figure 134.

**Male.** Total length, 2.8 mm. Carapace, 1.2 mm long, 1.1 mm wide. Abdomen, 1.8 mm long, 1.4 mm wide.

First leg: femur, 7.3 mm, patella, 0.5 mm, tibia, 7.5 mm, metatarsus, 11.5 mm, tarsus, 1.7 mm; total, 28.5 mm. First leg about 24 times as long as carapace.

Male palpus as shown in figure 133.

**Type Data.** Male holotype from Cueva de la Boca, 6 km SE of Villa Santiago, Nuevo León, México, July 13, 1942 (C. Bolívar).

**Distribution.** Known from two Nuevo León caves.

**Other Records.** *Nuevo León:* Cueva de la Boca, May 1, 1966 (J. Fish, E. Alexander), male, immature; June 17, 1944 (F. Bonet), immature female; July 13, 1942 (C. Bolívar), 11 males, seven females, immature. Cueva de Chorros de Agua, 3 km W of Montemorelos, April 10, 1966 (W. Russell), female.

**Metagonia coahuila**, new species

FIGURE 126

**Diagnosis.** Small, relatively short legged species with dusky pattern on carapace, readily separated by details of epigynum (fig. 126).

**Etymology.** Specific name from Mexican state Coahuila, used in apposition.

**Female.** Total length, 2.1 mm. Carapace, 0.9 mm long, 0.85 mm wide. Abdomen, 1.3 mm long, 1.1 mm wide.

Cephalothorax and legs pale yellow; carapace with pair of dusky bands on clypeus and pair of linear stripes at center of pars thoracica; eyes ringed with black; patellae of legs pale brown; abdomen white, plain or with dusky subintegumental spots.

Eyes large, with triads occupying somewhat more than two-thirds width of carapace at that point; front eyes separated by two full diameters; posterior median eyes separated by long diameter.

First leg: femur, 4 mm, patella, 0.35 mm, tibia, 4.5 mm, metatarsus, 5.7 mm, tarsus, 1.2 mm; total, 15.75 mm. First leg 17 times as long as carapace. Tibia and patella of fourth leg, 3.2 mm.

Epigynum as shown in figure 126.

**Type Data.** Female holotype, and four females, from Cueva de Cuevacillas, 16 km NE of Arteaga, Coahuila, México, July 26, 1965 (J. Reddell, J. Fish).

**Distribution.** Known from two caves in Coahuila.

**Other Record.** *Coahuila:* Cueva de las Vigas, 23 km E of Arteaga, June 3, 1966 (J. Reddell), two females found hanging from webs along wall.

**Metagonia mcNatti**, new species

FIGURE 135

**Diagnosis.** Well marked species with large eyes and pattern of brownish spots and rings on carapace and legs; epigynum (fig. 135) broadly rounded behind, with pair of marks on each side margin.

**Etymology.** Named for Mr. Logan McNatt.

**Female.** Total length, 3 mm. Carapace, 1.15 mm long, 1 mm wide. Abdomen, 2 mm long, 1.3 mm wide.

Cephalothorax and appendages white to pale yellow, marked as follows: carapace with two triangular black spots at middle; eye tubercles tinged with black; patellae of legs and distal ends of tibiae with brown rings and coxae flecked with brown; sternum with scalloped brown stripe along side margins. Abdomen gray.

Eyes in two triads on rather prominently elevated tubercles occupying full width of head; anterior lateral eyes separated by three diameters; posterior row of four eyes in re-curved line, with middle eyes separated by one and one-half diameters.

Second leg: femur, 4.75 mm, patella, 0.5 mm, tibia, 4.15 mm, metatarsus, 6.5 mm, tarsus, 1.15 mm; total, 17.05 mm. Second leg about 14 times as long as carapace. First leg missing. Tibia and patella of fourth leg, 4.5 mm.

Epigynum as shown in figure 135.

**Type Data.** Female holotype from Cueva de los Pinos Ramas, K1112 México-Tuxtla Gutiérrez Highway, Chiapas, México, August 19, 1967 (J. Reddell, J. Fish, T. R. Evans).

**Distribution.** Known from two caves in Chiapas.

**Other Record.** *Chiapas:* Cueva Cerro Hueco, 3 km SE of Tuxtla Gutiérrez, August 18, 1967 (J. Reddell, J. Fish, M. Tandy), immature female.

#### Family Symphytognathidae

The only Mexican genus of this family so far identified with the cave habitat is *Maymena*, established by me in 1960 (Gertsch, p. 30) for three well marked species. Three additional species are described below, and the male of *Maymena misteca* Gertsch is described for the first time. Although few examples of these tiny spiders have come from outside habitats, it is clear that they must be classified as troglophiles. Reduction in eye size of some of the species is the only discernible evidence of cave adaptation.

#### Genus *Maymena* Gertsch

*Maymena mayana* (Chamberlin and Ivie)

*Nesticus mayanus* Chamberlin and Ivie, 1938, p. 134, figs. 12-13. Gertsch, 1960, p. 31, figs. 49-51, 60-64.

**New Records.** *Veracruz:* Cueva de Ojo de Agua de Tlilapan, Tlilapan, August 4, 1967 (J. Reddell, J. Fish, T. Evans), two males, five females. Grutas de Atoyac, Atoyac, August 6, 1969 (S. and J. Peck), two males, seven females. *Chiapas:* Cueva de San Juan de Arco, Comitán, August 17, 1969 (S. Peck), male, female. Cueva de Sala de Agua Grande, 10 km W of Yanga, August 9, 1967 (J. Reddell, J. Fish, T. Evans), four males, five females. Hoyo de Don Nicho, 13 km W of

Fig. 129 *Metagonia atoyacae*, new species, left male palpus, retrolateral view.

Fig. 130. *Metagonia serena*, new species, epigynum, ventral view.

Figs. 131-132. *Metagonia candela*, new species. 131. Left male palpus, retrolateral view. 132. Epigynum, ventral view.

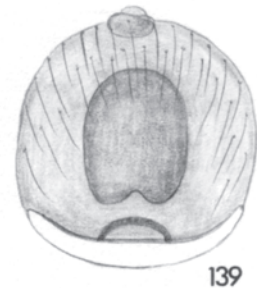
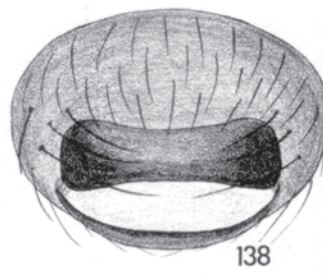
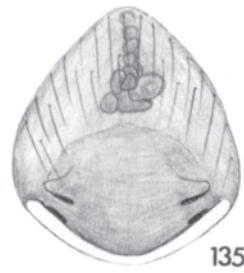
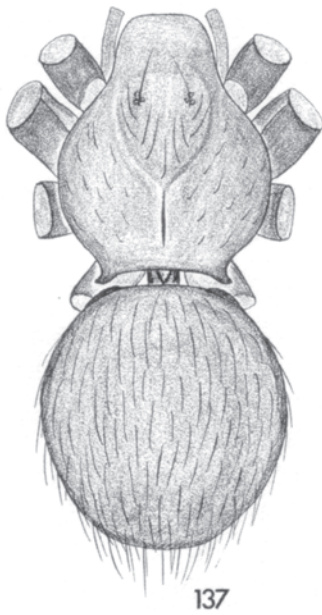
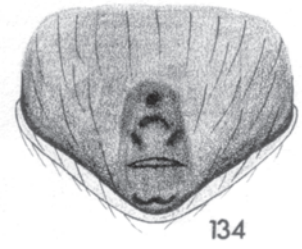
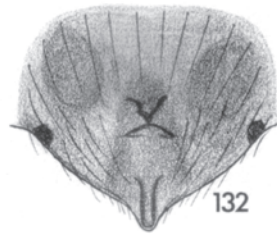
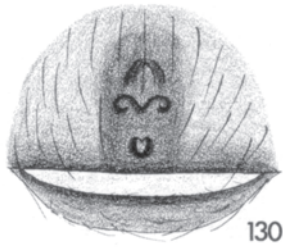
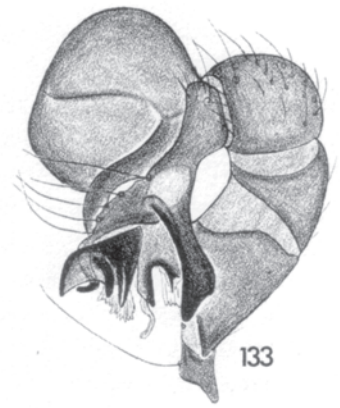
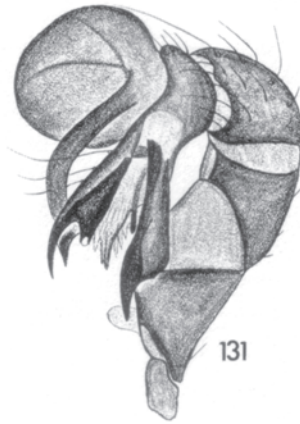
Figs. 133-134. *Metagonia placida*, new species. 133. Left male palpus, retrolateral view. 134. Epigynum, ventral view.

Fig. 135. *Metagonia mcnatti*, new species, epigynum, ventral view.

Fig. 136. *Metagonia amica*, new species, epigynum, ventral view.

Figs. 137-138. *Pholcophora gruta*, new species. 137. Carapace and abdomen of female, dorsal view. 138. Epigynum, ventral view.

Fig. 139. *Metagonia secreta*, new species, epigynum, ventral view.



Ocozocoautla, August 16, 1967 (J. Reddell, J. Fish, T. Evans), male, 10 females.

*Maymena chica* Gertsch

*Maymena chica* Gertsch, 1960, p. 35, figs. 56-58, 69, 70.

**New Records.** *Tamaulipas*: Cueva de los Vampiros, 20 km NW of El Limón, May 27, 1968 (J. Reddell), female. *San Luis Potosí*: Cueva Pinta, 14 km NE of Valles, January 31, 1969 (J. Reddell, W. Russell), four females. Sótano de la Tinaja, 10½ km NE of Valles, February 18, 1970 (J. A. L. Cooke), female from ground debris 1,500 feet from entrance. Cueva de Taninul #4, 12½ km SE of Ciudad Valles, July 11, 1969 (S. and J. Peck), male. Cueva de la Puente, 21 km S of San Francisco, November 30, 1968 (J. Sumner, W. Ramsey, D. Faith, J. McIntire), female. Sótano del Tigre, 14 km NE of Valles, November 24, 1967 (J. Reddell, J. Fish), female. Sótano de Pichijumo, 8 km NE of Valles, June 1, 1968 (J. Reddell), female; April 12, 1969 (T. Raines), male.

*Maymena cascada*, new species

FIGURES 142-143, 145

**Diagnosis.** Related to *Maymena chica* but readily separated by following features: epigynum (fig. 145) simple, gently rounded lobe with two internal receptacles; cymbium of male palpus drawn out to slender tube (figs. 142-143).

**Etymology.** Specific name from Spanish *cascada*, cascade, used in apposition, named for Cueva de la Cascada.

**Female.** Total length, 2.1 mm. Carapace, 0.9 mm long, 0.8 mm wide.

Coloration and structure typical, like those of *chica* and *mayana*. Carapace and appendages dusky yellow to light brown; eye tubercles blackish; legs with few black hairs and setae. Abdomen uniform gray to bluish gray.

Clypeus subvertical, equal in height to three diameters of anterior lateral eye. First eye row straight; dark anterior median eyes

separated by radius, about as far from slightly larger lateral eyes (9/8). Posterior eye row moderately procurved; oval median eyes separated by their diameter, about as far from lateral eyes. Median ocular quadrangle as broad as long; front eyes smaller (10/8).

First leg: femur, 1.5 mm, patella, 0.45 mm, tibia, 1.1 mm, metatarsus, 0.82 mm, tarsus, 0.27 mm; total, 4.14 mm. Tibia and patella of fourth leg, 1 mm.

Epigynum (fig. 145) without projecting lobe, presenting small pattern of internal receptacles.

**Male.** Total length, 1.5 mm. Carapace, 0.8 mm long, 0.77 mm wide.

Coloration and structure like those of female but posterior eye row straight.

First leg: femur, 1.45 mm, patella, 0.5 mm, tibia, 1.2 mm, metatarsus, 0.7 mm, tarsus, 0.57 mm; total, 4.42 mm. Tibia and patella of fourth leg, 0.9 mm. First tibia with black clasping spur at apex below on prolateral side, pointing between two similar spines at base of adjacent metatarsus on prolateral side.

Male palpus (figs. 142-143) similar to that of *chica* in having cymbium drawn out to thin trough but this ended in narrow point.

**Type Data.** Male holotype, 16 females and immatures, from Cueva de la Cascada, Tequila, Veracruz, México, August 6, 1967 (J. Reddell, J. Fish, T. Evans).

*Maymena delicata*, new species

FIGURES 140-141, 144

**Diagnosis.** Related to *Maymena chica* but readily separated by following features: epigynum with small, truncated lobe and distinctive pattern of receptacles (fig. 144); male palpus with elongated cymbium and embolus twisted apically to distinctive form (figs. 140-141).

**Etymology.** Specific name from Latin *delicatus*, dainty.

**Female.** Total length, 2.15 mm. Carapace, 0.95 mm long, 0.8 mm wide.

Coloration and structure typical, like those of *chica* and *mayana*. Cephalothorax and appendages pale yellowish brown; eye tuber-



cles black; legs with dusky shading and set with blackish hairs and spines. Abdomen gray to bluish, without contrasting pattern.

Clypeus sloping forward, equal in height to three diameters of anterior lateral eye. Front eye row faintly recurved; dark median eyes separated by two-thirds their diameter, about as far from larger lateral eyes (10/8). Posterior eye row slightly procurved; oval median eyes separated by long diameter, about same distance from lateral eyes. Median ocular quadrangle about as broad as long; front eyes smaller (10/8).

First leg: femur, 1.78 mm, patella, 0.55 mm, tibia, 1.52 mm, metatarsus, 0.92 mm, tarsus, 0.70 mm; total, 5.47 mm. Tibia and patella of fourth leg, 1.13 mm.

Epigynum (fig. 144) with small posterior lobe and internal pattern of receptacles.

**Male.** Total length, 1.7 mm. Carapace, 0.9 mm long, 0.8 mm wide.

Coloration and structure essentially like those of females, but eyes of front row subequal in size.

First leg: femur, 1.65 mm, patella, 0.52 mm, tibia, 1.5 mm, metatarsus, 1 mm, tarsus, 0.7 mm; total, 5.37 mm. Tibia and patella of fourth leg, 1.12 mm. First legs with stout clasping spine and supporting spines on metatarsus like those of *chica* and *cascada*.

Male palpus (figs. 140-141) with cymbium drawn out to elongated trough, twisted at apex to distinctive form.

**Type Data.** Male holotype and three females from Cueva de Ojo de Agua Grande, 10 km N of Potrero Viejo, Veracruz, México (J. Reddell, J. Fish, W. Bell).

**Maymena grisea, new species**

FIGURE 148

**Diagnosis.** Similar to *Maymena chica* Gertsch but separated from all known species by the epigynum (fig. 148) which bears two sharp spurs beside small rounded lobe overhanging genital groove.

**Etymology.** Specific name from Latin *griseus*, gray.

**Female.** Total length, 2.2 mm. Carapace,

1.1 mm long, 0.97 mm wide.

Coloration and structure typical, like those of *chica* and *mayana*. Carapace pale yellow, shaded with dusky; eye tubercles black; sternum blackish; coxae and femora of legs pale yellow but apical segments brownish. Abdomen gray, dusky on sides.

Clypeus sloping forward, equal in height to two and one-half diameters of anterior lateral eyes. Front eye row weakly procurved; dark anterior median eyes smaller than anterior lateral eyes (10/12), separated by third of diameter, nearly full diameter from anterior lateral eyes. Posterior eye row gently procurved; oval posterior median eyes separated by long diameter, about as far from subequal lateral eyes. Median ocular quadrangle as broad as long; front eyes smaller (10/12).

First leg: femur, 1.3 mm, patella, 0.45 mm, tibia, 0.90 mm, metatarsus, 0.94 mm, tarsus, 0.55 mm; total, 4.14 mm. Tibia and patella of fourth leg, 1.2 mm.

Epigynum (fig. 148) broad sclerotized plate bearing behind small lobe flanked by distinct, sharp spur on each side and small median pit near posterior coxae.

**Type Data.** Female holotype from Cueva de la Capilla, 13½ km NW of Gómez Farías El Porvenir, Tamaulipas, México, January 13, 1971 (J. Reddell, R. Mitchell, and group).

*Maymena misteca* Gertsch

FIGURES 146-147

*Maymena misteca* Gertsch, 1960, p. 36, fig. 68.

**Diagnosis.** Similar to *Maymena chica* but readily distinguished by following features: epigynum with moderately prominent, rounded posterior lobe and distinctive pattern of internal structures and inconspicuous pit between receptacles; first leg of male without clasping spine at apex of tibia but with single long spine at base of metatarsus; male palpus (figs. 146-147) with elongated cymbium and distinct apical process as shown.

**Type Data.** Female holotype from Gruta de Acuitlapán, Guerrero, México, in the American Museum of Natural History.

**Distribution.** So far known only from caves in Guerrero.

**New Records.** *Guerrero*: Cueva Chica del Mogote, August 25, 1965 (J. Reddell, J. Fish, W. Bell), male, four females. Grutas del Mogote, 16 km N of Cacahuamilpa, August 25, 1965 (J. Reddell, J. Fish, W. Bell), male, three females.

### Family Nesticidae

The nesticids are sedentary spiders that have long been identified with the cave habitat and a high percentage of the species live in caves, many as blind troglobites. The Mexican fauna includes half a dozen species of which none at present can be classified as an obligative cavernicole.

Genus *Gaucelmus* Keyserling

*Gaucelmus augustinus* Keyserling

*Gaucelmus augustinus* Keyserling, 1884, p. 99.

**Type Data.** Female type from cellars of Fort St. Augustine, Florida.

**Distribution.** Caves and outside situations from Florida to Texas and south through Mexico into Central America.

**Records.** *Tamaulipas*: Cueva del Nacimiento del Río Frío, 7 km S of Gómez Farías, June 29, 1969 (S. Peck), two females. Cueva de los Cuarteles, Aldama, December 1948 (C. Bolívar), female. *San Luis Potosí*: Cueva de Llanura, 3 km W of Micos, July 31, 1970 (W. Russell, D. McKenzie), two females, immature. *Nuevo León*: Grutas del Palmito,

6½ km S of Bustamente, December 26, 1963 (W. Russell), female; July 13, 1963 (W. Russell), female in entrance room; December 30, 1964 (W. Russell), female. *Querétaro*: Cueva del Chevrón, 3 km E of Pinal de Amoles, July 17, 1969 (S. Peck), female.

### *Gaucelmus calidus*, new species

FIGURES 149-150

**Diagnosis.** Relative of *augustinus* readily separated by following features: epigynum with large accessory lobes and distinct dark septum on margin of genital groove; conductor of male palpus (fig. 149) with deep groove in apical half to form rounded lobe and curved retrolateral process with divided spur at apex.

**Etymology.** Specific name from Latin *calidus*, warm or hot.

**Female.** Total length, 7 mm. Carapace, 2.75 mm long, 2.35 mm wide. Abdomen, 4.3 mm long, 3.5 mm wide.

Cephalothorax and legs dull to bright orange brown; legs plain or faintly marked with reddish annulae; abdomen dull white to yellowish, in some specimens with dusky dorsal pattern.

Structure similar to that of *augustinus*; retromargin of chelicera with small lobe covered with denticles.

First leg: femur, 7.35 mm, patella, 1.25 mm, tibia, 6.65 mm, metatarsus, 6.6 mm, tarsus, 2.5 mm; total, 24.35 mm. First leg about nine times, first femur 2.6 times as long as carapace.

Epigynum (fig. 150) larger than that of *augustinus* with following features: seminal receptacles large, oval, separated by half their

Figs. 140-141. *Maymena delicata*, new species. 140. Left male palpus, ventral view. 141. Left male palpus, dorsal view.

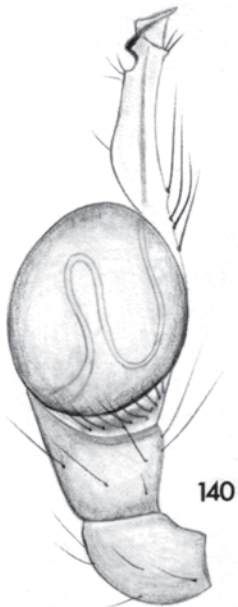
Figs. 142-143. *Maymena cascada*, new species. 142. Left male palpus, ventral view. 143. Left male palpus, dorsal view.

Fig. 144. *Maymena delicata*, new species, epigynum, ventral view.

Fig. 145. *Maymena cascada*, new species, epigynum, ventral view.

Figs. 146-147. *Maymena misteca* Gertsch. 146. Left male palpus, ventral view. 147. Left male palpus, dorsal view.

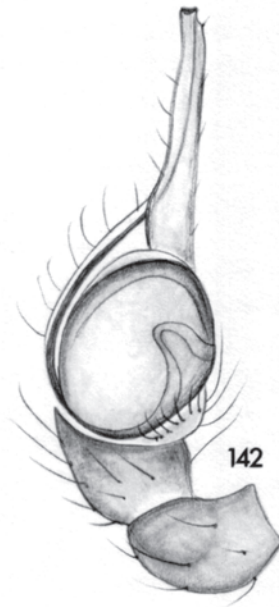
Fig. 148. *Maymena grisea*, new species, epigynum, ventral view.



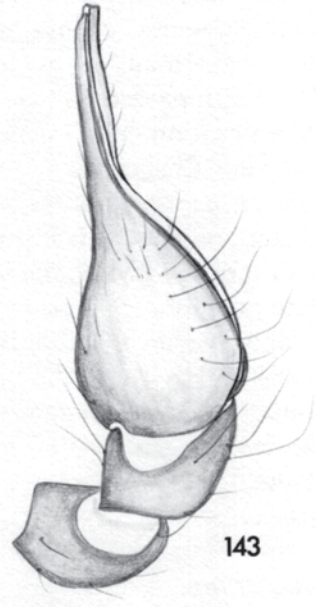
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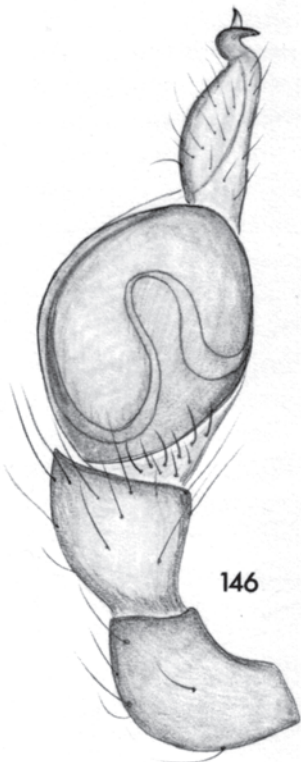
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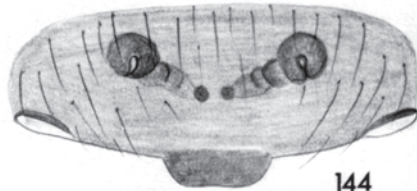
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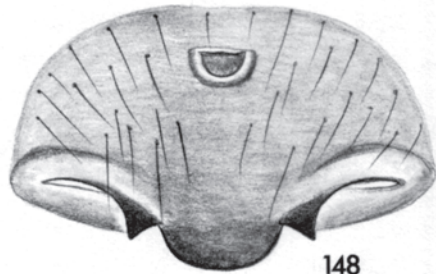
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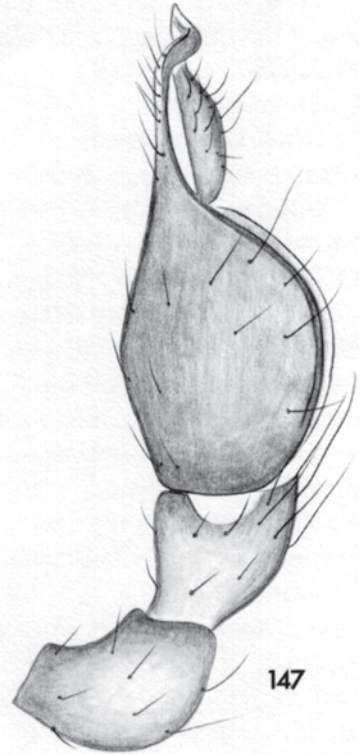
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148



147



width and bearing large accessory lobe at base outside; posterior margin with distinctive, sclerotized pattern and conspicuous dark median septum.

**Male.** Total length, 4.65 mm. Carapace, 2.35 mm long, 2.15 mm wide. Abdomen, 2.3 mm long, 1.6 mm wide.

Coloration and structure like those of female. Chelicerae stouter than those of *augustinus*; promargin with three teeth but distal one enlarged, slightly sinuous, and basal pair reduced in size; retromargin with denticulate compound tooth; fang with typical bulbous enlargement at base.

First leg: femur, 7.8 mm, patella, 1.15 mm, tibia, 8.1 mm, metatarsus, 7.5 mm, tarsus, 2.75 mm; total, 27.3 mm. First leg 11.6 times, first femur 3.4 times as long as carapace.

Male palpus (fig. 149) like that of *augustinus* except as follows: conductor deeply divided to form rounded lobe and longer curved process bifid at apex.

**Type Data.** Male holotype from Grutas de Zapaluta, 6½ km S of Zapaluta, Chiapas, México, July 19, 1950 (C. and M. Goodnight).

**Distribution.** Caves of Hidalgo, Veracruz Chiapas and Oaxaca, and Guatemala.

**Records.** *Hidalgo*: Cueva de El Tenango, 6½ km S of Chapulhuacán, August 18, 1965 (J. Reddell, J. Fish, W. Bell), five females on walls above stream passage. *Veracruz*: Cueva de Ojo de Agua de Tlilapan, Tlilapan, August 1967 (J. Reddell, J. Fish, T. R. Evans), three males, many females; August 3, 1967 (J. Reddell), four females; August 8, 1969 (S. and J. Peck), male, seven females. Cave at Fortín de las Flores, June 27, 1963 (R. E. Woodruff), six females; April 28, 1944 (C. Bolívar, I. Pina), two females. Sótano de Sphodrini, Tequila, August 6, 1967 (J. Reddell, T. R. Evans), immature. Cueva del Ojo de Agua Grande, 10 km N of Potrero Viejo, August 22, 1965 (J. Reddell, J. Fish, W. Bell), female. *Chiapas*: Grutas de Zapaluta, July 19, 1950 (C. and M. Goodnight), two males, females; August 20, 1967 (J. Reddell, J. Fish, T. R. Evans), females, immature. Cueva del Tío Ticho, 1½ km S of Comitán,

August 21, 1967 (J. Reddell, J. Fish, T. R. Evans), two females, immature. Sumidero del Camino, 16 km NE of Comitán, August 22, 1967 (J. Reddell, J. Fish), females. Cueva Chica de Hunchabien, 1½ km N of Comitán, August 21, 1967 (J. Reddell), female. *Oaxaca*: Cueva Bonita del Presidente, 1½ km N of Huautla, August 12, 1967 (J. Reddell, J. Fish, T. R. Evans), female. Milliped Cave, 8 km N of Huautla, June 1965 (W. Russell), male, two females. Cueva del Camino, Puente de Fierro, August 13, 1967 (J. Reddell), two females.

#### Genus *Nesticus* Thorell

#### *Nesticus pallidus* Emerton

*Nesticus pallidus* Emerton, 1875, p. 275.

**Distribution.** Common North American species widespread in Mexico in caves and in outside situations.

**Cave Records.** *Tamaulipas*: Cueva de la Capilla, El Porvenir, January 13, 1971 (J. Reddell, R. Mitchell), penultimate male. Bee Cave, 19 km NW of El Limón, January 29, 1968 (J. Reddell), three females. Cueva de la Mina, 9½ km NW of Gómez Farías, July 1, 1969 (S. Peck, R. Norton), female, immature; March 24, 1967 (R. Mitchell), female. Sótano de los Pinos, Joya de Salas, June 5, 1965 (D. McKenzie), male, female. Cueva de la Virgén, 19 km W of Hidalgo, April 10, 1966 (W. Russell), three females, immature. Cueva de El Pachón, 7½ km NE of Antiguo Morelos, November 24, 1967 (J. Reddell, S. Fowler), small female. *San Luis Potosí*: Cueva Chica, 2½ km NE of El Pujal, March 13, 14, 1940 (W. Bridges), males, females, immature; April 2, 1942 (C. Bolívar), female; June 5, 1967 (R. Mitchell); two males, three females; July 22, 1969 (S. and J. Peck), female. Cueva de Los Sabinos, 12½ km NE of Valles, August 14, 1942 (C. Bolívar, F. Bonet, B. Osorio, D. Peláez), two females; April 3, 1942 (C. Bolívar), two males, two females; March 30, 1946 (B. J. Dontzin, E. Ruda), male, female; May 21, 1944 (F. Bonet), two females; January 27, 1969 (J. Reddell, T. Mollhagen, T.



Albert, R. Smith), females, immature. Sótano de Yerbaniz, 21 km N of Valles, February 17, 1970, females, immature. Sótano de Pichijumo, 8 km NE of Valles, January 26, 1969 (J. Reddell, T. Mollhagen, T. Albert, R. Smith), two males, three females, immature; June 1968 (J. Reddell), males, females. Sótano del Tigre, 14 km NE of Valles, February 1, 1968 (J. Reddell, W. Russell), female. Sótano del Valle de los Fantasmas, November 24, 1969 (J. Fish, J. Davis), female. Cueva de la Puente, 1 km S of San Francisco, November 30, 1968 (J. Sumner, W. Ransel, D. Faith, J. McIntire), three females. Ventana Jabalí, 20 km NE of Valles, March 26, 1964 (T. Raines, D. McKenzie, W. Bell), female; July 12, 1969 (S. and J. Peck), four females, immature. Sótano de la Tinaja, 10½ km NE of Valles, December 24, 1963 (D. McKenzie), female, immature; February 18, 1970 (J. A. L. Cooke), female, immature from flood debris on mud slope 500 m from entrance. Sótano del Arroyo, 12 km NE of Valles, November 25, 1962 (J. Reddell), females, immature. *Coahuila*: Sumidero de Alicantre, 16 km W of Cuatro Ciénegas, November 8, 1964 (W. Russell), female. *Querétaro*: Sótano de El Tigre, 24 km SW of Jalpan, July 11, 1967 (J. Fish), female. *Michoacán*: Cueva de la Calera, Tuxpán, April 1941 (C. Bolívar, F. Bonet, Velo, B. Osorio), two females, immature. *Chihuahua*: Cueva del Diablo, Salaces, July 23, 1947 (W. J. Gertsch), male, female. *Guerrero*: Grutas de Cacahuamilpa, June 2, 1940 (D. Peláez), male, female, immature; October 24, 1942 (C. Bolívar, D. Peláez), males, females, immature; May 5, 1963 (J. Hendrichs), females, immature; August 24, 1965 (J. Reddell, J. Fish, W. Bell), female, immature; September 2, 1966 (J. and W. Ivie), many males and females; August 15, 1969 (J. Fish, J. Reddell), female, immature. *Oaxaca*: Cueva Puente de Fierro, 8 km N of Huautla, August 13, 1967 (J. Reddell, J. Fish, T. R. Evans), female. *Veracruz*: Cueva de Ojo de Agua Grande, 11 km N of Potrero Viejo, August 3, 1967 (J. Reddell, J. Fish, T. R. Evans), females, immature. Cueva de la Cascada, 1 km W of Tequila, June 1963 (D. McKenzie), female. Cueva de Sala de Agua

Grande, 10 km E of Yanga, August 9, 1967 (J. Reddell, J. Fish, T. R. Evans), male, many females, immature. Sótano de Oztoatlicholaa, ½ km NW of Tequila, June 1963 (D. McKenzie), female. *Chiapas*: Hoyo de Don Nicho, 13 km W of Ocozocautla, August 16, 1967 (J. Reddell, J. Fish, T. R. Evans), male, female. Cueva Cerro Hueco, 3 km SE of Tuxtla Gutiérrez, August 8, 1967 (J. Reddell, J. Fish, M. Tandy), male, females, immature. Cueva del Tío Ticho, 1½ km S of Comitán, August 21, 1967 (J. Reddell, J. Fish, T. R. Evans), females, immature. Grutas de Zapaluta, 6½ km SE of Zapaluta, August 20, 1967 (J. Reddell, J. Fish, T. R. Evans), females. Cueva del Tempisque, 13 km W of Ocozocautla, August 17, 1967 (J. Reddell, J. Fish, T. R. Evans), females, immature. Sumidero del Camino, 16 km NE of Comitán, August 22, 1967 (J. Reddell, J. Fish), females, immature. *Yucatán*: Cenote Hebia, near Hochtún, July 5, 1948 (C. M. Goodnight), males, females, immature.

#### *Nesticus nahuanus*, new species

FIGURES 151, 156

**Diagnosis.** Large species with stout body and appendages, readily separated from all known species by features of the genitalia: Epigynum (fig. 156) with central pale sclerite; paracymbium of male palpus (fig. 151) with thin lamina at apex and three small processes on inner margin.

**Etymology.** Specific name from Mexican *nahua*, the Nahuatl people.

**Female from Cueva de la Boca.** Total length, 5.6 mm. Carapace, 2.5 mm long, 2 mm wide. Abdomen, 3.7 mm long, 2.7 mm wide.

Cephalothorax and appendages bright yellow to orange, without contrasting markings; eye tubercles without dark pigment; abdomen gray, without pattern.

Structure typical: clypeus broad, sloping, equal in height to four diameters of anterior lateral eye. Eyes evanescent, small and widely separated, set on inconspicuous pale tubercles; first eye row slightly recurved, with

anterior median eyes separated by full diameter, nearly twice as far from anterior lateral eye; posterior eye row moderately procurved, with posterior median eyes separated by more than two diameters (9/21), nearer lateral eyes (9/13). Chelicera with three large teeth on promargin and line of about 12 small denticles on retromargin.

First leg: femur, 4.5 mm, patella, 1.1 mm, tibia, 4.5 mm, metatarsus, 4.5 mm, tarsus, 1.75 mm; total, 16.35 mm. First femur 1.8 times, first leg 6.5 times as long as carapace.

Epigynum as shown in figure 156.

**Male.** Total length, 5.5 mm. Carapace, 2.7 mm long, 2.3 mm wide. Abdomen, 3.2 mm long, 2 mm wide.

Coloration and structure essentially like those of female. Posterior eye row more weakly recurved.

First leg: femur, 5 mm, patella, 1.25 mm, tibia, 5.2 mm, metatarsus, 5.3 mm, tarsus, 1.9 mm; total, 18.65 mm. First femur 1.8 times, first leg about seven times as long as carapace.

Male palpus (fig. 151) with following features: paracymbium large, curved, with thin spatulate lamina at apex and with three small processes on inner margin; tegular spurs two small triangular processes; median apophysis a short sclerite with thick hook at apex; conductor a heavy triangular sclerite; embolus of average length, thick at base, with small apical curve to conductor.

**Type Data.** Male holotype, three males and seven females from Cueva de la Boca, 6 km SE of Santiago, Nuevo León, México, July 13, 1942 (C. Bolívar, Maldonado, B. Osorio, D. Peláez).

**Distribution.** Caves of Nuevo León.

**Other Records.** *Nuevo León:* Cueva de la Boca, June 17, 1944 (F. Bonet), two males; May 1, 1966 (J. Fish, E. Alexander), female; January 22, 1967 (T. Raines), male, penultimate male; December 4, 1966 (T. Raines), female; June 20, 1969 (S. and J. Peck), female. Resumidero de Pablillo, Pablillo, June 4, 1966 (J. Reddell, D. McKenzie), immature female. Small caves, Chipinque Mesa, Monterrey, June 24, 1969 (S. and J. Peck, R. Norton), male, two females, immature.

### *Nesticus hoffmanni*, new species

FIGURES 152, 157

**Diagnosis.** Relative of *nahuanus* with larger eyes and well marked dark pattern on abdomen and longer legs, readily separated by features of genitalia: epigynum (fig. 157) a simple rounded elevation with openings on genital margin; paracymbium of male palpus (fig. 152) a short, thick, curved spur without conspicuous processes.

**Etymology.** Named for the late Dr. Carlos Hoffmann of Mexico City.

**Female.** Total length, 6 mm. Carapace, 2.7 mm long, 2.3 mm wide. Abdomen, 4 mm long, 2.5 mm wide.

Cephalothorax and appendages dull to bright orange; carapace with dusky shadings on pars cephalica and black eye tubercles; abdomen gray to yellow, with pattern of black chevrons thickly covering dorsum and with pale venter; legs with dusky rings as follows: distal one on femora, and basal and subdistal ones on tibiae.

Structure like that of *nahuanus* except as noted. Front eye row slightly recurved; anterior median eyes separated by nearly diameter, as far from lateral eye. Posterior eye row weakly procurved; posterior median eyes separated by narrow diameter, slightly closer to lateral eye. Eyes larger, darkly pigmented and closer together than those of *nahuanus*.

First leg: femur, 5.25 mm, patella, 1.2 mm, tibia, 5.15 mm, metatarsus, 5.15 mm, tarsus, 1.8 mm; total, 18.35 mm. First femur 1.9 times, first leg about seven times as long as carapace.

Epigynum as shown in figure 157.

**Male.** Total length, 4.5 mm. Carapace, 2.2 mm long, 2.1 mm wide. Abdomen, 2.6 mm long, 1.7 mm wide.

Coloration and structure like those of female except as noted. Posterior eye row straight.

First leg: femur, 5.35 mm, patella, 1.1 mm, tibia, 5.7 mm, metatarsus, 5.5 mm, tarsus, 1.8 mm; total, 19.45 mm. First femur 2.4 times, first leg about nine times as long as carapace.

Male palpus (fig. 152) with following fea-

tures: paracymbium a short, thick, curved spur without conspicuous processes; two tegular apophyses, a rounded spur and curved blade; median apophysis a narrow sclerite with small apical hook; embolus thick at base, with distinctive coil at center, and from there becoming thin and making wide turn to conductor.

**Type Data.** Male holotype, another male, six females and immature from Cueva de El Ocote, 7 km N of Kilometer 295, 1½ km N of Palomas (small roadside cave), July 20, 1956 (V. Roth, W. J. Gertsch).

**Distribution.** Caves of Hidalgo and San Luis Potosí.

**Other Records.** *Hidalgo:* Cueva de El Ocote, August 18, 1964 (J. and W. Ivie), female, immature; August 11, 1966 (J. Fish, J. Reddell), three females, immature; July 16, 1969 (S. and J. Peck), female, immature. *San Luis Potosí:* Cueva del Llano de Conejo, Xilitla, April 3, 1969 (T. R. Evans), female.

#### ***Nesticus vazquezae*, new species**

FIGURE 153

**Diagnosis.** Near relative of *hoffmanni* with smaller, more widely spaced eyes, longer legs and distinct epigynum (fig. 153).

**Etymology.** Named for Dr. Leonila Vazquez of the Instituto de Biología of Mexico City.

**Female.** Total length, 6.8 mm. Carapace, 2.9 mm long, 2.35 mm wide. Abdomen, 4 mm long, 2.75 mm wide.

Cephalothorax and appendages bright orange; eyes narrowly ringed with black; legs without dusky rings; abdomen gray, without pattern.

Structure like that of *hoffmanni* except as noted. Eyes of medium size and farther apart. First eye row moderately recurved; anterior median eyes separated by full diameter, as far from lateral eye. Posterior eye row moderately procurved; posterior median eyes separated by more than diameter (16/20), a narrow diameter from posterior lateral eye.

First leg: femur, 6.2 mm, patella, 1.35 mm, tibia, 6 mm, metatarsus, 5.75 mm, tarsus,

2.15 mm; total, 21.45 mm. First femur 2.1 times, first leg 7.4 times as long as carapace.

Epigynum as shown in figure 153.

**Type Data.** Female holotype and two females from Sótano del Gobernador, Pinal de Amoles, Querétaro, México, March 10, 1967 (J. Reddell, J. Fish).

**Distribution.** Caves of Querétaro.

**Other Records.** *Querétaro:* Cueva del Mercurio, Tejamanil, July 10, 1967 (J. Reddell), female. Sótano de Tejamanil, Tejamanil, August 9, 1966 (J. Fish), seven females, immature.

#### **Family Ctenidae**

The ctenids are often common in caves and live on the walls and floors, usually in plain sight. Although some of the species are paler than those found in outside situations, all of these active, vagrant spiders are classed as trogliphiles.

#### ***Ctenus mitchelli*, new species**

FIGURES 154-155

**Diagnosis.** Large, typical species of genus readily recognized by distinctive features of male and female genitalia as follows: epigynum (fig. 155) a longer than broad, apically rounded lobe with long brown spur on each side; male palpus (fig. 154) with elongated median apophysis nearly as long as bulb.

**Etymology.** Named for Dr. Robert Mitchell.

**Female.** Total length, 25.5 mm. Carapace, 10.5 mm long, 8.7 mm wide. Abdomen, 15 mm long, 10 mm wide.

Cephalothorax and appendages uniform light to dark reddish brown, without contrasting pattern; eyes ringed with black and linear cervical groove dusky; legs darker red at apices; abdomen gray to blackish, covered with dusky hairs, with median pale streak on dorsum from base to middle and sometimes dusky band on venter.

Structure typical: pars cephalica five-ninths

width of carapace; sternum, 4.3 mm long, 4 mm wide, rounded behind and narrowed to trivial point between posterior coxae; first eye row narrower than second, strongly recurved, with anterior median eyes separated by radius, full diameter from subequal lateral eyes; posterior eye row recurved, with median eyes separated by one-third diameter, about diameter from subequal lateral eyes; median ocular quadrangle as broad as long, narrowed in front (62/45), with front eyes smaller (60/35); clypeus equal in height to diameter of large posterior median eyes.

First leg: femur, 13 mm, patella, 5.2 mm, tibia, 13.3 mm, metatarsus, 12.3 mm, tarsus, 4 mm; total, 47.8 mm. First femur 1.2 times, first leg 4.7 times as long as carapace. First tibia with five pairs, first metatarsus with three pairs of stout ventral spines.

Epigynum (fig. 155) an elongated lobe, narrowed at base, rounded behind, with long spur on each posterior corner.

**Male.** Total length, 20.5 mm. Carapace, 10 mm long, 8 mm wide. Abdomen, 10.5 mm long, 6 mm wide.

Coloration and structure like those of female except as noted. Pars cephalica narrower, in ratio 7:16.

First leg: femur, 13.5 mm, patella, 4.5 mm, tibia, 14.5 mm, metatarsus, 13.5 mm, tarsus, 5.3 mm; total, 51.3 mm. First femur 1.3 times, first leg five times as long as carapace.

Male palpus (fig. 154) with strong, outwardly directed spur on tibia; embolus a short pointed process; median apophysis an elongated, oval sclerite nearly as long as bulb. Fourth metatarsus straight.

**Type Data.** Male holotype from Cueva de la Mina, 7 km NW of Gómez Farías, Tamaulipas, México, March 24, 1967 (R. Mitchell).

**Distribution.** Common in caves of Tamaulipas and San Luis Potosí.

**Selected Records.** *Tamaulipas:* Cueva de la Mina, March 24, 1967 (R. Mitchell), female; March 9, 1969 (J. Reddell, G. Tucker), male. Crystal Cave, Rancho del Cielo, March 24, 1967 (R. Mitchell), female. Grutas de Quintero, 13 km SW of Mante, June 6, 1967 (R. Mitchell), female, two immature; November 28, 1964 (J. Reddell), female. Cueva de El Pachón, 7½ km NE of Antiguo Morelos, no date available (R. Remington), three females. *San Luis Potosí:* Cueva Mosca, 24 km NE of Ciudad del Maíz, July 16, 1967 (J. Reddell, J. Fish), female, five immature. Sótano de Pichijumo, 8 km NE of Valles, January 31, 1968 (R. Mitchell, F. Rose), female. Cueva de Valdosa, 10½ km SE of Valles, November 26, 1967 (M. Collins, T. R. Evans, M. Meredith), two females. Cueva de la Selva, Xilitla, April 10, 1966 (T. Raines), female. Cueva Chica, 2½ km NE of El Pujal, November 23, 1967 (T. Raines), two females. Cueva del León, 8 km NE of Valles, June 1, 1968 (J. Reddell), female.

#### Family Agelenidae

The family Agelenidae has contributed a small number of cave-adapted species to the world fauna. Probably most notable are *Hadites tegenarioides* Keyserling of Yugoslavia and *Cicurina buwata* Chamberlin and Ivie of Texas, both of which are completely blind. Two genera in Mexico have good representation in caves, *Cicurina*, with two blind species described below and *Tegenaria*, with some species showing reduction of eyes and general loss of dark pigment, in these respects

Figs. 149-150. *Gaucelmus calidus*, new species. 149. Right male palpus, ventral view. 150. Epigynum, posterior view.

Fig. 151. *Nesticus nahuanus*, new species, left male palpus, ventral view.

Fig. 152. *Nesticus hoffmanni*, new species, left male palpus, ventral view.

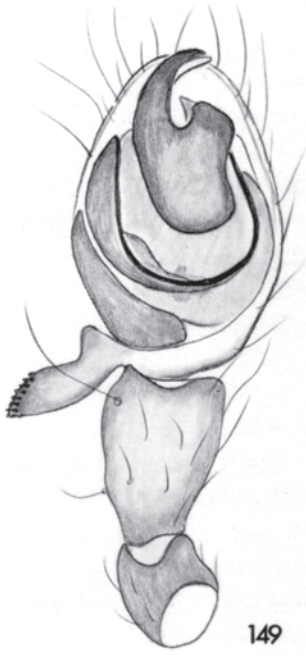
Fig. 153. *Nesticus vazquezae*, new species, epigynum, ventral view.

Figs. 154-155. *Ctenus mitchelli*, new species. 154. Left male palpus, ventral view. 155. Epigynum, ventral view.

Fig. 156. *Nesticus nahuanus*, new species, epigynum, ventral view.

Fig. 157. *Nesticus hoffmanni*, new species, epigynum, ventral view.





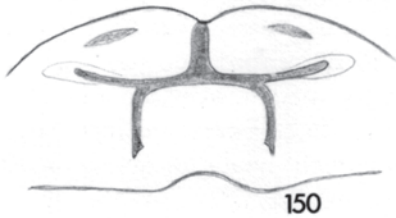
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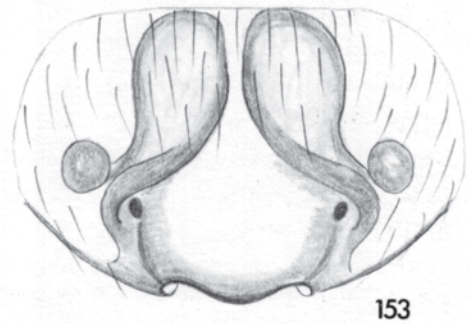
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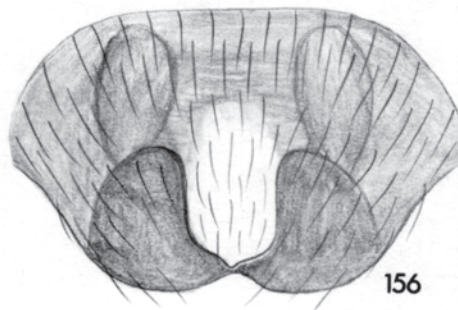
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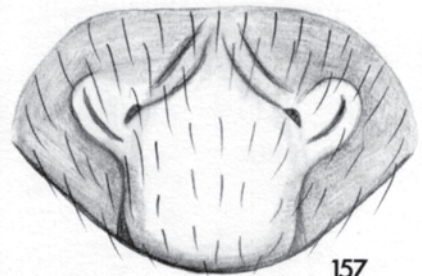
153



154



156



157

comparable to *Tegenaria herculea* Fage and *hispanica* Fage of Spain.

The taxa of the *Tegenaria mexicana* group as recently established by Roth (1968, pp. 15-25) are now known to be widespread in Mexican caves. The close similarity among the species of the epigyna and male palpi prompted Roth to regard the various populations as representing only subspecies of a single polytypic species called *mexicana*. Substantial differences in color pattern, size and relationships of the eyes and in the comparative lengths of legs and spinnerets were noted but not considered of specific import. In this paper the complex is considered to represent a superspecies, with at least some of the elements narrowly sympatric, and the taxa are given specific status. Only those species identified with caves are considered here and various new cave records are cited.

Genus *Tegenaria* Latreille

*Tegenaria mexicana* Roth

*Tegenaria mexicana mexicana* Roth, 1968, p. 21, figs. 21, 22, 25.

**New Records.** *Guerrero*: Grutas de Acuitlapán, 16 km E of Taxco, April 9, 1968 (W. Calvert), male. Grutas de las Granadas, 16 km E of Taxco, April 9, 1968 (W. Calvert), two immature.

*Tegenaria decora*, new species

FIGURES 164-165

**Diagnosis.** Small dusky species related to *selva* and occurring within its general distri-

bution, distinguished by following features: small size, 7 to 9 mm; eyes of median quadrangle subequal; median apophysis of male palpus a shallow, semilunar lamina with short curved tip.

**Etymology.** Specific name from Latin *decorus*, graceful, comely.

**Female.** Total length, 8 mm. Carapace, 3.7 mm long, 2.7 mm wide. Abdomen, 4.35 mm long, 3 mm wide.

Base color of cephalothorax and appendages dull orange; eye tubercles black; carapace with spotted band on each side, pale median stripe and quite wide submarginal pale band margined by black seam; sternum light brown, with faint pale spot in front of middle; chelicerae dark reddish brown; legs with faint dusky rings. Abdomen gray, with irregular median pale stripe on dorsum.

Structure typical: pars cephalica truncated in front, its width about two-thirds that of pars thoracica. Clypeus vertical, 0.18 mm, about as high as long diameter of anterior lateral eye. Ratio of eyes: ALE:AME:PLE:PME = 30:24:30:24. Front eye row faintly procurved; anterior median eyes separated by their radius, nearer lateral eyes. Posterior eye row slightly procurved; posterior median eyes separated by their diameter, as far from lateral eyes. Median ocular quadrangle as broad as long, narrowed in front (70/60); eyes subequal in size. Chelicera moderately geniculate at base; promargin with four teeth; retro-margin with seven teeth. Sternum, 1.8 mm long, 1.75 mm wide.

Leg formula, 4123. First femur 1.6 times, first leg six times as long as carapace.

Posterior spinneret: basal segment, 0.6 mm, apical segment, 0.85 mm. Colulus three times as broad as long.

	I	II	III	IV	Palp
Femur	6.00	5.10	5.00	6.15	1.80
Patella	1.50	1.35	1.25	1.25	0.65
Tibia	5.50	4.65	3.90	5.25	1.30
Metatarsus	6.00	5.35	5.25	7.00	—
Tarsus	3.30	2.70	2.35	3.10	2.00
Total	22.30	19.15	17.75	22.75	5.75

Epigynum (fig. 164) similar to those of other species of *mexicanus* group.

**Male.** Total length, 7.3 mm. Carapace, 3.3 mm long.

Coloration and structure like those of female except as noted. Posterior eye row straight; posterior median eyes slightly larger than anterior median eyes.

First leg: femur, 6.7 mm, patella, 1.4 mm, tibia, 6.6 mm, metatarsus, 7.0 mm, tarsus, 3.7 mm; total, 25.4 mm. First femur twice as long, first leg 7.7 times as long as carapace. Tibia and patella of fourth leg, 7.5 mm.

Posterior spinneret: basal segment, 0.43 mm, apical segment, 0.55 mm.

Male palpus (fig. 165) with narrow median apophysis.

**Type Data.** Male holotype, and six females and immature, from Cueva de Potrerillos, 1½ km W of Ahuacatlán, San Luis Potosí, México, July 12, 1967 (J. Reddell, J. Fish, P. Russell).

*Tegenaria selva* Roth

*Tegenaria mexicana selva* Roth, 1968, p. 23, figs. 28, 29.

**New Records.** *San Luis Potosí:* Sótano de Araña, west of Valle de los Fantasma, January 29, 1969 (R. Harmon, J. Cepeda), female. Sótano de la Golondrina, Valle de los Fantasma, November 29, 1968 (W. Elliott, J. Jarl, S. Cathey, M. Burk), male, female, immature. Sótano de Abernathy, west of Valle de los Fantasmás, January 30, 1969 (W. Elliott, D. Honea, M. Abernathy), female. Sótano del Puerto de los Lobos, San Francisco, September 14, 1968 (W. Elliott), two females. Sótano de Ojo de Agua, 4 km S of San Francisco, November 30, 1968 (W. Elliott, J. Jarl), two females, immature. *Tamaulipas:* Cueva de la Mina, Rancho del Cielo, January 10, 1971 (J. Reddell), female; June 3, 1967 (R. Mitchell), female, immature; January 27, 1968 (J. Reddell, R. Mitchell, F. Rose, J. George), immature female; March 9, 1969 (J. Reddell, C. Tucker), two females. Cueva del Remolino, 8½ km W of Gómez Farías, June 4, 1967 (R. Mitchell), male.

Cueva de Rancho del Cielo n. 3, 5 km NW of Gómez Farías, July 5, 1969 (S. and J. Peck), immature.

*Tegenaria blanda*, new species

**Diagnosis.** Uniformly pale orange, long-legged species with small eyes, possible troglolite, similar to *caverna* but distinguished by following features: both eye rows essentially straight; eyes larger and closer together; apical segment of posterior spinnerets shorter than basal one.

**Etymology.** Specific name from Latin *blandus*, bland.

**Female from Cueva de la Capilla.** Total length, 11 mm. Carapace, 4.6 mm long, 3.45 mm wide. Abdomen, 5.6 mm long, 3.7 mm wide.

Cephalothorax and appendages of quite uniform dull orange color; eyes narrowly ringed with black; spines dusky; chelicerae orange brown; sternum clear in center, margined with narrow brown seam. Abdomen whitish, clothed thinly with inconspicuous pale hairs.

Structure typical: pars cephalica prominently elevated, strongly convex; front truncated, equal at margin to more than half of width of rounded pars thoracica. Clypeus vertical, equal in height to about two diameters of anterior lateral eye. Ratio of eyes: ALE:AME:PLE:PME = 21:19:23:21. Front eye row straight; dark anterior median eyes separated by less than diameter (19/13), from lateral eyes by full diameter. Posterior eye row faintly recurved; suboval median eyes separated by more than diameter (21/26), farther from lateral eyes (21/30). Median ocular quadrangle slightly longer than wide (65/63), narrowed in front (65/45); anterior median eyes slightly smaller. Sternum, 2.2 mm long, 2.1 mm wide. Chelicerae moderately geniculate at base; promargin with three teeth, middle one largest; retromargin with eight teeth, distal ones larger.

Leg formula, 4123. First femur about 1.9 times, first leg 6.6 times as long as carapace.

Posterior spinneret: basal segment,

	I	II	III	IV	Palp
Femur	8.60	8.00	7.00	8.70	2.80
Patella	1.70	1.65	1.65	1.65	0.85
Tibia	7.65	6.15	6.15	7.25	1.95
Metatarsus	8.75	8.35	8.35	10.52	—
Tarsus	4.00	3.50	3.50	4.10	2.80
Total	30.70	27.65	26.65	32.20	8.20

0.75 mm, apical segment, 0.65 mm long. Colulus about four times as broad as long.

Epigynum similar to that of *decora*.

**Type Data.** Female holotype and female from Cueva de la Capilla, 13½ km NW of Gómez Farías, El Porvenir, Tamaulipas, México, January 28, 1969 (J. Reddell, R. Mitchell, F. Rose, J. George).

**Distribution.** Known only from Cueva de la Capilla.

**Other Record.** *Tamaulipas*: Cueva de la Capilla, El Porvenir, January 13, 1971 (J. Reddell, R. Mitchell, and group), one sub-adult female, probably this species.

#### *Tegenaria caverna*, new species

FIGURES 158–160

**Diagnosis.** Orange-brown species without dark pattern, possible troglobite, with eyes greatly reduced in size, readily separated from relatives by following features: both eye rows recurved; anterior and posterior median eyes separated by more than twice their diameter; median ocular quadrangle narrowed in front and anterior eyes smaller.

**Etymology.** Specific name based on Latin *caverna*, cavern, used in apposition.

**Female.** Total length, 14 mm. Carapace, 5.5 mm long, 3.8 mm wide. Abdomen, 8.5 mm long, 6.5 mm wide.

Cephalothorax and appendages mostly dull orange; eyes very narrowly ringed with black; sternum clear but narrowly margined with brown; chelicerae, labium and endites dark reddish brown; hairs and spines blackish. Abdomen gray, covered with inconspicuous hairs and blackish setae.

Structure typical: pars cephalica truncated in front, its width there five-eighths that of pars thoracica. Clypeus vertical, 0.45 mm, equal in height to about three diameters of anterior lateral eye. Ratio of eyes: ALE:AME:PLE:PME = 20:12:30:14. Front eye row moderately recurved; anterior median eyes separated by more than two diameters (12/25), as far from lateral eyes. Posterior eye row moderately recurved; suboval median eyes separated by more than three diameters (14/50), nearer lateral eyes (14/35). Median ocular quadrangle broader than long (75/62), narrowed in front (75/50); dark front eyes much smaller. Sternum, 2.55 mm long, 2.55 mm wide. Chelicerae moderately geniculate at base; promargin with four teeth; retro-

	I	II	III	IV	Palp
Femur	8.35	7.60	7.60	9.35	3.35
Patella	2.00	2.00	1.90	2.00	1.00
Tibia	8.15	7.60	6.60	8.25	2.40
Metatarsus	9.50	8.80	9.35	11.90	—
Tarsus	4.20	3.75	3.65	4.50	3.00
Total	32.20	29.75	29.10	36.00	9.75



margin with seven teeth, two inner ones small.

Leg formula, 4123. First femur 1.5 times, first leg about six times as long as carapace.

Posterior spinneret: basal segment, 1 mm, apical segment, 1.4 mm. Colulus about four times as broad as long.

Epigynum like that of other species of group.

**Male.** Total length, 12 mm. Carapace, 5.4 mm long.

Coloration and structure like those of female except as follows: eyes of median quadrangle subequal in size; anterior median eyes separated by not fully two diameters;

posterior median eye on left side obsolete.

Leg formula, 4123. First femur 1.6 times, first leg seven times as long as carapace.

Posterior spinnerets: basal segment, 0.75 mm, apical segment, 1 mm.

Male palpus (figs. 158-160) with relatively thick tibia and spur of characteristic form; median apophysis a long, semilunar lamina.

**Type Data.** Male holotype, two females and two immature, from Cueva del Puerto del León, 6½ km SE of Río Blanco, Querétaro, México, July 9, 1967 (J. Reddell, J. Fish, P. Russell).

**Distribution.** Known only from above cave.

	I	II	III	IV	Palp
Femur	9.70	9.00	8.50	10.00	3.00
Patella	2.10	2.00	1.90	2.00	1.00
Tibia	9.70	8.70	7.80	9.20	1.75
Metatarsus	11.00	10.70	10.80	14.25	—
Tarsus	4.70	4.35	4.00	5.15	2.25
Total	37.20	34.75	33.00	40.60	8.10

### *Tegenaria rothi*, new species

FIGURES 161-163

*Tegenaria mexicana tlaxcala* Roth, 1968, p. 24 (Part: records from Hidalgo).

**Diagnosis.** Well marked species with dusky pattern and ringed legs of moderate length, found inside caves (troglophile) and outside, readily separated from relatives by following features: eyes large, close together, both rows procurved; anterior median eyes as large as or larger than anterior lateral; median ocular quadrangle as broad in front as behind; anterior median eyes larger than anterior lateral.

**Etymology.** Distinctive species named for Mr. Vincent Roth, Southwestern Research Station, Portal, Arizona, principal student of this and other agelenid spiders.

**Female from Cueva de El Ocote.** Total length, 11.5 mm. Carapace, 5.25 mm long, 3.75 mm wide. Abdomen, 6.50 mm long, 4 mm wide.

Base color of cephalothorax and append-

ages dull yellow, marked by dusky pigment; carapace with irregular dusky stripes on each side, leaving median and sublateral pale bands and with narrow dusky marginal seam; legs with dusky rings; sternum dusky brown, with faint, pale linear streak in front of middle of some specimens; chelicerae dark reddish brown. Abdomen mostly dusky, with indistinct pale median stripe on dorsum.

Structure typical: pars cephalica broadly truncated in front and equal to about two-thirds of width of pars thoracica. Clypeus vertical, 0.4 mm, equal in height to about 1.3 diameters of posterior lateral eye. Ratio of eyes: ALE:AME:PLE:PME = 40:40:38:30. Front eye row moderately procurved; median eyes separated by third of diameter (40/14), as far from lateral eye. Posterior eye row moderately procurved; posterior median eyes separated by more than diameter (30/35), as far from lateral eyes. Median ocular quadrangle longer than broad (100/96), as broad in front as behind; anterior median eyes larger.

	I	II	III	IV	Palp
Femur	7.25	6.60	5.70	7.25	2.75
Patella	2.00	2.00	1.75	1.75	0.80
Tibia	7.00	5.50	4.50	6.25	1.75
Metatarsus	7.35	6.30	6.00	8.10	—
Tarsus	3.35	2.40	2.50	3.25	2.75
Total	26.95	22.80	20.45	26.60	8.05

Chelicerae moderately geniculate at base; pro-marginal with four teeth; retromarginal with six to eight teeth.

Leg formula, 1423. First femur about 1.4 times, first leg five times as long as carapace.

Posterior spinneret: basal segment, 0.8 mm, apical segment, 1.2 mm.

Epigynum similar to that of *decora*.

**Male.** Total length, 10.5 mm. Carapace, 5 mm long.

Coloration and structure like those of female except as noted below: Ratio of eyes: ALE:AME:PLE:PME = 35:40:35:35. Eyes closer together: anterior median eyes separated by one-fourth diameter; posterior median eyes separated by diameter. Anterior median eyes clearly larger than lateral eyes.

First leg: femur, 8.5 mm, patella, 2 mm, tibia, 8.3 mm, metatarsus, 9.3 mm, tarsus, 4.5 mm; total, 32.6 mm. First femur 1.7 times, first leg 6.5 times as long as carapace.

Posterior spinneret: basal segment, 0.6 mm, apical segment, 0.85 mm.

Male palpus: femur, 2.6 mm, patella, 0.7 mm, tibia, 1.35 mm, tarsus, 2.25 mm; total, 6.9 mm. See figs. 161-163 for details.

**Type Data.** Male holotype, and males, females and immature from Cueva de El Ocote, 7 km N of Kilometer 295, 1½ km N of

Palomas, Hidalgo, México, July 20, 1956 (V. Roth, W. J. Gertsch).

**Distribution.** Known only from Hidalgo and southern San Luis Potosí.

**Other Records.** *Hidalgo*: 5 km N of Chapulhuacán, April 20, 1963 (W. J. Gertsch, V. Roth), female. *San Luis Potosí*: Tamazunchale, April 19, 1963 (W. J. Gertsch, W. Ivie), two females.

#### Genus *Cicurina*

#### *Cicurina mina*, new species

FIGURES 166-167

**Diagnosis.** Small, pale, essentially blind troglobitic species of subgenus *Cicurusta*, similar to *arcuata* and related species, readily distinguished by small size (3.5 mm), reduction of eyes to vestiges, complicated epigynum with five coils on each side and details of palpus.

**Etymology.** Specific name from Spanish *mina*, with reference to Cueva de la Mina.

**Female from Cueva de la Capilla.** Total length, 3.6 mm. Carapace, 1.75 mm long, 1.2 mm wide. Abdomen, 1.85 mm long, 1.3 mm wide.

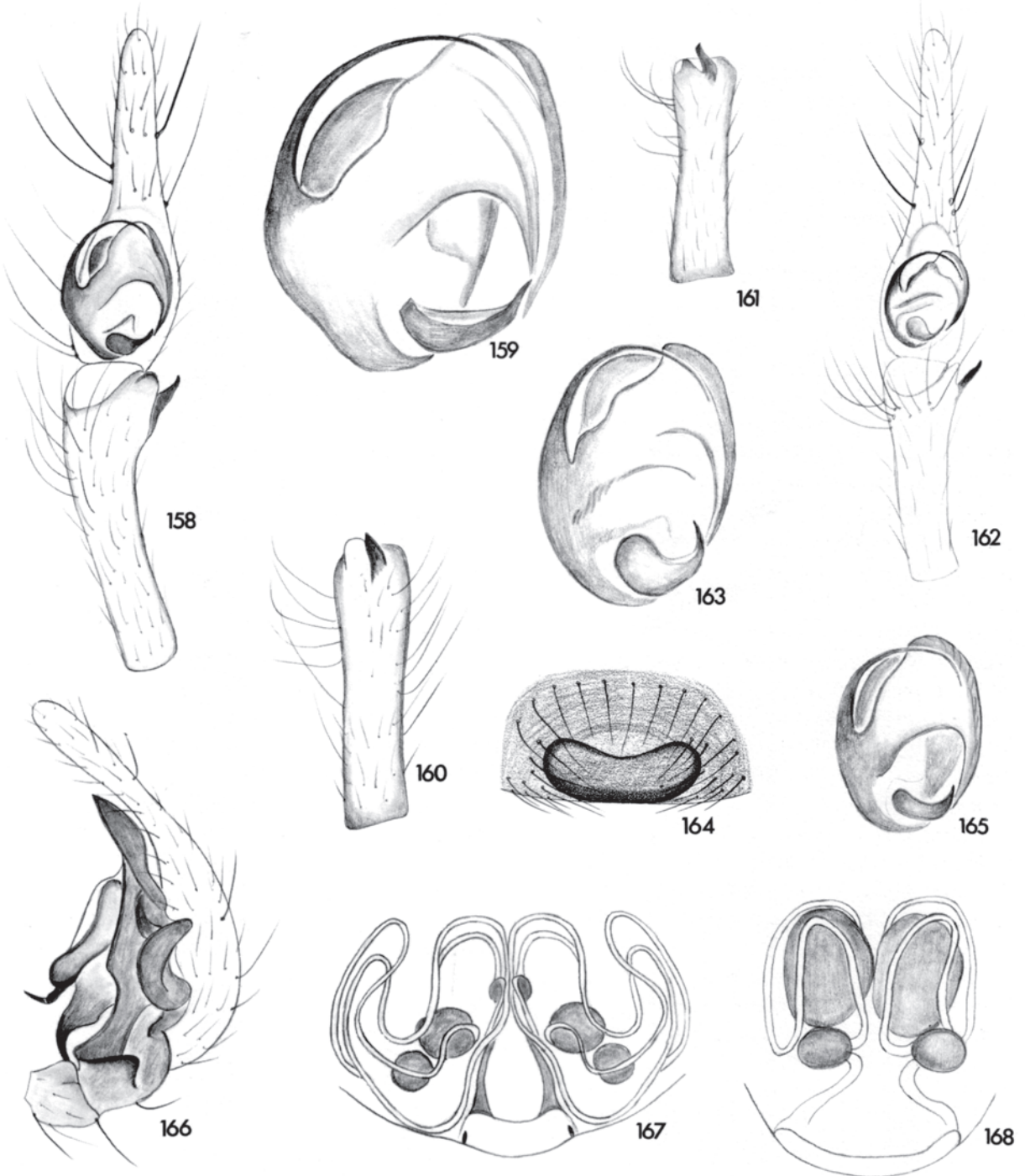
Figs. 158-160. *Tegenaria caverna*, new species. 158. Left male palpus, ventral view. 159. Bulb of left male palpus, enlarged. 160. Tibia of left male palpus, retrolateral view.

Figs. 161-163. *Tegenaria rothi*, new species. 161. Tibia of left male palpus, retrolateral view. 162. Left male palpus, ventral view. 163. Bulb of left male palpus, enlarged.

Figs. 164-165. *Tegenaria decorata*, new species. 164. Epigynum, ventral view. 165. Bulb of left male palpus.

Figs. 166-167. *Cicurina mina*, new species. 166. Left male palpus, retrolateral view. 167. Epigynum, ventral view.

Fig. 168. *Cicurina coahuila*, new species, epigynum, ventral view.



Cephalothorax and appendages pale amber, with faint brownish shadings; hairs and spines dusky; linear cervical groove brown. Abdomen whitish, covered with dusky hairs.

Structure typical but size small. Eye group occupying less than half the width of head; eyes reduced to four small, well separated unpigmented spots; anterior and posterior median eyes obsolete. Chelicera slightly geniculate at base; promargin with three teeth, large middle tooth with small one on each side; retromargin with line of seven or eight teeth of which apical ones are larger. Sternum, 0.8 mm long, 0.75 mm wide. Tibia and patella of first leg, 2.2 mm, of fourth leg, 2.15 mm long.

Epigynum (fig. 167) typical of subgenus *Cicurusta* with primary and secondary spermathecae and complicated pattern of thin tubules; primary spermathecum much larger than secondary one; thin tubules with five distinct coils on each side.

**Male from Cueva de la Mina. Tamaulipas:** total length, 3.4 mm.

Structure much like that of female. Pars cephalica narrower. Legs proportionately longer: tibia and patella of first and fourth legs, 2.3 mm.

Male palpus (fig. 166) like that of *arcuata*; tip of conductor a short, curved spine; tibial apophysis a slightly curved, prominent blade drawn to a point.

**Type Data.** Female holotype and two females from Cueva de la Capilla, 13½ km NW of Gómez Farías, El Porvenir, Tamaulipas, México, January 13, 1971 (J. Reddell, R. Mitchell, and group).

**Distribution.** Known only from caves in La Sierra de Guatemala, Tamaulipas, Mexico.

**Other Records. Tamaulipas:** Cueva de la Mina, 7 km NW of Gómez Farías, March 24, 1961, two immature, June 3, 1967, female, and March 26, 1967, male (R. Mitchell); March 9, 1969 (J. Reddell), two females; July 1, 1969 (S. Peck, R. Norton), female.

#### *Cicurina iviei*, new species

**Diagnosis.** Small, dusky, six-eyed, troglo-

philic species of subgenus *Cicurusta*, related to *arcuata* and *mina*, readily distinguished by following features: size small, about 3 mm; six eyes in close-set triads, with anterior median eyes missing; legs short, with tibia and patella of fourth leg shorter than carapace.

**Etymology.** Named for the late Wilton Ivie, responsible for most of the systematic work on this difficult spider genus.

**Female.** Total length, 2.8 mm. Carapace, 1.03 mm long, 0.73 mm wide. Abdomen, 1.75 mm long, 0.90 mm wide.

Cephalothorax and appendages dull yellowish, with dusky shadings; eye tubercles and linear cervical groove black; hairs and spines blackish; abdomen uniform gray, covered with inconspicuous hairs.

Structure typical but size very small. Eye group near frontal margin, occupying half width of head. Eyes six, close together; anterior lateral eyes only slightly separated at the midline and no trace of median eyes; posterior eye row gently procurved with median eyes separated by their diameter and half as far from larger lateral eyes. Sternum, 0.6 mm long, 0.55 mm wide. Chelicerae slightly geniculate at base; promargin with three teeth of which middle one is larger; retromargin with six teeth. Legs short; tibia and patella of first leg, 0.87 mm, of fourth leg, 0.90 mm long, each shorter than carapace.

Epigynum similar to that of *mina*.

**Type Data.** Female holotype and female from Harrison Sinkhole, Rancho del Cielo, Tamaulipas, México, January 12, 1971 (J. Cooke, M. Brownfield, W. Elliott).

**Distribution.** Known only from above material.

#### *Cicurina coahuila*, new species

FIGURE 168

**Diagnosis.** Small, pale, blind species of subgenus *Cicurella*, without trace of eyes, related to *buwata* and various six-eyed species of Texas, readily separated by details of epigynum (fig. 168).

**Etymology.** Specific name based on Mexican state of Coahuila.



**Female.** Total length, 3.8 mm. Carapace, 1.6 mm long, 1 mm wide. Abdomen, 2.2 mm long, 1.5 mm wide.

Cephalothorax and appendages pale amber, with faint brownish shadings; hairs and spines dusky; linear cervical groove and fangs brownish. Abdomen chalky white, with inconspicuous hairs.

Structure typical but size small. Carapace smooth, shining, with sparse covering of dusky hairs. Ocular area smooth, without trace of eyes. Chelicerae slightly geniculate at base; promargin with two teeth; retromargin with five subequal teeth. Sternum, 0.8 mm

long, 0.65 mm wide. Tibia and patella of first leg, 1.6 mm, of fourth leg, 1.75 mm long.

Epigynum (fig. 168) typical of subgenus *Cicurella*, with large oval spermathecum, small basal lobe, and single large tube forming loop on each side.

**Type Data.** Female holotype, and female and immature, from Cueva de los Lagos, 24 km W of Ciudad Acuña, Coahuila, México, January 23, 1964 (J. Reddell, D. McKenzie, J. Porter).

**Distribution.** Known only from above cave.

**Other Records.** *Coahuila*: Cueva de los Lagos, November 15, 1964 (J. Reddell, B. Martin), female, immature.

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A NEW SPECIES OF *MEXAPHAENOPS* FROM TAMAULIPAS, MEXICO  
(COLEOPTERA: CARABIDAE)<sup>1</sup>

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The caves of the Gómez Farías region in Tamaulipas have yielded a fourth species of the strictly troglobitic trechine genus *Mexaphaenops* Bolívar. In several respects this recently discovered species is intermediate between *M. elegans* and *M. prietoi*. With *M. prietoi* it shares smaller body size, fusion of mentum and submentum, only six prebasilar setae, reduction of the apical triangle, and a small apical button on the aedeagus. With *M. elegans* it shares the general body form (less robust than *prietoi* but with elytra less convex than *elegans*) and two pairs of elytral discal setae. From both of these species, the Gómez Farías *Mexaphaenops* differs in possessing a second (posterior) pair of marginal setae on the pronotum and in having shallower, irregular elytral striation. The diagnostic character of the *Paratrechus* series—the position of (at least) the anterior discal seta on the fifth stria—is obscured in the new species, since the seta is apparently on the third stria. However, striae three through six are interrupted near the anterior puncture, and the first umbilicate puncture is situated farther from the margin than usual, suggesting that these irregularities stem from lengthening and nar-

rowing of the bases of the elytra during development.

***Mexaphaenops intermedius*, new species**

Figures 1, 2

**Diagnosis:** Similar to *M. prietoi* Bolívar in fusion of the mentum and submentum, six prebasilar setae, and reduction of the apical triangle, but differing in having the front convex between the frontal grooves, two pairs of marginal setae on the pronotum, and narrower elytra with irregular longitudinal striation, two discal punctures, and two punctures in the apical triangle.

**Description:** Length 5.0-5.4 mm, mean 5.2 mm. Form moderately robust and convex; glabrous, highly polished, rufotestaceous; microsculpture isodiametric on head, finely transverse on disc of pronotum, and indistinctly isodiametric on elytra, where the cuticular polygons show a tendency to coalesce. Head slightly less than 0.75 as wide as long, subconvex between frontal grooves, which are evanescently continued to posterior supraorbital puncture; eyes reduced to pale areolae about 0.07 mm in diameter; mentum

<sup>1</sup>This study was supported in part by a grant from the National Science Foundation (GB-5521).

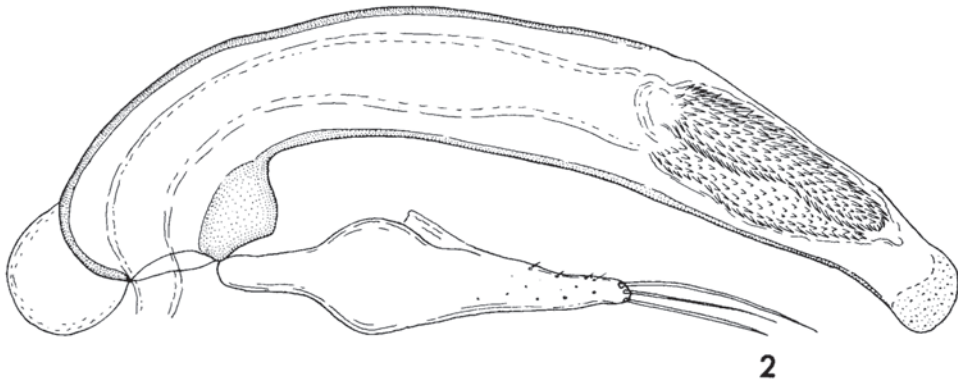
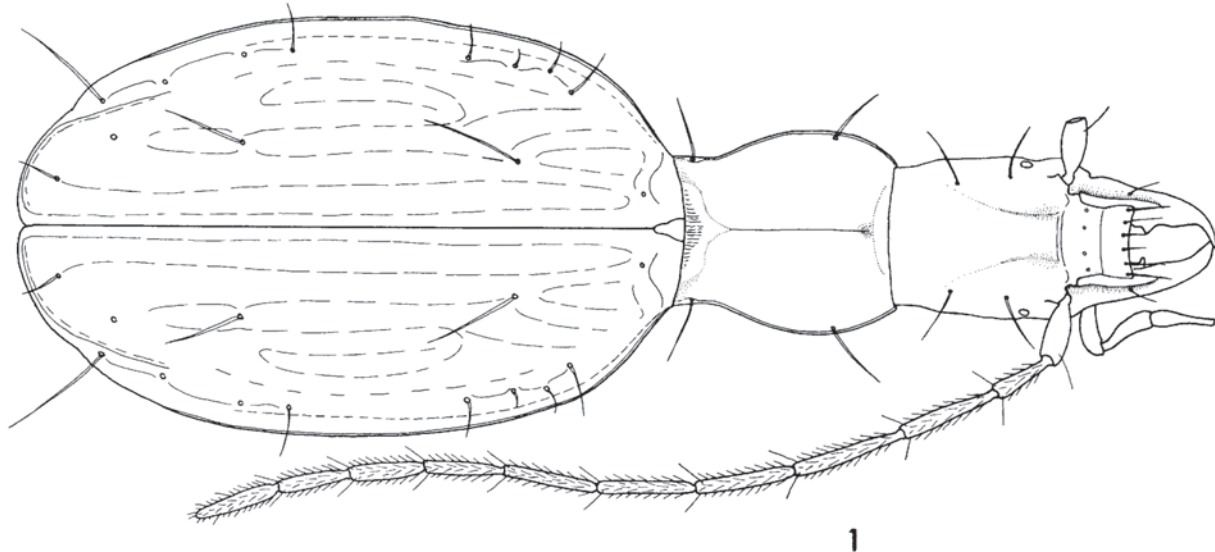


Fig. 1. *Mexaphaenops intermedius*, n. sp. Cueva de la Capilla, Tamaulipas, México. Length 5.2 mm.

Fig. 2. *Mexaphaenops intermedius*, n. sp., aedeagus in left lateral view. Length 0.66 mm.



fused to submentum, separated at most by a feeble, barely discernible trace of a suture; submentum with row of six transverse (prebasilar) setae: a short medial, a long lateral, and an epilobar seta each side. Pronotum about as long as head, slightly longer than wide; width at apex about 0.7 maximum width, which occurs well before middle (between apical fourth and fifth), and subequal to width at base; lateral margins arcuate in apical two-thirds, convergent, then conspicuously sinuate in basal seventh; hind angles small, feebly reflexed, and acute; base with numerous fine wrinkles between foveae; anterior marginal setae in apical fifth, posterior setae in bead well before hind angles. Elytra elongate-elliptical, 1.6 times as long as wide, moderately convex, prehumeral borders strongly oblique in basal eighth, disc medially deplanate near base; longitudinal striae feebly and irregularly impressed, only first two complete, intervals feebly convex; scutellar stria obsolete; humeral set of umbilicate punctures closely spaced, the first puncture slightly displaced medially; both anterior and posterior discal punctures present, anterior situated on third stria at level of third umbilicate puncture, posterior on third stria in apical 0.4; apical triangle reduced to

two punctures, anterior apical absent, lateral placed close to recurrent portion of apical groove near its anterior terminus, posterior puncture small and setiferous; apical recurrent groove directed toward seventh stria. Appendages slender and elongate, as usual for the genus; antenna five-sixths the body length, segments two through eleven pubescent; metatibia less than 0.6 as long as elytra. Aedeagus (Fig. 2) 0.66-0.70 mm long, apical button not appreciably inflated; parameres slender, each with three apical setae.

**Type Series:** Holotype male (American Museum of Natural History) and four paratypes, Cueva de la Capilla, elevation about 2000 meters, 13½ km NW of Gómez Farías, Tamaulipas, México, January 28, 1968 (J.R. Reddell, R.W. Mitchell, F. Rose, J. George). Known only from the type locality.

**Measurements of holotype:** Total length 5.20 mm, head 0.98 mm long X 0.72 mm wide, pronotum 0.96 mm long X 0.92 wide, pronotum 0.64 mm wide at apex and 0.64 mm wide at base, elytra 2.96 mm long X 1.84 mm wide, antenna 4.28 mm long, metatibia 1.70 mm long, aedeagus 0.66 mm long.

The four known species of *Mexaphaenops* may be separated by the following key.

1. Larger (5.0 - 7.3mm); pronotum with one or two pairs of marginal setae; elytra with one or two discal punctures; humeral set of umbilicate punctures approximately equidistant . . . . . 2
 

Smaller (4.8 - 5.1 mm); pronotum without marginal setae; elytra without discal punctures; fourth puncture of humeral set farther from third puncture than distance between first and third; San Luis Potosí . . . . . *fishi* Barr
- 2(1). Length 5.0 - 6.2 mm; mentum fused to submentum, only a trace of a suture visible; six prebasilar setae on submentum; apical triangle with only one or two punctures present . . . . . 3
 

Length 6.6 - 7.3 mm; mentum separated from submentum by a distinct suture; (6-) 8 (-10) prebasilar setae on submentum; apical triangle with full complement of three punctures; Querétaro . . . . . *elegans* Barr
- 3(2). Pronotum with two pairs of marginal setae; elytron with two discal punctures; apical triangle with lateral and posterior punctures; moderately slender and convex, elytral striae feeble and irregular; Tamaulipas . . . . . *intermedius*, new species

Pronotum with only one pair (anterior) of marginal setae; elytron with only one (anterior) discal puncture; apical triangle with only one (lateral) puncture; robust and very convex; elytral striae shallow but regular; Nuevo León . . . . . *prieto* Bolívar

Descriptions and illustrations of *M. elegans* and *M. fishi* are found in the paper by Barr (1967), and *M. prieto*, the type species of the genus, was described and figured by Bolívar (1942).

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NEW SPECIES OF SCHIZOMIDS (ARACHNIDA, SCHIZOMIDA)  
FROM MEXICAN CAVES<sup>1</sup>

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Major speleological efforts concentrated in eastern Mexico have produced many new arachnids in the last 10 years. Among these are several undescribed species of the order Schizomida. Until this time only two of the several known species from Mexico have been described: *Schizomus davis* Gertsch, from San Fernando, Tamaulipas, and *S. cavernicolens* Chamberlin and Ivie from caves in Yucatán.

All the material available to me at present is that of cave collections, with no supplementary specimens from surface localities. Hence, it is impossible at this time to establish whether any of these new species are restricted to caves. Morphological evidence gives little indication of their cave existence, since they bear no fundamental difference from schizomids found in surface localities. It should be mentioned here that these animals are typically eyeless; however many possess very simple structures called "eye spots". This and other characteristics suggest that schizomids are well suited for cave existence with little morphological modification. For this reason it may not be surprising to find that some or all of these new species occur in surface localities.

I take pleasure in naming three species after their discoverers: Dr. J. A. L. Cooke, who I also wish to thank for additional material loaned to me from The American Museum of Natural History, New York; Dr. Robert W. Mitchell; and Mr. James Reddell, who has supplied many specimens from his personal collection for this work.

Four of the species described are quite distinct from others of North America; however *S. mexicanus*, new species, bears a close resemblance to *S. davis*. The males of these two species may be separated by a comparison of the flagella and the pedipalpal trochanters. *S. davis* bears a strong spur distally on the trochanter, whereas *S. mexicanus* is without such a spur.

***Schizomus mexicanus*, new species**

Figures 1-3, 16. Table I.

This description is based on the holotype male, the allotype female, the paratype male, and the paratype female, all in 80% ethyl alcohol.

<sup>1</sup>Supported in part by grant funds awarded by the International Center for the Arid and Semi-Arid Land Studies (ICASALS), Texas Tech University.

**Males.** Total length (from anterior margin of first cheliceral segment to end of flagellum), 4.28-4.40 mm.

**Cephalothorax.** Carapace: Almost twice as long as wide, strongly convex, the lateral margins vertical, produced antero-mesally into a sharp, conical process; eye spots elongate, oval, pale areas on antero-lateral surface. Mesopeltidium: Acutely triangular, gently curved, pointing nearly diagonally toward midline, the free lateral plates separated by their length. Metapeltidium: No suggestion of a median longitudinal suture, more than twice as wide as long. Anterior sternum: Triangular, pointing caudad, the apex reaching to base of coxa II, antero-lateral margins curved. Posterior sternum: Pointing cephalad, the apex reaching base of coxa IV.

**Abdomen.** Terga: I somewhat chevron shaped, located closer to metapeltidium than to II; II-IX similar. Sterna: II large, III small, IV-IX similar. Segments X-XII: Somewhat telescopic, XII the longest. Flagellum: Spatulate, horizontally compressed; stalk slightly more than one fourth total length of flagellum; body two thirds as wide as long, dorsal aspect with a pair of depressions near the distal end, extending caudally; bearing 16 setae.

**Pedipalps.** Length slightly variable; trochanter bluntly produced distally; femur and patella narrow proximally, expanded distally; tibia without subapical spur; tarsus-basitarsus with a small, subapical, mesal spur; length of segments given in Table I.

**Legs.** I antenniform, half again as long as body; relative lengths I-IV-II-III; length of segments given in Table I.

**Chelicerae.** First segment, lateral aspect: A vertical group of three long, feathered setae flanking moveable finger; a single seta arising below and behind moveable finger; two setae arising much below and behind previous seta; a group of three setae arranged basally on fixed digit. First segment, mesal aspect: A ventral group of three long, feathered setae flanking

moveable finger as in lateral aspect; a vertical group of four setae arising just behind moveable finger and directly below the large dorsal seta; a curving group of six medium, feathered setae in the upper half and middle third of first segment; two peg-shaped setae arising in a nearly vertical row below previous setae. First segment, ventral aspect: A group of six feathered setae of various lengths arising on or near the ventral margin. First segment, fixed digit: Bearing eight teeth; a group of seven closely associated feathered setae on mesal aspect. Second segment (moveable finger): Mesal aspect bearing a row of 20 curled, feathered setae oriented along the length of the moveable finger, near the outer margin; the inner margin bearing a row of 19 teeth along the middle one third of length.

The females differ from the description of the males as follows:

**Females.** Total length, 4.56-4.64 mm.

**Pedipalps.** Smaller, less variable, especially the femur and patella; length of segments given in Table I.

**Legs.** I not as long, subequal to body length; length of segments given in Table I.

**Abdomen.** Flagellum: four segmented, elongate, cylindrical; fourth segment longer than previous three.

**Type locality.** Sótano de la Tinaja, 10½ km NE Ciudad Valles, San Luis Potosí, México. Male holotype, female allotype, male paratype, and female paratype; J.A.L. Cooke, 18 February 1970. All types are placed in the American Museum of Natural History, New York.

**Additional localities.** SAN LUIS POTOSI: Cueva Chica, 2½ km NE of El Pujal, 5 June 1967, R. W. Mitchell. Sótano de Pichijumo, 8 km NE of Valles, 26 January 1969, J. R. Reddell, T. R. Mollhagen, T. Albert, and Richard Smith. Cueva de Taninul n. 1, 13½ km SE of Valles, 27 March 1967, R. W. Mitchell. Sótano del Tigre, 14 km NE of Valles, 1 February 1968, J. R. Reddell and R. W. Mitchell. TAMAULIPAS: Cueva de los Vampiros, 20 km NW of Limón, 27 May 1968, J. R. Reddell.



Table I. *Schizomus mexicanus*, new species

MALES	Pedipalp mm	I mm	II mm	III mm	IV mm
Coxa	.52-.55	.52-.53	.40-.44	.34-.38	.33-.36
Trochanter	.38-.39	.25-.29	.22-.22	.21-.22	.28-.30
Femur	.81-1.11	1.25-1.29	.83-.91	.70-.79	1.11-1.18
Patella	1.01-1.31	—	.44-.47	.27-.33	.41-.42
Tibia	.40-.43	1.50-1.50	.60-.60	.41-.48	.86-.86
Basitarsus	.21-.22	.99-1.07	.51-.52	.50-.53	.75-.76
Tarsus	.21-.22	.88-.92	.44-.45	.46-.47	.45-.53

FEMALES	Pedipalp mm	I mm	II mm	III mm	IV mm
Coxa	.50-.52	.47-.49	.39-.43	.34-.35	.32-.35
Trochanter	.32-.33	.28-.28	.20-.20	.20-.21	.28-.29
Femur	.39-.40	1.02-1.09	.75-.79	.67-.67	1.00-1.04
Patella	.50-.50	—	.39-.40	.27-.31	.41-.41
Tibia	.39-.39	1.23-1.27	.49-.52	.40-.43	.74-.76
Basitarsus	.19-.21	.89-.90	.41-.42	.41-.41	.63-.64
Tarsus	.19-.21	.81-.82	.38-.41	.42-.43	.49-.49

***Schizomus longimanus***, new species

Figures 4-6, 17. Table II

This description is based on the holotype male, the allotype female, the paratype male, and the paratype female, all in 80% ethyl alcohol.

**Males.** Total length, 4.60-4.68 mm.

**Cephalothorax.** Carapace: More than twice as long as wide, strongly convex, the lateral margins nearly vertical, produced antero-mesally into a sharp, conical process; eye spots present, but very much reduced, located anterolaterally on carapace. Mesopeltidium: Acutely triangular, gently curved, pointing nearly diagonally toward midline, the free lateral plates separated by their length. Metapeltidium: no suggestion of a median, longitudinal suture, more than twice as wide as long. Anterior sternum: Triangular, pointing caudad, the apex reaching just beyond coxa II, antero-lateral margins curved. Posterior sternum: Pointing cephalad, the apex reaching base of coxa IV.

**Abdomen.** Terga: I somewhat chevron shaped, located equally between II and metapeltidium; II - IX similar. Sterna: II large, III small, IV-IX similar. Segments X-XII: Somewhat telescopic, XII the longest. Flagellum: Club-shaped, horizontally compressed; stalk one-fourth total length of flagellum; body oval, slightly longer than wide, dorsal aspect with a pair of deep median depressions, extending caudally; bearing 16 setae.

**Pedipalps.** Trochanter produced distally; femur and patella narrow proximally, expanding distally; tibia without subapical spur; tarsus-basitarsus with a small, subapical, mesal spur; length of segments given in Table II.

**Legs.** I antenniform, extremely long, more than twice the length of the body; relative lengths I-IV-II-III; length of segments given in Table II.

**Chelicerae.** First segment, lateral aspect: A vertical group of three long, feathered setae flanking moveable finger; a single seta arising below and behind moveable finger; two setae

arising much below and behind previous seta; a group of three setae arranged basally on fixed digit. First segment, mesal aspect: A vertical group of three long, feathered setae flanking moveable finger as in lateral aspect; a vertical group of four setae arising just behind moveable finger, and directly below the large dorsal seta; a largely horizontal group of six medium, feathered setae in the dorsal half and frontal two thirds of first segment; two peg-shaped setae arising in a vertical row below previous setae. First segment, ventral aspect: A group of seven feathered setae of various lengths arising on or near the ventral margin. First segment, fixed digit: Bearing seven teeth; a group of seven closely associated feathered setae on mesal aspect. Second segment (moveable finger): Mesal aspect bearing a row of 22 curled, feathered setae oriented along the length of the moveable finger, near the outer

margin; the inner margin bearing a row of 18 teeth along the middle one-third of the length.

The females differ from the description of the males as follows:

**Females.** Total length, 4.46-5.26 mm.

**Pedipalps.** Slightly smaller, especially the femur and patella; length of segments given in Table II.

**Legs.** I not nearly as long, subequal to body length; length of segments given in Table II.

**Abdomen.** Flagellum: Four segmented, elongate, cylindrical; fourth segment longer than previous three.

**Type locality.** Cueva Cerro Hueco, 3 km SE Tuxtla Gutiérrez, Chiapas, México. Male holotype, female allotype, male paratype, and female paratype; J. Reddell, J. Fish, M. Tandy, 18 August 1967. All types are placed in The American Museum of Natural History, New York.

Table II. *Schizomus longimanus*, new species

MALES	Pedipalp	I	II	III	IV
	mm	mm	mm	mm	mm
Coxa	.58-.59	.69-.74	.46-.47	.38-.41	.35-.35
Trochanter	.30-.33	.39-.42	.21-.23	.21-.25	.37-.40
Femur	.42-.51	1.83-1.88	.94-1.01	.91-.92	1.52-1.52
Patella	.51-.61	—	.46-.51	.34-.37	.59-.62
Tibia	.45-.47	2.24-2.40	.73-.75	.55-.57	1.15-1.15
Basitarsus		1.66-1.72	.64-.72	.65-.66	1.00-1.06
Tarsus	.25-.26	1.08-1.15	.35-.38	.46-.46	.52-.55
FEMALES	Pedipalp	I	II	III	IV
	mm	mm	mm	mm	mm
Coxa	.50-.57	.53-.61	.43-.47	.37-.39	.34-.35
Trochanter	.32-.33	.23-.29	.21-.23	.22-.23	.34-.34
Femur	.35-.39	1.05-1.09	.75-.76	.62-.70	1.14-1.25
Patella	.39-.46	—	.37-.38	.30-.31	.44-.49
Tibia	.36-.39	1.24-1.32	.49-.50	.40-.43	.79-.85
Basitarsus		.96-.97	.45-.46	.47-.48	.72-.74
Tarsus	.21-.26	.80-.82	.36-.37	.36-.37	.45-.45

**Schizomus mitchelli**, new species

Figures 7-9, 18. Table III.

This description is based on the holotype male, the allotype female, the paratype male, and the paratype female, all in 80% ethyl alcohol.

**Males.** Total length, 3.84-4.20 mm.

**Cephalothorax.** Carapace (propeltidium): Somewhat less than twice as long as wide, strongly convex, the lateral margins nearly vertical, produced antero-mesally into a sharp, conical process; eye spots absent. Mesopeltidium: Acutely triangular, vaguely curved, pointing nearly diagonally toward midline, the free lateral plates separated by their length. Metapeltidium: no suggestion of a median longitudinal suture, more than twice as wide as long. Anterior sternum: Triangular, pointing caudad, the apex reaching between coxae II and III; antero-lateral margins curved. Posterior sternum: Pointing cephalad, the apex reaching just beyond coxa IV.

**Abdomen.** Terga: I convex, located closer to metapeltidium than to II; II-IX similar. Sterna: II large, III small, IV-IX similar. Segments X-XII somewhat telescopic, XII the longest. Flagellum: Club shaped, horizontally compressed; stalk one fourth total length of flagellum; body equilaterally triangular, dorsal aspect with a deep, median depression, extending caudally; bearing 16 setae.

**Pedipalps.** Length slightly variable, as long as body, the femur and patella being elongated; trochanter slightly produced distally; tibia with large, subapical, ventro-mesal spur; tarsus-basitarsus with a small, subapical, mesal spur; length of segments given in Table III.

**Legs.** I antenniform, half again as long as body; relative lengths I-IV-II-III; length of segments given in Table III.

**Chelicerae.** First segment, lateral aspect: A vertical group of three long, feathered setae flanking moveable finger; a single seta arising below and behind moveable finger; two setae arising much below and behind previous seta;

Table III. *Schizomus mitchelli*, new species

MALES	Pedipalp	I	II	III	IV
	mm	mm	mm	mm	mm
Coxa	.51-.52	.50-.51	.40-.41	.33-.36	.29-.32
Trochanter	.38-.44	.25-.30	.20-.22	.20-.21	.32-.32
Femur	.93-1.18	1.20-1.21	.74-.82	.70-.74	1.13-1.15
Patella	1.00-1.24	—	.40-.43	.27-.30	.30-.37
Tibia	.49-.57	1.47-1.51	.56-.58	.43-.47	.80-.86
Basitarsus	.33-.34	.90-1.11	.43-.47	.50-.51	.68-.69
Tarsus	.33-.34	.78-.87	.39-.42	.36-.40	.35-.42
FEMALES	Pedipalp	I	II	III	IV
	mm	mm	mm	mm	mm
Coxa	.48-.50	.49-.53	.42-.43	.33-.36	.29-.32
Trochanter	.30-.32	.27-.27	.21-.23	.21-.23	.29-.29
Femur	.39-.40	1.02-1.06	.74-.75	.69-.69	1.04-1.05
Patella	.43-.47	—	.38-.40	.26-.27	.41-.43
Tibia	.37-.38	1.26-1.28	.47-.51	.36-.37	.71-.79
Basitarsus	.20-.21	.88-.96	.38-.40	.43-.45	.49-.64
Tarsus	.20-.21	.80-.84	.33-.36	.35-.38	.42-.43

a group of three setae arranged basally on fixed digit. First segment, mesal aspect: A vertical group of three long, feathered setae flanking moveable finger as in lateral aspect; a vertical group of four setae arising just behind moveable finger and directly below the large dorsal seta; a group of three clustered and three horizontally trailing setae in the dorsal half and frontal half of the first segment; two peg-shaped setae arising in a vertical row below previous setae. First segment, ventral aspect: A group of six feathered setae of various lengths arising on or near the ventral margin. First segment, fixed digit: Bearing seven teeth; a group of seven closely associated, feathered setae on mesal aspect. Second segment (moveable finger): Mesal aspect bearing a row of 19 curled, feathered setae oriented along the length of the moveable finger, near the outer margin; the inner margin bearing a row of 19 teeth along the middle one third of the length.

The females differ from the description of the males as follows:

**Females.** Total length, 4.32-4.48 mm.

**Pedipalps.** Much smaller, less variable, especially the femur and patella; tibia without spur; lengths of segments given in Table III.

**Legs.** I not as long, subequal to body length; length of segments given in Table III.

**Abdomen.** Flagellum: four segmented, elongate, cylindrical; fourth segment longer than previous three.

**Type locality.** Cueva de El Pachón, 7½ km NE Antiguo Morelos, Tamaulipas, México. Male holotype; J. Reddell, S. Fowler, 25 November 1967. Female allotype, male paratype, and female paratype; R. W. Mitchell, 6 June 1967. All types are placed in the American Museum of Natural History, New York.

**Additional locality.** TAMAULIPAS: Cueva de la Florida, 8½ km NE of Antiguo Morelos, 10 March 1969, J. R. Reddell, Suzanne Fowler, and Bart Cook.

**Schizomus cookei**, new species

Figures 10-12, 19. Table IV.

This description is based on the holotype

male, the allotype female, the paratype male, and the paratype female, all in 80% ethyl alcohol.

**Males.** Total length, 4.08-4.32 mm.

**Cephalothorax.** Carapace: somewhat less than twice as long as wide, strongly convex, the lateral margins nearly vertical, produced antero-mesally into a sharp, conical process; eye spots absent. Mesopeltidium: acutely triangular, vaguely curved, pointing nearly diagonally toward midline, the free lateral plates separated by their length. Metapeltidium: no suggestion of median, longitudinal suture, more than twice as wide as long. Anterior sternum: triangular, pointing caudad, the apex reaching just beyond coxa II; antero-lateral margins curved. Posterior sternum: pointing cephalad, the apex reaching the base of coxa IV.

**Abdomen.** Terga: I convex, located much closer to metapeltidium than to II; II-IX similar. Sterna: II large, III small, IV-IX similar; Segments X-XII somewhat telescopic, XII the longest. Flagellum: club-shaped, horizontally compressed; stalk one fourth total length of flagellum; body oval to triangular, slightly wider than long, dorsal aspect with a median depression bordered by two lateral swellings; bearing 16 setae.

**Pedipalps.** Length greatly variable, sometimes longer than body, the femur and patella being variably elongated; trochanter produced distally; femur and patella narrow proximally, expanding distally; tibia with large, subapical, ventro-mesal spur; tarsus-basitarsus with a small, subapical, mesal spur; lengths of segments given in Table IV.

**Legs.** I antenniform, a third again as long as body; relative lengths I-IV-II-III; length of segments given in Table IV.

**Chelicerae.** First segment, lateral aspect: a vertical group of three long, feathered setae flanking moveable finger; a single seta arising below and behind moveable finger; two setae arising much below and behind previous seta; a group of three setae arranged basally on fixed digit. First segment, mesal aspect: a ventral group of three long, feathered setae flanking moveable finger as in lateral aspect; a vertical group of four setae arising just behind



Table IV. *Schizomus cookei*, new species

MALES	Pedipalp	I	II	III	IV
	mm	mm	mm	mm	mm
Coxa	.52-.59	.51-.56	.43-.46	.35-.37	.30-.32
Trochanter	.38-.56	.29-.34	.21-.22	.22-.22	.34-.35
Femur	.59-1.29	1.14-1.28	.84-.93	.74-.78	1.09-1.21
Patella	.70-1.42	—	.45-.50	.30-.32	.41-.43
Tibia	.51-.67	1.37-1.49	.59-.61	.41-.45	.82-.82
Basitarsus	.30-.36	1.03-1.13	.50-.50	.51-.53	.71-.79
Tarsus		.92-.94	.39-.44	.41-.47	.42-.47

FEMALES	Pedipalp	I	II	III	IV
	mm	mm	mm	mm	mm
Coxa	.59-.60	.56-.58	.48-.48	.38-.38	.32-.36
Trochanter	.40-.41	.32-.33	.20-.23	.22-.23	.38-.38
Femur	.41-.46	1.09-1.14	.79-.80	.76-.78	1.13-1.13
Patella	.52-.53	—	.44-.50	.36-.39	.46-.46
Tibia	.46-.46	1.39-1.39	.49-.59	.44-.48	.87-.89
Basitarsus	.25-.27	1.02-1.07	.47-.54	.51-.55	.70-.76
Tarsus		.81-.89	.42-.43	.40-.43	.46-.53

moveable finger and directly below the large dorsal seta; a curving group of four medium feathered setae in the dorsal third and frontal half of first segment; two peg-shaped setae arising in a vertical row below previous setae. First segment, vertical aspect: a group of seven feathered setae of various lengths arising on or near the ventral margin. First segment, fixed digit: bearing six teeth; a group of eight closely associated feathered setae on mesal aspect. Second segment (moveable finger): mesal aspect bearing a row of 17 curled, feathered setae oriented along the length of the moveable finger, near the outer margin; the inner margin bearing a row of 18 teeth along the middle one third of the length.

The females differ from the description of the males as follows:

**Females.** Total length, 4.48-4.62 mm.

**Pedipalps.** Much smaller, less variable, especially the femur and patella; tibia without spur; length of segments given in Table IV.

**Legs.** I not as long, subequal to body length;

length of segments given in Table IV.

**Abdomen.** Flagellum: four segmented, elongate, cylindrical; fourth segment longer than previous three.

**Type locality.** Sótano de la Tinaja, 10½ km NE of Ciudad Valles, San Luis Potosí, México. Male holotype, female allotype, male paratype and female paratype, J.A.L. Cooke, 19 February 1970. All types are placed in the American Museum of Natural History, New York.

**Additional locality.** SAN LUIS POTOSI: Sótano de Yerbaniz, 20 km N of Valles, 7 January 1970, R. W. Mitchell.

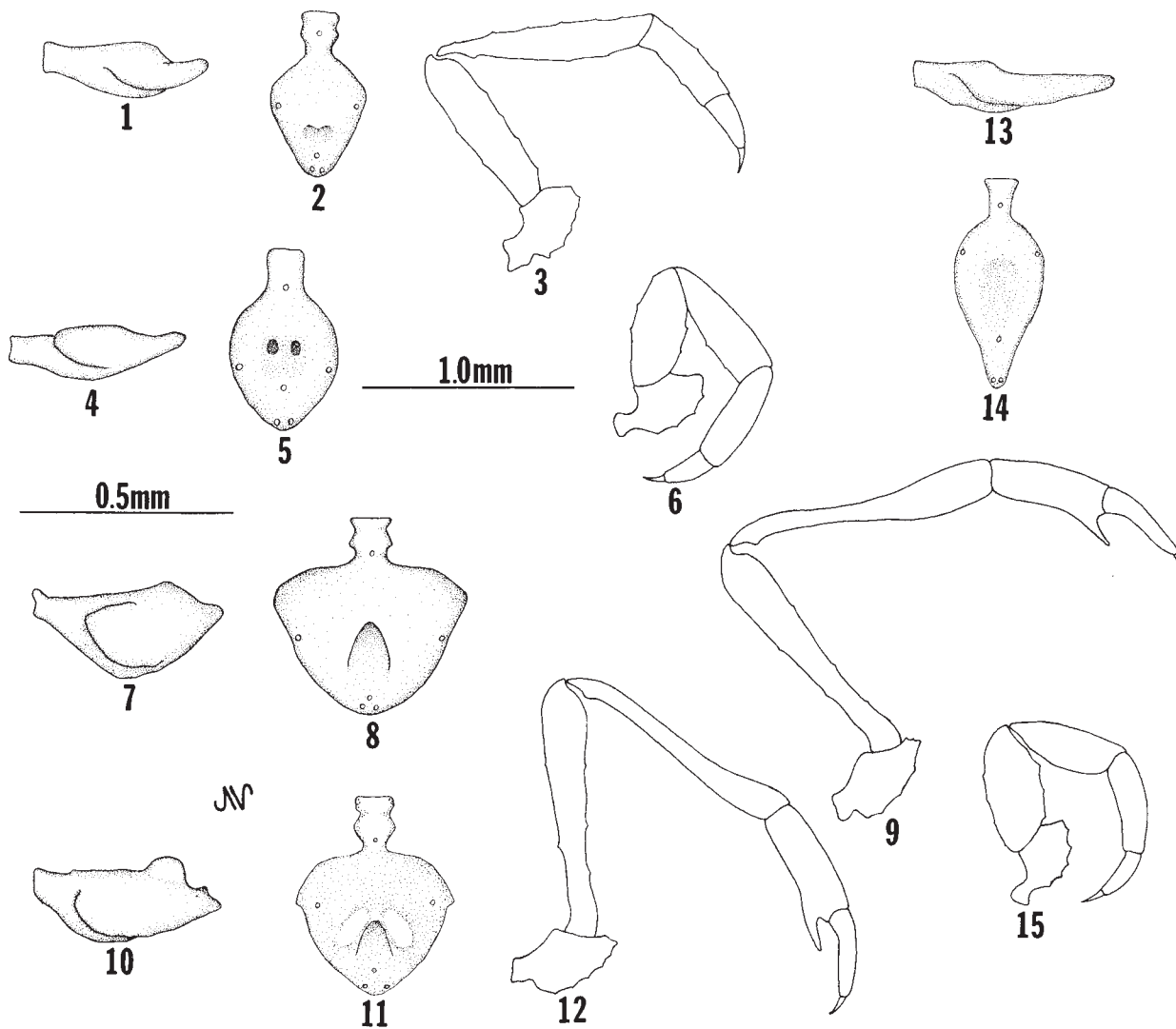
#### **Schizomus reddelli**, new species

Figures 13-15. Table V.

This description is based on the holotype male, in 80% ethyl alcohol.

**Male.** Total length, 4.43 mm.

**Cephalothorax.** Carapace: twice as long as wide, strongly convex, the lateral margins



Figs. 1-3. *Schizomus mexicanus*, new species, male: 1, flagellum, lateral aspect; 2, flagellum, dorsal aspect; 3, pedipalp, lateral aspect.

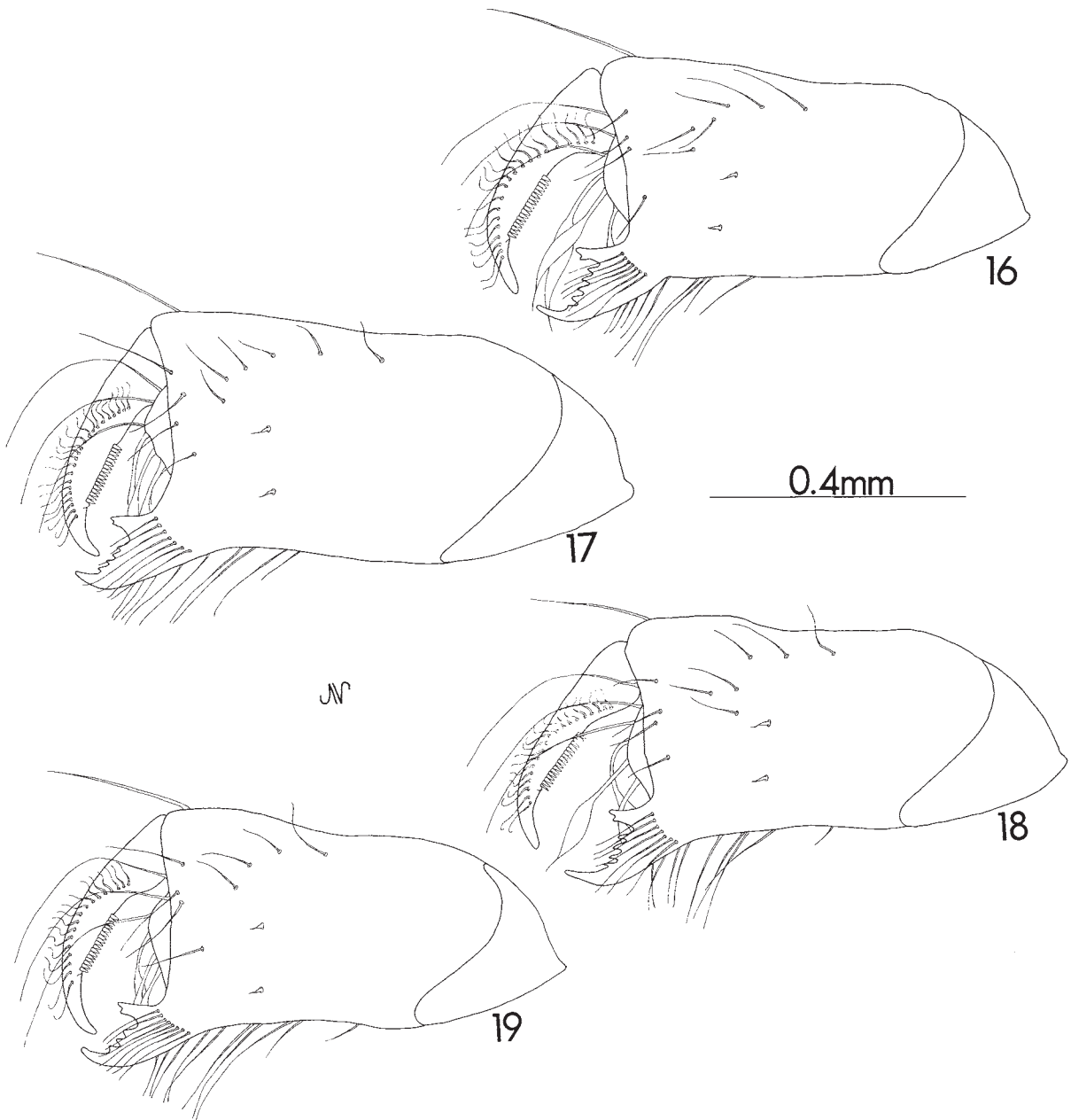
Figs. 4-6. *S. longimanus*, new species, male: 4, flagellum, lateral aspect; 5, flagellum, dorsal aspect; 6, pedipalp, lateral aspect.

Figs. 7-9. *S. mitchelli*, new species, male: 7, flagellum, lateral aspect; 8, flagellum, dorsal aspect; 9, pedipalp, lateral aspect.

Figs. 10-12. *S. cookei*, new species male: 10, flagellum, lateral aspect; 11, flagellum, dorsal aspect; 12, pedipalp, lateral aspect

Figs. 13-15. *S. reddelli*, new species, male: 13, flagellum, lateral aspect; 14, flagellum, dorsal aspect; 15, pedipalp lateral aspect.

The 1.0 mm scale refers to the pedipalps, the 0.5 mm scale refers to the flagella.



Figs. 16-19. Mesal aspect of male chelicerae; 16, *Schizomus mexicanus*, new species; 17, *S. longimanus*, new species; 18, *S. mitchelli*, new species; 19. *S. cookei*, new species.

vertical, produced antero-mesally into a small, sharp, conical process; eye spots absent. Mesopeltidium: acutely triangular, vaguely curved, pointing nearly diagonally toward midline, the free lateral plates separated by their length. Metapeltidium: no suggestion of a median, longitudinal suture, twice as wide as long. Anterior sternum: triangular, pointing caudad, the apex reaching between coxae II and III; antero-lateral margins curved. Posterior sternum: pointing cephalad, the apex reaching past coxa IV.

**Abdomen.** Terga: I somewhat chevron-shaped, located closer to II than to metapeltidium; II-IX similar. Sterna: II large, III small, IV-IX similar. Segments X-XII somewhat telescopic, XII the longest. Flagellum: spade-

shaped, horizontally compressed; stalk two-tenths total length of flagellum; body elongate, oval, half as wide as long, dorsal aspect with very little surface relief; bearing 16 setae.

**Pedipalps.** Trochanter vaguely produced distally; femur and patella narrow proximally, expanded distally; tibia without subapical spur; tarsus-basitarsus with a small, subapical, mesal spur; length of segments given in Table V.

**Legs.** I antenniform, somewhat longer than body; relative lengths I-IV-II-III; length of segments given in Table V.

**Type locality.** Cueva de Tres Manantiales, 23 km NW Limón, Tamaulipas, México. Male holotype; J. Reddell 27 May 1968. The type is placed in the American Museum of Natural History, New York.

Table V. *Schizomus reddelli*, new species

MALE	Pedipalp	I	II	III	IV
	mm	mm	mm	mm	mm
Coxa	.51	.52	.43	.35	.27
Trochanter	.33	.28	.20	.21	.34
Femur	.34	1.13	.82	.70	1.05
Patella	.40	—	.40	.29	.38
Tibia	.38	1.57	.59	.44	.81
Basitarsus	.21	1.13	.48	.48	.75
Tarsus		1.02	.41	.43	.49

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- Gertsch, W.J. 1940. Two new American whip-scorpions of the family Schizomidae. Amer. Mus. Nov., 1077. 4 pp.



THREE NEW RICINULEIDS FROM MEXICAN CAVES  
(ARACHNIDA, RICINULEI)<sup>1</sup>

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Up to the present time four species of the Order Ricinulei have been recorded from cave habitats in Mexico. These came, respectively, from cenotes in Yucatán (*Cryptocellus pearsei* Chamberlin and Ivie, 1939), Grutas de Caca-huamilpa in Guerrero (*Cryptocellus boneti* Bolívar, 1941), Cueva de Los Sabinos in San Luis Potosí (*Cryptocellus osorioi* Bolívar, 1946) and from Cueva de Taninul in San Luis Potosí (*Cryptocellus pelaezi* Coronado, 1970). The ranges of some of these species have been enlarged to other caves in their respective areas as shown by Reddell (1971) in his listing of recent records. The present paper enlarges the Mexican fauna by three additional species from cave habitats, two from Durango and one from Chiapas. Only one Mexican species, *Cryptocellus spinotibialis* Goodnight and Goodnight, 1952, is known from an outside habitat, having been taken from under rotting logs at Finca Guatimoc, above 4,000 feet in altitude, in a tropical region north of Tapachula, Chiapas. This species is not closely related to those taken from caves.

The three new species described here are strikingly distinct taxa; they also show good

relationship to the cluster of species known from caves. Most distinct of all is *Cryptocellus bolivari*, the new species from Chiapas, which presents unique differences from all others in features of the tarsal claws and male chelicerae. A large species, *Cryptocellus red-delli* from a cave in Durango, with elongated body and legs longer than those of any other, may be a cave adapted type restricted to its cave system. The Mexican ricinuleids usually live on or near guano beds in the total darkness of moist bat caves and subsist on guano associated invertebrates. Bolívar (1941, p. 206) suggested that they might be called guanicole troglaphiles.

The material on which these species are based was collected by Mr. James Reddell of Austin, Texas, and his associates, and is deposited in the collection of the American Museum of Natural History in New York. The species are dedicated to him and to the outstanding students of the Ricinulei in North America.

<sup>1</sup>This project has been supported by grants GB-3880 and GB-6524X1 of the National Science Foundation.

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**Cryptocellus bolivari**, new species

Figures 1-7

**Diagnosis.** Fairly large, distinctive species readily recognized by following features: tarsal claws asymmetrical, some being spatulate and others normal in form; movable finger of chelicera (fig. 2) laterally thin, widened over most of length; copulatory apparatus of male (figs. 6-7) with accessory piece of tarsal process a slender rod and tarsal process trifurcate at apex.

**Etymology.** Dedicated to Dr. C. Bolívar y Pieltain, of the Instituto Politécnico in Mexico City, noted student of Ricinulei and cave faunas.

Coloration in both sexes quite uniform, bright rusty orange or reddish; carapace with usual faint pale marking on each side opposite second coxae; tergites on abdomen margined in dull yellow and middle three with pair of linear depressions on each side filled with dusky tubercles; venter of abdomen with three pairs of linear markings on sternites and

with dusky smudging at base; terminal segments of appendages paler; entire body clothed with short, whitish, quite inconspicuous hairs.

**Male holotype.** Total length, 6.5 mm. Carapace, 2.1 mm long, 1.2 mm wide in front, 2 mm wide between third coxae. Cucullus, 0.9 mm long, 1.5 mm wide. Abdomen, 4 mm long, 2.2 mm wide.

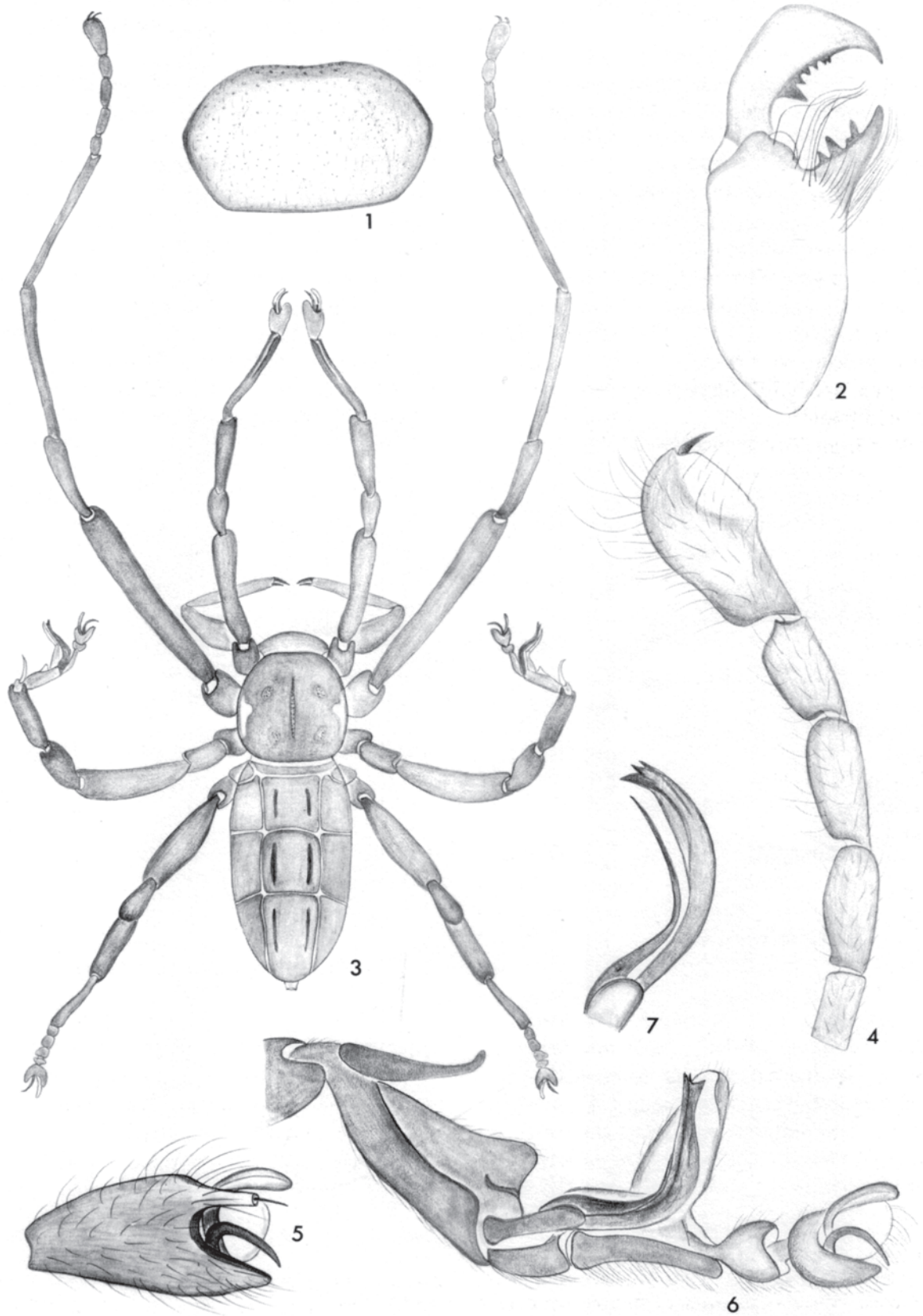
Structure of male as shown in figures 1-7. Carapace slightly longer than wide, broadly truncated in front and behind, with median furrow and lateral depressions shallow; entire surface covered quite evenly with small dark tubercles which are more concentrated in depressions and around margins. Cucullus (fig. 1) evenly covered with small tubercles. Left chelicera (fig. 2): movable claw laterally thin, widened through much of length, armed with single row of six teeth of which basal tooth is much larger; fixed finger with four teeth. Coxae forming floor of cephalothorax smoother than carapace, with few spinules along apical margins.

	I	II	III	IV	Palp
Coxa	1.15	1.20	1.00	0.80	0.50
Trochanter I	0.70	0.80	0.70	0.70	0.75
Trochanter II	----	----	0.80	0.75	0.40
Femur	2.15	3.70	2.30	1.85	1.15
Patella	0.80	1.60	0.85	1.00	----
Tibia	1.35	2.90	1.30	1.30	----
Metatarsus	1.75	3.00	1.20	1.40	----
Tarsus	0.70	2.70	1.50	1.25	1.80
Total	8.60	15.90	9.65	9.05	4.40

Leg formula, 2341. First femur as long, first leg about four times as long as carapace; second femur 1.8 times, second leg 7.5 times as long as carapace. Basal segments of legs I and II thickly covered, apical segments sparsely covered with small tubercles; posterior legs

with few tubercles. Second leg longest, without spurs or enlargements; terminal segment of coxa thickened, longer, others of about equal length. Tarsal claws atypical as follows: retroclaw of first tarsus (fig. 5) spatulate but proclaw normal; both claws of second tarsus

Figs. 1-7. *Cryptocellus bolivari*, new species, male. 1. Cucullus. 2. Left chelicera, prolateral view. 3. Dorsal view of entire animal. 4. Second tarsus, retrolateral view. 5. Terminal tarsal segment of first tarsus, retrolateral view. 6. Male copulatory apparatus of third left leg, prolateral view. 7. Movable process of copulatory apparatus, with elements separated.



essentially normal; retroclaw of third tarsus (fig. 6) spatulate; both claws of fourth tarsus spatulate.

Abdomen (fig. 3) typical of series; tergites evenly covered with small tubercles and with concentrations in depressions on middle three; sternites relatively smooth, coriaceous, with inconspicuous tubercles mostly along sides and in depressions. Postabdomen short, with rings tightly telescoped.

Copulatory apparatus of third leg (figs. 6-7) with following features; metatarsus deeply channeled and with long, slightly curved metatarsal process hinged at base; movable tarsal process with principal branch trifurcate at apex and with simple, slender, spinelike accessory piece.

**Male from Grutas de Zapaluta.** Total length,

	I	II	III	IV	Palp
Coxa	0.75	0.90	0.70	0.70	0.35
Trochanter I	0.40	0.65	0.50	0.55	0.60
Trochanter II	----	----	0.55	0.50	0.50
Femur	1.75	3.00	2.00	2.00	1.15
Patella	0.70	1.30	0.75	0.75	----
Tibia	1.20	2.25	1.00	1.10	----
Metatarsus	1.35	2.25	1.20	1.20	----
Tarsus	0.60	2.10	0.75	1.00	1.65
Total	6.80	12.40	7.45	7.80	4.25

Leg formula, 2431. First femur about equal to, first leg four times as long as carapace; second femur 1.8 times, second leg 7.3 times as long as carapace. Legs much more slender than those of male; tarsal claws essentially like those of male.

**Type Data.** Male holotype from Sumidero del Camino, 16 km NE of Comitán, Chiapas, México, August 22, 1967 (J. Reddell, J. Fish).

**Distribution.** Caves of Chiapas.

**Other records.** CHIAPAS: Grutas de Zapaluta, 6½ km NE of Zapaluta, August 20, 1967 (J. Reddell, J. Fish, T.R. Evans), two males,

5.2 mm. With basic features of holotype, including trifurcate tarsal process of copulatory device, but with thin legs like those of females from same cave described below. Males from this cave thus somewhat less masculine and with some strong features of holotype somewhat diluted.

**Female from Grutas de Zapaluta.** Total length, 5.4 mm. Carapace, 1.7 mm long, 1 mm wide at front and 1.6 mm wide at third coxae. Cucullus, 0.8 mm long, 1.25 mm wide. Abdomen, 3.7 mm long, 2.3 mm wide.

Structure and general appearance similar to that of male except as follows: Movable finger of chelicera rounded, somewhat narrower, with large basal tooth and seven small ones; teeth on fixed finger five, all of medium size.

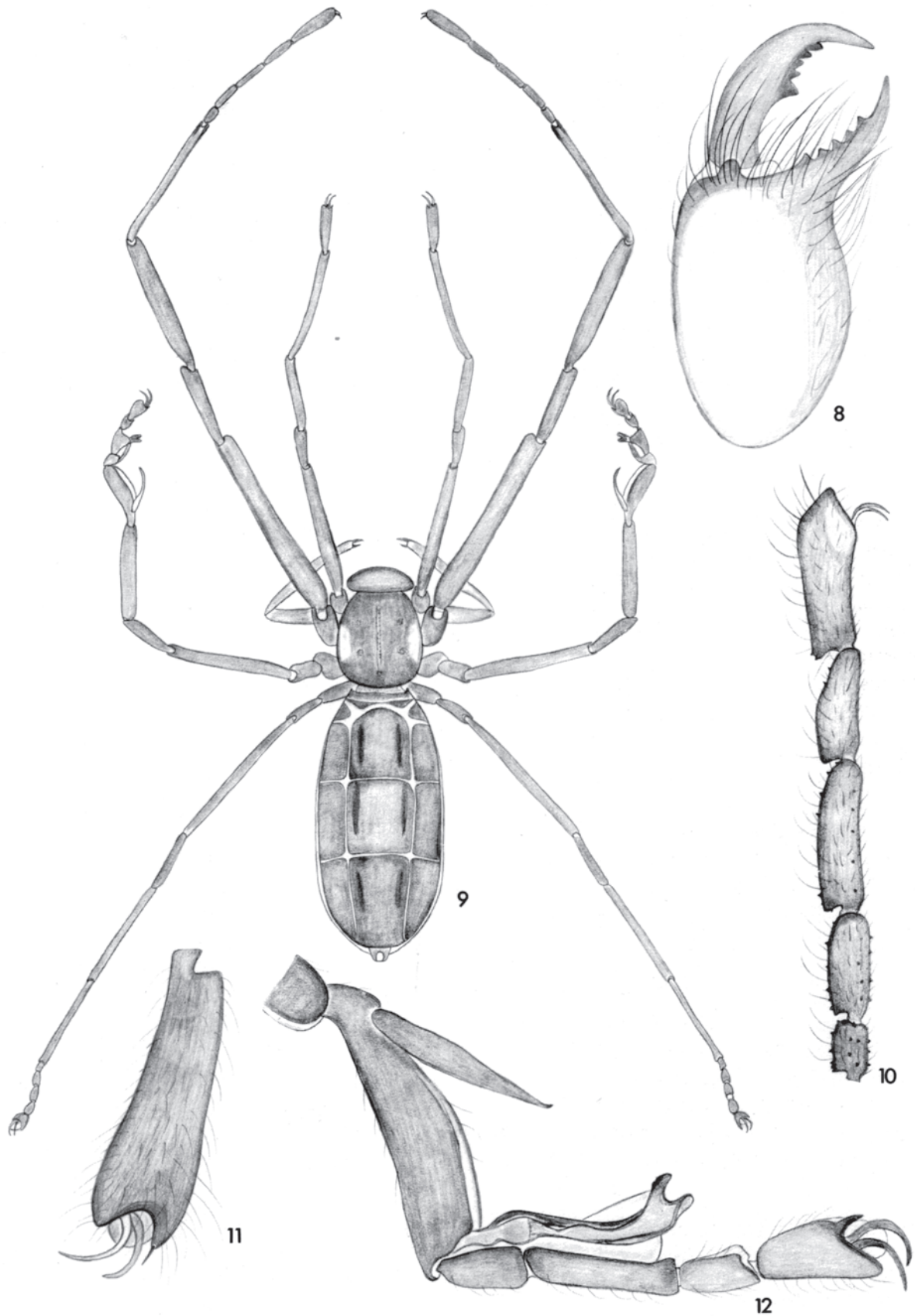
three females; July 17, 1969 (S. and J. Peck), two females, two nymphs.

**Cryptocellus reddelli**, new species

Figures 8-12

**Diagnosis.** Larger, smoother, probable cave adapted species with thin body and long legs, readily recognized by following features: chelicera (fig. 8) of normal form, with short teeth on both fingers; tarsal claws (fig. 11) normal,

Figs. 8-12. *Cryptocellus reddelli*, new species, male. 8. Left chelicera, prolateral view. 9. Dorsal view of entire animal. 10. Second left tarsus, retrolateral view. 11. First left tarsus, prolateral view. 12. Copulatory apparatus of third left leg, prolateral view.





all thin and evenly curved; copulatory apparatus of male (fig. 12) with all elements elongated, accessory piece and simple spine and principal tarsal process deeply emarginated at apex.

**Etymology.** Dedicated to Mr. James Reddell of Austin, Texas, speleologist and student of cave biology, who has collected many cave animals of outstanding interest.

Coloration typical of series, dark reddish, with usual pale spots on sides of carapace and faint pale margining of tergites of abdomen.

**Male holotype.** Total length, 7 mm. Carapace, 1.85 mm long, 0.9 mm wide in front, 1.65 mm wide between third coxae. Cucullus, 0.75 mm long, 1.2 mm wide. Abdomen,

4.8 mm long, 2.4 mm wide.

Structure of male as shown in figures 8-12. Carapace distinctly longer than broad, considerably narrowed and truncated in front, gently rounded on sides and nearly truncated behind; median and lateral depressions shallow, with small clusters of inconspicuous tubercles; surface with many pale oval pits and few scattered tubercles most numerous and conspicuous on sides and especially along posterior margin. Cucullus with scattered small tubercles and pale pits. Left chelicera (fig. 8) normal; movable finger evenly curved, with five stout teeth on inner margin; fixed finger with five stout subequal teeth on inner margin.

	I	II	III	IV	Palp
Coxa	0.75	1.00	0.85	0.75	0.50
Trochanter I	0.50	0.75	0.60	0.75	0.50
Trochanter II	---	---	0.75	0.80	0.30
Femur	2.35	3.70	2.50	3.00	1.25
Patella	0.80	1.60	1.00	1.00	---
Tibia	1.80	3.00	1.75	2.00	---
Metatarsus	1.80	2.75	1.20	1.80	---
Tarsus	0.85	3.30	1.50	1.50	1.75
Total	8.85	16.10	10.00	11.60	4.30

Leg formula, 2431. First femur 1.2 times, first leg about 4.8 times as long as carapace; second femur twice, second leg about nine times as long as carapace. Basal segments of all legs with moderate numbers of small tubercles; apical segments with fewer scattered tubercles; femora, patellae and tibiae of legs I and II with row of spinules on each side of angled ventral surfaces. Second leg longest, without spurs or enlargements; terminal segment of tarsus (fig. 10) not much thickened, longer than basal segments. All tarsal claws thin, curved, of normal form.

Abdomen (fig. 9) twice as long as wide; tergites considerably longer than broad; tergites

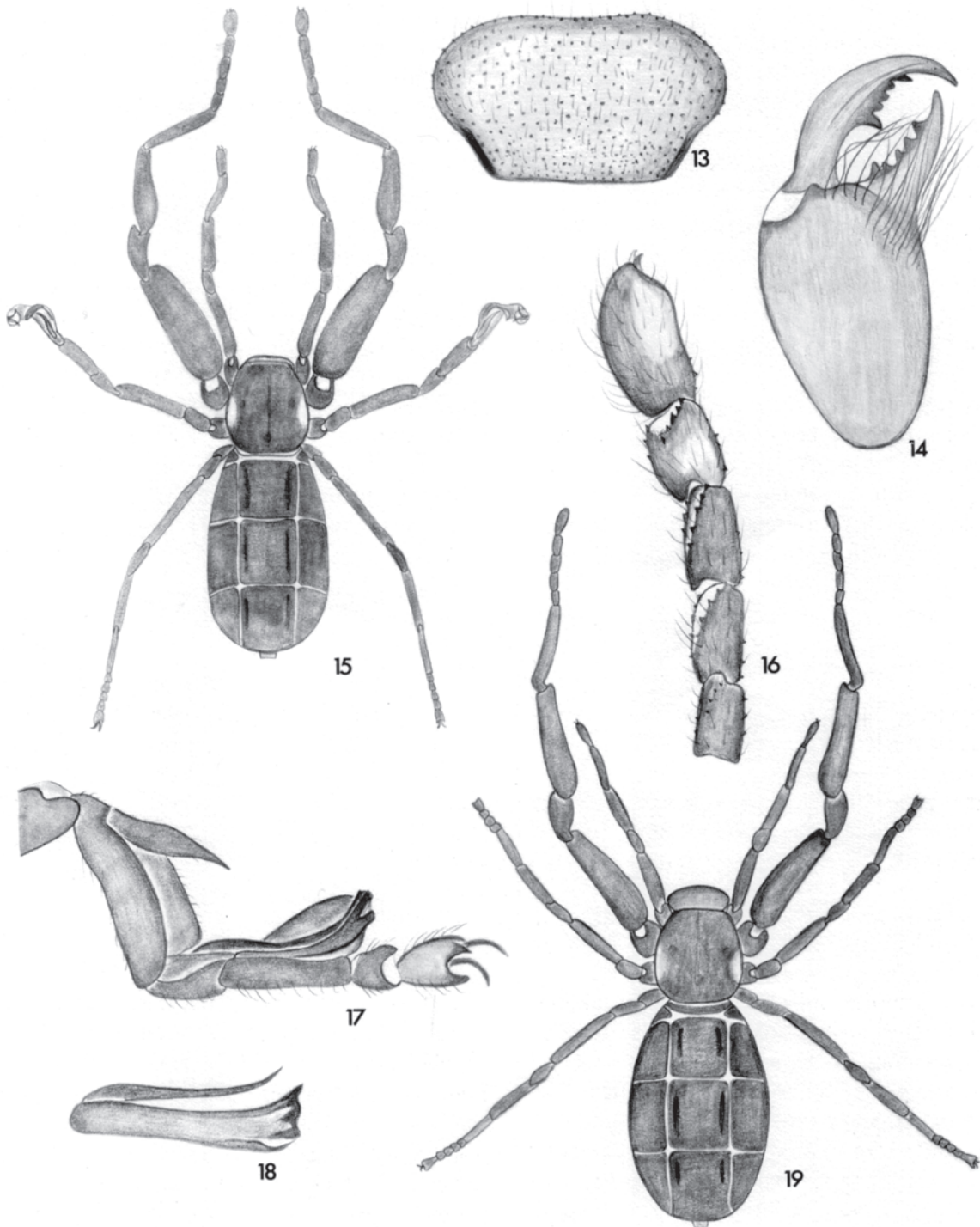
and sternites relatively smooth, with few small tubercles and numerous pale round and oval pits. Postabdomen tightly telescoped, with basal ring slightly emarginated above.

Copulatory apparatus (fig. 12) with following features: metatarsus deeply channeled back to curved metatarsal process; movable tarsal process with principal branch deeply grooved at apex and with simple, spinelike accessory piece.

**Type Data.** Male holotype and two nymphs from Cueva de los Riscos, Sierra de la India, four miles south of Mapimí, Durango, México, August, 1964 (W. Russell).

**Distribution.** Known only from above specimens.

Figs. 13-19. *Cryptocellus mitchelli*, new species. 13. Cucullus of male. 14. Left chelicera of male, prolateral view. 15. Dorsal view of male. 16. Second tarsus of male, retrolateral view. 17. Male copulatory apparatus of third left leg, prolateral view. 18. Tarsal process of copulatory apparatus, with elements separated. 19. Dorsal view of female.



**Cryptocellus mitchelli**, new species

Figures 13-19

**Diagnosis.** Medium sized species similar in superficial appearance to that of *dorotheae* Gertsch and Mulaik (1939) of Texas but readily separated as follows: size much larger, about 5 mm as compared with about 3 mm; second coxae enlarged, twice as wide as third pair; carapace and abdomen finely sculptured with oval pits and small tubercles; movable finger of chelicera (fig. 14) normal, with typical dentition; copulatory apparatus (figs. 17-18) of male with slender simple rod as accessory piece and principal tarsal process flared at apex.

**Etymology.** Dedicated to Dr. Robert W. Mitchell of Texas Tech University, Lubbock, Texas, student of caves, cave faunas, and especially of the Ricinulei.

Coloration of both sexes bright reddish brown; carapace with distinct yellowish spot

on each side opposite third coxa; tergites of abdomen distinctly margined in yellow and venter with blackish masculations on two sternites at base; clothing of short whitish hairs covering body and appendages.

**Male holotype.** Total length, 5 mm. Carapace 1.6 mm long, 0.8 mm wide in front and 1.35 mm wide at third coxae. Cucullus, 0.62 mm long, 1.1 mm wide. Abdomen, 3.5 mm long, 2.1 mm wide.

Structure of male as shown in figures 13-18. Carapace longer than wide, with median groove and lateral depressions shallow; entire surface evenly covered with small tubercles, oval pits and short pale hairs, all inconspicuous. Culcullus (fig. 13) with similar sculpturing. Left chelicera (fig. 14) with quite typical dentition; movable finger evenly curved, moderately broad, with five teeth on inner margin, basal one largest; fixed finger with five stout teeth on inner margin. Third coxae larger than those of other species, twice as broad as first coxa.

	I	II	III	IV	Palp
Coxa	0.50	0.80	0.65	0.60	0.25
Trochanter I	0.35	0.60	0.40	0.40	0.35
Trochanter II	---	---	0.50	1.00	0.35
Femur	1.15	2.10	1.20	1.05	0.80
Patella	0.60	1.00	0.60	0.60	---
Tibia	0.85	1.50	0.80	1.00	---
Metatarsus	0.95	1.50	0.65	0.85	---
Tarsus	0.50	1.80	1.15	0.85	1.10
Total	4.90	9.30	5.95	6.35	2.85

Leg formula, 2431. First femur about two-thirds, first leg three times as long as carapace; second femur 1.3 times, second leg about six times as long as carapace. All legs rather thickly tuberculate, with tubercles larger and more numerous on basal segments. Second leg longest, with thickened segments; femur nearly one-fourth as wide as long as seen from above, flattened on sides, its depth about one-third of length, thickly studded with tubercles, those of marginal ventral row large; tibia about one-third as broad as long, narrowed apically, with ventral row of stout

tubercles on each side; metatarsus about six times as long as wide, with row of small tubercles along each ridged margin; tarsal segments (fig. 16) about of equal length, with terminal one moderately enlarged. Tarsal claws normal, all thin, evenly curved. Two other males with thicker femora than those of holotype.

Abdomen (fig. 15) typical of series, less than twice as long as broad; dorsum with inconspicuous pale pits and covering of inconspicuous tubercles; middle tergites only slightly longer than broad. Postabdomen tightly

telescoped, without noticeable emargination on any ring.

Copulatory apparatus on third leg (figs. 17-18) with following features: metatarsus deeply grooved and metatarsal process quite thick and curved at apex; tarsal process with principal branch moderately flared and fluted at apex and with spinelike accessory piece simple.

**Female.** Total length, 5.5 mm. Carapace,

1.65 mm long, 0.85 mm wide at front, 1.40 mm wide at third coxae. Cucullus, 0.65 mm long, 1.1 mm wide. Abdomen, 3.75 mm long, 2.3 mm wide.

Structure as shown in figure 19, similar to that of male; abdomen proportionately broader; movable finger of chelicera thinner but dentition same; sculpturing of entire body like that of males but tubercles on legs smaller.

	I	II	III	IV	Palp
Coxa	0.50	0.80	0.65	0.65	0.25
Trochanter I	0.30	0.60	0.50	0.50	0.35
Trochanter II	----	----	0.50	0.55	0.25
Femur	1.10	2.00	1.25	1.05	0.80
Patella	0.50	0.80	0.60	0.65	----
Tibia	0.75	1.35	0.80	0.90	----
Metatarsus	0.80	1.60	0.80	0.80	----
Tarsus	0.40	1.80	0.75	0.80	1.15
Total	4.35	8.95	5.85	5.90	2.80

Leg formula, 2431. First femur about two-thirds, first leg 2.6 times as long as carapace; second femur 1.2 times, second leg 5.5 times as long as carapace. Legs somewhat thinner than those of male; second femur less incrassated but otherwise similar.

**Type Data.** Male holotype, five males, seven females and one nymph from Cueva del Guano, 53 kilometers south of Torreon, Durango, Mexico, February 24, 1966 (J. Reddell, W. Bell).

**Distribution.** Known only from above material.

Gertsch, W. J. and S. Mulaik. 1939. Report on a new ricinuleid from Texas. *Amer. Mus. Novitates*, 1037:1-5.

Goodnight, C. J. and M. L. Goodnight. 1952. A new ricinulid from Chiapas, Mexico (Arachnoidea, Ricinulei). *Amer. Mus. Novitates*, 1583:1-5.

Reddell, J. 1971. A preliminary bibliography of Mexican cave biology, with a checklist of published records. *Association for Mexican Cave Studies, Bull.*, 3:1-184.

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A CHECKLIST OF THE CAVE FAUNA OF MEXICO. I. SIERRA DE EL ABRA,  
TAMAULIPAS AND SAN LUIS POTOSÍ<sup>1</sup>

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Texas Tech University, Lubbock

INTRODUCTION

This is the first of a series of reports outlining the cave fauna of Mexico. It is concerned with the fauna of the caves of the Sierra de El Abra, Tamaulipas and San Luis Potosí. The Sierra de El Abra is a low-lying range running approximately north-south and extending from the Río Tampaon in the south to the Río Guayalejo in the north. Its eastern face is a steep, at times vertical, scarp rising more than 1000 feet from the Atlantic coastal plain, whereas the western side is a comparatively gentle slope. Drainage is almost entirely subterranean and the numerous arroyos which cut the eastern slopes end abruptly in pits plunging into large complex cave systems. Higher on the range many pits several hundred feet deep may be found, some of which enter large chambers. On the eastern face large entrances frequently lead into horizontal tunnels, some of which are quite extensive.

The discovery in 1936 of the blind characin fish, *Anoptichthys jordani* Hubbs and Innes, focused attention on the Sierra de El Abra.

Subsequent explorations of the region by Federico Bonet, Candido Bolívar y Pieltain and their associates resulted in the discovery of numerous species of cavernicole, some of which are quite remarkable. The area has been well-described by Bonet (1953). Breder (1942) has discussed the ecology of one cave (Cueva Chica) and Osorio Tafall (1943) has discussed the aquatic biology of two (Cueva Chica and Cueva de Los Sabinos). Reddell (1971) has published a bibliography and checklist of published records of the Mexican cave fauna, so a further discussion of its described fauna is not included here. Detailed discussions of the area, together with maps and descriptions of the caves, are being prepared by Robert Mitchell and William Russell.

The Sierra de El Abra was one of the first areas in Mexico to be visited by the Texas cavers who were to found the Association for Mexican Cave Studies. Several trips to the Sótano del Arroyo in San Luis Potosí revealed the extensive nature of the cave systems of

<sup>1</sup>Supported in part by grant funds awarded by the International Center for the Arid and Semi-Arid Land Studies (ICASALS), Texas Tech University.

the range and preliminary collections in this cave revealed the presence of interesting undescribed species. Although the caves of the range had been well-collected by Bonet, Bolívar, and associates many new species have been discovered in the last few years. The presence of several unusual troglobite species, including a blind scorpion, has spurred interest in the area.

At the present time eighteen species of troglobite (9 aquatic and 9 terrestrial) are known from the range. This is few when compared with the fauna of a high altitude area, such as the Sierra de Guatemala in Tamaulipas, but this is as is to be expected (Mitchell, 1969). Additional troglobite species are to be expected when the area is investigated more fully.

An attempt has been made in this report to include all records, both new and published, but only basic bibliographic citations are included. Complete literature records may be obtained in Reddell (1971). The cave names are those accepted as standard by the Association for Mexican Cave Studies. Caves are located on the accompanying map. Troglobites are indicated by an asterisk.

We wish to express our appreciation to the following people who have assisted in the collecting or who have provided us with specimens: Francis Abernathy, Richard Albert,

Tom Albert, Edward Alexander, William Bell, Mike Collins, Bart Cook, Gil Ediger, William Elliott, Jane Evans, T. R. Evans, Ross Felton, John Fish, John George, Dave Honea, David McKenzie, Larry Manire, Marsha Meredith, Tony Mollhagen, Stewart Peck, Terry Raines, Eric Remington, Francis Rose, William Russell, A. Richard Smith, Richard Smith, Dennis Sustare, Mills Tandy, and Suzanne Wiley.

We also wish to express our appreciation to the following taxonomists for their identification of material included in this report: T. C. Barr, Jr., beetles; T. E. Bowman, isopods and mysids; Mel Brownfield, palpigrades; H. R. Burke, beetles; O. L. Cartwright, beetles; Nell B. Causey, millipedes; F. E. Chace, shrimps; A. C. Cole, ants; R. C. Froeschner, hemipterans; R. J. Gagne, flies; G. E. Gates, earthworms; W. J. Gertsch, scorpions, ricinuleids, amblypygids, uropygids, and spiders; Roberto Gonzalez R., japygids; A. B. Gurney, cockroaches; L. H. Herman, beetles; H. H. Hobbs, ostracods and crayfish; T. H. Hubbell, crickets; Leslie Hubricht, snails; P. D. Hurd, Jr., bees; J. M. Kingsolver, beetles; L. V. Knutson, flies; G. M. Kohls, ticks; J. D. Lynch, frogs; T. C. Maa, streblid flies; W. B. Muchmore, pseudoscorpions; Craig Nelson, lizards; Alan Solem, snails; T. J. Spilman, beetles; William Voss, mites; R. E. Warner, beetles; and Pedro Wygodzinsky, thysanurans.

## PHYLUM PROTOZOA

### CLASS SARCODINA

#### ORDER AMOEBIDA

##### Family Amoebidae

###### *Amoeba* sp.

Records.--SAN LUIS POTOSI: Cueva Chica.  
Bibliography.--Osorio Tafall, 1943.

#### ORDER HELIOZOIDA

##### Family Actinophryidae

###### *Actinophrys* sp.

Records.--SAN LUIS POTOSI: Cueva Chica.  
Bibliography.--Osorio Tafall, 1943.

ORDER TESTACIDA

Family Arcellidae

*Arcella vulgaris* Ehrenberg

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.

Bibliography.--Osorio Tafall, 1943.

Family Diffugiidae

*Centropyxis aculeatus* Ehrenberg

Records.--SAN LUIS POTOSI: Cueva Chica and Cueva de Los Sabinos.

Bibliography.--Osorio Tafall, 1943.

CLASS CILIATA

ORDER GYMNOSTOMATIDA

Family Colepidae

*Coleps* sp. cf. *hirtus* (Mueller)

Records.--SAN LUIS POTOSI: Cueva Chica.

Bibliography.--Osorio Tafall, 1943.

ORDER PERITRICHIDA

Family Vorticellidae

*Vorticella* sp. cf. *microstoma* Ehrenberg

Records.--SAN LUIS POTOSI: Cueva Chica.

Bibliography.--Osorio Tafall, 1943.

PHYLUM CNIDARIA

CLASS HYDROZOA

ORDER HYDROIDEA

Family Hydridae

*Hydra* sp.

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.

Bibliography.--Osorio Tafall, 1943.

PHYLUM ASCHELMINTHES

CLASS ROTIFERA

ORDER BDELLOIDEA

Family Philodinidae

*Philodina roseola* Ehrenberg

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.

Bibliography.--Osorio Tafall, 1943.

ORDER FLOSCULARIACEA

Family Flosculariidae

*Sinantherina socialis* (L.)

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.  
Bibliography.--Osorio Tafall, 1943.

ORDER PLOIMA

Family Brachionidae

*Lepadella patella* (Mueller)

Records.--SAN LUIS POTOSI: Cueva Chica.  
Bibliography.--Osorio Tafall, 1943.

*Monostyla closteroerca* Schmarda

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.  
Bibliography.--Osorio Tafall, 1943.

*Monostyla quadridentata* Ehrenberg

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.  
Bibliography.--Osorio Tafall, 1943.

*Platyias patulus* (Mueller)

Records.--SAN LUIS POTOSI: Cueva Chica.  
Bibliography.--Osorio Tafall, 1943.

PHYLUM ANNELIDA

CLASS CLITELLATA

ORDER BRANCHIOBDELLIDA

Family Branchiobdellidae

*Cambarincola macrodonta* Ellis

Records.--SAN LUIS POTOSI: Cueva Chica.  
Bibliography.--Hobbs, 1941; Osorio Tafall, 1943; Rioja, 1942; 1943.  
Comment.--This worm was taken from the crayfish, *Procambarus acutus cuevachicae*.

ORDER OLIGOCHAETA

Family Acanthodrilidae

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

Records.--SAN LUIS POTOSI: Cueva Chica.  
Comment.--Two poorly preserved juveniles were collected.

Family Aelosomatidae

*Aelosoma* sp.

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.  
Bibliography.--Osorio Tafall, 1943.

Family Ocnerodrilidae

*Eukerria saltensis* (Beddard)

Records.--TAMAULIPAS: Cueva de la Florida.  
Bibliography.--Gates, 1971.

Family Octochaetidae

*Trigaster reddelli* Gates

Records.--SAN LUIS POTOSI: Sótano de Yerbaniz.  
Bibliography.--Gates, 1971.

*Trigaster vallesensis* Gates

Records.--SAN LUIS POTOSI: Sótano de Yerbaniz.

Bibliography.--Gates, 1971.

Family Tubificidae

*Aulophorus* sp.

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.

Bibliography.--Osorio Tafall, 1943.

PHYLUM ARTHROPODA

CLASS CRUSTACEA

ORDER EUCOPEPODA

Family Canthocamptidae

*Canthocamptus* sp.

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.

Bibliography.--Osorio Tafall, 1943.

*Nitocra* sp.

Records.--SAN LUIS POTOSI: Cueva Chica and Cueva de Los Sabinos.

Bibliography.--Osorio Tafall, 1943.

*Attheyella* sp. cf. *pilosa* Chappuis

Records.--SAN LUIS POTOSI: Cueva Chica and Cueva de Los Sabinos.

Bibliography.--Bowman, Prins, and Morris, 1968; Osorio Tafall, 1943.

Family Cyclopidae

*Cyclops (Acanthocyclops) robustus* Sars

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.

Bibliography.--Osorio Tafall, 1943.

*Eucyclops ?serrulatus* (Fischer)

Records.--SAN LUIS POTOSI: Cueva Chica and Cueva de Los Sabinos.

Bibliography.--Osorio Tafall, 1943.

Comment.--This species is only tentatively identified from these two caves.

*Eucyclops (Tropocyclops) prasinus* (Fischer)

Records.--SAN LUIS POTOSI: Cueva Chica and Cueva de Los Sabinos.

Bibliography.--Osorio Tafall, 1943.

*Macrocyclops albidus* (Jurine)

Records.--SAN LUIS POTOSI: Cueva Chica and Cueva de Los Sabinos.

Bibliography.--Osorio Tafall, 1943.

*Paracyclops* sp. cf. *fimbriatus* (Fischer)

Records.--SAN LUIS POTOSI: Cueva Chica and Cueva de Los Sabinos.

Bibliography.--Osorio Tafall, 1943; Rioja, 1953.

*Thermocyclops inversus* Kiefer

Records.--SAN LUIS POTOSI: Cueva Chica and Cueva de Los Sabinos.

Bibliography.--Osorio Tafall, 1943.

Family Diaptomidae

\**Diaptomus (Microdiaptomus) cokeri* Osorio Tafall

Records.--SAN LUIS POTOSI: Cueva Chica and Cueva de Los Sabinos.

Bibliography.--Anonymous, 1942; Osorio Tafall, 1942; 1943.



ORDER CLADOCERA

Family Chydoridae

*Alona* sp.

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.  
Bibliography.--Osorio Tafall, 1943.

Family Daphnidae

*Ceriodaphnia lacustris* Birge

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.  
Bibliography.--Osorio Tafall, 1943.

ORDER PODOCOPA

Family Cypridae

*Candona* sp.

Records.--SAN LUIS POTOSI: Cueva Chica and Cueva de Los Sabinos.  
Bibliography.--Osorio Tafall, 1943.

*Cypris* sp.

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.  
Bibliography.--Osorio Tafall, 1943.

Family Entocytheridae

*Ankylocythere sinuosa* (Rioja)

Records.--SAN LUIS POTOSI: Cueva Chica.  
Bibliography.--Hart, 1962; Hobbs, 1971; Rioja, 1941; 1941a; 1951.

*Entocythere claytonhoffi* Rioja

Records.--SAN LUIS POTOSI: Cueva Chica; TAMAULIPAS: Cueva de San Nicolas.  
Bibliography.--Hart, 1962; Hobbs, 1971; Rioja, 1942; 1942a; 1951.

Comment.--In Cueva Chica this ostracod is commensal on the crayfish, *P. acutus cueva-chicae*; in Cueva de San Nicolas it was taken from *P. tolteca*.

\**Sphaeromicola cirolanae* Rioja

Records.--SAN LUIS POTOSI: Sótano del Arroyo, Sotanito de Montecillos, Sótano de Pichijumo, Cueva de Los Sabinos, and Sótano del Tigre; TAMAULIPAS: Cueva de la Florida and Grutas de Quintero.

Bibliography.--Hart, 1962; Hobbs, 1971; Rioja, 1951.

Comment.--This species has been taken from *Speocirolana bolivari* and *S. pelaezi* in Grutas de Quintero. In the other caves it is known from *S. pelaezi*.

ORDER ISOPODA

Family Armadillidae

*Venezillo pleogoniophorus* (Rioja)

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.  
Bibliography.--Mulaik, 1960; Rioja, 1951a; 1954.

Family Cirolanidae

\**Speocirolana bolivari* (Rioja) (det. T.E. Bowman)

Records.--TAMAULIPAS: Grutas de Quintero.  
Bibliography.--Rioja, 1951; 1953a; Villalobos, 1951.

Comment.--This abundant species is found in deep still pools.

\**Speocirolana pelaezi* (Bolívar) (det. T.E. Bowman)

Records.--SAN LUIS POTOSI: Sótano del Arroyo, Cueva Chica, Cueva de la Curva, Sotanito de Montecillos, Sótano de Pichijumo, Sótano de las Piedras, Cueva de Los Sabinos,

Sótano del Tigre, and Sótano de la Tinaja; TAMAULIPAS: Cueva de la Florida, Cueva de El Pachón, and Grutas de Quintero.

Bibliography.--Bolívar, 1950; Osorio Tafall, 1943; Rioja, 1951; 1953a; Schultz, 1965.

Comment.--This species is usually taken from small elevated pools not inhabited by the blind fish, *Astyanax* spp. See Figs. 10, 27.

Family Sphaeroniscidae

\**Spherarmadillo cavernicola* Mulaik

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.

Bibliography.--Mulaik, 1960; Schultz, 1970a.

Family Trichoniscidae

\**Brackenridgia bridgesi* (Van Name)

Records.--SAN LUIS POTOSI: Boca del Abra, Sótano del Arroyo, Cueva Chica, Ventana Jabalí, Cueva de Los Sabinos, Sótano del Tigre, and Sótano de la Tinaja; TAMAULIPAS: Cueva de El Pachón and Grutas de Quintero.

Bibliography.--Mulaik, 1960; Rioja, 1950; 1955; Vandell, 1965a; Van Name, 1942.

Comment.--This abundant species is usually found on pieces of rotting wood and both within and along the edges of pools. See fig. 9.

\**Cylindroniscus vallesensis* Schultz

Records.--SAN LUIS POTOSI: Cueva Pinta.

Bibliography.--Schultz, 1970.

Comment.--This species was found in a moist area among small pieces of wood.

ORDER MYSIDACEA

Family Lepidopsidae

\**Speleomysis quinterensis* (Villalobos) (det. T.E. Bowman)

Records.--SAN LUIS POTOSI: Sótano de la Tinaja; TAMAULIPAS: Grutas de Quintero.

Bibliography.--Villalobos, 1951.

Comment.--A single mysid was taken from the terminal lake in Sótano de la Tinaja. Mysids are abundant about pieces of wood in pools in Grutas de Quintero. See Fig. 11.

ORDER DECAPODA

Family Astacidae

*Procambarus* sp. (det. H.H. Hobbs)

Records.--SAN LUIS POTOSI: Sótano de Pichijumo.

Comment.--A single juvenile male was collected.

*Procambarus acutus cuevachicae* (Hobbs)

Records.--SAN LUIS POTOSI: Cueva Chica.

Bibliography.--Hobbs, 1941; 1971; Villalobos, 1953; 1958.

Comment.--This species is abundant in the second pool in the cave.

*Procambarus tolteca* Hobbs (det. H.H. Hobbs)

Records.--TAMAULIPAS: Cueva de San Nicolas.

Bibliography.--Hobbs, 1971.

Family Palaemonidae

*Macrobrachium carcinus* (L.)

Records.--SAN LUIS POTOSI: Cueva Chica.

Bibliography.--Breder, 1942.

Comment.--This rarely seen species is doubtless introduced from the Río Tampoán.

\**Troglocubanus* sp. (det. F.E. Chace)

Records.--SAN LUIS POTOSI: Sótano de la Tinaja.

Bibliography.--Reddell, 1967a.

Comment.--A single individual of this undescribed species (now under study by Dr. Alejandro Villalobos) was found in the terminal lake room.

CLASS ARACHNIDA

ORDER SCORPIONIDA

Family Chactidae

\**Typhlochactas ellioti* Mitchell

Records.--SAN LUIS POTOSI: Sótano de Yerbaniz.

Bibliography.--Mitchell, 1971a.

Comment.--Three specimens of this remarkable species have been taken. See Fig. 1.

Family Vejovidae

*Vejovis* sp. (*mexicanus* group) (det. W.J. Gertsch)

Records.--TAMAULIPAS: Cueva de San Rafael de los Castros.

Comment.--A single female of this species was collected.

ORDER CHELONETHIDA

Family Chernetidae

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

Records.--SAN LUIS POTOSI: Cueva Escondida, Ventana Jabalí, Sótano de Pichijumo, Cueva Pinta, Cueva de Los Sabinos, Cueva de Taninul n. 1, Sótano de la Tinaja, and Cueva de Valdosa; TAMAULIPAS: Cueva del Abra, Cueva de la Florida, and Grutas de Quintero.

Comment.--The family Chernetidae is in serious need of revision, therefore no attempt was made to apply generic names to this material. These specimens were all taken from bat guano.

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

Records.--TAMAULIPAS: Grutas de Quintero.

Comment.--A single male of this new species was found on bat guano.

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

Records.--TAMAULIPAS: Cueva de San Rafael de los Castros.

Comment.--Three males of an apparent new species were taken from bat guano.

Family Chthoniidae

*Aphrastochthonius* sp. (det. W.B. Muchmore)

Records.--TAMAULIPAS: Cueva de la Florida.

Comment.--This is a new species of this rare genus, previously known only from Alabama.

*Tyrannochthonius* sp. (det. W.B. Muchmore)

Records.--TAMAULIPAS: Cueva de San Rafael de los Castros.

Comment.--A single male of an apparent new species has been collected.

Family Vachoniidae

\**Paravachonium bolivari* Beier

Records.--TAMAULIPAS: Grutas de Quintero.

Bibliography.--Beier, 1956; Chamberlin and Malcolm, 1960.

Comment.--An unidentified pseudoscorpion from Sótano de Yerbaniz is pictured in Fig. 2.

ORDER UROPYGIDA

Family Thelyphonidae

*Mastigoproctus giganteus* Lucas (det. W.J. Gertsch)

Records.--SAN LUIS POTOSI: Ventana Jabalí.

Bibliography.--McKenzie, 1965.

Comment.--This species is usually found on walls near the cave entrance (see Fig. 18).

ORDER SCHIZOMIDA

Family Schizomidae

*Agastoschizomus lucifer* Rowland

Records.--SAN LUIS POTOSI: Sótano de Matapalma, Sótano de la Tinaja, and Sótano de Yerbaniz.

Bibliography.--Rowland, 1971.

Comment.--This is the largest species of the order. See Figs. 3-4.

*Schizomus* sp. (det. J.R. Reddell)

Records.--SAN LUIS POTOSI: Sótano del Arroyo, Cueva Grande, and Ventana Jabalí; TAMAULIPAS: Cueva de San Rafael de los Castros.

Bibliography.--McKenzie, 1965.

Comment.--This material is represented only by females or immatures so specific determination is difficult or impossible.

*Schizomus cookei* Rowland

Records.--SAN LUIS POTOSI: Sótano de la Tinaja and Sótano de Yerbaniz.

Bibliography.--Rowland, 1971a.

*Schizomus mexicanus* Rowland

Records.--SAN LUIS POTOSI: Cueva Chica, Sótano de Pichijumo, Cueva de Taninul n. 1, and Sótano del Tigre.

Bibliography.--Rowland, 1971a.

*Schizomus mitchelli* Rowland

Records.--TAMAULIPAS: Cueva de la Florida and Cueva de El Pachón.

Bibliography.--Rowland, 1971a.

ORDER AMBLYPYGIDA

Family Tarantulidae

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

Records.--SAN LUIS POTOSI: Cueva de Taninul n. 1; TAMAULIPAS: Cueva de San Rafael de los Castros and Sótano de El Venadito.

Bibliography.--McKenzie, 1965.

Comment.--This material probably belongs in one of the two following species.

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

Records.--SAN LUIS POTOSI: Sótano del Tigre and Cueva de Valdosa; TAMAULIPAS: Cueva de la Florida.

Comment.--This species may be taken from cave walls and floor.

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

Records.--SAN LUIS POTOSI: Sótano de Pichijumo and Sótano del Tigre; TAMAULIPAS: Cueva de la Florida.

Comment.--This species is frequently abundant on cave walls and floor.

ORDER ARANEAE

Family Araneidae

*Neosconella pagnia* Walckenaer (det. W.J. Gertsch)

Records.--SAN LUIS POTOSI: Sótano del Arroyo.

Comment.--A single male of this species was collected.

Family Argiopidae

*Wendilgarda mexicana* Keyserling

Records.--SAN LUIS POTOSI: Cueva Chica.

Bibliography.--Archer, 1953.

Family Barychelidae

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

Records.--TAMAULIPAS: Grutas de Quintero.

Family Clubionidae

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

Records.--SAN LUIS POTOSI: Cueva de Taninul n. 1; TAMAULIPAS: Cueva de la Florida.

Comment.--Specimens from Cueva de Taninul n. 1 were immature; a male from Cueva de la Florida may represent a new species.

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

Records.--TAMAULIPAS: Cueva del Abra.

Bibliography.--Reddell, 1965.

Family Ctenidae

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

Records.--SAN LUIS POTOSI: Sótano del Arroyo, Ventana Jabalí, Cueva de Los Sabinos, Cuevacita del Sotanito, Cueva de Taninul n. 1, and Sótano de la Tinaja; TAMAULIPAS: Cueva de la Florida and Cueva de San Rafael de los Castros.

Bibliography.--McKenzie, 1965.

Comment.--This material may belong to *C. mitchelli*.

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

Records.--SAN LUIS POTOSI: Sótano del Tigre.

Comment.--An adult female was collected on guano in the bat passage.

*Ctenus mitchelli* Gertsch

Records.--SAN LUIS POTOSI: Cueva Chica, Cueva del León, Sótano de Pichijumo, and Cueva de Valdosa; TAMAULIPAS: Cueva de El Pachón and Grutas de Quintero.

Bibliography.--Gertsch, 1971.

Family Filistatidae

*Filistata hibernalis* (Hentz)

Records.--TAMAULIPAS: Cueva de los Pajaros.

Comment.--This species was taken from near the entrance.

Family Leptonetidae

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

Records.--TAMAULIPAS: Cueva de El Pachón.

Comment.--This genus is represented by several species in Mexican caves.

Family Lycosidae

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

Records.--SAN LUIS POTOSI: Sótano de Pichijumo.

Comment.--No adult specimens were collected.

Family Nesticidae

*Nesticus pallidus* Emerton

Records.--SAN LUIS POTOSI: Sótano del Arroyo, Cueva Chica, Ventana Jabalí, Sótano de



Pichijumo, Cueva de Los Sabinos, Sótano del Tigre, Sótano de la Tinaja, and Sótano de Yerbaniz; TAMAULIPAS: Cueva de El Pachón.

Bibliography.--Gertsch, 1971.

Family Oonopidae

*Triaeris patellaris* Bryant (det. W.J. Gertsch)

Records.--SAN LUIS POTOSI: Sótano de Pichijumo and Cueva de Los Sabinos.

Comment.--This species is also known from a cave in Veracruz.

Family Pholcidae

*Metagonia pachona* Gertsch

Records.--TAMAULIPAS: Cueva de El Pachón.

Bibliography.--Gertsch, 1971.

*Metagonia tinaja* Gertsch

Records.--SAN LUIS POTOSI: Sótano del Arroyo, Cueva de Los Sabinos, Sótano del Tigre, Sótano de la Tinaja, and Sótano de Yerbaniz.

Bibliography.--Gertsch, 1971.

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

Records.--SAN LUIS POTOSI: Sótano del Arroyo.

Comment.--No adults of this genus were collected.

*Modisimus boneti* Gertsch

Records.--SAN LUIS POTOSI: Cueva Chica; TAMAULIPAS: Cueva de la Florida.

Bibliography.--Gertsch, 1971.

*Pholcophora elliotti* Gertsch

Records.--SAN LUIS POTOSI: Sótano de las Piedras and Cueva de Taninul n. 1.

Bibliography.--Gertsch, 1971.

Family Salticidae

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

Records.--TAMAULIPAS: Cueva del Abra.

Comment.--This is certainly an accidental.

Family Scytodidae

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

Records.--SAN LUIS POTOSI: Cueva Escondida, Cuevacita del Sotanito, Cueva de Taninul n. 4, and Cueva de Valdosa; TAMAULIPAS: Cueva del Abra, Grutas de Quintero, and Cueva de San Rafael de los Castros.

Bibliography.--Reddell, 1965.

Comment.--This material represents at least one new species. See Fig. 19.

*Loxosceles bolivari* Gertsch

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.

Bibliography.--Gertsch, 1958.

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

Records.--TAMAULIPAS: Grutas de Quintero.

Comment.--The specimens collected were immature.

*Scytodes fusca* Walckenaer (det. W.J. Gertsch)

Records.--SAN LUIS POTOSI: Cueva de Taninul n. 1.

Family Symphytognathidae

*Maymena chica* Gertsch

Records.--SAN LUIS POTOSI: Sótano de Pichijumo, Cueva Pinta, Cueva de Taninul n. 4, Sótano del Tigre, and Sótano de la Tinaja.

Bibliography.--Gertsch, 1971.

Family Theraphosidae

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

Records. — SAN LUIS POTOSI: Cueva Chica, Sótano de Manuel, Sótano de las Piedras, and Cueva de Los Sabinos, TAMAULIPAS: Cueva de la Florida and Cueva de los Pajaros. Bibliography.--McKenzie, 1965.

Family Theridiidae

*Coleosoma floridanum* (Banks) (det. W.J. Gertsch)

Records.--SAN LUIS POTOSI: Cueva de Taninul n. 1.

Comment.--A single female of this species was collected.

*Euryopsis spinigera* O.P.-Cambridge

Records.--SAN LUIS POTOSI: ?Cueva Chica.

Bibliography.--Levi, 1954.

Comment.--This species may or may not have been taken from inside the cave.

*Stemmops bicolor* O.P.-Cambridge (det. W.J. Gertsch)

Records.--TAMAULIPAS: Cueva de El Pachón.

Comment.--Several specimens were collected in the main passage.

*Theridion dilutum* Levi (det. W.J. Gertsch)

Records.--SAN LUIS POTOSI: Sótano del Arroyo.

Comment.--A female was collected.

*Thymoites deprus* (Levi)

Records.--SAN LUIS POTOSI: Cueva Chica.

Bibliography.--Levi, 1959.

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

Records.--SAN LUIS POTOSI: Cueva Chica.

Comment.--Only immature specimens were collected.

Family Thomisidae

*Xysticus robinsoni* Gertsch

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.

Bibliography.--Gertsch, 1953.

Family Uloboridae

*Uloborus variegatus* O.P.-Cambridge

Records.--TAMAULIPAS: Cueva de la Florida and Cueva de los Pajaros.

Comment.--This species is probably a troglaxene.

ORDER RICINULEI

Family Ricinoididae

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

Records.--SAN LUIS POTOSI: Cueva de Valdosa.

Comment.--This species is similar to but possibly distinct from *C. osorioi*.

*Cryptocellus osorioi* Bolívar (det. W.J. Gertsch)

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos, Cueva de Taninul n. 1, and Sótano del Tigre; TAMAULIPAS: Cueva de la Florida, Grutas de Quintero, and Sótano de El Venadito.

Bibliography.--Anonymous, 1942; Bolívar, 1946; Coronado, 1970; Mitchell, 1969a; 1970.

Comment.--This large species is abundant in Sótano del Tigre. See Fig. 8.

*Cryptocellus pelaezi* Coronado (det. W.J. Gertsch)

Records.--SAN LUIS POTOSI: Sótano de Manuel and Cueva de Taninul n. 1; TAMAULIPAS: Cueva de la Florida.

Bibliography.--Coronado, 1970; Mitchell, 1969a; 1970.

Comment.--Large populations of this species are present in Cueva de la Florida and Cueva de Taninul n. 1. See Fig. 7.

ORDER OPILIONIDA

Family Phalangodidae

*\*Hoplobunus boneti* (Goodnight and Goodnight)

Records.--SAN LUIS POTOSI: Cueva de la Curva, Sótano de Matpalma, Sótano de Pichijumo, Cueva Pinta, Cueva de Los Sabinos, Sótano de Soyate, Sótano del Tigre, Sótano de la Tinaja, Cueva de Valdosa, and Sótano de Yerbaniz; TAMAULIPAS: Sótano de El Venadito.

Bibliography.--Goodnight and Goodnight, 1942; 1945; 1971; Mitchell, 1971.

Comment.--This abundant species is frequently found on cave walls or silt banks. See Figs. 21-22.

*Karos parvus* Goodnight and Goodnight

Records.--TAMAULIPAS: Cueva de El Pachón and Grutas de Quintero.

Bibliography.--Goodnight and Goodnight, 1971.

ORDER PALPIGRADI

Family Koeneniidae

*Koenenia hanseni* Silvestri (det. Mel Brownfield)

Records.--SAN LUIS POTOSI: Sótano de la Tinaja.

Comment.--This species is abundant in organic debris in the main passage.

ORDER ACARINA

Family Argasidae

*Antricola coprophilus* (McIntosh) (det. G.M. Kohls)

Records.--SAN LUIS POTOSI: Sótano de la Tinaja; TAMAULIPAS: Cueva de la Florida.

Comment.--This species was taken from bat guano. See Fig. 6.

*Antricola mexicanus* Hoffmann (det. G.M. Kohls)

Records.--SAN LUIS POTOSI: Cueva de Taninul n. 1 and Sótano del Tigre; TAMAULIPAS: Cueva de la Florida.

Comment.--This species was taken from bat guano.

*Ornithodoros (Alectorobius) dyeri* Cooley and Kohls

Records.--SAN LUIS POTOSI: Cueva de Taninul n. 1.

Bibliography.--Hoffmann, 1962.

Family Ereyinetidae

*Ereynetes sabinensis* Baker

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.

Bibliography.--Baker, 1945.

Family Heterozercnidae

*Discozercon* sp. (det. William Voss)

Records.--SAN LUIS POTOSI: Cueva de Taninul n. 1.

Comment.--This species was taken from a large scolopendromorph centipede.

Family Rhagidiidae

*Rhagidia* sp.

Records.--SAN LUIS POTOSI: Sótano de la Tinaja.

Bibliography.--Elliott and Strandtmann, in press.

Comment.--This is an undescribed species.

*Rhagidia weyerensis* (Packard)

Records.--SAN LUIS POTOSI: Sótano de la Tinaja.

Bibliography.--Elliott and Strandtmann, in press.

Family Trombiculidae

*Eltonella (Coecicula) boneti* (Hoffmann)

Records.--TAMAULIPAS: Grutas de Quintero.

Bibliography.--Brennan and Jones, 1959; Hoffmann, 1952; Vercammen-Grandjean, 1965.

CLASS CHILOPODA

ORDER SCOLOPENDROMORPHA

Family Scolopendridae

*Newportia sabina* Chamberlin

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.

Bibliography.--Chamberlin, 1942.

*Scolopendra sumichrasti* Saussure

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.

Bibliography.--Chamberlin, 1942.

Comment.--A large scolopendromorph centipede, possibly this species, has been collected in this cave recently (see Fig. 25).

ORDER SCUTIGEROMORPHA

Family Scutigerae

*Pselliodes sabinorum* Chamberlin

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.

Bibliography.--Chamberlin, 1942.

CLASS DIPLOPODA

ORDER POLYDESMIDA

Family Polydesmidae

Unidentified genus and species (det. N.B. Causey)

Records.--SAN LUIS POTOSI: Sótano de la Tinaja.

Comment.--A single female of this species was collected.

\*Undescribed genus and species (det. N.B. Causey)

Records.--TAMAULIPAS: Cueva de El Pachón.

Comment.--This apparent new genus of troglobite was taken from off of silt banks.

Family Rhachodesmidae

Unidentified genus and species (det. N.B. Causey)

Records.--TAMAULIPAS: Cueva de El Pachón.

Comment.--Immature specimens of this family were collected.

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

Records.--SAN LUIS POTOSI: Sótano del Tigre.

Comment.--These specimens probably belong to *P. potosinus*.

*Pararhachistes potosinus* Chamberlin (det. N.B. Causey)

Records.--SAN LUIS POTOSI: Sótano de Pichijumo and Sótano de la Tinaja.

Comment.--This large beautiful blue milliped is frequently abundant on silt banks in Sóta-

no de la Tinaja. The presence of copulating adults and immatures indicate the species is a troglophile. See Fig. 23.

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

Records.--SAN LUIS POTOSI: Cueva Chica.

Comment.--No mature specimens of this abundant genus were collected.

Family Sphaeriodesmidae

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

Records.--SAN LUIS POTOSI: Sótano de la Tinaja.

Comment.--Only females were collected.

Family Stylodesmidae

Undescribed genus and species (det. N.B. Causey)

Records.--SAN LUIS POTOSI: Sótano de Pichijumo, Cueva Pinta, and Sótano de la Tinaja; TAMAULIPAS: Cueva de la Florida, Cueva de El Pachón, Grutas de Quintero, and Sótano de El Venadito.

Comment.--Two apparently new species of troglophile are represented. This genus is usually found beneath rocks and among pieces of rotting wood. See Fig. 24.

*Bolivaresmus sabinus* Chamberlin

Records.--SAN LUIS POTOSI: Sótano del Arroyo, Cueva Chica, Sótano de Pichijumo, Cueva de Los Sabinos, Sótano del Tigre, Sótano de la Tinaja, Cueva de Valdosa, and Sótano de Yerbaniz.

Bibliography.--Causey, 1971; Chamberlin, 1942.

Comment.--This species is usually found on rotten wood or around bat guano.

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

Records.--SAN LUIS POTOSI: Sótano del Tigre.

Comment.--This may represent an undescribed species.

Family Xystodesmidae

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

Records.--SAN LUIS POTOSI: Sótano de Pichijumo and Sótano de la Tinaja.

Comment.--This genus, abundant in Mexican caves, is in need of revision.

#### ORDER CHORDEUMIDA

Family Trichopetalidae

\**Mexiterpes sabinus* Causey

Records.--SAN LUIS POTOSI: Sótano del Arroyo, Cueva Pinta, and Sótano de la Tinaja.

Bibliography.--Causey, 1963; 1969.

Comment.--This rare troglobite is known only from a few specimens, most of which were found clinging to the underside of small rocks.

#### ORDER SPIROBOLIDA

Family Atopetholidae

Unidentified genus and species (det. N.B. Causey)

Records.--SAN LUIS POTOSI: Sótano del Arroyo.

Comment.--No mature specimens of this family were collected.

Family Messicobolidae

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

Records.--SAN LUIS POTOSI: Sótano de Pichijumo.

Comment.--Only immature specimens were collected.

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



Records.--TAMAULIPAS: Cueva de El Pachón.  
Comment.--No mature specimens were collected.

Family Rhinocricidae

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

Records.--SAN LUIS POTOSI: Sótano de Pichijumo, Cueva Pinta, and Sótano de la Tinaja.  
Comment.--Immature specimens were collected; they may belong in *R. potosianus*.

*Rhinocricus potosianus* Chamberlin (det. N.B. Causey)

Records.--SAN LUIS POTOSI: Sótano del Tigre.  
Comment.--This species may be a troglophile.

ORDER SPIROSTREPTIDA

Family Spirostreptidae

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

Records.--SAN LUIS POTOSI: Sótano del Tigre.  
Bibliography.--Mitchell, 1970.

Comment.--This species, abundant on bat guano, may belong in *O. lenonus*.

*Orthoporus lenonus* Chamberlin (det. N.B. Causey)

Records.--SAN LUIS POTOSI: Sótano de la Tinaja and Sótano de Yerbaniz; TAMAULIPAS: Cueva de la Florida.  
Bibliography.--Mitchell, 1970.  
Comment.--This troglophile is abundant on bat guano in Cueva de la Florida.

CLASS INSECTA

ORDER THYSANURA

Family Nicoletiidae

Unidentified genus and species (det. Pedro Wygodzinsky)

Records.--SAN LUIS POTOSI: Sótano del Arroyo, Cueva Grande, Sótano de Manuel, Sótano de Pichijumo, and Sótano de la Tinaja; TAMAULIPAS: Grutas de Quintero and Sótano de El Venadito.

Bibliography.--Reddell, 1965.

Comment.--This family is well-represented by troglobites and troglophiles in the Sierra de El Abra, but definite generic assignment to specimens must await a revisionary study now in progress. See Fig. 26.

ORDER DIPLURA

Family Campodeidae

*Campodea (Campodea) chica* Wygodzinsky

Records.--SAN LUIS POTOSI: Cueva Chica.  
Bibliography.--Wygodzinsky, 1944.

Comment.--Many unidentified campodeids have been collected in caves in the Sierra de El Abra

Family Japygidae

Unidentified genus and species (det. Roberto Gonzalez R.)

Records.--SAN LUIS POTOSI: Sótano del Arroyo.

Comment.--A single anomalous specimen was taken in the cave and could not be assigned

to a genus, although it may belong to *Holjapyx*. Japygids are known from many caves in the Sierra de El Abra, but await study.

ORDER COLLEMBOLA

Family Hypogastruridae

*Acherontiella sabina* Bonet

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos; TAMAULIPAS: Cueva del Abra and Cueva de El Pachón.

Bibliography.--Bonet, 1945; 1946.

*Willemia persimilis bulbosa* Bonet

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.

Bibliography.--Bonet, 1945.

Family Neelidae

*Neelus murinus* Folsom

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.

Bibliography.--Bonet, 1947.

Family Onychiuridae

*Mesaphorura foveata* Bonet

Records.--SAN LUIS POTOSI: Cueva Chica.

Bibliography.--Bonet, 1944.

ORDER BLATTODEA

Family Blaberidae

*Blaberus giganteus* (L.) (det. A.B. Gurney)

Records.--TAMAULIPAS: Cueva de San Rafael de los Castros.

Comment.--Three specimens of this large roach were taken in the cave.

Family Blattellidae

?*Ichnoptera* sp. (det. A.B. Gurney)

Records.--TAMAULIPAS: Cueva de San Rafael de los Castros.

Comment.--A nymph possibly belonging to this genus was collected.

Family Blattidae

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

Records.--SAN LUIS POTOSI: Cueva de Taninul n. 4.

Bibliography.--McKenzie, 1965.

Comment.--A nymph was taken in this cave.

ORDER SALTATORIA

Family Gryllidae

*Miogryllus* sp. (det. T.H. Hubbell)

Records.--SAN LUIS POTOSI: Cueva de Taninul n. 4.

Bibliography.--McKenzie, 1965.

Comment.--This species was taken below one of the entrances to the cave.

*Paracophus apterus* Chopard (det. T.H. Hubbell)

Records.--SAN LUIS POTOSI: Sótano del Arroyo, Cueva Chica, Cueva Grande, Sótano de Manuel, Sótano de Pichijumo, Cueva de Los Sabinos, Cueva de Taninul n. 1, Cueva de

Taninul n. 4, Sótano del Tigre, and Sótano de la Tinaja; TAMAULIPAS: Cueva del Abra, Cueva de El Pachón, Grutas de Quintero, and Sótano de El Venadito.

Bibliography.--Chopard, 1947.

Comment.--This extremely abundant troglophile in the caves of the Sierra de El Abra is found under rocks, on silt banks, and on cave walls throughout the caves. See Fig. 12.

Family Tettigoniidae

*Dichopetala* sp. (det. T.H. Hubbell)

Records.--SAN LUIS POTOSI: Cueva de Taninul n. 4.

Bibliography.--McKenzie, 1965.

Comment.--This species was taken beneath one of the skylight entrances to the cave.

ORDER HEMIPTERA

Family Cydnidae

*Pangaeus (Pangaeus)* sp. (det. R.C. Froeschner)

Records.--TAMAULIPAS: Cueva de San Rafael de los Castros.

Comment.--A single female of this genus was collected.

*Pangaeus (Pangaeus) docilis* (Walker) (det. R.C. Froeschner)

Records.--SAN LUIS POTOSI: Cueva Grande and Ventana Jabalí; TAMAULIPAS: Grutas de Quintero.

Bibliography.--McKenzie, 1965.

Comment.--This troglophile hemipteran is found in association with bat guano.

Family Pyrrhocoridae

*Dysdercus* sp. (det. R.C. Froeschner)

Records.--SAN LUIS POTOSI: Cueva de Taninul n. 4.

Comment.--Eight nymphs of this genus were collected below one of the skylight entrances to the cave.

ORDER COLEOPTERA

Family Alleculidae

*Lystronychus* sp. (det. T.J. Spilman)

Records.--SAN LUIS POTOSI: Cueva Escondida.

Comment.--Two adult beetles of this genus were taken on bat and rat dung in darkness.

Family Carabidae

*Amara (Celia)* sp. (det. T.C. Barr, Jr.)

Records.--SAN LUIS POTOSI: Sótano del Tigre.

Comment.--This species was probably washed into the cave.

*Ancistroglossus gracilis* Chaudoir (det. T.C. Barr, Jr.)

Records.--SAN LUIS POTOSI: Sótano del Tigre.

Comment.--This species is probably an accidental.

*Apenes* sp. (det. T.C. Barr, Jr.)

Records.--SAN LUIS POTOSI: Sótano del Arroyo.

Comment.--This genus was collected from organic debris washed into the cave.

*Ardistomis* sp. (det. T.C. Barr, Jr.)

Records.--SAN LUIS POTOSI: Sótano del Arroyo, Sótano de Pichijumo, Sótano del Tigre, and Sótano de la Tinaja.

Comment.--This troglophile is usually found among organic debris.

*Chlaenius* sp. (det. T.C. Barr, Jr.)

Records.--SAN LUIS POTOSI: Sótano del Arroyo.

Comment.--This species was collected from organic debris washed into the cave.

*Clivina* sp. (det. T.C. Barr, Jr.)

Records.--SAN LUIS POTOSI: Sótano del Arroyo.

Comment.--This probable troglophile is also known from caves in Tamaulipas.

*Colpodes acuminatus* Chevrolat (det. T.C. Barr, Jr.)

Records.--SAN LUIS POTOSI: Sótano del Tigre.

Comment.--This species is also known from a cave in Querétaro.

*Lachnophorus (Aretaonus) sculptifrons* Bates (det. T.C. Barr, Jr.)

Records.--SAN LUIS POTOSI: Sótano del Tigre.

Comment.--This species may have washed into the cave.

*Pachyteles urrutiai* Bolívar (det. T.C. Barr, Jr.)

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos and Sótano de la Tinaja; TAMAULIPAS: Cueva de la Florida, Cueva de El Pachón, and Grutas de Quintero.

Bibliography.--Bolívar, 1952.

Comment.--This troglophile is fairly abundant in several of the above caves.

*Pentagonica* sp. nr. *picticornis* Bates (det. T.C. Barr, Jr.)

Records.--SAN LUIS POTOSI: Sótano del Tigre.

Comment.--This species was probably washed into the cave.

*Pterostichus (Ithytolus)* sp. (det. T.C. Barr, Jr.)

Records.--SAN LUIS POTOSI: Sótano del Arroyo, Sótano de la Tinaja, and Sótano de Yerbaniz.

Comment.--This possible new species is certainly a troglophile.

*Tachys* sp. (det. T.C. Barr, Jr.)

Records.--SAN LUIS POTOSI: Sótano del Arroyo, Cueva Chica, Sótano del Tigre, and Sótano de la Tinaja.

Comment.--Two or more troglophile species of this genus are present in these caves.

*Tachys (Paratachys)* sp. (det. T.C. Barr, Jr.)

Records.--SAN LUIS POTOSI: Sótano de Pichijumo.

Comment.--This species may be a troglophile.

#### Family Curculionidae

*Dioprophorus* sp. (det. R.E. Warner)

Records.--SAN LUIS POTOSI: Sótano de la Tinaja.

Comment.--This species was almost certainly washed into the cave.

#### Family Dermestidae

*Dermestes carnivorus* F. (det. J.M. Kingsolver)

Records.--SAN LUIS POTOSI: Ventana Jabalí.

Bibliography.--McKenzie, 1965.

Comment.--This beetle was collected from bat guano.

#### Family Elateridae

*Ischiodontus* sp. (det. T.J. Spilman)

Records.--TAMAULIPAS: Cueva de la Florida.

Comment.--Three specimens of this genus were collected.

#### Family Hydrobiidae

Unidentified genus and species (det. T.C. Barr, Jr.)

Records.--TAMAULIPAS: Cueva del Abra.

Comment.--A single specimen was collected from beneath a rock on bat guano.

Family Hydrophilidae

*Tropisternus (Cyphostethus) chalybeus* Laporte

Records.--SAN LUIS POTOSI: Sótano del Arroyo.

Comment.--This species was certainly washed into the cave.

Family Leiodidae

*Ptomaphagus elabra* Peck

Records.--SAN LUIS POTOSI: Cueva Chica, Sótano de Manuel, Sótano de Pichijumo, Cueva de Los Sabinos, Cueva de Taninul n. 1, Sótano del Tigre, Sótano de la Tinaja, Cueva de Valdosa, and Ventana Jabalí; TAMAULIPAS: Cueva de la Florida, Cueva de El Pachón, Grutas de Quintero, and Sótano de Santa Elena.

Bibliography.--Peck, 1971.

Comment.--This species is frequently abundant on vampire bat guano.

Family Mordellidae

*Diclidia* sp. (det. H.R. Burke)

Records.--SAN LUIS POTOSI: Sótano del Arroyo.

Comment.--This species was probably washed into the cave.

Family Passalidae

*Passalus* sp. (det. O.L. Cartwright)

Records.--SAN LUIS POTOSI: Sótano del Arroyo.

Comment.--This species was found on a rotten log washed into the cave.

Family Ptilodactylidae

*Ptilodactyla* sp. (det. T.J. Spilman)

Records.--SAN LUIS POTOSI: Sótano del Arroyo.

Comment.--This species is probably a troglophile.

Family Scarabaeidae

*Atænius strigicauda* Bates (det. O.L. Cartwright)

Records.--SAN LUIS POTOSI: Cueva Chica.

Comment.--This species was probably washed into the cave.

*Ateuchus* sp. (det. O.L. Cartwright)

Records.--SAN LUIS POTOSI: Cueva Chica.

Comment.--This species was probably also washed into the cave.

Family Scydmaenidae

Unidentified genus and species (det. T.C. Barr, Jr.)

Records.--SAN LUIS POTOSI: Sótano del Arroyo and Sótano de la Tinaja.

Comment.--These beetles were taken from flood debris in the caves.

Family Staphylinidae

Unidentified genus and species (det. L.H. Herman)

Records.--SAN LUIS POTOSI: Sótano de la Tinaja.

Comment.--Larvae of this family were taken in this cave.

*Biocrypta magnolia* Blatchley (det. L.H. Herman)

Records.--SAN LUIS POTOSI: Sótano del Arroyo.

Bibliography.--Reddell, 1966.

Comment.--This species may have been washed into the cave.

*Carpelimus* sp. (det. L.H. Herman)

Records.--SAN LUIS POTOSI: Sótano del Arroyo.

Comment.--Beetles of this genus were probably washed into the cave.

*Homaetarsus (Gastrolobium)* sp. (det. L.H. Herman)

Records.--SAN LUIS POTOSI: Sótano del Arroyo.

Comment.--Beetles of this genus may have been washed into the cave.



*Lithocharodes* sp. nr. *fuscipennis* Sharp (det. L.H. Herman)

Records.--SAN LUIS POTOSI: Sótano del Arroyo.

Comment.--This beetle was collected from flood debris.

*Neobisnius* sp. (det. L.H. Herman)

Records.--SAN LUIS POTOSI: Sótano del Arroyo.

Comment.--This species is probably also an accidental.

*Scopaeus* sp. (det. L.H. Herman)

Records.--SAN LUIS POTOSI: Sótano del Arroyo.

Comment.--This species is probably an accidental.

*Stamnodes* sp. (det. L.H. Herman)

Records.--SAN LUIS POTOSI: Sótano del Arroyo.

Comment.--This possible troglophile is also known from caves in Chiapas and Guerrero.

*Stilicolina condei* Jarrige

Records.--SAN LUIS POTOSI: Sótano del Arroyo, Sótano del Tigre, and Sótano de la Tinaja.

Bibliography.--Herman, 1970.

Comment.--This troglophile has reduced eyes and, despite a distribution ranging from Texas south to San Luis Potosí, it is not known from the surface.

Family Tenebrionidae

*Alphitobius laevigatus* (F.) (det. T.J. Spilman)

Records.--SAN LUIS POTOSI: Cueva de Taninul n. 1.

Comment.--This species was taken from bat guano.

*Eleodes rugosa* Perbosc (det. T.J. Spilman)

Records.--SAN LUIS POTOSI: Cueva Chica, Cueva Escondida, and Cueva de Taninul n. 1; TAMAULIPAS: Cueva de la Florida and Cueva de los Pajaros.

Comment.--This species is abundant in entrance areas of caves. In Cueva Escondida it was found on bat guano and rodent droppings in darkness.

*Liodema* sp. nr. *kirschi* Bates (det. T.J. Spilman)

Records.--SAN LUIS POTOSI: Ventana Jabalí; TAMAULIPAS: Cueva del Abra, Cueva de la Florida, and Grutas de Quintero.

Bibliography.--McKenzie, 1965; Reddell, 1965.

*Zophobas atratus* (Fabricius) (det. T.J. Spilman)

Records.--SAN LUIS POTOSI: Ventana Jabalí.

Bibliography.--McKenzie, 1965.

Comment.--This species was taken from bat guano.

ORDER DIPTERA

Family Phyllomyzidae

*Pholeomyia indecora* Lowe

Records.--SAN LUIS POTOSI: Cueva Chica.

Bibliography.--Breder, 1942.

Family Psychodidae

*Psychoda* sp.

Records.--SAN LUIS POTOSI: Cueva Chica.

Bibliography.--Breder, 1942.

Family Sciaridae

*Bradysia* sp. (det. R.J. Gagne)

Records.--SAN LUIS POTOSI: Sótano de Pichijumo and Sótano de Yerbaniz.

Comment.--This genus is abundant in caves, despite the few collection records.

Family Streblidae

*Megistopoda araneae* (Coq.) (det. T.C. Maa)

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos and Cueva de Taninul n. 1.  
Bibliography.--Hoffmann, 1953.

Comment.--This species was taken from *Artibeus jamaicensis* in Cueva de Taninul n. 1.

*Trichobius* sp. nr. *dugesii* Townsend (det. T.C. Maa)

Records.--SAN LUIS POTOSI: Cueva de Taninul n. 1.

Comment.--This species was taken from *Artibeus jamaicensis*.

*Trichobius* sp. nr. *sparsus* Kess. (det. T.C. Maa)

Records.--TAMAULIPAS: Cueva de los Pajaros.

Comment.--A single female was collected.

*Trichobius caecus* Edw.

Records.--SAN LUIS POTOSI: Cueva Grande; TAMAULIPAS: Cueva de El Pachón.  
Bibliography.--Hoffmann, 1953.

*Trichobius dugesii* Townsend

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.

Bibliography.--Hoffmann, 1953.

*Trichobius parasiticus* Gervais (det. T.C. Maa)

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.

Comment.--This species was taken from *Desmodus rotundus murinus*.

Family Therevidae

*Henicomysia hubbardi* Coq. (det. L.V. Knutson)

Records.--TAMAULIPAS: Cueva de los Pajaros.

Comment.--One specimen of this species was collected near the entrance.

ORDER HYMENOPTERA

Family Apidae

*Partamona cupira orizabensis* (Str.) (det. P.D. Hurd, Jr.)

Records.--TAMAULIPAS: Cueva de los Pajaros.

Comment.--A nest of this stingless bee was located just inside the cliff entrance.

Family Formicidae

*Euponera* sp. (det. A.C. Cole)

Records.--SAN LUIS POTOSI: Ventana Jabalí.

Bibliography.--McKenzie, 1965.

Comment.--This species was taken from the entrance area.

*Pachycondyla harpax montezumia* F. Smith

Records.--SAN LUIS POTOSI: Sótano del Arroyo and Cueva Chica.

Bibliography.--McKenzie, 1965.

Comment.--This species is also known from caves in Tamaulipas and Yucatán.

*Pheidole* sp. (*bicarinata* group) (det. A.C. Cole)

Records.--SAN LUIS POTOSI: Cueva Grande.

Bibliography.--McKenzie, 1965.

PHYLUM MOLLUSCA

CLASS GASTROPODA

ORDER BASOMMATOPHORA

Family Physidae

*Physa* sp. (det. Leslie Hubricht)

Records.--SAN LUIS POTOSI: Cueva de la Curva.

Comment.--This species was taken from the pool at the bottom of the cave.

ORDER MESOGASTROPODA

Family Thiaridae

*Pachychilus corpulentus* Thompson

Records.--TAMAULIPAS: Cueva del Nacimiento del Río Mante.

Bibliography.--Thompson, 1967.

ORDER GEOPHILA

Family Achatinidae

*Lamellaxis (Allopeas) gracilis* (Hutton) (det. Alan Solem)

Records.--SAN LUIS POTOSI: Sótano de la Tinaja.

Comment.--This species was taken from cave walls in darkness.

*Leptinaria mexicana* (Pfr.) (det. Alan Solem)

Records.--SAN LUIS POTOSI: Sótano de la Tinaja.

Comment.--This species was taken from cave walls in darkness.

PHYLUM CHORDATA

CLASS TELEOSTOMI

ORDER CYPRINIFORMES

Family Characidae

\**Astyanax* sp.

Records.--SAN LUIS POTOSI: Sótano de Pichijumo and Sótano del Tigre.

Bibliography.--Wiley and Mitchell, 1971.

Comment.--Blind fish of this genus are known from more than 20 caves in the Sierra de El Abra. A paper including the new records is being prepared by Robert W. Mitchell.

\**Astyanax antrobius* (Alvarez)

Records.--TAMAULIPAS: Cueva de El Pachón.

Bibliography.--Alvarez, 1946; Wiley and Mitchell, 1971.

\**Astyanax hubbsi* (Alvarez)

Records.--SAN LUIS POTOSI: Sótano del Arroyo, Cueva de Los Sabinos, and Sótano de la Tinaja.

Bibliography.--Alvarez, 1947; Johnson, 1967; Wiley and Mitchell, 1971.

\**Astyanax jordani* (Hubbs and Innes)

Records.--SAN LUIS POTOSI: Cueva Chica.

Bibliography.--Breder, 1942; Hubbs and Innes, 1936; Wiley and Mitchell, 1971.

*Astyanax mexicanus* (Phillipi)

Records.--SAN LUIS POTOSI: Well near Cueva Chica and Cueva Chica.

Bibliography.--Breder, 1942.

Comment.--This species interbreeds with *A. jordani* in Cueva Chica.

ORDER CYPRINODONTIFORMES

Family Poeciliidae

*Platypoecilus* sp.

Records.--SAN LUIS POTOSI: Well near Cueva Chica.

Bibliography.--Breder, 1942.

CLASS AMPHIBIA

ORDER ANURA

Family Leptodactylidae

*Hylactophryne augusti augusti* (Duges)

Records.--TAMAULIPAS: Cueva de El Pachón.

Bibliography.--Martin, 1958.

*Syrhophus cystignathoides* (Cope) (det. J.D. Lynch)

Records.--SAN LUIS POTOSI: Cueva Pinta and Sótano de Yerbaniz.

Comment.--This species was collected from an alcove in darkness in Cueva Pinta.

*Syrhophus dennisi* Lynch (det. J.D. Lynch)

Records.--SAN LUIS POTOSI: Cueva Chica and Cueva de la Ranita; TAMAULIPAS: Cueva de la Florida and Cueva de El Pachón.

Bibliography.--Lynch, 1970.

Comment.--This species is usually found in the general vicinity of the cave entrance.

*Syrhophus longipes* (Baird) (det. J.D. Lynch)

Records.--TAMAULIPAS: Grutas de Quintero.

Comment.--This species was taken from below the largest skylight entrance.

CLASS REPTILIA

ORDER SQUAMATA

Family Crotalidae

*Bothrops atrox asper* (Garman) (det. J.R. Reddell)

Records.--SAN LUIS POTOSI: Sótano del Arroyo, Sótano de Palma Seca, and Cueva de Fer-de-Lance.

Bibliography.--McKenzie, 1965.

Comment.--The fer-de-lance has been seen on almost every visit to Sótano del Arroyo; a large adult was observed in the Big Room, almost 2000 feet from the entrance. They probably wash into caves, although an individual was seen crawling into the entrance to Cueva de Fer-de-Lance.

Family Xantusiidae

*Lepidophyma* sp. (det. Craig Nelson)

Records.--SAN LUIS POTOSI: Sótano del Arroyo.

Comment.--A large lizard of this genus was collected from a molasses trap set in the floor of the 30-foot level of the cave.

*Lepidophyma micropholis* Walker

Records.--TAMAULIPAS: Cueva de El Pachón.

Bibliography.--Walker, 1955.

CLASS AVES

ORDER STRIGIFORMES

Family Tytonidae

*Tyto alba* (Scopoli)

Records.--TAMAULIPAS: Cueva del Abra.

Bibliography.--Holman, 1969.

CLASS MAMMALIA

ORDER CHIROPTERA

Family Emballonuridae

*Balantiopteryx plicata plicata* Peters

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos.

Bibliography.--Mollhagen, 1971.

Family Phyllostomidae

*Artibeus jamaicensis yucatanicus* Allen

Records.--SAN LUIS POTOSI: Cueva Chica, Cueva de la Curva, Cueva de Los Sabinos, and Cueva de Taninul n. 1; TAMAULIPAS: Cueva del Abra, Cueva de El Pachón, and Grutas de Quintero.

Bibliography.--Mollhagen, 1971.

Comment.--This is among the most abundant of all bats in Mexican caves (see Fig. 28).

*Artibeus lituratus palmarum* J.A. Allen and Chapman

Records.--TAMAULIPAS: Grutas de Quintero.

Bibliography.--Mollhagen, 1971.

*Desmodus rotundus murinus* Wagner

Records.--SAN LUIS POTOSI: Cueva Chica, Cueva de la Curva, and Cueva de Los Sabinos; TAMAULIPAS: Cueva del Abra, Cueva de El Pachón, and Grutas de Quintero.

Bibliography.--Mollhagen, 1971.

Comment.--Vampires usually hang in small clusters (see Fig. 16); the liquid pools of guano below a roost is the habitat of many species of invertebrates, including the beetle, *Ptomaphagus elabra*.

*Diphylla ecaudata* Spix.

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos; TAMAULIPAS: Cueva de El Pachón and Grutas de Quintero.

Bibliography.--Mollhagen, 1971.



*Glossophaga soricina leachii* Gray

Records.--SAN LUIS POTOSI: Cueva de Los Sabinos; TAMAULIPAS: Cueva de la Florida, Cueva de El Pachón, and Grutas de Quintero.

Bibliography.--Mollhagen, 1971.

*Micronycteris megalotis mexicanus* Miller

Records.--TAMAULIPAS: Grutas de Quintero.

Bibliography.--Mollhagen, 1971.

*Mormoops megalophylla megalophylla* Peters

Records.--SAN LUIS POTOSI: Cueva Chica; TAMAULIPAS: Grutas de Quintero.

Bibliography.--Mollhagen, 1971.

*Pteronotus davyi fulvus* (Thomas)

Records.--SAN LUIS POTOSI: Cueva Chica; TAMAULIPAS: Cueva de la Florida.

Bibliography.--Mollhagen, 1971.

*Pteronotus parnellii* (Gray)

Records.--SAN LUIS POTOSI: Cueva Chica and Cueva de Taninul n. 1; TAMAULIPAS: Cueva de la Florida and Cueva de El Pachón.

Bibliography.--Mollhagen, 1971.

Family Natalidae

*Natalus stramineus* Gray

Records.--SAN LUIS POTOSI: Cueva Chica and Cueva de Taninul n. 1; TAMAULIPAS: Cueva del Abra, Cueva de la Florida, Cueva de El Pachón, and Grutas de Quintero.

Bibliography.--Mollhagen, 1971.

Family Vespertilionidae

*Eptesicus fuscus miradorensis* H. Allen

Records.--TAMAULIPAS: Grutas de Quintero.

Bibliography.--Mollhagen, 1971.

Family Molossidae

*Tadarida aurispinosa* (Peale)

Records.--TAMAULIPAS: Cueva del Abra.

Bibliography.--Mollhagen, 1971.

*Tadarida brasiliensis mexicana* (Saussure)

Records.--SAN LUIS POTOSI: Ventana Jabalí; TAMAULIPAS: Cueva del Abra.

Bibliography.--Mollhagen, 1971.

*Tadarida laticaudata ferruginea* Goodwin

Records.--TAMAULIPAS: Cueva del Abra.

Bibliography.--Mollhagen, 1971.

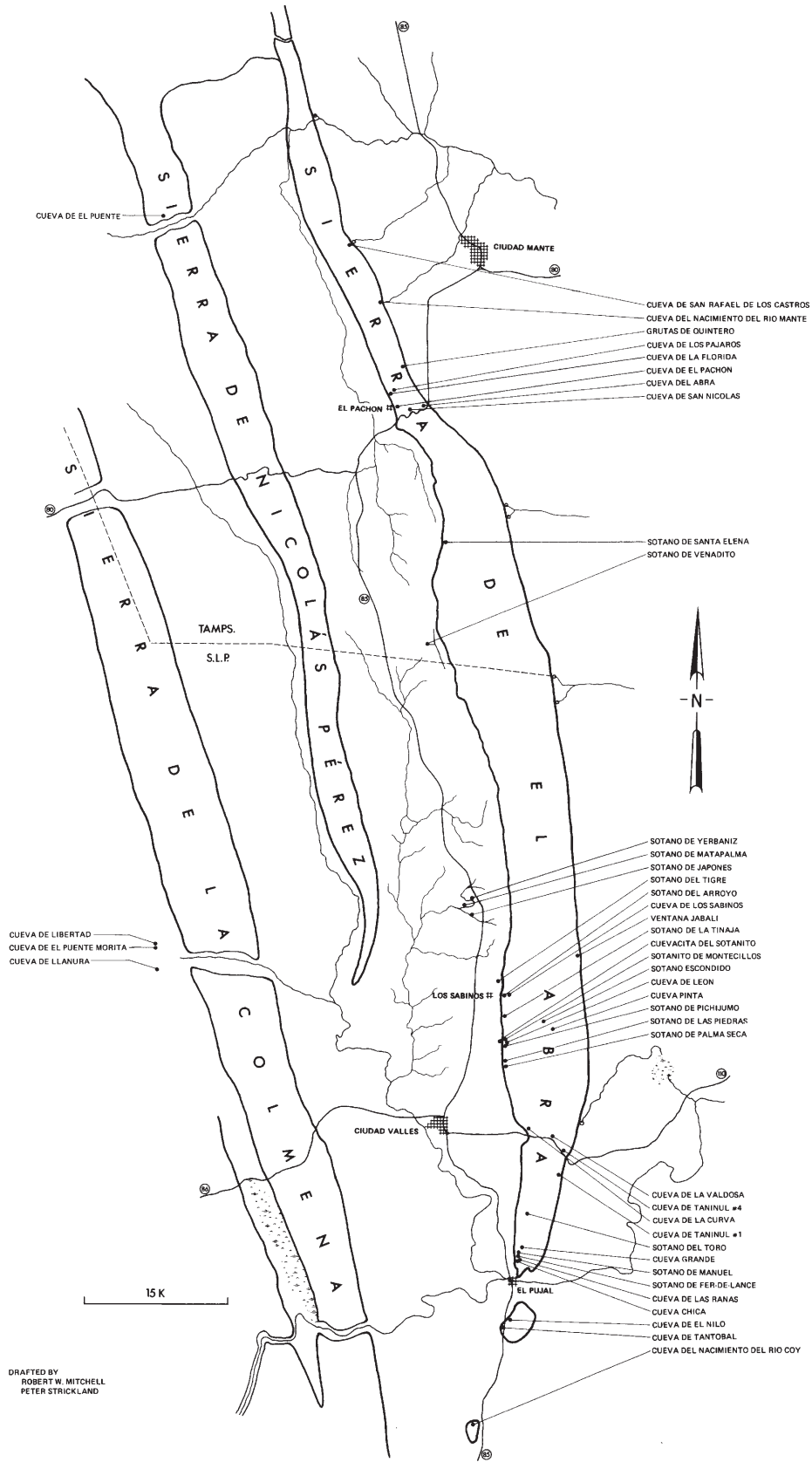
ORDER RODENTIA

Family Cricetidae

*Neotoma angustapalata* Baker

Records.--TAMAULIPAS: Cueva de El Pachón.

Bibliography.--Martin and Martin, 1954.



Map. Sierra de El Abra, Tamaulipas and San Luis Potosí, México, showing caves for which biological records are available. Cartographer: William H. Russell.



Fig. 1. *Typhlochactas elliotti*, Sótano de Yerbaniz



Fig. 2. Unidentified pseudoscorpion, Sótano de Yerbaniz





Fig. 3. Male *Agastoschizomus lucifer*, Sótano de Yerbaniz



Fig. 4. Female *Agastoschizomus lucifer*, Sótano de Yerbaniz



Fig. 5. *Koenenia hanseni*, Sótano de la Tinaja



Fig. 6. *Antricola* sp., Cueva de la Florida



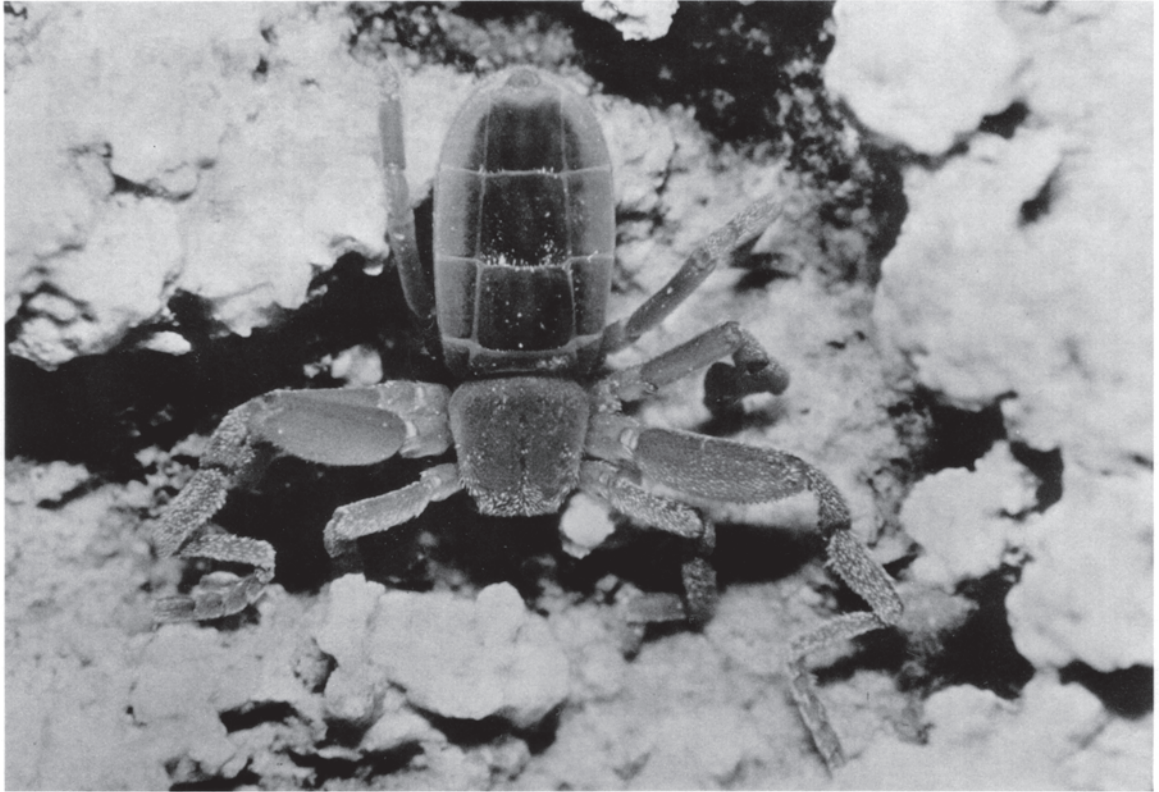


Fig. 7. *Cryptocellus pelaezi*, Cueva de la Florida



Fig. 8. *Cryptocellus osorioi* carrying egg, Sótano del Tigre





Fig. 9. *Brackenridgia bridgesi*, Grutas de Quintero

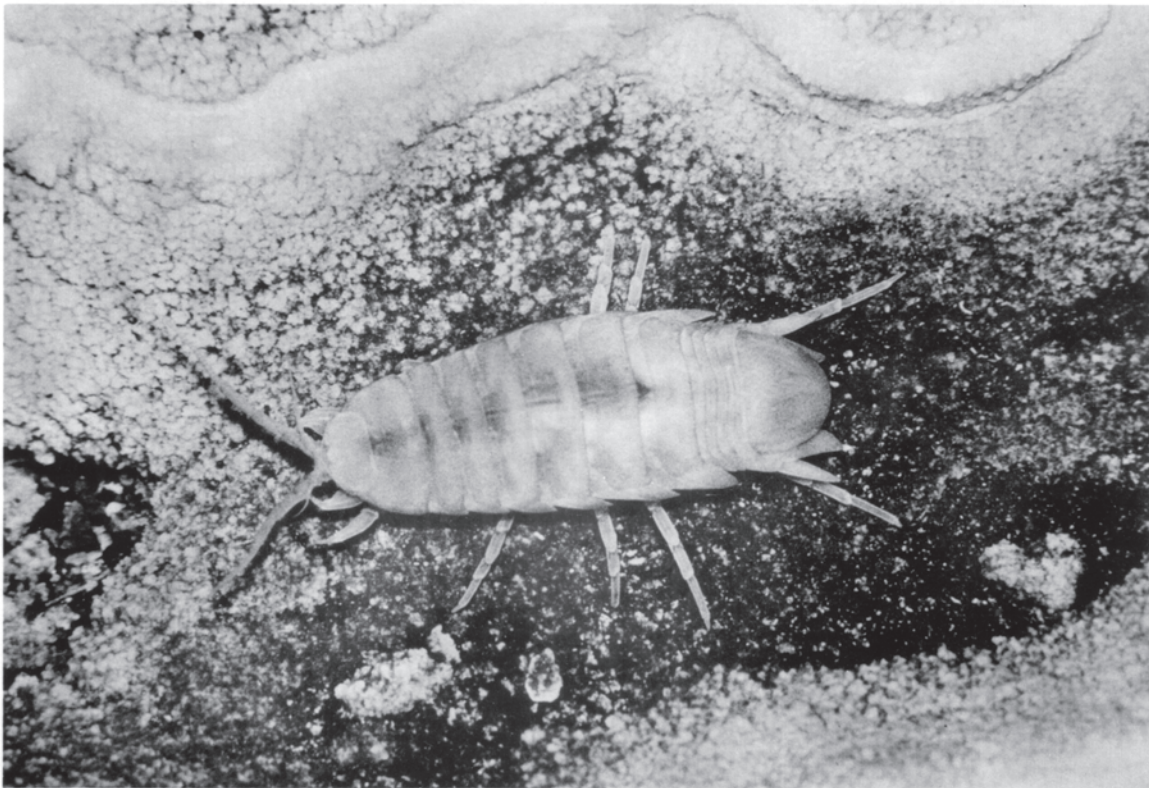


Fig. 10. *Speocirolana pelaezi* in drip pool, Sótano del Tigre





Fig. 11. *Speleomysis quinterensis*, Grutas de Quintero



Fig. 12. *Paracophus apterus*, Sótano de Taninul n. 1

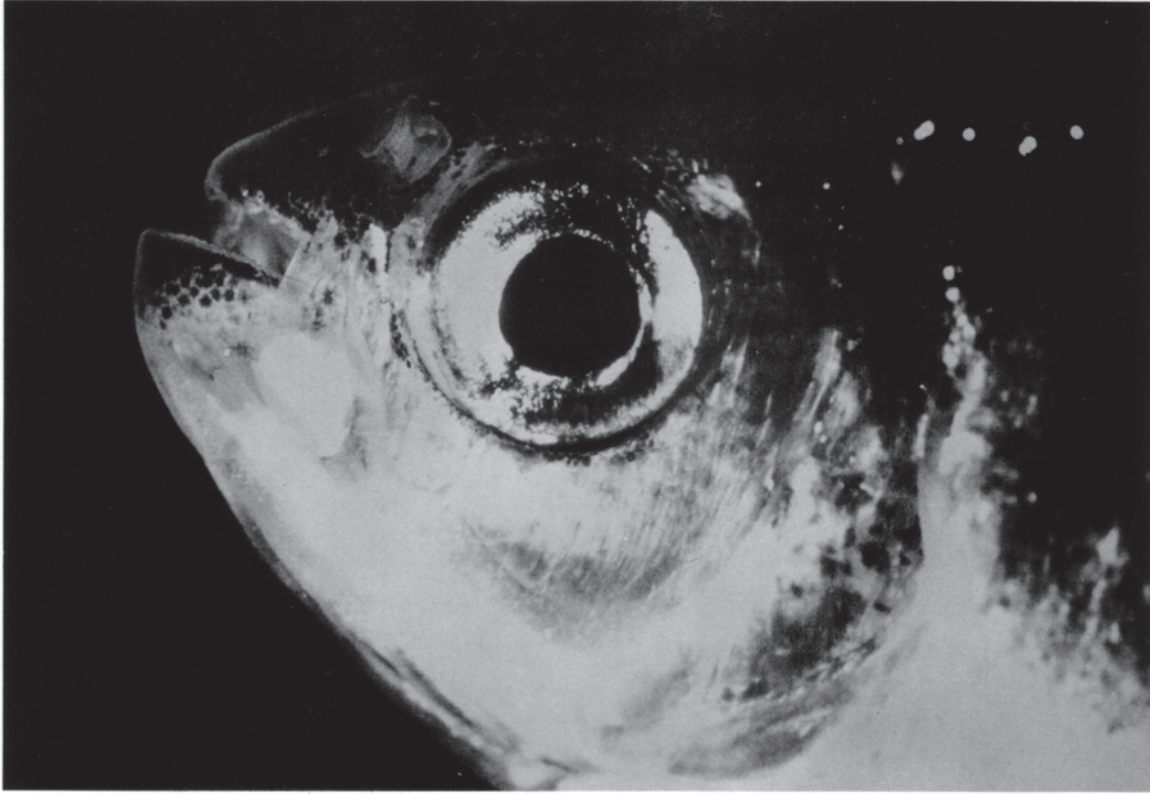


Fig. 13. Head of *Astyanax mexicanus*, surface ancestor of eyeless *Astyanax*

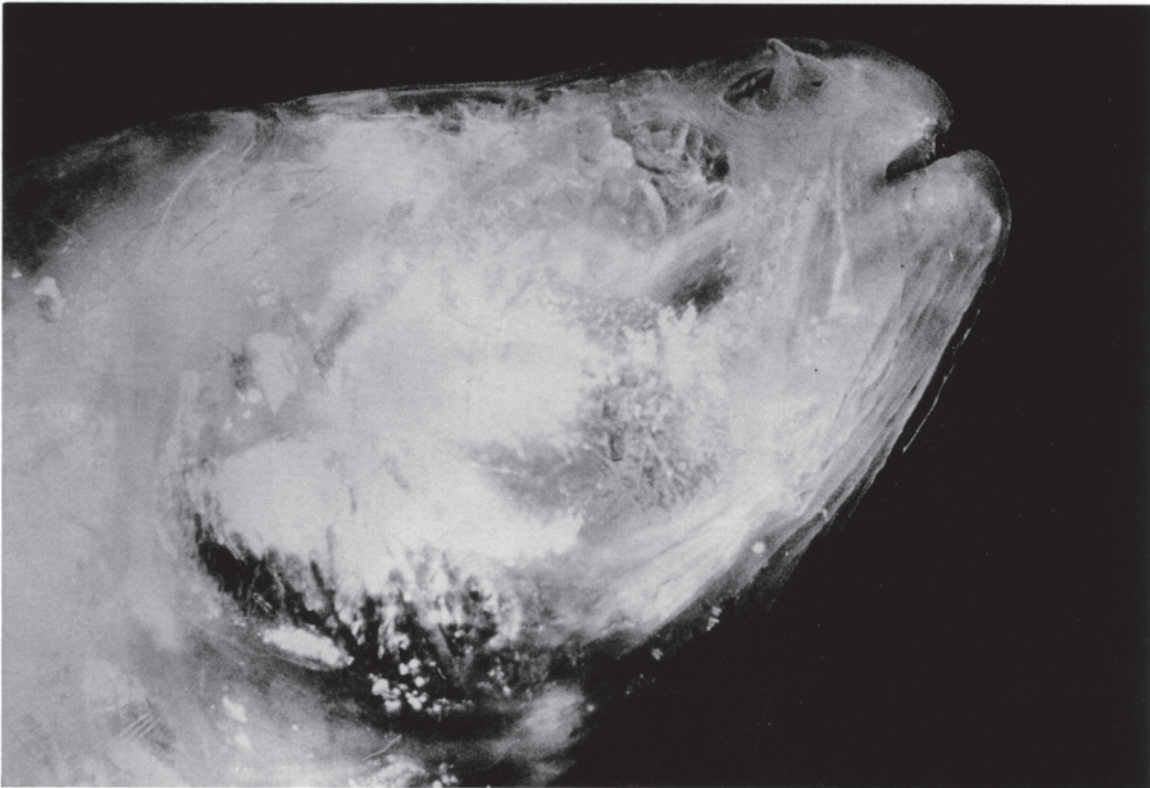


Fig. 14. Head of *Astyanax antrobius*, Cueva de El Pachón





Fig. 15. *Astyanax antrobius*, Cueva de El Pachón



Fig. 16. Vampire bats, *Desmodus rotundus murinus*, Cueva de Los Sabinos



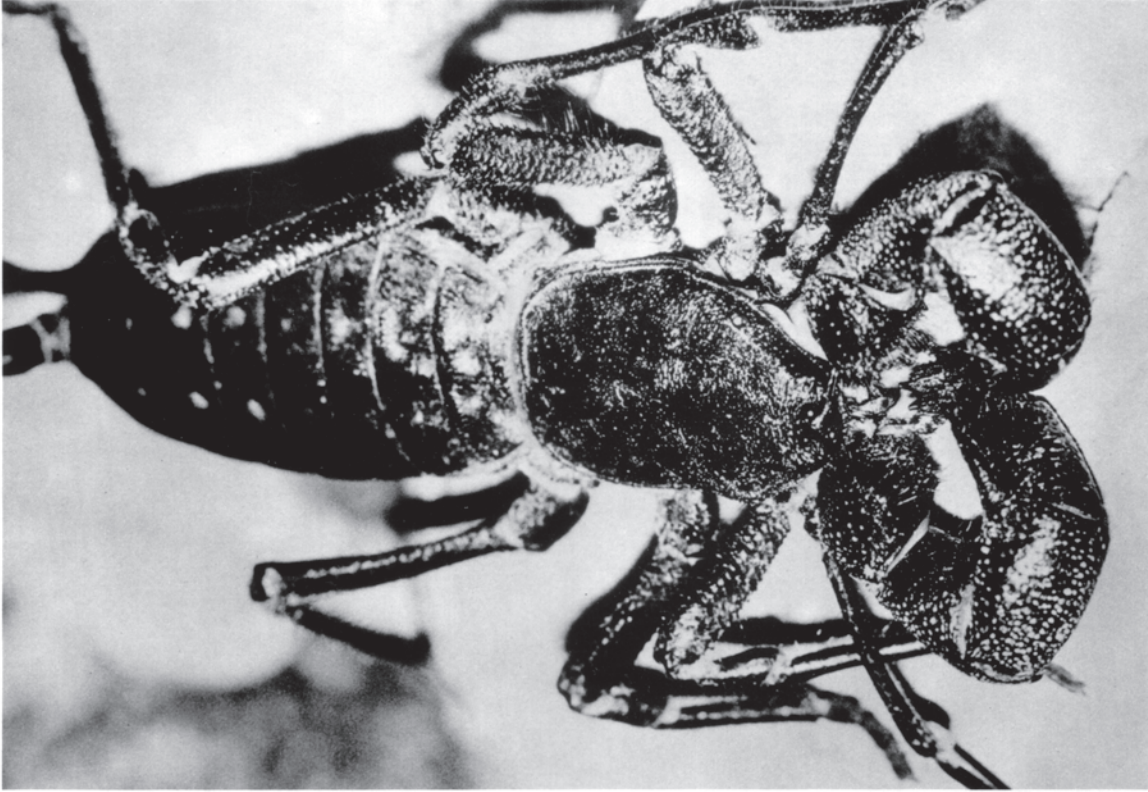


Fig. 18. *Mastigoproctus giganteus*, Ventana Jabali



Fig. 17. *Tarantula* sp., Grutas de Quintero





Fig. 20. *Ctenus mitchelli* guarding egg sac, Sótano de la Tinaja



Fig. 19. *Loxosceles* sp., Cueva de Valdosa

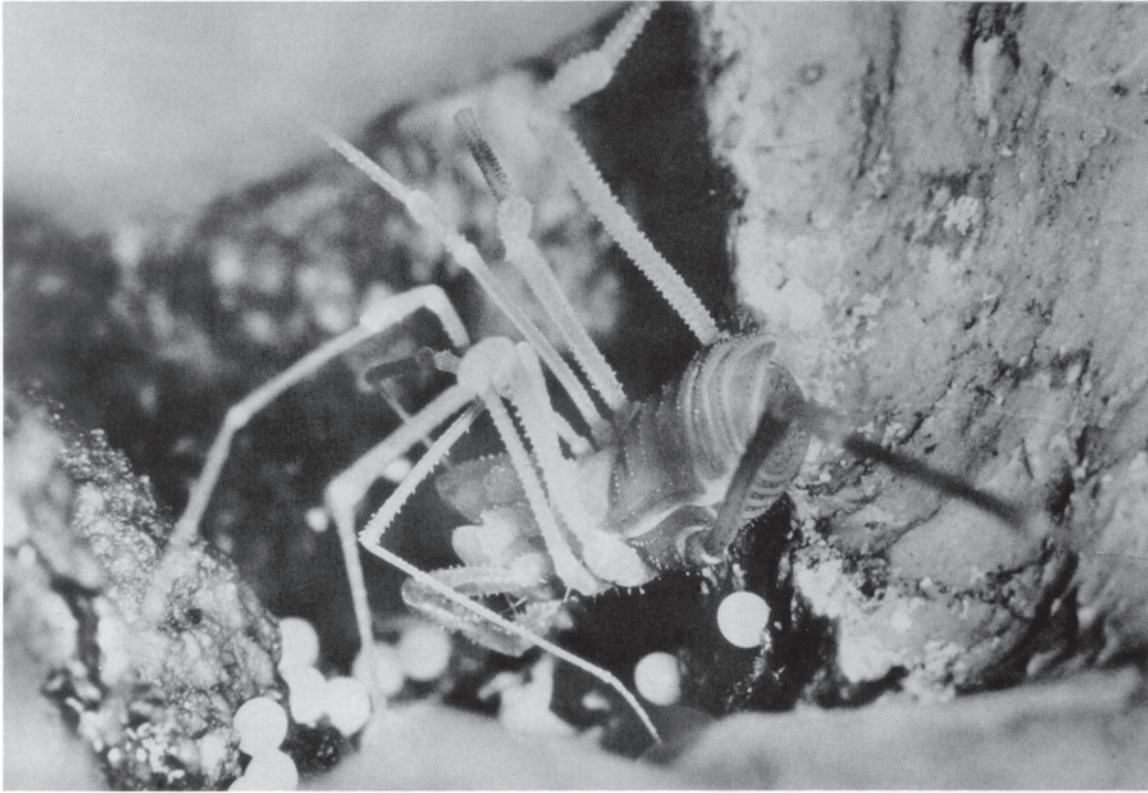


Fig. 22. *Hoplobunus boneti* guarding eggs, Sótano de la Tinaja

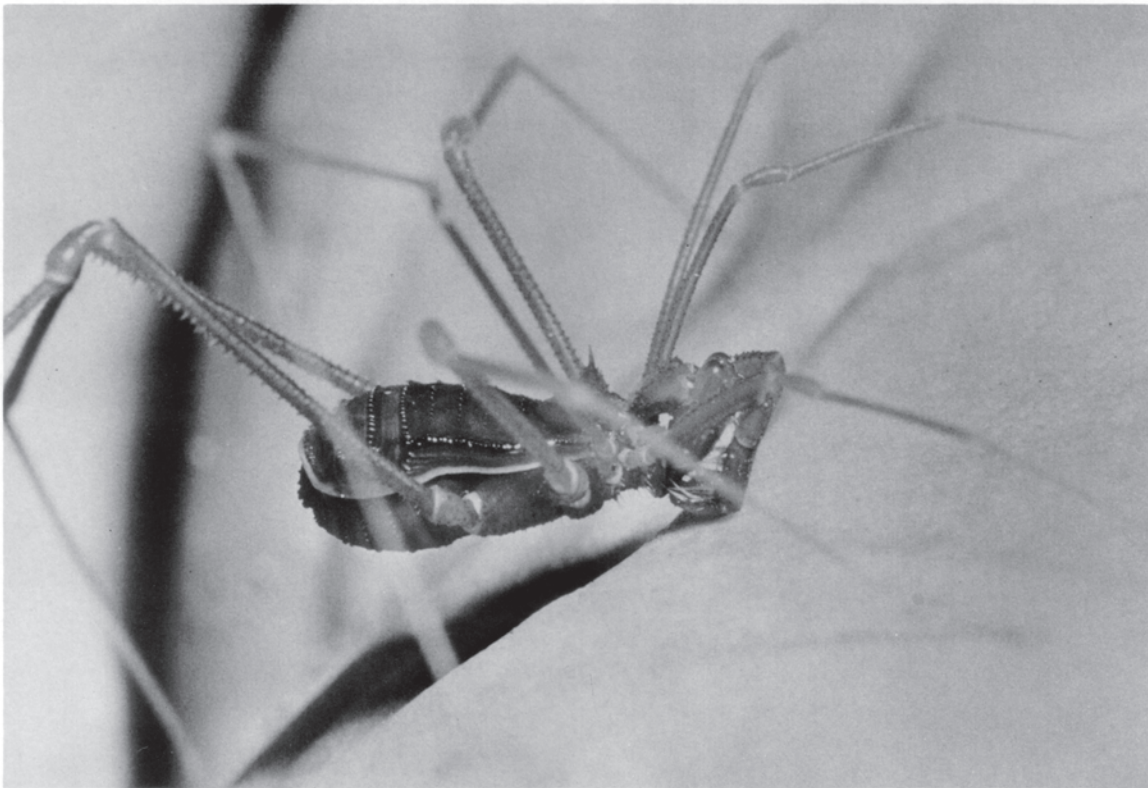


Fig. 21. *Hoplobunus boneti*, Cueva de Los Sabinos



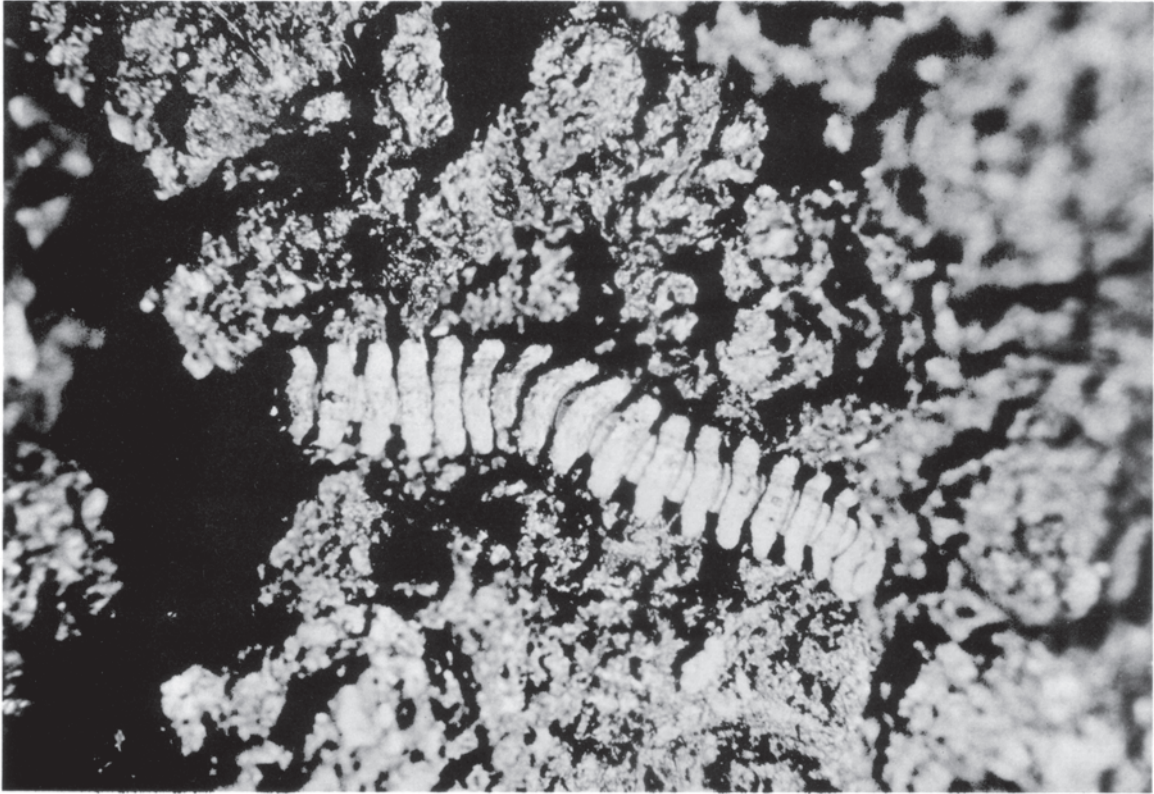


Fig. 24. *Styloidesmid* millipede, Cueva de la Florida



Fig. 23. *Pararhachistes potosinus*, Sótano de la Tinaja



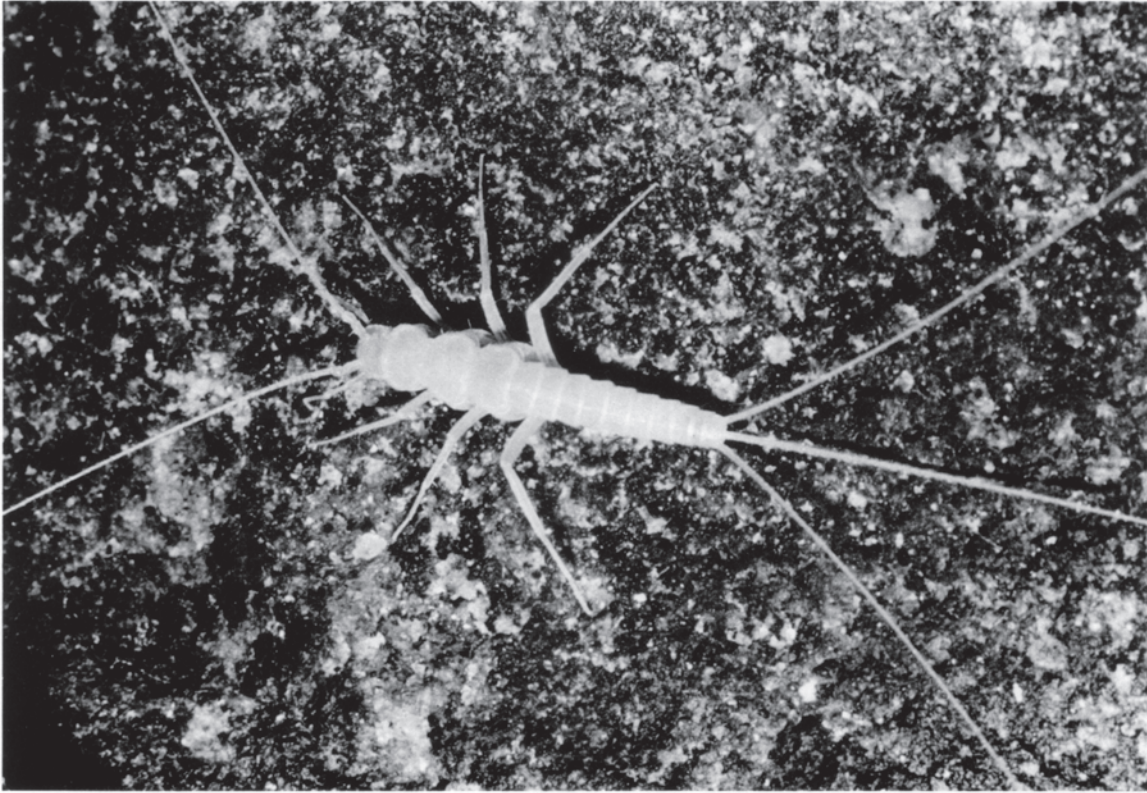


Fig. 26. Nicoletiid thysanuran, Grutas de Quintero

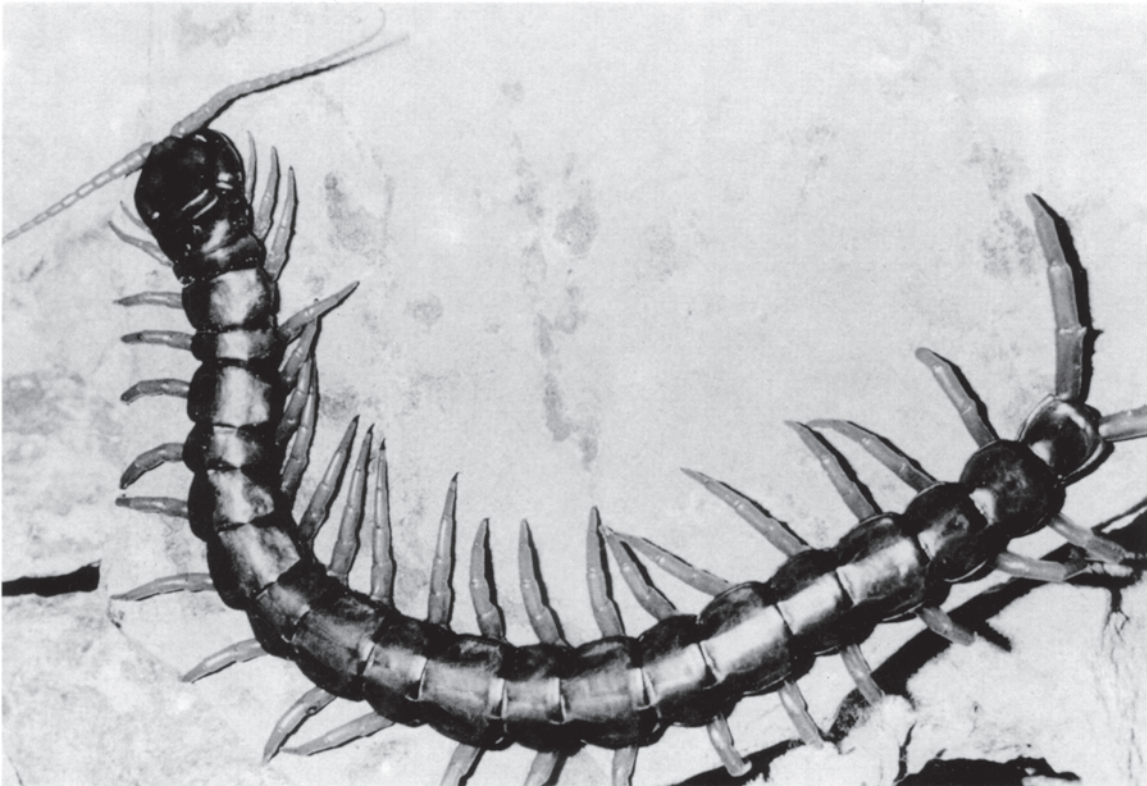


Fig. 25. Scolopendromorph centipede, Cueva de Los Sabinos





Fig. 28. *Artibeus jamaicensis yucatanicus*, Cueva de Los Sabinos

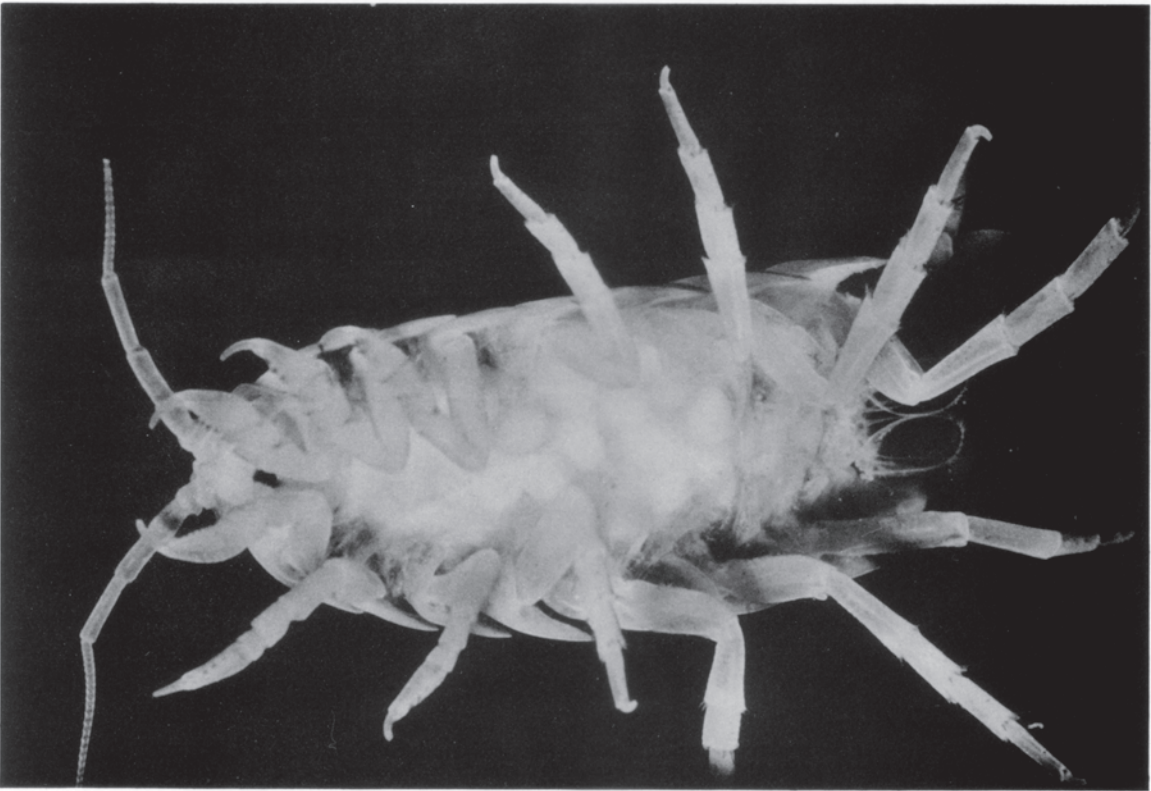


Fig. 27. *Speocirolana pelaezi* with eggs, Grutas de Quintero

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A CHECKLIST OF THE CAVE FAUNA OF MEXICO. II.  
SIERRA DE GUATEMALA. TAMAULIPAS<sup>1</sup>

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INTRODUCTION

The singular cavernicole fauna of the Sierra de Guatemala was introduced to biospeleology in 1969 with the description of one of its most remarkable species, the eyeless troglobite scorpion, *Typhlochactas rhodesi* Mitchell.

This was the first high altitude karst area in Mexico to be intensely studied. Although several caves were investigated by Paul S. Martin in the 1950's, his collections were limited to vertebrates. The wealthy invertebrate fauna remained entirely unknown until 1963, when James Reddell, David McKenzie, and Larry Manire explored caves in the vicinity of Rancho del Cielo and Gómez Farías. Concentrated collecting in the area began about four years ago with several trips made by Robert W. Mitchell, James Reddell, and their associates. Adequate sampling of these caves has been a time-consuming and laborious task; however the efforts of many have been amply rewarded.

The caves of the Sierra de Guatemala are now known to harbor one of the world's rich-

est and most diverse troglobite faunas. In addition to the eyeless scorpion there exist species of planarian, mysid, isopod, pseudoscorpion, opilionid, mygalomorph spider, araneomorph spider, milliped, gryllid cricket, carabid beetle, staphylinid beetle, catopid beetle, and fish.

There is no doubt that other taxa of equal interest and importance remain to be discovered and described.

Locations of those caves from which collections are available may be found on the accompanying map.

It is appropriate here to express our appreciation to Mr. Frank Harrison, the late owner of Rancho del Cielo. His kindness and hospitality to the biologists and cavers who visited Rancho del Cielo have made of this one of the best-studied areas in Mexico.

We wish to express our sincere appreciation to Mr. John Hunter of Brownsville, Texas, for his continuing help, interest, and enthusiasm for our efforts. His hospitality at Rancho del Cielo has made our efforts in the

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Sierra de Guatemala much more pleasant and profitable. He was also the first to direct us to Cueva de la Capilla.

We wish to thank Mrs. Barbara Warburton, Director of the Southmost Biological Field Station at Rancho del Cielo, for assisting us in many ways during our many trips to the area. She aided us in locating many caves, including Cueva de la Mina.

We wish to express our appreciation to the following people who have helped in the collection or who have supplied specimens for our use: Edward Alexander, Bart Cook, William Elliott, Ross Felton, John Fish, John George, Lawrence Gilbert, Fred Howell, Masaharu Kawakatsu, Orion Knox, Jr., David McKenzie, Larry Manire, Stewart Peck, Terry Raines, Francis Rose, William Russell, Pierre Strinati, Virginia Tipton, William Tozer, Gary Tucker, and Suzanne Wiley.

We wish also to thank the following systematists for their identification of the indicated taxa which has been included in this report: D.M. Anderson, beetles; T.C. Barr, Jr., beetles; T.E. Bowman, isopods; O.L. Cartwright, beetles; N.B. Causey, millipeds; F.E. Chace, mysids; Kenneth Christiansen, collembolans; A.C. Cole, ants; D.R. Davis, moths; R.C. Froeschner, hemipterans; G.E. Gates, earthworms; W.J. Gertsch, scorpions, amblypygids, and spiders; A.B. Gurney, cockroaches; L.H. Herman, beetles; J.L. Herring, hemipterans; T.H. Hubbell, crickets; J.M. Kingsolver, beetles; G.M. Kohls, ticks; T.C. Maa, flies; E.L. Mockford, psocids; W.B. Muchmore, pseudoscorpions; S.B. Peck, beetles; C.W. Sabrosky, flies; T.J. Spilman, beetles; C.C. Steyskal, flies; A. Stone, flies; A. Vandel, isopods; William Voss, mites; W.W. Wirth, flies; and Pedro Wygodzinsky, thysanurans and diplurans.

## PHYLUM PLATYHELMINTHES

### CLASS TURBELLARIA

#### ORDER TRICLADIDA

##### Unidentified Terricola

Records.--Cueva de la Capilla.

Comment.--Two terrestrial flatworms were observed near the upper entrance. See Fig. 4.

##### Family Planariidae

###### *Dugesia* sp.

Records.--Cueva de la Capilla.

Bibliography.--Mitchell and Kawakatsu, in press.

Comment.--This troglophile flatworm was immature, but it is probably the same species as

*Dugesia* sp. III. See Fig. 3.

###### \**Dugesia* sp. I

Records.--Cueva de la Mina.

Bibliography.--Mitchell and Kawakatsu, in press.

Comment.--This is the first troglitic flatworm to be reported from Mexico and is the first eyeless *Dugesia*. It was found in a small drip pool. See Figs. 1, 2.

###### \**Dugesia* sp. II

Records.--Cueva de la Capilla.

Bibliography.--Mitchell and Kawakatsu, in press.

Comment.--This eyeless species is known from small drip pools.

###### *Dugesia* sp. III

Records.--Cueva de las Perlas.

Bibliography.--Mitchell and Kawakatsu, in press.

Comment.--This eyed, pigmented species is found in intermittent drip pools.

**PHYLUM ANNELIDA**

**CLASS CLITELLATA**

**ORDER OLIGOCHAETA**

Unidentified earthworms

Records.--Cueva de la Capilla and Cueva de la Mina.

Comment.--Unidentified aquatic earthworms live in silt in small pools. See Fig. 8.

Family Acanthodrilidae

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

Records.--Bee Cave.

Comment.--This may represent an undescribed endemic species.

*Eodrilus albus* Gates

Records.--Cueva de la Capilla.

Bibliography.--Gates, 1970; 1971.

Comment.--This species lives in small silt-floored pools. It, or closely related species, is also known from Cueva de las Perlas. See Fig. 7.

Family Lumbricidae

*Eisenia rosea* (Savigny)

Records.--Sótano de la Joya de Salas.

Bibliography.--Gates, 1971.

**PHYLUM ARTHROPODA**

**CLASS CRUSTACEA**

**ORDER ISOPODA**

Family Cirolanidae

\**Speocirolana bolivari* (Rioja) (det. T.E. Bowman)

Records.--Bee Cave.

Comment.--This species was collected from a lower water-filled passage.

\**Speocirolana pelaezi* (Bolívar) (det. T.E. Bowman)

Records.--Cueva de la Mina.

Comment.--This species was collected from drip pools in the lowest point in the cave.

Family Sphaeroniscidae

\**Spherarmadillo cavernicola* Mulaik

Records.--Cave at Rancho del Cielo.

Bibliography.--Schultz, 1970.

Comment.--The identity of the cave from which this species is reported cannot be made.

Family Trichoniscidae

\**Brackenridgia bridgesi* (Van Name) (det. A. Vandel)

Records.--Cueva de la Mina.

Comment.--This species has been collected from rotten wood and from pools. It is known from both the vicinity of pools and under water. This amphibious nature is demonstrated in Fig. 15.

ORDER MYSIDACEA

Family Lepidopsidae

\**Speleomysis quinterensis* (Villalobos) (det. F.E. Chace)

Records.--Bee Cave.

Comment.--A single specimen of this marine relict was collected in the same pool in which *Speocirolana bolivari* was taken.

CLASS ARACHNIDA

ORDER SCORPIONIDA

Family Chactidae

\**Typhlochactas rhodesi* Mitchell

Records.--Cueva de la Mina.

Bibliography.--Mitchell, 1968.

Comment.--This remarkable blind scorpion is shown in Fig. 9.

Family Vejovidae

*Vejovis* sp. nr. *granulatus* Pocock (det. W.J. Gertsch)

Records.--Cueva de las Perlas.

Comment.--This scorpion was collected near the end of the cave. See Fig. 26.

ORDER CHELONETHIDA

Family Chernetidae

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

Records.--Cueva de la Mina.

Comment.--This species was found in a rat nest.

Undescribed (?) genus and species (det. W.B. Muchmore)

Records.--Crystal Cave.

Comment.--This species was taken from rat droppings.

*Hesperochnes* sp. (det. W.B. Muchmore)

Records.--Cueva de los Vampiros.

Comment.--This species was found on bat guano.

Family Chthoniidae

*Tyrannochthonius* sp. (det. W.B. Muchmore)

Records.--Cueva de Tres Manantiales and Cueva de los Vampiros.

Comment.--This probably represents an undescribed species of troglophile.

\**Tyrannochthonius troglobius* Muchmore

Records.--Cueva de la Mina.

Bibliography.--Muchmore, 1969.

Family Syarinidae

*Pachychitra* sp. (det. W.B. Muchmore)

Records.--Cueva de los Vampiros.

Comment.--This is apparently an undescribed species of troglophile.

Family Vachoniidae

\**Paravachonium* sp. (det. W.B. Muchmore)

Records.--Sótano de Gómez Farías.



Comment.--This is a large undescribed troglobite. An unidentified troglobite pseudo-scorpion has been collected in Cueva de la Mina (Fig.10).

ORDER UROPYGIDA

Family Thelyphonidae

*Mastigoproctus giganteus* Lucas

Records.--Cueva del Nacimiento del Río Frío.

Comment.--This species may frequently be found on walls near the entrance.

ORDER SCHIZOMIDA

Family Schizomidae

*Schizomus mexicanus* Rowland

Records.--Cueva de los Vampiros.

Bibliography.--Rowland, 1971.

*Schizomus reddelli* Rowland

Records.--Cueva de Tres Manantiales.

Bibliography.--Rowland, 1971.

ORDER AMBLYPYGIDA

Family Tarantulidae

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

Records.--Sótano de Gómez Farías.

Comment.--This material may also belong to *T. fuscimana*.

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

Records.--Cueva de Tres Manantiales and Cueva de los Vampiros.

Comment.--This species is usually found running along the floor or walls.

ORDER ARANEAE

Family Agelenidae

*Cicurina iviei* Gertsch

Records.--Harrison Sinkhole.

Bibliography.--Gertsch, 1971.

\**Cicurina mina* Gertsch

Records.--Cueva de la Capilla and Cueva de la Mina.

Bibliography.--Gertsch, 1971.

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

Records.--Cueva del Infiernillo and Cueva del Remolino.

Comment.--This material is represented only by immature specimens.

*Tegenaria blanda* Gertsch

Records.--Cueva de la Capilla.

Bibliography.--Gertsch, 1971.

*Tegenaria selva* Roth

Records.--Cueva de la Mina and Cueva del Rancho del Cielo n. 3.  
Bibliography.--Gertsch, 1971.

Family Argiopidae

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

Records.--Bee Cave.  
Comment.--A single female of this genus was collected.

Family Barychelidae

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

Records.--Cueva de la Mina.  
Comment.--Immature specimens of an apparent new species were collected.

Family Ctenidae

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

Records.--Sótano de Gómez Farías, Cueva del Nacimiento del Río Frío, Sótano de El Refugio, Cueva de los Vampiros, and Wet Cave.  
Comment.--Some of these records may be of *C. mitchelli*; others may represent an undescribed species.

*Ctenus mitchelli* Gertsch

Records.--Crystal Cave and Cueva de la Mina.  
Bibliography.--Gertsch, 1971.  
Comment.--This large species is frequently abundant on cave walls.

Family Ctenizidae

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

Records.--Sótano de El Refugio.  
Comment.--This undescribed species was found in small holes in the silt floor.

Family Dipluridae

\**Euagrus cavernicola* Gertsch

Records.--Cueva de la Capilla, Harrison Sinkhole, and Cueva de la Mina.  
Bibliography.--Gertsch, 1971.  
Comment.--This is one of four troglobite mygalomorph spiders in the world. See Fig.11.

Family Erigonidae

Erigoninae gen. et sp. (det. W.J. Gertsch)

Records.--Cueva de la Mina.  
Comment.--This material was too immature to determine generically.

Family Leptonetidae

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

Records.--Cueva de la Mina and Wet Cave.  
Comment.--This may belong in *L. capilla*.

\**Leptoneta capilla* Gertsch

Records.--Cueva de la Capilla.  
Bibliography.--Gertsch, 1971.

*Leptoneta rainesi* Gertsch

Records.--Cueva de los Vampiros.  
Bibliography.--Gertsch, 1971.

Family Linyphiidae

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

Records.--Sótano de la Joya de Salas.  
Comment.--A single male of this genus was collected.

Family Lycosidae

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

Records.--Sótano de Gómez Farías.

Comment.--An immature individual was collected.

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

Records.--Bee Cave.

Comment.--An immature individual was collected.

Family Nesticidae

*Gaucelmus augustinus* Keyserling

Records.--Cueva del Nacimiento del Río Frío.

Bibliography.--Gertsch, 1971.

*Nesticus pallidus* Emerton

Records.--Cueva de la Capilla, Cueva de la Mina, and Sótano de los Pinos.

Bibliography.--Gertsch, 1971.

Family Pholcidae

*Coryssocnemis clarus* Gertsch

Records.--Cueva del Nacimiento del Río Frío.

Bibliography.--Gertsch, 1971.

\**Metagonia capilla* Gertsch

Records.--Cueva de la Capilla.

Bibliography.--Gertsch, 1971.

Comment.--An unidentified pholcid spider is shown in Fig. 12.

*Metagonia pura* Gertsch

Records.--Cueva de la Capilla.

Bibliography.--Gertsch, 1971.

*Metagonia secreta* Gertsch

Records.--Cueva del Nacimiento del Río Frío.

Bibliography.--Gertsch, 1971.

*Modisimus mckenziei* Gertsch

Records.--Sótano del León.

Bibliography.--Gertsch, 1971.

*Modisimus mitchelli* Gertsch

Records.--Cueva de la Capilla, Crystal Cave, Harrison Sinkhole, Cueva del Infiernillo, Sótano de la Joya de Salas, Cueva de la Mina, Cueva Chica de la Perra, Sótano de El Porvenir, Cueva del Rancho del Cielo n. 3, and Sótano de El Refugio.

Bibliography.--Gertsch, 1971.

Family Salticidae

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

Records.--Bee Cave.

Comment.--A single penultimate male was collected below the entrance drop.

Family Symphytognathidae

*Maymena chica* Gertsch

Records.--Cueva de los Vampiros.

Bibliography.--Gertsch, 1971.

*Maymena grisea* Gertsch

Records.--Cueva de la Capilla.

Bibliography.--Gertsch, 1971.

Family Theraphosidae

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

Records.--Cueva de la Mina and Wet Cave.

Comment.--This tarantula was found on the wall near the entrance.

Family Theridiidae

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

Records.--Crystal Cave.

Comment.--A single female was collected.

ORDER OPILIONES

Family Phalangodidae

\**Hoplobunus inops* Goodnight and Goodnight

Records.--Sótano de la Joya de Salas and Cueva de la Mina.

Bibliography.--Goodnight and Goodnight, 1971.

Comment.--This troglobite is found on cave walls and on silt banks. What is probably this species has also been found in Cueva de la Capilla (see Fig. 13).

*Hoplobunus mexicanus* (Roewer)

Records.--Cueva de la Capilla.

Bibliography.--Goodnight and Goodnight, 1971.

ORDER ACARINA

Family Argasidae

*Ornithodoros yumatensis* Cooley and Kohls (det. G.M. Kohls)

Records.--Cueva de los Vampiros.

Comment.--This species was taken from bat guano.

Family Heterozetidae

?*Heterozetis* sp. (det. William Voss)

Records.--Cueva de la Mina.

Comment.--Both males and females of this family have been collected.

CLASS DIPLOPODA

ORDER CHORDEUMIDA

Family Cleidogonidae

Unidentified genus and species (det. N.B. Causey)

Records.--Wet Cave.

Bibliography.--Reddell, 1966.

Comment.--A single female was collected. It probably belongs in *Cleidogona*.

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

Records.--Cueva de la Capilla, Crystal Cave, Harrison Sinkhole, Sótano de la Joya de Salas, Cueva de la Mina, Cueva Chica de la Perra, Sótano de los Pinos, Cueva del Rancho del Cielo n. 3, Cueva del Rancho del Cielo n. 7, and Cueva de Tres Manantiales.

Comment.--One or more undescribed species are represented by these records.



ORDER GLOMERIDA

Family Glomeridae

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

Records.--Cueva del Nacimiento del Río Frío.

Comment.--This immature material probably belongs in *G. promiscus*.

\**Glomeroides promiscus* Causey (det. N.B. Causey)

Records.--Sótano de Gómez Farías, ?Cueva de la Mina, Cueva del Rancho del Cielo n. 3, and Cueva del Rancho del Cielo n. 7.

Bibliography.--Causey, 1964.

ORDER JULIDA

Family Paraiulidae

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

Records.--Harrison Sinkhole.

Comment.--No mature specimens were obtained.

ORDER POLYDESMIDA

Family Peridontodesmidae

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

Records.--Sótano de El Refugio.

Comment.--No mature specimens were obtained.

Family Polydesmidae

Undescribed genus and species (det. N.B. Causey)

Records.--Bee Cave and Sótano de El Refugio.

Comment.--A possible undescribed genus and species of troglobite was collected.

Family Rhachodesmidae

Unidentified genus and species (det. N.B. Causey)

Records.--Wet Cave.

Bibliography.--Reddell, 1966.

Comment.--Material from this cave was immature.

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

Records.--Bee Cave and Cueva del Rancho del Cielo n. 7.

Bibliography.--Reddell, 1966.

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

Records.--Sótano de El Refugio.

Comment.--A male of this genus was collected.

\**Strongylodesmus harrisoni* Causey

Records.--Cueva de la Capilla, Crystal Cave, Harrison Sinkhole, Cueva de Infiernillo, Cueva de la Mina, Cueva del Rancho del Cielo n. 7, Cueva del Remolino, and 2,000 Meter Cave.

Bibliography.--Causey, 1971.

Comment.--This large, beautiful species is shown in Fig. 14.

Family Sphaeriodesmidae

\**Sphaeriodesmus* sp. (det. N.B. Causey)

Records.--Crystal Cave, Harrison Sinkhole, Cueva de la Mina, Cueva Chica de la Perra, Cueva del Rancho del Cielo n. 3, Cueva del Rancho del Cielo n. 7, and Wet Cave.

Bibliography.--Reddell, 1966.

Comment.--This genus is frequently abundant on silt banks.

Family Stylodesmidae

*Gibberdesmus egenus* Causey

Records.--Crystal Cave and Cueva de la Mina.

Bibliography.--Causey, 1971.

*Gibberdesmus gelidus* Causey

Records.--Sótano de Gómez Farías and Cueva del Nacimiento del Río Frío.

Bibliography.--Causey, 1971.

Family Xystodesmidae

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

Records.--Cueva de Tres Manantiales.

Comment.--This is apparently an undescribed species.

ORDER POLYZONIDA

Family Polyzonidae

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

Records.--Cueva de la Mina.

Comment.--This may be an undescribed species.

Family Siphonophoridae

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

Records.--Crystal Cave and Cueva de la Mina.

Bibliography.--Reddell, 1966.

Comment.--This may be an undescribed species.

ORDER SPIROSTREPTIDA

Family Cambalidae

\**Mexicambala* sp. (det. N.B. Causey)

Records.--Bee Cave, Cueva de la Capilla, Crystal Cave, Sótano de Gómez Farías, Harrison Sinkhole, Sótano de la Joya de Salas, Cueva de los Leones, and Cueva del Nacimiento del Río Frío.

Bibliography.--Reddell, 1966; 1967.

CLASS INSECTA

ORDER THYSANURA

Family Michilidae

Unidentified genus and species (det. Pedro Wygodzinsky)

Records.--Sótano de Gómez Farías.

Comment.--This species was found on moss-covered walls at the bottom of the entrance.

ORDER DIPLURA

Family Campodeidae

Unidentified genus and species (det. Pedro Wygodzinsky)

Records.--Bee Cave, Crystal Cave, Sótano de la Joya de Salas, Cueva de la Mina, Cueva del Rancho del Cielo n. 3, and Cueva del Rancho del Cielo n. 7.

Bibliography.--Reddell, 1966.

Comment.--At least one species of troglobite dipluran is included in these records.

ORDER COLLEMBOLA

Family Oncopoduridae

\**Oncopodura* sp. (det. Kenneth Christiansen)

Records.--Bee Cave.

Comment.--This is an undescribed species.

ORDER BLATTODEA

Family Blaberidae

*Pycnoscelus surinamensis* (L.) (det. A.B. Gurney)

Records.--Bee Cave.

Comment.--This species was collected in the entrance area.

Family Blattellidae

*Pseudomops septentrionalis* Heb. (det. A.B. Gurney)

Records.--Sótano de la Joya de Salas.

Comment.--This species probably was washed into the cave.

ORDER SALTATORIA

Family Gryllidae

*Amphiacusta* sp. (det. T.H. Hubbell)

Records.--Cuevita de la Escuela.

Comment.--This probable new species was taken from the ceiling and walls.

*Gryllus* sp. (det. T.H. Hubbell)

Records.--Sótano de la Joya de Salas.

Comment.--This cricket probably fell or was washed into the cave.

\**Paracophus* sp. (det. T.H. Hubbell)

Records.--Sótano de Gómez Farías, Harrison Sinkhole, Sótano de la Joya de Salas, Cueva de la Mina, Cueva del Nacimiento del Río Frío, and Sótano de los Pinos.

Bibliography.--Reddell, 1966.

Comment.--This genus includes both eyed and eyeless species in the caves of the Sierra de Guatemala (see Fig.16). The genus is being revised by T.H. Hubbell.

*Paracophus apterus* Chopard (det. T.H. Hubbell)

Records.--Sótano de Gómez Farías, Cueva del Nacimiento del Río Frío, and Cueva del Rancho del Cielo n. 3.

Bibliography.--Reddell, 1966.

Comment.--This species is an abundant troglophile in the caves of the Sierra de El Abra.

Family Rhabdiphoridae

Undescribed genus and species (det. T.H. Hubbell)

Records.--Cueva de la Capilla, Dry Cave, Cueva de la Mina, and 2000 Meter Cave.

Comment.--This troglaxene is found on ceilings just within the entrance (see Fig. 17).

Family Stenopelmatidae

*Glaphyrosoma* sp. (det. T.H. Hubbell)

Records.--Sótano de El Molino.

Comment.--This species was probably washed into the cave.

*Stenopelmatus* sp.

Records.--Crystal Cave.

Comment.--This species was found under a rock in the entrance area.

ORDER PSOCOPTERA

Family Psyllipsocidae

*Psyllipsocus ramburi* Selys (det. E.L. Mockford)

Records.--Cueva de los Vampiros.

Comment.--This is a common species in caves throughout the world.

ORDER HEMIPTERA

Family Lygaeidae

Unidentified genus and species (det. R.C. Froeschner)

Records.--Sótano de los Pinos.

Comment.--This species was certainly accidentally introduced into the cave.

"*Lethaeus*" sp. (det. J.L. Herring)

Records.--Sótano de Gómez Farías.

Comment.--This species was taken below the entrance drop.

Family Veliidae

*Rhagovelia* sp. (det. J.L. Herring)

Records.--Sótano de la Joya de Salas.

Comment.--This species was probably washed into the cave.

ORDER COLEOPTERA

Family Alleculidae

*Hymenorus* sp. (det. T.J. Spilman)

Records.--Sótano de la Joya de Salas.

Comment.--This species may be a troglophile.

Family Cantharidae

Unidentified genus and species (det. D.M. Anderson)

Records.--Sótano de la Joya de Salas.

Comment.--This species doubtless is an accidental.

Family Carabidae

Unidentified genus and species (det. T.C. Barr, Jr.)

Records.--Cueva del Infiernillo.

Comment.--Only a larva was collected.



- \**Antroforceps bolivari* Barr  
Records.--Sótano de la Joya de Salas.  
Bibliography.--Barr, 1967.
- Apenes obscura* Chaudoir (det. T.C. Barr, Jr.)  
Records.--Bee Cave.  
Comment.--This is probably an accidental.
- Bembidion* sp. nr. *lacunarium* Zimm. (det. T.C. Barr, Jr.)  
Records.--Sótano de la Joya de Salas.  
Comment.--This species may be a troglophile.
- Brachinus* sp. (det. T.C. Barr, Jr.)  
Records.--Sótano de la Joya de Salas.  
Comment.--This species was probably washed into the cave.
- Bradycellus* sp. (det. T.C. Barr, Jr.)  
Records.--Sótano de la Joya de Salas.  
Comment.--This species was probably washed into the cave.
- Clivina* sp. (det. T.C. Barr, Jr.)  
Records.--Bee Cave and Sótano de la Joya de Salas.  
Comment.--This species may be a troglophile.
- Colpodes* sp. (det. T.C. Barr, Jr.)  
Records.--Bee Cave.  
Comment.--This species is probably a troglophile.
- \**Mexaphaenops intermedius* Barr  
Records.--Cueva de la Capilla.  
Bibliography.--Barr, 1971.  
Comment.--This species was collected from flowstone and under rocks on silt. See Fig. 19.
- \**Mexisphodrus profundus* Barr (det. T.C. Barr, Jr.)  
Records.--Sinkhole at Rancho del Cielo, Crystal Cave, Harrison Sinkhole, Sótano de la Joya de Salas, and Cueva de la Mina.  
Bibliography.--Barr, 1966.  
Comment.--This species is usually found running along flowstone or cave walls. See Fig. 18.
- Pachyteles urrutiai* Bolívar (det. T.C. Barr, Jr.)  
Records.--Cueva de los Vampiros.  
Comment.--This species was taken from the vicinity of vampire bat guano.
- Pterostichus (Poecilus)* sp. cf. *mexicanus* Chaudoir (det. T.C. Barr, Jr.)  
Records.--Sótano de la Joya de Salas.  
Comment.--This species may have been washed into the cave.
- Stenomorphus* sp. (det. T.C. Barr, Jr.)  
Records.--Sótano de la Joya de Salas.  
Comment.--This species was probably washed into the cave.
- Tachys* (s.str.) sp. (det. T.C. Barr, Jr.)  
Records.--Bee Cave.  
Comment.--This is a troglophile; it was collected under rocks.
- Family Dytiscidae  
Undetermined genus and species  
Records.--Cueva de la Capilla.  
Comment.--An unidentified troglophile dytiscid was abundant in pools. See Fig. 20.
- Family Elateridae  
*Cardiophorus* sp. (det. T.J. Spilman)  
Records.--Cueva de los Vampiros.  
Comment.--This beetle was taken near the cave entrance.

Family Helodidae

*Scirtes* sp. (det. J.M. Kingsolver)

Records.--Sótano de El Molino.

Comment.--This beetle was probably washed into the cave.

Family Leiodidae

*Ptomaphagus elabra* Peck

Records.--Bee Cave, Sótano de Gómez Farías, Cueva del Nacimiento del Río Frío, and Cueva de los Vampiros.

Bibliography.--Peck, 1971.

\**Ptomaphagus (Adelops) troglomexicanus* Peck (det. S.B. Peck)

Records.--Cueva de la Capilla, Cueva de la Mina, and Cueva Chica de la Perra.

Bibliography.--Peck, 1968.

Comment.--This species was taken from flowstone slopes and among small rocks on moist silt near the end of Cueva de la Capilla. See Fig. 21.

Family Lycidae

Unidentified genus and species (det. D.M. Anderson)

Records.--Cueva del Nacimiento del Río Frío.

Comment.--Larvae of this family were collected.

Family Meloidae

*Epicauta* sp. (det. T.J. Spilman)

Records.--Sótano de la Joya de Salas.

Comment.--This beetle was probably washed into the cave.

Family Ptilodactylidae

*Ptilodactyla* sp. (det. T.J. Spilman)

Records.--Sótano de la Joya de Salas.

Comment.--This beetle is probably a troglophile.

Family Scarabaeidae

*Aphodius* sp. (det. O.L. Cartwright)

Records.--Crystal Cave and Cueva del Rancho del Cielo n. 3.

Comment.--This species was taken from the entrance slopes.

*Ataenius cognatus* Lec. (det. O.L. Cartwright)

Records.--Sótano de la Joya de Salas.

Comment.--This species was taken below the entrance drop among dead goats.

*Onthophagus* sp. (det. O.L. Cartwright)

Records.--Sótano de la Joya de Salas.

Comment.--This beetle was found among dead goats below the entrance drop.

Family Silphidae

*Silpha cayennensis* Sturm. (det. T.J. Spilman)

Records.--Sótano de la Joya de Salas.

Comment.--This species probably was washed into the cave.

Family Staphylinidae

Unidentified genus and species (det. L.H. Herman)

Records.--Sótano de la Joya de Salas.

Comment.--Only larvae were collected.

Aleocharinae gen. et sp. (det. L.H. Herman)

Records.--Sótano de Gómez Farías.

Comment.--It is not possible at this time to apply generic names to this subfamily.

*Belonuchus* sp. nr. *moquinus* Casey (det. L.H. Herman)

Records.--Crystal Cave.

Bibliography.--Reddell, 1966.

- Comment.--This is an abundant troglophile in Mexican caves.  
*Biocrypta magnolia* Blatchley (det. L.H. Herman)  
Records.--Bee Cave.  
Comment.--This species was collected under a rock below the entrance.  
*Homaeotarsus* sp. (det. L.H. Herman)  
Records.--Bee Cave.  
Comment.--This species was taken from the entrance area.  
*Homaeotarsus (Gastrolobium)* sp. nr. *luridum* Sharp (det. L.H. Herman)  
Records.--Sótano de El Molino.  
Comment.--This species may have washed into the cave.  
*Philonthus* sp. (det. L.H. Herman)  
Records.--Cueva de la Mina.  
Comment.--This species was taken from a rat nest.  
*\*Stenopholea reddelli* Herman  
Records.--Cueva de la Mina.  
Bibliography.--Herman, 1969.  
Comment.--This is the first troglobite staphylinid known from the New World.  
*Stilicolina condei* Jarrige  
Records.--Bee Cave and Sótano de los Pinos.  
Bibliography.--Herman, 1970.  
Comment.--This is a common troglophile in Mexican caves.
- Family Tenebrionidae  
*Eleodes* sp. (det. T.J. Spilman)  
Records.--2000 Meter Cave.  
Comment.--This species was taken from the entrance area.

#### ORDER LEPIDOPTERA

- Family Noctuidae  
Unidentified genus and species  
Records.--Crystal Cave.  
Comment.--An unidentified noctuid moth is shown in Fig. 25.
- Family Tineidae  
*Amydria* sp. (det. D.R. Davis)  
Records.--Cueva de la Mina.  
Comment.--This is apparently an undescribed species.

#### ORDER DIPTERA

- Family Chironomidae  
Unidentified genus and species (det. W.W. Wirth)  
Records.--Sótano de la Joya de Salas.
- Family Phyllomyzidae  
*Pholeomyia* sp. (det. C.W. Sabrosky)  
Records.--Bee Cave.  
Comment.--This fly was abundant in the back part of the cave.
- Family Sciomyzidae  
*Pherbellia humilis* (Loew) (det. C.C. Steyskal)

Records.--Sótano de la Joya de Salas.

Family Streblidae

*Trichobius corynorhini* Cockerell (det. T.C. Maa)

Records.--Cueva de la Capilla.

Comment.--This species was taken from *Plecotus* sp.

Family Tipulidae

Unidentified genus and species (det. A. Stone)

Records.--Cueva de la Mina.

ORDER HYMENOPTERA

Family Formicidae

*Euponera stigma* (Fabr.) (det. A.C. Cole)

Records.--Sótano de Gómez Farías.

Comment.--This species was taken below the entrance drop.

*Neoponera villosa* (Fabr.) (det. A.C. Cole)

Records.--Sótano de El Molino.

Comment.--This species was probably washed into the cave.

*Pachycondyla harpax montezumia* F. Smith (det. A.C. Cole)

Records.--Sótano de la Joya de Salas and Sótano de El Molino.

Comment.--This species is known from several Mexican caves.

PHYLUM MOLLUSCA

CLASS GASTROPODA

Unidentified terrestrial snails

Records.--Cueva de la Capilla and Cueva de la Mina.

Comment.--A large terrestrial snail is a troglophile in Cueva de la Mina (see Figs. 5, 24).

A second species is fairly abundant about the upper entrance to Cueva de la Capilla (see Fig. 6).

PHYLUM CHORDATA

ORDER TELEOSTOMI

ORDER CYPRINIFORMES

Family Characidae

\**Astyanax* sp. (det. R.W. Mitchell)

Records.--Bee Cave.

Bibliography.--Reddell, 1967b.



CLASS AMPHIBIA

ORDER URODELA

Family Plethodontidae

*Chiropterotriton* sp.

Records.--Two small caves at El Chihue.

Bibliography.--Rabb, 1958.

*Chiropterotriton chondrostega* (Taylor)

Records.--Large, bell-shaped sink and two unidentified sinks at Rancho del Cielo.

Bibliography.--Martin, 1958.

*Chiropterotriton multidentata* (Taylor)

Records.--Cave at Aserradero del Paraíso, Fissure near Casa Piedras, and Cueva de la Mina.

Bibliography.--Martin, 1958; Rabb, 1958.

Comment.--This species is frequently abundant in Cueva de la Mina (see Fig. 22).

*Pseudoeurycea bellii* (Gray)

Records.--Cave at Agua Linda, Balanced Rock Cave, Crystal Cave, and Cueva de la Mina.

Bibliography.--Martin, 1958.

Comment.--In Cueva de la Mina this species is occasionally seen on the wall of the cave immediately below the entrance drop. See Fig. 27.

*Pseudoeurycea scandens* Walker

Records.--Cave at El Chihue, Fissure at Casa Piedras, Caves at Rancho del Cielo, Cueva de la Mina, and Cueva de la Capilla.

Bibliography.--Martin, 1958; Walker, 1955.

Comment.--This species is frequently present in large numbers on walls and formations in the vicinity of the entrance to Cueva de la Mina and Cueva de la Capilla. See Fig. 23.

ORDER ANURA

Family Leptodactylidae

*Eleutherodactylus decoratus purpurus* Lynch

Records.--Cave at Aserradero del Paraíso, Cave at El Chihue, and Cave at Rancho del Cielo.

Bibliography.--Lynch, 1967; Martin, 1958.

*Syrrophus longipes* (Baird)

Records.--Cave at Aserradero del Paraíso, Cave at El Chihue, Bee Cave, and Crystal Cave.

Bibliography.--Lynch, 1970a; Martin, 1958.

Family Ranidae

*Rana pipiens* (Schreber)

Records.--Dry sinkhole at Rancho del Cielo.

Bibliography.--Martin, 1958.

CLASS REPTILIA

ORDER SQUAMATA

Family Colubridae

*Rhadinaea crassa* Smith

Records.--Cave in Gómez Farías region and Cueva de la Mina.

Bibliography.--Martin, 1968.

Comment.--This snake was taken on a rock about 20 feet below the entrance to Cueva de la Mina.

CLASS AVES

ORDER STRIGIFORMES

Family Strigidae

*Ciccaba virgata tamaulipensis* (Phillips)

Records.--Caves near Rancho del Cielo.

Bibliography.--Koopman and Martin, 1959.

ORDER APODIFORMES

Family Apodidae

*Chaetura vauxi tamaulipensis* Sutton

Records.--Caves No. 6, 14, and 19 at Rancho del Cielo.

Bibliography.--Harrell, 1951.

Family Trochilidae

*Campylopterus curvipennis curvipennis* (Lichtenstein)

Records.--Cave No. 13 at Rancho del Cielo.

Bibliography.--Harrell, 1951.

*Lampornis amethystinus amethystinus* Swainson

Records.--Cave No. 6 at Rancho del Cielo.

Bibliography.--Harrell, 1951.

ORDER CORACIIFORMES

Family Momotidae

*Momotus momota coeruliceps* (Gould)

Records.--Caves No. 11 and 13 at Rancho del Cielo.

Bibliography.--Harrell, 1951.

ORDER PASSERIFORMES

Family Troglodytidae

*Catherpes mexicanus* (Swainson)

Records.--Cave No. 20 at Rancho del Cielo).

Bibliography.--Harrell, 1951.

Family Turdidae

*Catharus mexicanus mexicanus* (Bonaparte)

Records.--Cave No. 13 at Rancho del Cielo.

Bibliography.--Harrell, 1951.

*Myadestes obscurus obscurus* Lafresnaye

Records.--Caves No. 6 and 13 at Rancho del Cielo.

Bibliography.--Harrell, 1951.

CLASS MAMMALIA

ORDER CHIROPTERA

Family Phyllostomidae

*Anoura geoffroyi* Gray

Records.--Cueva de la Mina.

Bibliography.--Baker and Lopez, 1968.

*Artibeus aztecus* Andersen

Records.--Caves at Rancho del Cielo.

Bibliography.--Alvarez, 1963; Mollhagen, 1971.

*Artibeus jamaicensis yucatanicus* Allen

Records.--Cave at El Nacimiento del Río Sabinas.

Bibliography.--Alvarez, 1963; Mollhagen, 1971.

*Artibeus lituratus palmarum* J.A. Allen and Chapman

Records.--Cave at El Nacimiento del Río Sabinas.

Bibliography.--Alvarez, 1963; Mollhagen, 1971.

*Desmodus rotundus murinus* Wagner

Records.--Cave at El Nacimiento del Río Sabinas.

Bibliography.--Alvarez, 1963; Mollhagen, 1971.

*Leptonycteris nivalis* (Saussure)

Records.--Cueva de la Mina.

Bibliography.--Mollhagen, 1971.

*Pteronotus parnellii* (Gray)

Records.--Cave at El Nacimiento del Río Sabinas.

Bibliography.--Alvarez, 1963; Mollhagen, 1971.

Family Vespertilionidae

*Myotis nigricans dalquesti* Hall and Alvarez

Records.--Cave at El Nacimiento del Río Sabinas and Cueva del Nacimiento del Río Frío.

Bibliography.--Alvarez, 1963; Mollhagen, 1971.

*Plecotus* sp.

Records.--Cueva de la Capilla.

Comment.--A specimen collected here was lost before final identification could be made. It was probably *P. mexicanus*.

*Plecotus mexicanus* G.M. Allen

Records.--Cueva Chica de la Perra.

Bibliography.--Mollhagen, 1971.

Family Molossidae

*Tadarida laticaudata ferruginea* Goodwin

Records.--Cave at El Nacimiento del Río Sabinas.

Bibliography.--Alvarez, 1963; Mollhagen, 1971.

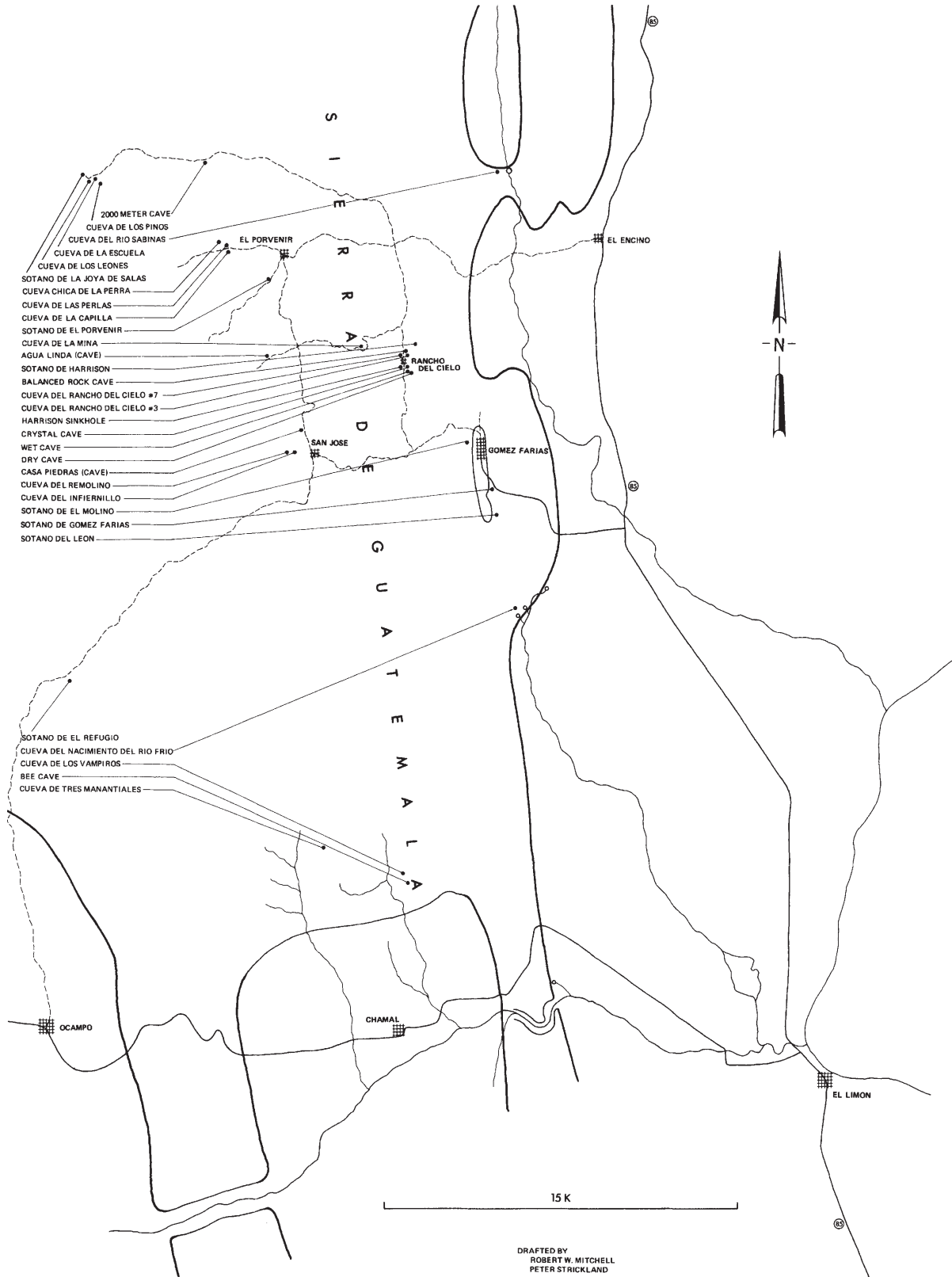
ORDER RODENTIA

Family Cricetidae

*Neotoma angustapalata* Baker

Records.--Cave near El Encino and Caves near Rancho del Cielo.

Bibliography.--Alvarez, 1963; Hooper, 1953.



Map. Sierra de Guatemala, Tamaulipas, México, showing caves for which biological records are available.



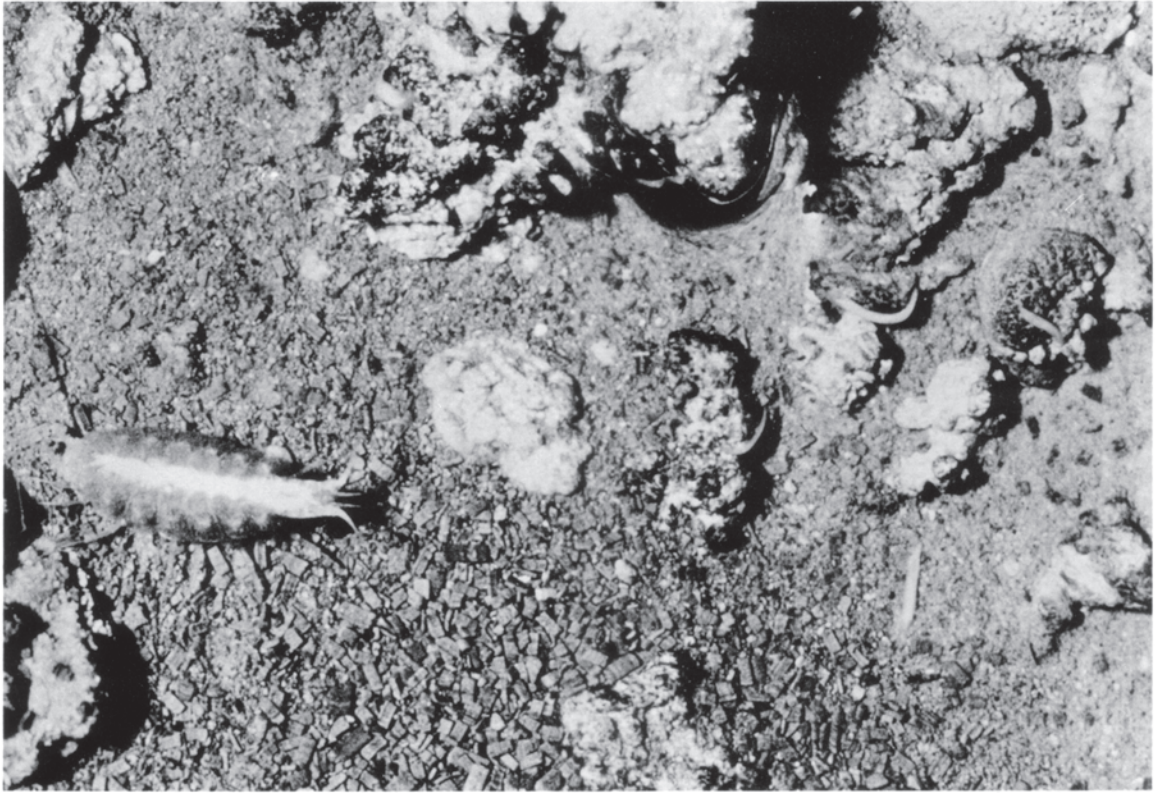


Fig. 1. *Brackenridgia bridgesi* and *Dugesia* sp. I in small pool, Cueva de la Mina



Fig. 2. *Dugesia* sp. I, Cueva de la Mina





Fig. 3. *Dugesia* sp., Cueva de la Capilla



Fig. 4. Unidentified terrestrial planarian, Cueva de la Capilla



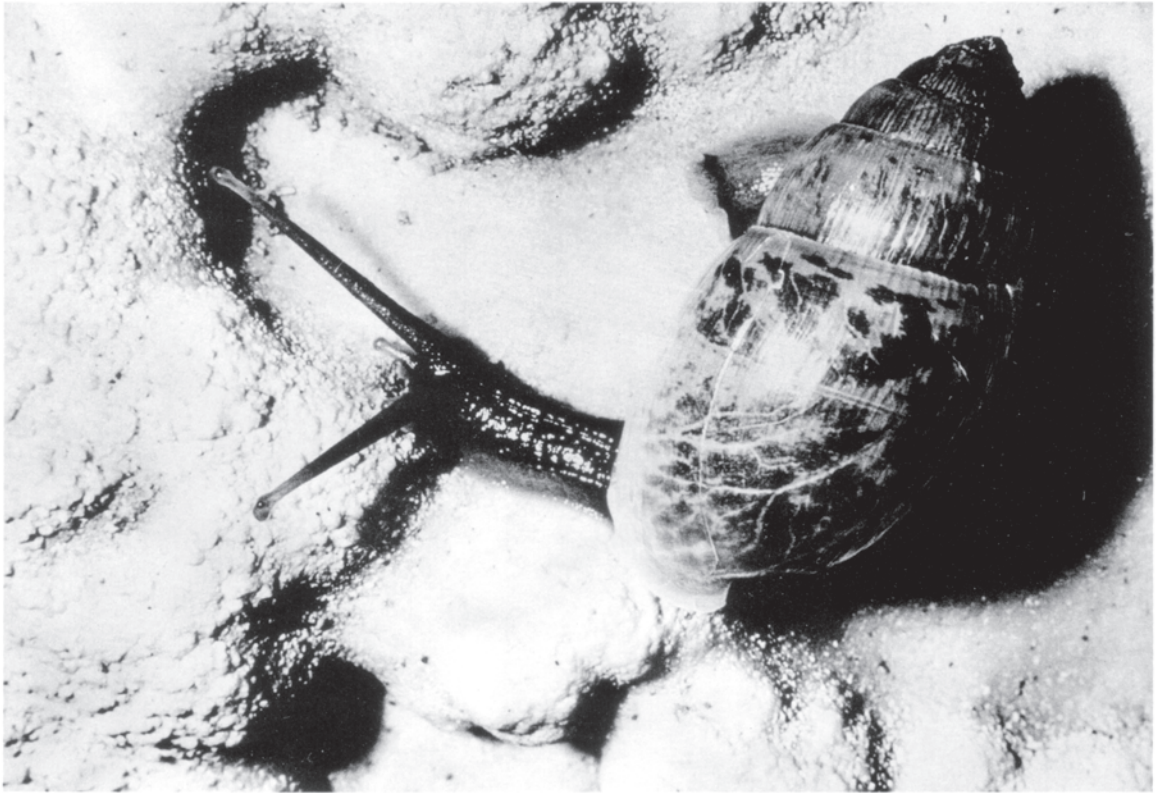


Fig. 5. Large unidentified terrestrial snail, Cueva de la Mina

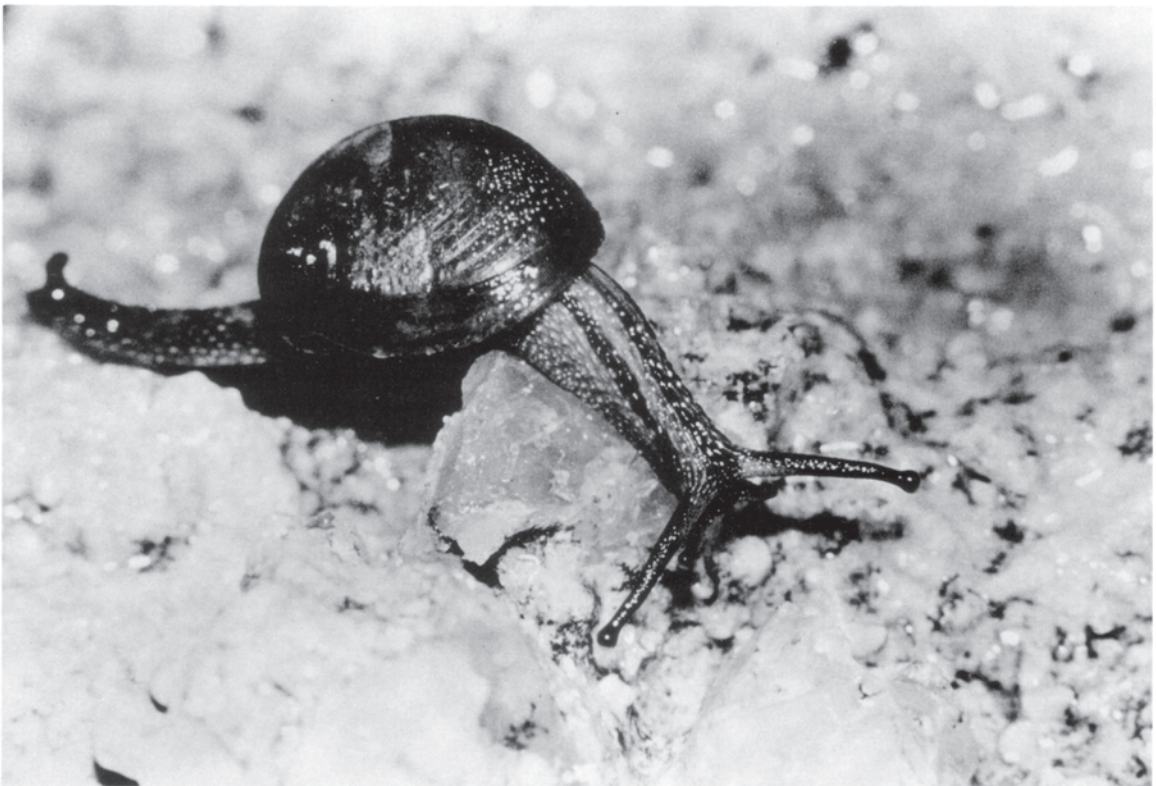


Fig. 6. Second species of unidentified terrestrial snail, Cueva de la Capilla





Fig. 7. *Eodrilus albus*, Cueva de las Perlas

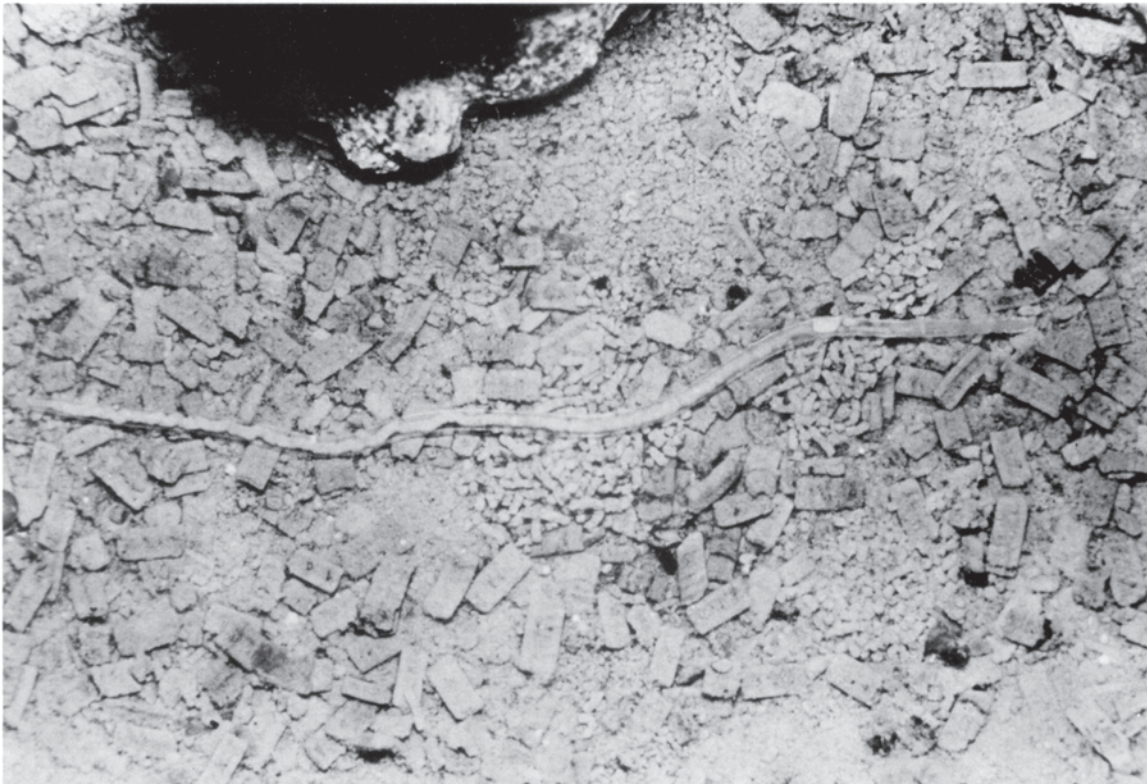


Fig. 8. Unidentified aquatic earthworm, Cueva de la Capilla





Fig. 9. *Typhlochactas rhodesi*, Cueva de la Mina

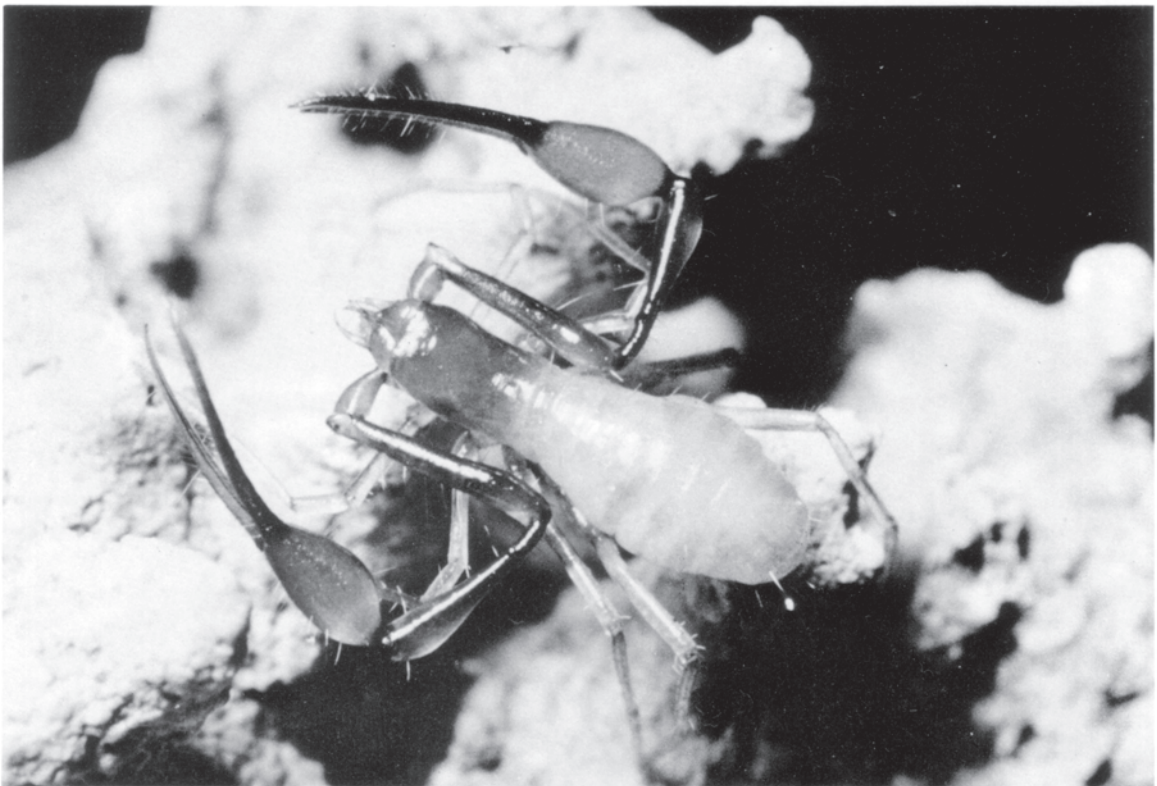


Fig. 10. Unidentified pseudoscorpion, Cueva de la Mina





Fig. 11. *Euagrus cavernicola*, Cueva de la Capilla

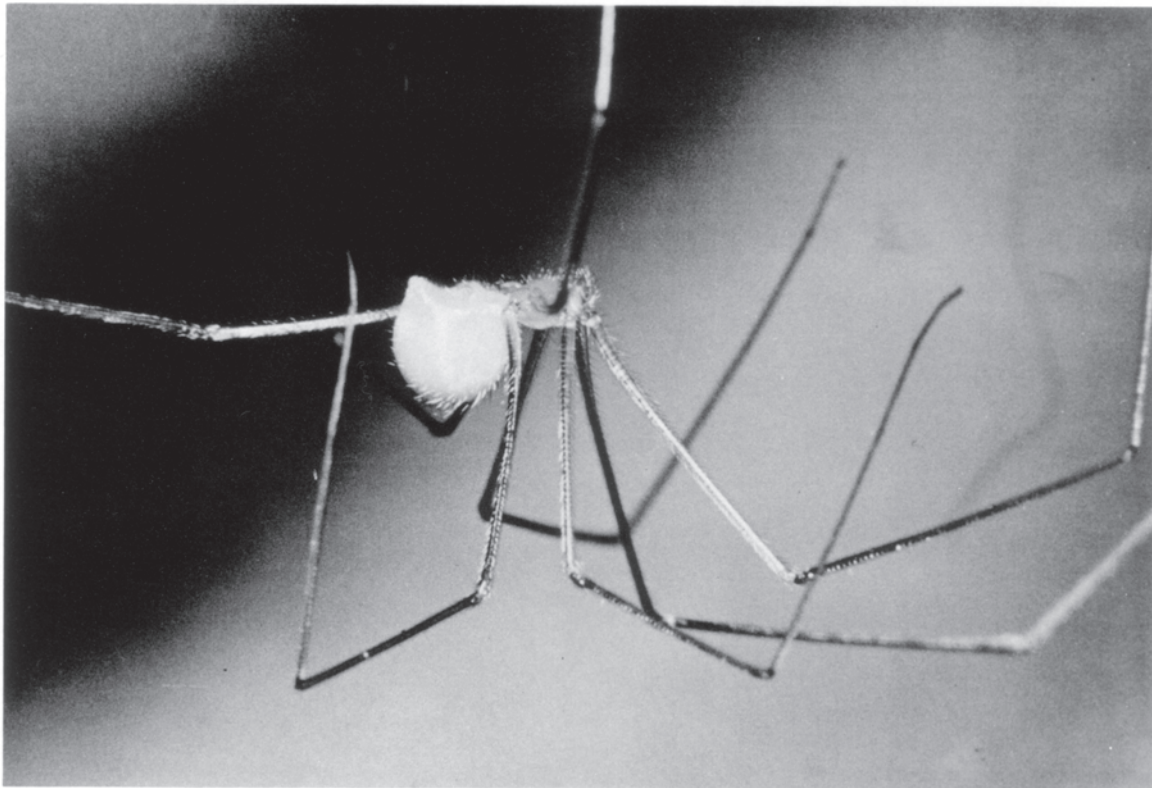


Fig. 12. Pholcid spider, Cueva de la Capilla

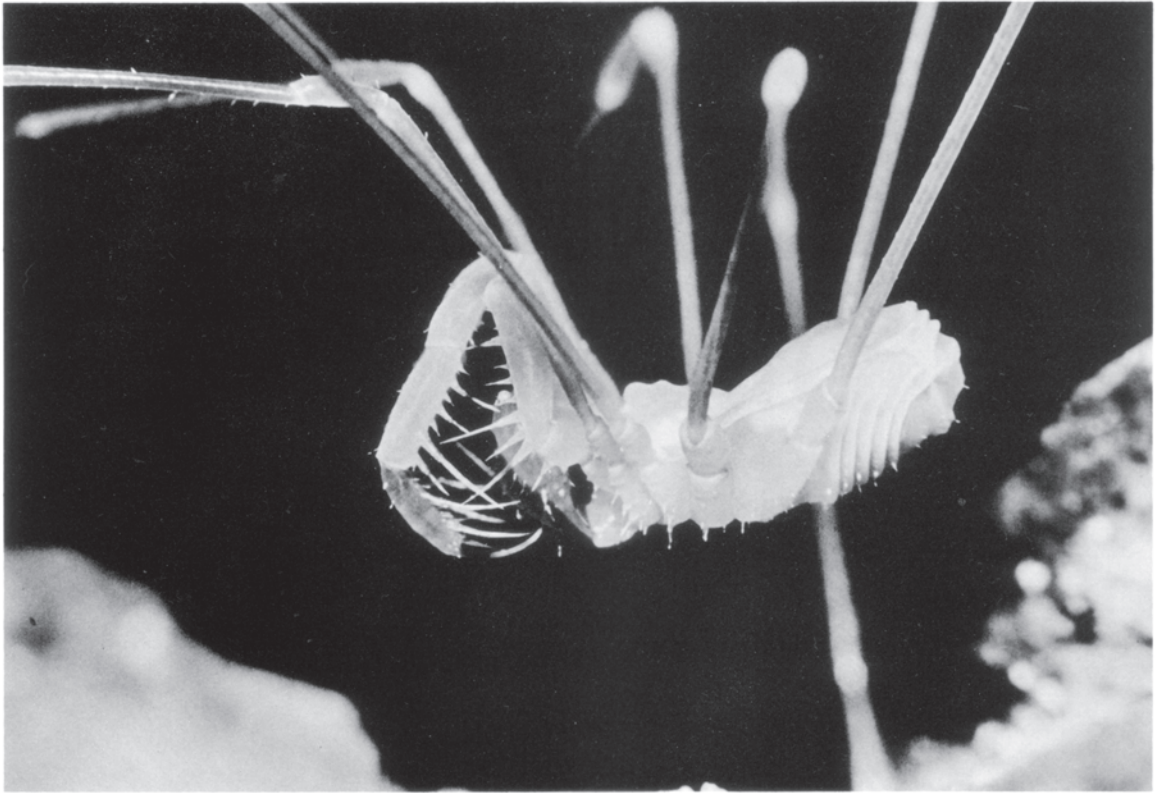


Fig. 13. *Hoplobunus inops* (?), Cueva de la Capilla

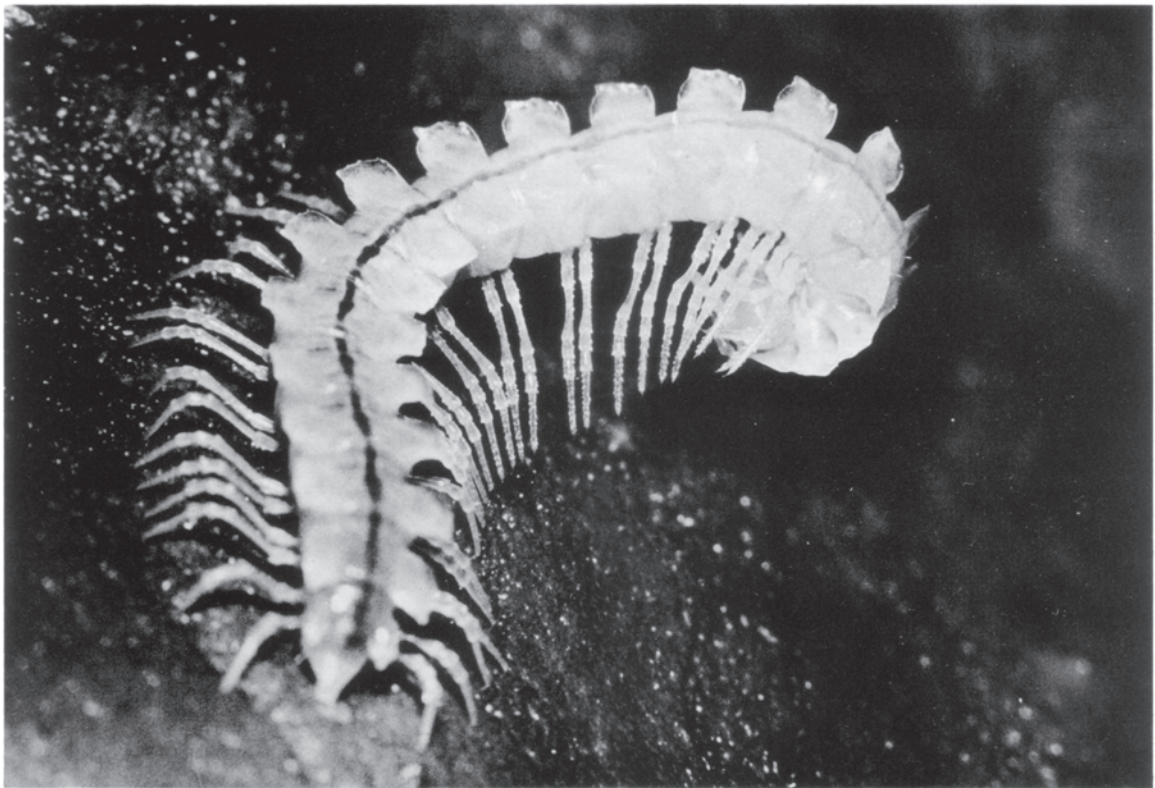


Fig. 14. *Strongyloidesmus harrisoni*, Cueva de la Mina





Fig. 15. *Brackenridgia bridgesi*, Cueva de la Mina





Fig. 16. *Paracophus* sp., Cueva de la Mina



Fig. 17. New genus and species of Rhapsidophoridae, Cueva de la Capilla



Fig. 18. *Mexisphodrus profundus*, Harrison Sinkhole

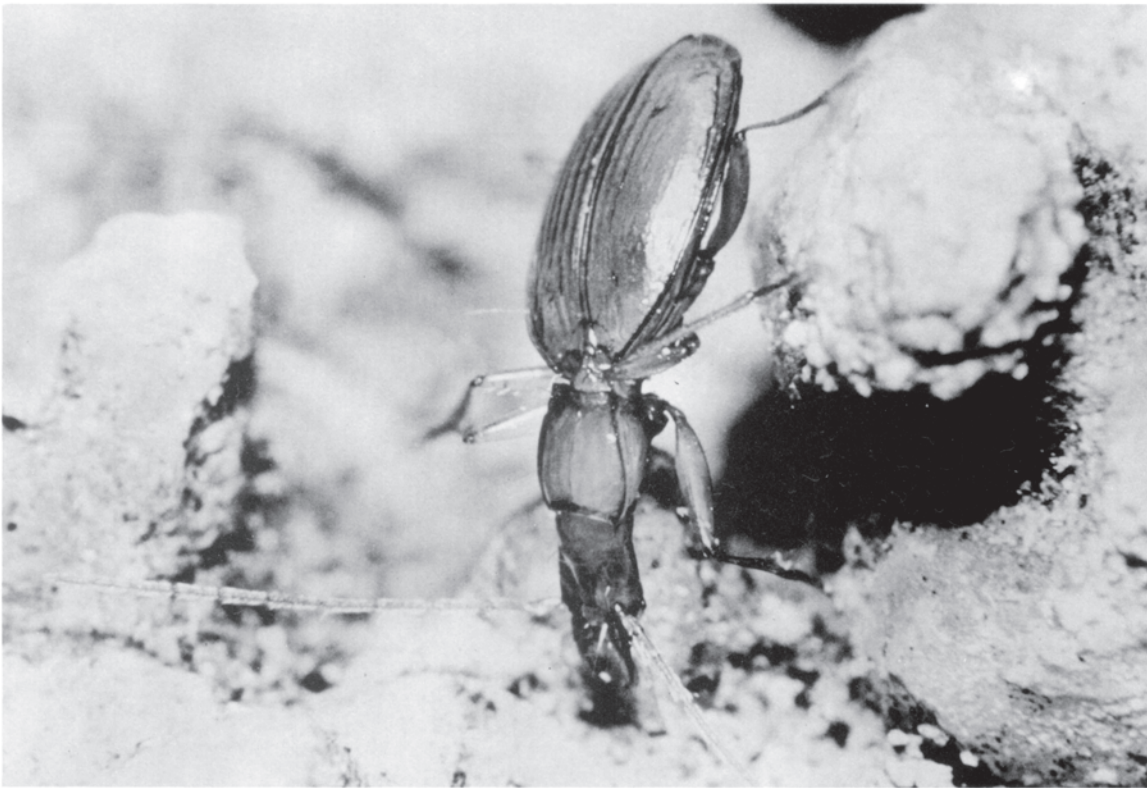


Fig. 19. *Mexaphaenops intermedius*, Cueva de la Capilla.



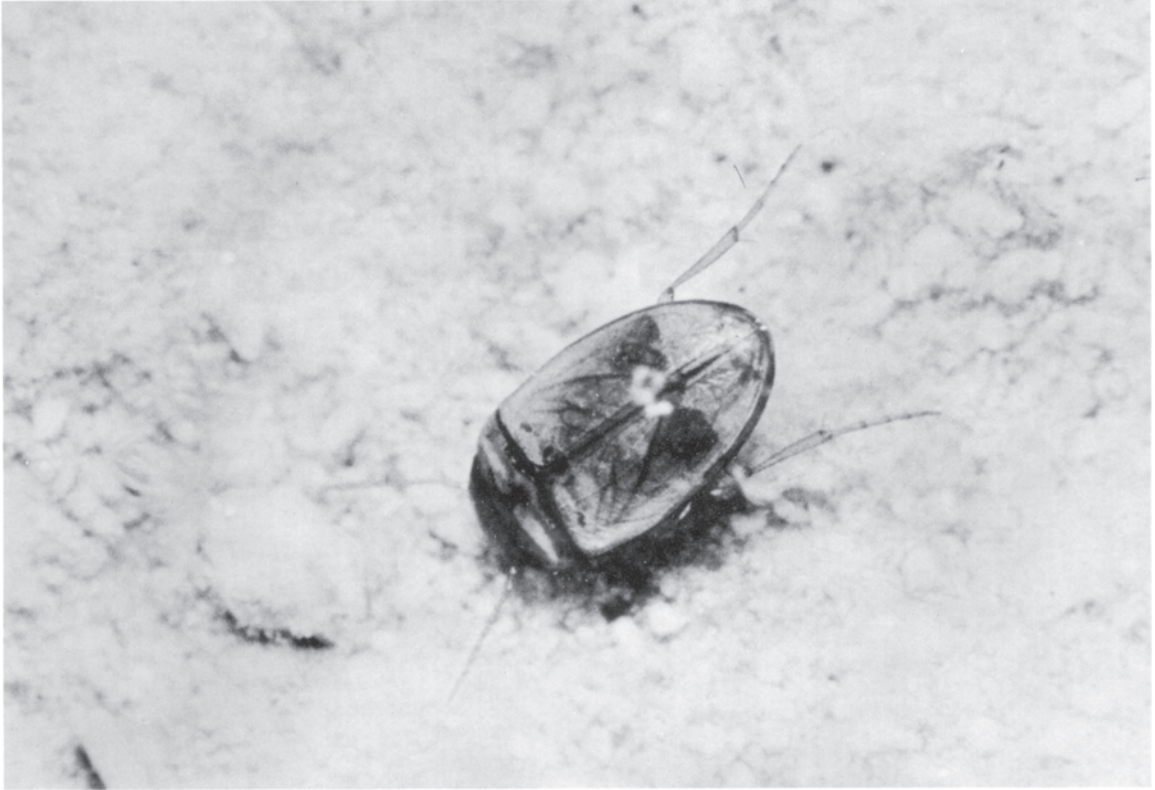


Fig. 20. Unidentified troglophile dytiscid beetle, Cueva de la Capilla

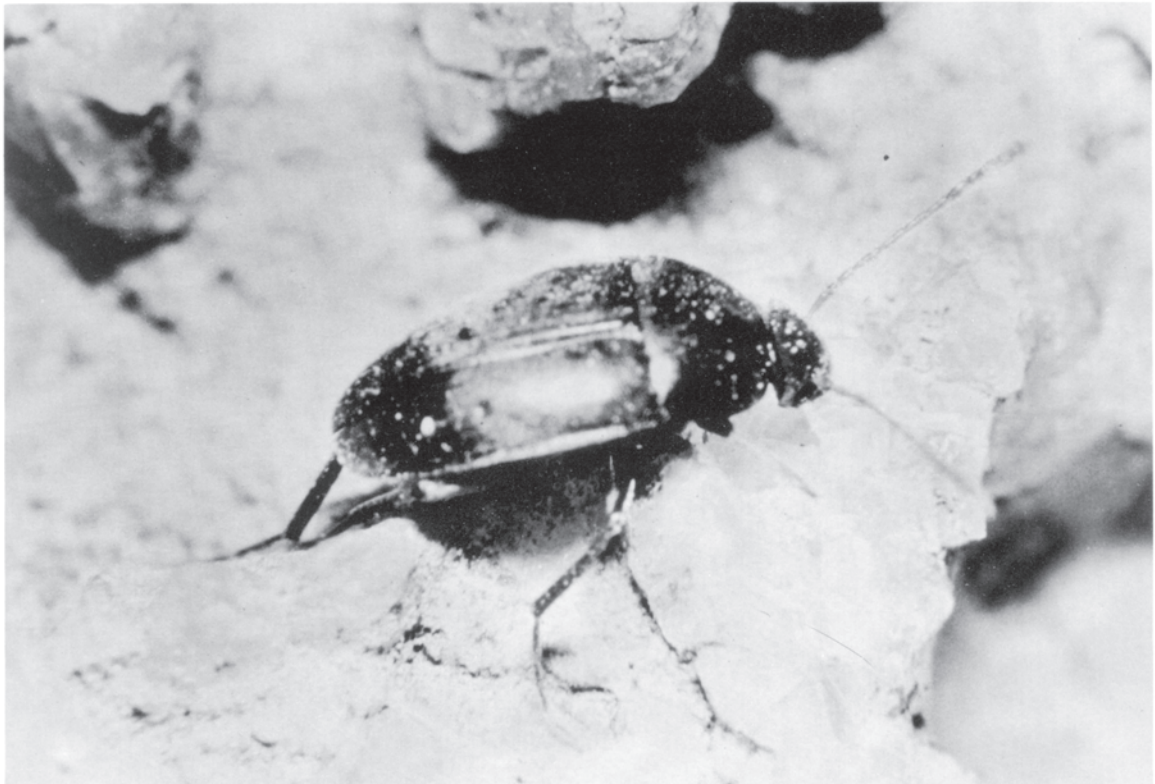


Fig. 21. *Ptomaphagus troglomexicanus*, Cueva de la Capilla



Fig. 22. *Chiropterotriton multidentata*, Cueva de la Capilla



Fig. 23. *Pseudoeurycea scandens*, Cueva de la Mina



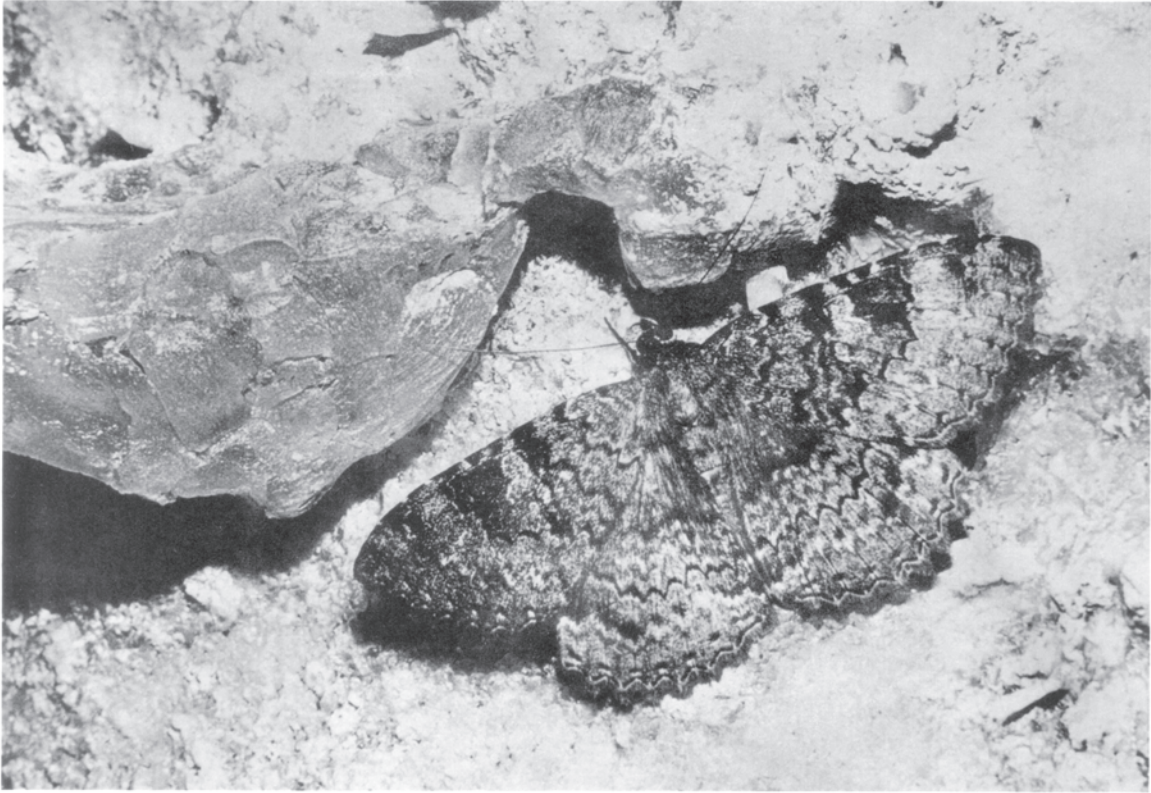


Fig. 25. Unidentified noctuid moth, Crystal Cave

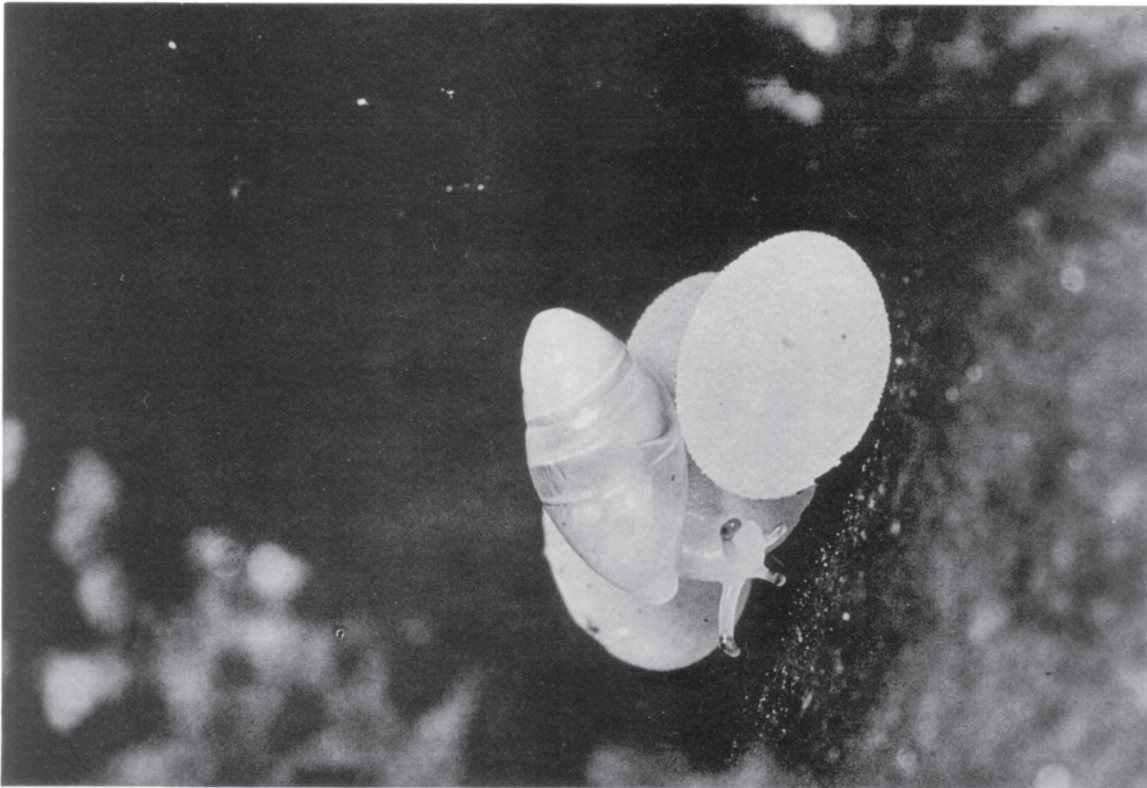


Fig. 24. Eggs and young of large unidentified terrestrial snail  
(see Fig. 5), Cueva de la Mina.





Fig. 27. *Pseudoeurycea belli*, Cueva de la Mina

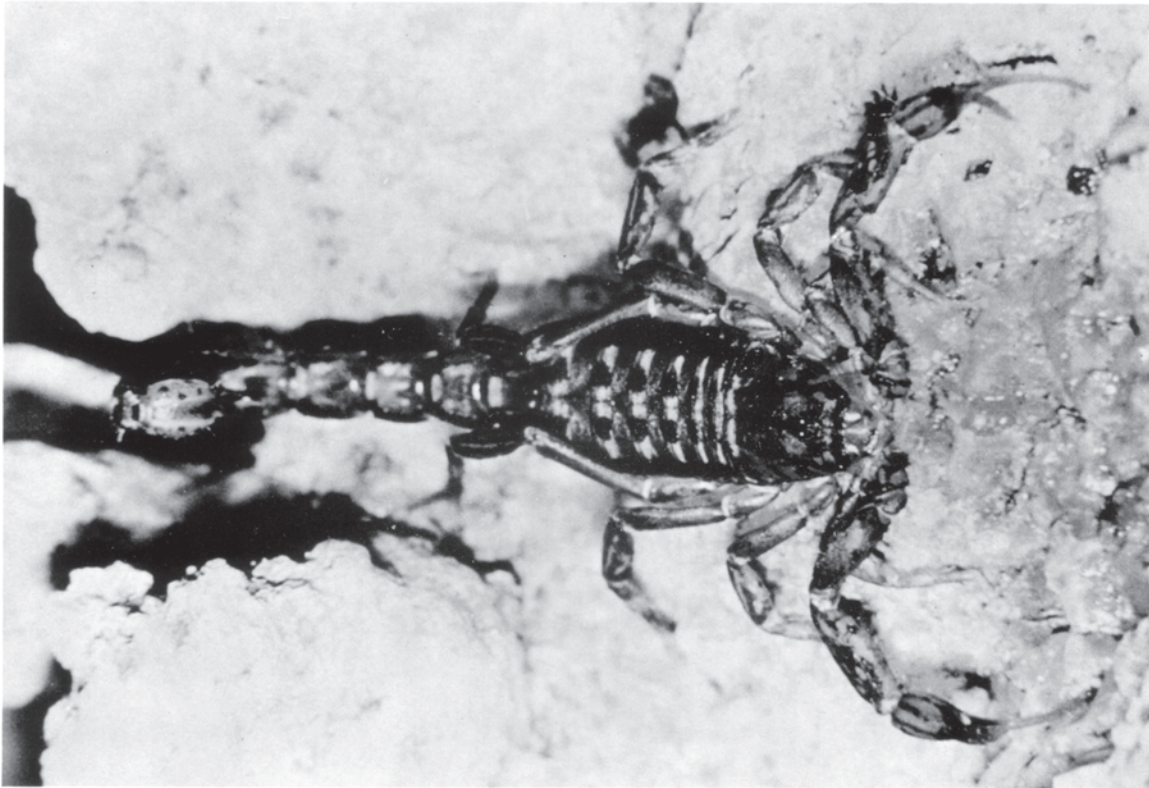


Fig. 26. *Vejovis* sp., Cueva de las Perlas

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A CHECKLIST OF THE CAVE FAUNA OF MEXICO. III. NEW RECORDS  
FROM SOUTHERN MEXICO

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During the past several years collections have been made in many caves in southern Mexico, and particularly in the states of Chiapas, Guerrero, and Veracruz. These have resulted in the addition of many new species to the known fauna of these regions. Although I anticipate publishing detailed reports on the caves and cave fauna of these states, the increased interest in these regions in the last two years has indicated a need to make available the accumulated records in advance of the more detailed reports.

The three states primarily covered by this report have been only poorly studied with respect to their cavernicole fauna. This is particularly unfortunate when the significance of these regions, which include altitudes ranging from near sea level to over 10,000 feet, is considered. Although the terrestrial troglobite fauna is less well-developed than in more northern Mexico, there still are many troglobites of great systematic and zoogeographic interest. Among the most unusual of these is the blind scorpion, *Typhlochactas reddelli* Mitchell, known only from Cueva del Ojo de Agua de Tlilapan, Veracruz. The isopod fauna is very well-developed and includes the remarkable oniscoid species, *Typhlotricholigoides aquaticus* Rioja, from Cueva del Ojo de Agua Grande, Veracruz. The aquatic troglo-

bites include the only described blind crayfish from Mexico, *Procambarus rodriguezii* Hobbs, and the blind crab, *Potamocarcinus (Typhlopseudothelphusa) mocinoi* (Rioja).

This list follows in style the two previous lists (Reddell and Mitchell, 1971; 1971a). The only previously published records included are of those species which have been re-collected and for which ecological data are now available. Complete published records and bibliographic citations are available in Reddell (1971). The locations of the caves included are listed below.

I wish here to express my appreciation to the following people who assisted in collecting or who supplied specimens: William Bell, William Calvert, Jane Evans, T.R. Evans, John Fish, David McKenzie, Stewart Peck, Terry Raines, and Mills Tandy.

I wish to thank the following systematists for providing me with identifications of the indicated taxa: Ross Arnett, beetles; T.C. Barr, Jr., beetles; R.W. Carlson, ichneumonids; O.L. Cartwright, beetles; N.B. Causey, millipedes; E.A. Chapin, beetles; Kenneth Christiansen, collembolans; A.C. Cole, ants; B. Condé, millipedes; W.A. Connell, beetles; W. E. Duellman, frogs; O.L. Flint, megalopterans; R.C. Froeschner, hemipterans; W.J. Gertsch, amblypygids and spiders; A.B. Gurney, ear-

wigs and roaches; L.H. Herman, beetles; J.L. Herring, hemipterans; H.H. Hobbs, decapods; T.H. Hubbell, crickets; J.M. Kingsolver, beetles; J.D. Lynch, frogs; T.C. Maa, streblid flies; E.L. Mockford, psocids; W.B. Muchmore, pseudoscorpions; S.B. Peck, beetles; C.W. Sa-

brosky, flies; Alan Solem, snails; P.J. Spangler, beetles; T.J. Spilman, beetles; A. Stone, flies; L.M. Walkley, ichneumonids; D.M. Weisman, moths; R.E. White, beetles; D.L. Wray, collembolans; Pedro Wygodzinsky, thysanurans; H.C. Yeatman, copepods.

#### CAVE LOCATIONS

##### CHIAPAS

Sumidero del Camino, 16 km NW Comitán  
Cueva Cerro Hueco, 3 km SE Tuxtla Gutiérrez  
Chen Senvilmut, 3 km N Huistán  
Cueva Chica de Hunchabien, 1½ km N Comitán  
Cueva Chica del Camino, K1112, México-Tuxtla Gutiérrez highway  
Hoyo de Don Nicho, 13 km W of Ocozocautla  
Cueva Mapachero, 3 km N Huistán  
Cueva de las Pinas Ramas, K1112, México-Tuxtla Gutiérrez highway  
Cueva del Tempisque, 13 km W Ocozocautla  
Cueva del Tío Ticho, 1½ km S Comitán  
Grutas de Zapaluta, 6½ km SE Zapaluta

##### GUERRERO

Gruta de Acuitlapán, 16 km E Taxco  
Grutas de Cacahuamilpa, Cacahuamilpa  
Grutas de las Granadas, 16 km E Taxco  
Grutas de Juxtlahuaca, 6½ km N Colotlipa  
Pozo Melendes, 10 km SE Taxco  
Cueva Chica del Mogote, 16 km NW Cacahuamilpa  
Grutas del Mogote, 16 km NW Cacahuamilpa

##### VERACRUZ

Cueva de Agua de Tlilapan, Tlilapan  
Grutas de Atoyac, 2 km E Atoyac  
Sótano de Botella Chica, 3 km NW Tequila  
Cueva de la Cascada, 1 km E Tequila  
Sótano del Humo, 8 km SW San Andres  
Sótano de Milpa, 8 km SW San Andres  
Cueva del Ojo de Agua de Tlilapan, Tlilapan  
Cueva del Ojo de Agua Grande, 10 km N Potrero Viejo  
Cueva de Opilionida, 1½ km N Tequila  
Sótano de Oztoatlicholoo, 1 km W Tequila  
Sótano del Profesor, Tequila  
Sótano del Relicario, 3 km N Tequila  
Cueva de Sala de Agua Grande, 9½ km E Yanga  
Resumidero de San Martín, San Martín  
Sótano de Sphodrini, Tequila  
Szontecomostoc, 5 km N Tequila  
Cueva de las Trozas, Tequila  
Sótano de la Y Griega, Tequila

#### PHYLUM ARTHROPODA

##### CLASS CRUSTACEA

##### ORDER EUCOPEPODA

##### Family Cyclopidae

*Macrocyclops albidus* (Jurine) (det. H.C. Yeatman)

Records.--GUERRERO: Grutas del Mogote.

Comment.--These specimens were taken from organic debris in the main stream passage.

*Mesocyclops* sp. nr. *brazilianus* Kiefer (det. H.C. Yeatman)

Records.--GUERRERO: Grutas del Mogote.

Comment.--This possible undescribed species was taken with the above species.

ORDER DECAPODA

Family Astacidae

*Procambarus mirandai* Villalobos (det. H.H. Hobbs)

Records.--CHIAPAS: Cueva Cerro Hueco.

Bibliography.--Villalobos, 1954.

Comment.--This species was abundant on silt in the main stream when the cave was visited 18 August 1967.

*Procambarus rodriguezii* Hobbs

Records.--VERACRUZ: ?Cueva del Ojo de Agua Grande.

Bibliography.--Hobbs, 1943.

Comment.--A juvenile crayfish, probably of this species, was seen in a small pool.

Family Pseudothelphusidae

Unidentified genus and species (det. H.H. Hobbs)

Records.--VERACRUZ: Cueva del Ojo de Agua Grande.

Comment.--A single specimen was collected in the main passage.

*Potamocarcinus (Typhlopseudothelphusa) mocinoi* (Rioja)

Records.--CHIAPAS: Cueva del Tío Ticho.

Bibliography.--Rioja, 1952.

Comment.--Several adults of this species were collected on mud at the edge of the stream in this cave on 21 August 1967. One female was carrying young and another eggs.

CLASS ARACHNIDA

ORDER CHELONETHIDA

Family Chernetidae

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

Records.--CHIAPAS: Grutas de Zapaluta; VERACRUZ: Cueva del Ojo de Agua Grande and Szontecomostoc.

Comment.--These specimens were all taken from bat guano.

*Lustrochernes* sp. (det. W.B. Muchmore)

Records.--CHIAPAS: Cueva del Tempisque.

Comment.--This specimen was taken from bat guano in a side alcove.

Family Syarinidae

*Pachychitra* sp. (det. W.B. Muchmore)

Records.--CHIAPAS: Cueva del Tío Ticho.

Comment.--This specimen was found in the room below the entrance drop.

ORDER SCHIZOMIDA

Family Schizomidae

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

Records.--GUERRERO: Grutas de Cacahuamilpa; VERACRUZ: Grutas de Atoyac.

Comment.--These specimens are probably representative of new species.

ORDER AMBLYPYGIDA

Family Tarantulidae

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

Records.--GUERRERO: Grutas de Juxtlahuaca and Grutas del Mogote; MEXICO: Grutas de la Estrella; VERACRUZ: Grutas de Atoyac and Szontecomostoc.

Comment.--This material may all belong in *T. fuscimana* or *T. whitei*.

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

Records.--CHIAPAS: Hoyo de Don Nicho, Cueva Chica de Hunchabien, and Grutas de Zapaluta; GUERRERO: Grutas de Acuitlapán, Grutas de Cacahuamilpa, and Grutas de las Granadas; VERACRUZ: Cueva del Agua de Tlilapan, Cueva del Ojo de Agua de Tlilapan, Cueva del Ojo de Agua Grande, and Cueva de Sala de Agua Grande.

Bibliography.--Bilimek, 1867.

Comment.--This species is frequently abundant on cave walls. In Grutas de Cacahuamilpa it was found on formations in the area beyond the commercial trail.

*Tarantula whitei* (Gervais) (det. W.J. Gertsch)

Records.--CHIAPAS: Cueva Cerro Hueco, Cueva de las Pinas Ramas, and Cueva del Tempisque.

Comment.--This species was taken off of cave walls.

ORDER ARANEAE

Family Agelenidae

*Melpomene singula* Gertsch and Ivie (det. W.J. Gertsch)

Records.--VERACRUZ: Cueva del Ojo de Agua Grande.

Family Clubionidae

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

Records.--GUERRERO: Grutas de Juxtlahuaca.

Family Ctenidae

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

Records.--GUERRERO: Grutas del Mogote; MEXICO: Grutas de la Estrella; VERACRUZ: Cueva de la Cascada, Sótano de Milpa, Sótano del Profesor, and Sótano de Sphodrini.

Comment.--This genus is abundant in caves in Mexico. Some of the above records may be representative of undescribed forms.

Family Dictynidae

*Dictyna jacalana* Gertsch and Davis

Records.--GUERRERO: Grutas de Juxtlahuaca.

Family Dipluridae

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

Records.--CHIAPAS: Cueva del Tío Ticho; GUERRERO: Grutas de Cacahuamilpa; VERACRUZ: Cueva de la Cascada and Cueva del Ojo de Agua de Tlilapan.

Family Hahniidae

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

Records.--VERACRUZ: Sótano de Botella Chica.

Family Linyphiidae

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



Records.--MEXICO: Grutas de la Estrella.

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

Records.--CHIAPAS: Chen Senvilmut.

Family Oonopidae

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

Records.--CHIAPAS: Cueva del Tempisque.

*Triaeris patellaris* Bryant (det. W.J. Gertsch)

Records.--VERACRUZ: Cueva de Sala de Agua Grande.

Family Plectreuridae

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

Records.--CHIAPAS: Cueva Chica del Camino.

Family Scytodidae

*Loxosceles misteca* Gertsch (det. W.J. Gertsch)

Records.--GUERRERO: Pozo Melendes and Grutas del Mogote; MEXICO: Grutas de la Estrella.

*Scytodes longipes* Lucas (det. W.J. Gertsch)

Records.--CHIAPAS: Cueva Chica del Camino; VERACRUZ: Cueva del Ojo de Agua de Tlilapan.

Family Theraphosidae

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

Records.--CHIAPAS: Cueva Chica de Hunchabien and Cueva de las Pinas Ramas.

Comment.--This species was taken from the vicinity of the cave entrance.

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

Records.--MEXICO: Grutas de la Estrella.

Comment.--This species was taken from the cave wall near the entrance.

Family Theridiidae

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

Records.--CHIAPAS: Cueva Chica del Camino and Cueva de las Pinas Ramas.

*Theridion adjacens* O.?-Cambridge (det. W.J. Gertsch)

Records.--CHIAPAS: Cueva Chica de Hunchabien.

Comment.--This species was taken from a web among breakdown.

*Theridion cobanum* Levi (det. W.J. Gertsch)

Records.--VERACRUZ: Cueva del Agua de Tlilapan.

Comment.--This species was taken from the wall above the cave stream.

*Theridion morulum* Cambridge (det. W.J. Gertsch)

Records.--GUERRERO: Grutas del Mogote.

*Tidarren sisyphoides* (Walckenaer) (det. W.J. Gertsch)

Records.--CHIAPAS: Hoyo de Don Nicho; VERACRUZ: Cueva del Ojo de Agua de Tlilapan.

Family Uloboridae

*Uloborus vicinus* O.P.-Cambridge (det. W.J. Gertsch)

Records.--VERACRUZ: Cueva del Ojo de Agua Grande.

Family Zoropsidae

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

Records.--CHIAPAS: Sumidero del Camino.

CLASS DIPLOPODA

ORDER POLYXENIDA

Family Polyxenidae

*Lophoproctinus diversunguis* Silvestri (det. B. Condé)

Records.--VERACRUZ: Grutas de Atoyac.

Comment.--This species was taken in total darkness and beneath a small rock.

ORDER CHORDEUMIDA

Family Cleidogonidae

*Cavota crucis* Chamberlin (det. N.B. Causey)

Records.--VERACRUZ: Grutas de Atoyac and Cueva del Ojo de Agua Grande.  
Bibliography.--Chamberlin, 1942.

Comment.--This troglobite was found on wood in both of these caves.

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

Records.--VERACRUZ: Sótano de Botella Chica and Sótano del Relicario.

Comment.--This probable undescribed species is under study by William Shear.

ORDER POLYDESMIDA

Family Euryuridae

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

Records.--VERACRUZ: Sótano de Botella Chica and Sótano de la Y Griega.

Family Polydesmidae

Undescribed genus and species (det. N.B. Causey)

Records.--VERACRUZ: Cueva de la Cascada.

Comment.--This troglobite is locally abundant on silt-covered ceilings.

ORDER SPIROBOLIDA

Family Atopetholidae

*Hiltonius carpinus carpinus* Chamberlin (det. N.B. Causey)

Records.--GUERRERO: Cueva Chica del Mogote and Grutas del Mogote.

Comment.--This species was taken on the cave wall in the twilight zone.

ORDER SPIROSTREPTIDA

Family Spirostreptidae

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

Records.--CHIAPAS: Hoyo de Don Nicho, Cueva del Tempisque, and Cueva del Tío Ticho;  
GUERRERO: Grutas de Juxtlahuaca.

Comment.--This material was all immature.

*Orthoporus fraternus* (Saussure) (det. N.B. Causey)

Records.--CHIAPAS: Sumidero del Camino and Grutas de Zapaluta.

Comment.--This species was abundant in the main bat chamber of Grutas de Zapaluta.

ORDER STEMMIULIDA

Family Stemmiulidae

Unidentified genus and species (det. N.B. Causey)  
Records.--CHIAPAS: Cueva Chica de Hunchabien.

CLASS INSECTA

ORDER THYSANURA

Family Nicoletiidae

Unidentified genus and species (det. Pedro Wygodzinsky)  
Records.--MEXICO: Grutas de la Estrella.

ORDER DIPLURA

Family Campodeidae

Unidentified genus and species (det. Pedro Wygodzinsky)  
Records.--VERACRUZ: Grutas de Atoyac, Cueva del Ojo de Agua Grande, Sótano de  
Oztoatlicholoa, and Sótano de las Trozas.  
Comment.--This material is under study by B. Condé.

ORDER COLLEMBOLA

Family Entomobryidae

*Lepidocyrtinus* sp. (det. Kenneth Christiansen)  
Records.--MEXICO: Grutas de la Estrella.  
Comment.--This may represent an undescribed species.

*Trogolaphysa* sp. (det. Kenneth Christiansen)  
Records.--GUERRERO: Grutas de Juxtlahuaca; VERACRUZ: Grutas de Atoyac.  
Comment.--At least one undescribed species of troglobite is represented by this material.

Family Poduridae

*Paranura caeca* Folsom (det. D.L. Wray)  
Records.--GUERRERO: Grutas del Mogote.

ORDER DERMAPTERA

Family Labiidae

*Labia rotundata* Scudder (det. A.B. Gurney)  
Records.--GUERRERO: Pozo Melendes.

ORDER BLATTODEA

Family Blattellidae

?*Chorisoneura* sp. (det. A.B. Gurney)

Records.--GUERRERO: Grutas de Juxtlahuaca.

Comment.--Only nymphs were collected.

Family Polyphagidae

Undescribed genus and species (det. A.B. Gurney)

Records.--GUERRERO: Grutas de Cacahuamilpa.

Comment.--This species of uncertain affinities was collected from guano in the terminal room.

*Homoeogamia mexicana* Burmeister (det. A.B. Gurney)

Records.--GUERRERO: Grutas de Cacahuamilpa; MEXICO: Grutas de la Estrella.

Bibliography.--Bilimek, 1867.

Comment.--This species was found in the entrance areas.

ORDER SALTATORIA

Family Acrididae

*Necaxacris* sp. cf. *micans* (Hebard) (det. T.H. Hubbell)

Records.--VERACRUZ: Sótano del Profesor.

Comment.--This species was found below the entrance drop.

Family Gryllidae

Undescribed (?) genus and species (det. T.H. Hubbell)

Records.--VERACRUZ: Sótano de Milpa.

*Amphiacusta bolivari* Chopard (det. T.H. Hubbell)

Records.--VERACRUZ: Grutas de Atoyac, Cueva de la Cascada, Sótano del Humo, Cueva del Ojo de Agua Grande, Sótano del Profesor, and Szontecomostoc.

Bibliography.--Chopard, 1947.

Comment.--This species is frequently found in the entrance regions of caves where its call is very noticeable. In Grutas de Atoyac it was found in large numbers among stalagmitic curtains in the entrance room.

?*Cycloptilum* sp. (det. T.H. Hubbell)

Records.--GUERRERO: Grutas de Juxtlahuaca.

Comment.--Nymphs of this or related genus were found under rocks in the entrance area.

Family Rhabdophoridae

Unidentified genus and species (det. T.H. Hubbell)

Records.--GUERRERO: Cueva Chica del Mogote and Grutas del Mogote.

Comment.--This material may represent an undescribed species.

Family Stenopelmatidae

*Anabropsis* sp. (det. T.H. Hubbell)

Records.--VERACRUZ: Sótano del Humo.

Comment.--This is probably an accidentally introduced species.

*Glaphyrosoma* sp. (det. T.H. Hubbell)

Records.--VERACRUZ: Sótano del Profesor.

Comment.--This genus is probably also an accidental.



ORDER PSOCOPTERA

Family Epipsocidae

*Epipsocus* sp. (det. E.L. Mockford)

Records.--CHIAPAS: Cueva del Tío Ticho.

Family Liposcelidae

*Liposcelis* sp. (det. E.L. Mockford)

Records.--VERACRUZ: Grutas de Atoyac.

Family Psyllipsocidae

*Psyllipsocus ramburi* Selys (det. E.L. Mockford)

Records.--CHIAPAS: Cueva Chica de Hunchabien.

Comment.--This species is abundant in caves throughout North America.

ORDER HEMIPTERA

Family Cydnidae

*Tomínotus unisetosus* Froeschner (det. R.C. Froeschner)

Records.--GUERRERO: Grutas del Mogote.

Family Gelastocoridae

*Nerthra* sp. (det. J.L. Herring)

Records.--GUERRERO: Pozo Melendes.

Family Veliidae

*Velia* sp. (det. R.C. Froeschner)

Records.--GUERRERO: Grutas del Mogote.

Comment.--These specimens were taken from the main stream passage.

ORDER MEGALOPTERA

Family Corydalidae

?*Corydalus* sp. (det. O.L. Flint)

Records.--VERACRUZ: Resumidero de San Martín.

Comment.--A larva of this or related genus was collected in the stream in this cave.

ORDER COLEOPTERA

Family Carabidae

*Agonum* sp. (det. T.C. Barr, Jr.)

Records.--VERACRUZ: Sótano de Milpa.

*Apenes* sp. (det. T.C. Barr, Jr.)

Records.--GUERRERO: Grutas del Mogote.

*Ardistomis* sp. (det. T.C. Barr, Jr.)

Records.--CHIAPAS: Cueva del Tempisque.

Comment.--This species was found in the entrance sink.

*Colpodes* sp. (det. T.C. Barr, Jr.)

Records.--GUERRERO: Cueva Chica del Mogote and Grutas del Mogote; VERACRUZ: Sótano de Botella Chica, Cueva de la Cascada, Sótano de Oztoatlicholoa, Cueva de Sala de Agua Grande, and Cueva de las Trozas.

Comment.--At least two probable troglophile species are represented by these records.

*Colpodes bicolor* Chaud. (det. T.C. Barr, Jr.)

Records.--CHIAPAS: Cueva Cerro Hueco, Cueva del Tempisque, Cueva del Tío Ticho, and Grutas de Zapaluta; GUERRERO: Cueva Chica del Mogote.

Comment.--This strikingly colored species is an abundant troglophile in Mexican caves.

*Euchroa nitidipennis* Putzeys (det. T.C. Barr, Jr.)

Records.--VERACRUZ: Sótano de Milpa.

*Loxandrus tetrastigma* Bates (det. T.C. Barr, Jr.)

Records.--CHIAPAS: Cueva del Tempisque.

*Masoreus* sp. (det. T.C. Barr, Jr.)

Records.--VERACRUZ: Cueva de Sala de Agua Grande.

*Mexisphodrus veraecrucis* Barr (det. T.C. Barr, Jr.)

Records.--VERACRUZ: Sótano de Sphodrini.

Comment.--This species was taken on walls in the lowest level of the cave.

*Paratrechus mexicanus* Putzeys (det. T.C. Barr, Jr.)

Records.--VERACRUZ: Cueva de la Cascada.

Comment.--This beetle was taken from organic debris in the upper level of the cave.

*Paratrechus tepoztlanensis* Bolívar (det. T.C. Barr, Jr.)

Records.--GUERRERO: Grutas del Mogote.

Comment.--This species was taken from leaf litter in the entrance crawlway.

?*Pelmatellus* sp. (det. T.C. Barr, Jr.)

Records.--VERACRUZ: Sótano del Humo.

*Selenophorus* sp. (det. T.C. Barr, Jr.)

Records.--VERACRUZ: Sótano del Profesor.

*Tachys* sp. (det. T.C. Barr, Jr.)

Records.--CHIAPAS: Cueva Cerro Hueco and Cueva del Tempisque.

Comment.--This troglophile was found among organic debris in these caves.

*Tachys (Tachyura) unistriatus* (Bilimek) (det. T.C. Barr, Jr.)

Records.--GUERRERO: Grutas de Cacahuamilpa and Grutas del Mogote.

Bibliography.--Bilimek, 1867.

Comment.--This species was found among organic debris in darkness in both caves.

#### Family Chrysomelidae

*Altica* sp. (det. R.E. White)

Records.--GUERRERO: Pozo Melendes.

*Coscinoptera* sp. (det. R.E. White)

Records.--GUERRERO: Grutas del Mogote.

Comment.--This species probably washed into the cave.

#### Family Coccinellidae

*Epilachna borealis* (F.) (det. E.A. Chapin)

Records.--GUERRERO: Grutas del Mogote.

*Epilachna defecta* Muls. (det. E.A. Chapin)

Records.--GUERRERO: Grutas del Mogote.

Comment.--Both of the above species of Coccinellidae were probably washed into the cave.

#### Family Dermestidae

*Dermestes carnivorus* F. (det. J.M. Kingsolver)

Records.--GUERRERO: Pozo Melendes.

*Dermestes maculatus* DeGeer (det. J.M. Kingsolver)

Records.--GUERRERO: Pozo Melendes.

#### Family Dytiscidae

*Agabus americanus* Aube (det. P.J. Spangler)

Records.--VERACRUZ: Cueva de la Cascada.

Family Leiodidae

*Dissochaetus* sp. (det. S.B. Peck)

Records.--CHIAPAS: Cueva Cerro Hueco.

Family Nitidulidae

*Omosita* sp. (det. W.A. Connell)

Records.--CHIAPAS: Cueva Chica de Hunchabien.

*Stelidota* sp. (det. W.A. Connell)

Records.--VERACRUZ: Cueva de Sala de Agua Grande.

Family Oedomeridae

*Sisenes* sp. (det. Ross Arnett)

Records.--VERACRUZ: Cueva de las Trozas.

Family Passalidae

*Popilius tropicus* (Perch.) (det. O.L. Cartwright)

Records.--VERACRUZ: Sótano de Botella Chica.

Comment.--This species was taken from a rotten log.

Family Ptilodactylidae

*Ptilodactyla* sp. (det. T.J. Spilman)

Records.--GUERRERO: Pozo Melendes.

Family Scarabaeidae

*Deltochilum gibbosum* Fab. (det. O.L. Cartwright)

Records.--CHIAPAS: Hoyo de Don Nicho.

*Macrodactylus lineatocollis* Bates (det. O.L. Cartwright)

Records.--VERACRUZ: Sótano del Relicario.

*Onthophagus landolti* Har. (det. O.L. Cartwright)

Records.--VERACRUZ: Cueva del Ojo de Agua Grande.

Comment.--This species was taken from bat guano in the main passage.

*Onthophagus vespertilio* Howden, Cartwright and Halffter (det. O.L. Cartwright)

Records.--GUERRERO: Gruta de Acuitlapán and Grutas del Mogote.

Comment.--This species is probably a troglophile.

Family Staphylinidae

Aleocharinae gen. et sp. (det. L.H. Herman)

Records.--CHIAPAS: Sumidero del Camino and Grutas de Zapaluta; VERACRUZ: Grutas de Atoyac, Sótano de Botella Chica, and Cueva del Ojo de Agua Grande.

Comment.--It is not possible at this time to assign material to genera in this subfamily.

*Belonuchus* sp. (det. L.H. Herman)

Records.--CHIAPAS: Hoyo de Don Nicho and Grutas de Zapaluta; MEXICO: Grutas de la Estrella; VERACRUZ: Cueva del Ojo de Agua de Tlilapan and Cueva del Ojo de Agua Grande.

Comment.--This is a common troglophile in Mexican caves.

*Hommaeotarsus* sp. (det. L.H. Herman)

Records.--MEXICO: Grutas de la Estrella.

*Orus* sp. (det. L.H. Herman)

Records.--VERACRUZ: Sótano de Botella Chica.

Comment.--This species was taken from off of the cave wall in the twilight zone.

*Philonthus* sp. (det. L.H. Herman)

Records.--GUERRERO: Grutas del Mogote; VERACRUZ: Cueva de la Cascada.

Comment.--This beetle was found among debris washed into the caves.

*Stamnoderus* sp. (det. L.H. Herman)

Records.--CHIAPAS: Hoyo de Don Nicho and Cueva del Tempisque; GUERRERO: Grutas del Mogote and Cueva Chica del Mogote.

Comment.--This may be a troglophile.

Family Tenebrionidae

*Eleodes* sp. (det. T.J. Spilman)

Records.--GUERRERO: Grutas de Juxtlahuaca, Pozo Melendes, and Grutas del Mogote;

VERACRUZ: Cueva del Ojo de Agua de Tlilapan.

Comment.--This genus is frequently found in dry guano-floored areas.

*Eleodes spinolai* Solier (det. T.J. Spilman)

Records.--GUERRERO: Grutas de Cacahuamilpa and Grutas del Mogote.

ORDER LEPIDOPTERA

Family Acrolophidae

?*Acrolophus* sp. (det. D.M. Weisman)

Records.--VERACRUZ: Cueva del Ojo de Agua Grande.

Comment.--A larva of this genus was collected.

ORDER DIPTERA

Family Phyllomyzidae

*Phleomyia* sp. (det. C.W. Sabrosky)

Records.--CHIAPAS: Cueva Cerro Hueco; VERACRUZ: Cueva del Ojo de Agua de Tlilapan.

Comment.--This genus was abundant in these caves.

Family Streblidae

*Trichobius parasiticus* Gervais (det. T.C. Maa)

Records.--CHIAPAS: Hoyo de Don Nicho.

Comment.--This fly was taken from off of the author below a bat roost.

Family Tipulidae

Unidentified genus and species (det. A. Stone)

Records.--VERACRUZ: Sótano del Relicario.

ORDER HYMENOPTERA

Family Formicidae

*Camponotus* sp. (det. A.C. Cole)

Records.--VERACRUZ: Sótano del Profesor.

*Formica* sp. (*rufibarbis* group) (det. A.C. Cole)

Records.--VERACRUZ: Sótano del Profesor.

Family Ichneumonidae

Nonnini, new genus and species (det. R.W. Carlson)

Records.--CHIAPAS: Sumidero del Camino.

*Melanichneumon* sp. (det. L.M. Walkley)

Records.--VERACRUZ: Cueva del Ojo de Agua Grande.



PHYLUM MOLLUSCA

CLASS GASTROPODA

ORDER GEOPHILA

Family Achatinidae

*Opeas pyrgula* (Schm. & Bttg.) (det. Alan Solem)

Records.--GUERRERO: Grutas de Cacahuamilpa.

Comment.--This species was taken from guano in the terminal room of the cave.

*Subulina porrecta* von Martens (det. Alan Solem)

Records.--GUERRERO: Grutas de Juxtlaahuaca.

Family Helicarionidae

*Habroconus (Habroconus) trochulinus* (Morelet) (det. Alan Solem)

Records.--GUERRERO: Grutas del Mogote.

Family Zonitidae

*Hawaiiia minuscula* (Binney) (det. Alan Solem)

Records.--VERACRUZ: Grutas de Atoyac.

Comment.--The specimen collected here was atypical.

PHYLUM CHORDATA

CLASS AMPHIBIA

ORDER ANURA

Family Bufonidae

*Bufo marinus* (L.) (det. Mills Tandy)

Records.--CHIAPAS: Hoyo de Don Nicho.

Comment.--Several specimens of this toad were present along the stream passage.

Family Hylidae

*Hyla staufferi staufferi* Cope (det. J.D. Lynch)

Records.--CHIAPAS: Hoyo de Don Nicho.

Comment.--This frog was taken below the entrance drop.

*Plectrohyla ?sagorum* Hartweg (det. J.D. Lynch)

Records.--CHIAPAS: Chen Senvilmut and Cueva Mapachero.

Comment.--Only very young individuals were taken in these caves.

Family Leptodactylidae

*Eleutherodactylus decoratus decoratus* Taylor (det. J.D. Lynch)

Records.--VERACRUZ: Cueva de la Cascada and Cueva de Opilionida.

*Leptodactylus melanotus* (Hallowell) (det. J.D. Lynch)

Records.--VERACRUZ: Cueva de Sala de Agua Grande.

*Tomodactylus nitidus nitidus* (Peters) (det. W.E. Duellman)

Records.--GUERRERO: Grutas del Mogote.

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A BIBLIOGRAPHY OF THE MEXICAN EYELESS CHARACIN FISHES  
OF THE GENUS *ASTYANAX*<sup>1</sup>

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Since their discovery in 1936 in La Cueva Chica, San Luis Potosí, México, the eyeless characin fishes of the genus *Astyanax* have been studied intensively in several laboratories around the world. Interest in these fishes has increased greatly in recent years with the discovery of many new localities, principally in the Sierra de El Abra of Tamaulipas and San Luis Potosí (Mitchell, Russell, Elliott, in litt.). Since studies of these fishes will continue to increase in importance to the bio-speleologist, geneticist, zoogeographer, ecologist, and evolutionary biologist, we have attempted to compile a bibliography which

includes all papers making any significant contribution to our knowledge of these interesting cavernicoles. Our bibliography which follows now comprises some 180 citations, almost all of which we have obtained and reviewed (those not seen are indicated with an asterisk). While we have striven for completeness and accuracy in compiling this bibliography, there are surely some papers which we have not discovered and some errors in citation. To better serve all those researchers presently interested in these fishes, we sincerely hope to be informed of corrections and additions to this bibliography.

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