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The Heterosphyronid Pseudoscorpions of New Mexico

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The present report is the first of a series of papers on the taxonomy and distribution of the 39 species of pseudoscorpions found by the writer in collections from New Mexico. Because only 11 species have been recorded previously from the state, the present series of papers will contain many new state records, as well as descriptions of several species new to the literature. The systematic papers will be followed by a report of ecological studies, with special reference to altitudinal distribution and microhabitat specificity.

The present series of papers is based on investigations begun in 1947 and aided financially by University of New Mexico faculty research grants, a grant from the American Academy of Arts and Sciences, and a grant (NSF-G112) from the National Science Foundation. For these grants, the writer is deeply appreciative. Except for representative specimens retained in the author's collections, all specimens studied, including holotypes and allotypes, have been deposited in the collections of the American Museum of Natural History.

SUBORDER HETEROSPHYRONIDA CHAMBERLIN

In our area pseudoscorpions of this suborder may be separated from those of the other two suborders, Diplosphyronida Chamberlin and Monosphyronida Chamberlin, by the single tarsal segment in the first and second legs in contrast to the two tarsal segments in the third and fourth legs. Species in this suborder are ordinarily small in size, and

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the chelicerae are usually large in relationship to body size. A single family is known from New Mexico.

FAMILY CHTHONIIDAE HANSEN, *SENSU STRICTO*

This family is characterized by the presence of transversely placed spiracles that are not accompanied by separate guard sclerites. The family may be considered as having a single subfamily, Chthoniinae, which is divided into three tribes. Representatives of two tribes, Chthoniini and Lechytiini, occur in New Mexico. As used here, the family Chthoniidae is equivalent to the subfamily Chthoniinae as used by Beier (1932).

TRIBE CHTHONIINI CHAMBERLIN

Members of this tribe may be recognized by the presence of a transverse pair of tactile setae near the center of the dorsal surface of the chelal hand. Two genera, *Apochthonius* Chamberlin and *Mundochthonius* Chamberlin, belonging to this tribe are represented in our New Mexico collections.

APOCHTHONIUS CHAMBERLIN

Apochthonius CHAMBERLIN, 1929, Ann. Mag. Nat. Hist., ser. 10, vol. 4, p. 64.

Specimens of species belonging to this genus can be recognized by the presence of three simple, seta-like coxal spines on each coxa of the first leg and by the contiguous marginal teeth of the chelal fingers. Each of these spines originates from a cleft on the surface of the coxa, and, while subject to slight variation in numbers, the spines usually occur well spaced in a linear row of three. Two species are known from New Mexico.

Apochthonius moestus (Banks)

Figure 1

Chthonius moestus BANKS, 1891, Canadian Ent., vol. 23, p. 165.

Apochthonius moestus, CHAMBERLIN, 1929, Ann. Mag. Nat. Hist., ser. 10, vol. 4, p. 67. HOFF, 1949, Bull. Illinois Nat. Hist. Surv., vol. 24, p. 434; 1952, Great Basin Nat., vol. 12, p. 42.

This is the more common and abundant species of *Apochthonius* from New Mexico. The species can be separated from the only other *Apochthonius* in the state by the somewhat rectangular and truncate or blunt teeth of the margin of the chelal fingers and by the lengths and length/width ratios of the palpal femur and palpal chela.

Apochthonius moestus has a wide geographical range. It is very common east of the Mississippi River. West of the Mississippi River, the

species has been reported from Missouri by Chamberlin (1929b), from north central Texas by Hoff (1951), and from New Mexico by Hoff (1952).

Careful study of the chaetotaxy, shape of palpal podomeres, and other characteristics fails to disclose morphological peculiarities that may make possible a separation of specimens from New Mexico from those of North Carolina (Hoff, 1945) and Illinois (Hoff, 1946). As a result, our specimens are assigned to *A. moestus* in spite of the fact that there are slight differences in actual sizes and in length/width ratios of palpal podomeres. Measurements of the palpal podomeres and determination of the length/width ratios indicate that the palpal podomeres of our specimens average a little less in length and a little more in length/width ratio than do the specimens from North Carolina and Illinois. This is more noticeable with respect to the chela than with respect to the femur and is more definite in the male than in the female. In the case of the palpal femur virtually all our specimens fall within the ranges for the femur lengths and length/width ratios of Illinois specimens. With respect to the chela length, however, only one-half of our females fall within the range of Illinois specimens, while all our males are very slightly below the lower limit of range for males of the eastern areas. The length/width ratios of the chelae of all the females and of one-half of the males fall within ranges given for Illinois specimens, many of our males having chelae that are slightly more slender than the chelae of Illinois specimens. It is interesting to note that there is much less variation in size and in length/width ratio within the New Mexico collections than in collections from North Carolina and Illinois.

Table 1 shows the lengths and length/width ratios of 10 males and nine females from New Mexico. All measurements given are of specimens mounted in Canada balsam. A comparison of these measurements with those taken from a large series of specimens in alcohol indicates that the following sampling is representative of the New Mexico specimens.

TABLE 1
RANGES OF CERTAIN PALPAL MEASUREMENTS OF
Apochthonius moestus FROM NEW MEXICO

| | Male | Female |
|--------------------|---------------|----------------|
| Femur length | 0.30-0.36 mm. | 0.34-0.37 mm. |
| Femur length/width | 4.25-4.8 | 4.0-4.5 |
| Chela length | 0.47-0.54 mm. | 0.525-0.57 mm. |
| Chela length/width | 4.6-4.95 | 4.3-4.6 |

RECORDS: The following collections, including the three previously recorded by Hoff (1952), are known from New Mexico: *Bernalillo County*: Two collections from Gambel oak litter in the Sandia Mountains, at 7400 and at 8300 feet elevation; three collections from Cedro Canyon in the Manzano Mountains, from oak, pinyon, and juniper litter at 7000 to 7200 feet elevation. *Sandoval County*: One collection from pinyon litter taken at the Juan Tabo Recreation area in the Sandia Mountains, at 7000 feet elevation. *San Miguel County*: One collection taken near Cowles, from spruce litter at the edge of a flood plain, elevation 8400 feet. *Santa Fe County*: Two collections from pinyon litter at 6950 feet elevation in the Ortiz Mountains; one collection from Gambel oak litter near Glorieta at 7200 feet elevation. *Valencia County*: One collection from pinyon litter taken at the south base of Mt. Taylor, north of Grants, at an elevation of 7500 feet. This last elevation was erroneously given as between 6500 and 7000 feet in my former publication (Hoff, 1952). All collections were made with Berlese funnels, the small size of the species making collecting difficult by any other means.

The distribution records indicate that *Apochthonius moestus* is somewhat restricted in its altitudinal range, being reported only from areas between 6900 and 8400 feet elevation. The species, with one exception, is reported only from oak, pinyon, and juniper litter, and this habitat relationship is probably in part responsible for limiting the distribution in elevation.

Apochthonius magnanimus, new species

Figures 2-4

MALE: The description of the male is based on two specimens, the holotype and one paratype. Measurements for the paratype follow in parentheses the corresponding measurements of the holotype, except that in some instances the measurement of only the holotype is given. Body and appendages light golden yellow in color; body and palps moderately slender, legs relatively more slender; body 1.55 (1.5) mm. long. Carapace subquadrate in general outline; lateral margins weakly convex; two eyes, the posterior one slightly weaker than the anterior; posterior margin of the carapace with four (six) setae; anterior margin with eight setae; total number of setae on carapace 22 (24); dorsal surface of carapace smooth, lateral surfaces with weakly developed net-like lines; length of carapace 0.43 (0.43) mm., greatest width at the level of the eyes and equal to 0.41 (0.39) mm.; posterior width 0.36 (0.33) mm. Abdomen rounded in outline; surface of sternites and tergites marked by weakly developed net-like lines; pleural membrane very weakly granu-

late; formula for tergal setae 4(5):4:6:6-8:6-8:8:8-10:8-10; about 10 setae on each sternite of the central part of the abdomen; abdomen 1.13 mm. in length, 0.59 mm. in width.

Chelicera in general similar to that of other species of the genus; fixed finger with seven to 11 triangular teeth, movable finger with about six to nine triangular teeth, the teeth of both fingers becoming progressively smaller towards the proximal end of the finger, so that frequently the more proximal teeth are small and rudimentary; movable finger with a well-developed galeal knob near the end of the exterior margin; surface of the cheliceral hand proximad to the base of the fixed finger with scale-like markings, each one of which appears to be tipped by a small spine so that in profile the surface of the hand appears spinose; length of movable finger 0.180 (0.187) mm.

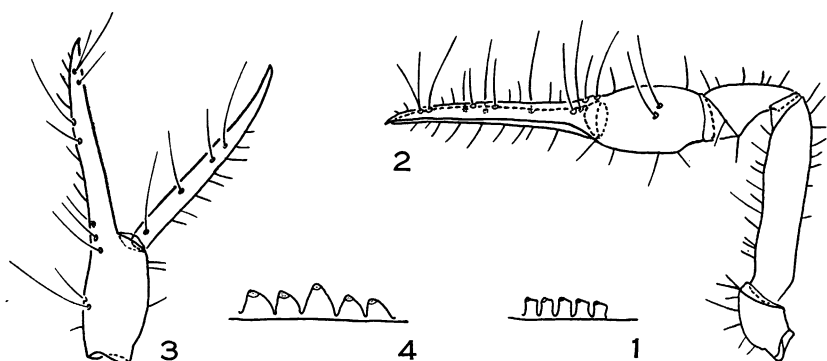


FIG. 1. *Apochthonius moestus* (Banks). Typical undamaged and unworn teeth from the center of the inner margin of the movable chelal finger; male specimen from New Mexico.

FIGS. 2-4. *Apochthonius magnanimus*, new species, holotype male. 2. Dorsal view of palp. 3. Lateral view of chela. 4. Typical unworn teeth from the center of the inner margin of the movable chelal finger; drawn to same scale as used in figure 1.

Palps moderately slender, golden yellow in color; setae long and acuminate. Trochanter 0.187 mm. long, 0.105 mm. wide; several long setae along the convex flexor margin, especially near the distal end. Femur subcylindrical; both flexor and extensor margins very weakly concave; numerous long setae on the flexor surface; setae of the extensor surface long near the distal end, short in the center, and absent from the proximal one-fourth of the femur; femur widest near the distal three-fourths; length of femur 0.49 (0.48) mm., width 0.103 (0.101) mm., length 4.75 times the width. Tibia subtriangular, extensor margin weakly convex and bearing several moderately long and fine setae; flexor margin

weakly concave and without setae except for a very long seta at the distal end of the margin; an additional long seta on the dorsal surface at the basal margin; tibia 0.227 (0.225) mm. long, 0.120 (0.120) mm. wide, length nearly 1.9 times the width. Chela in dorsal view with moderately stout hand and very slender and straight fingers; dorsal and flexor surfaces of hand with scale-like sculpturing more weakly developed in some instances but similar to that described as occurring on the cheliceral hand, the sculpturing of the dorsum of the chelal hand being somewhat variable (very weakly developed in the holotype and not conspicuous in profiles of either dorsal or lateral views except at the base of the fixed finger as observed in lateral view) and usually extending to the basal portion of the exterior margin of the fixed finger; extensor margin of hand evenly convex; flexor margin of hand a little flattened and with a marked sinus near the basal margin; setae moderately long except for the two tactile setae and a long seta in the center of the flexor surface of the hand; length of chela 0.74 (0.75) mm., width 0.154 (0.153) mm., length 4.8 to 4.9 times the width. From the side, the hand and fingers appear fairly slender; dorsal and ventral margins of the hand weakly convex, the ventral more regularly so than the dorsal, as the dorsum of the hand shows a weak angulation at the level of the tactile setae; setae of the dorsum of the hand shorter than the moderately long setae of the ventral surface; hand deepest near the level of the tactile setae of the dorsum of the hand; tactile setae of the chela arranged as shown in figures 2 and 3; movable finger slightly curved, fixed finger more nearly straight; movable finger with about 50 teeth, those of the distal two-thirds of the finger triangular in outline, contiguous, and with irregularly alternating large and small teeth, while those of the proximal third of the row are bluntly rounded; teeth of the fixed finger about 55 to 60 in number, all acute and triangular (some may be weakly retroconical) except for the proximal three or four bluntly rounded rudimentary teeth, large and small teeth irregularly alternating as on the opposing finger; length of hand 0.26 (0.26) mm., depth of hand 0.151 (0.154) mm.; movable finger 0.49 (0.49) mm. long, length of movable finger two-thirds of the length of the chela.

Legs relatively slender; yellow in color; very poorly developed scale-like sculpturing evident on the more proximal podomeres; setae long, very numerous on the distal podomeres but sparse on the proximal podomeres. First leg with coxa bearing typically three spines as characteristic of the genus; trochanter relatively stout; pars basalis subcylindrical, 0.267 mm. long, 0.060 mm. deep; pars tibialis 0.133 mm.

long, 0.058 mm. deep; tibia subcylindrical, with the extensor margin very weakly concave and the flexor margin very weakly convex, 0.174 mm. long, 0.044 mm. deep; tarsus widest near the basal end and tapering conspicuously towards the distal end, length 0.291 mm., depth 0.037 mm. Fourth leg with trochanter 0.159 mm. long, 0.108 mm. deep; entire femur 0.43 mm. long, 0.166 mm. deep, flexor margin evenly convex, extensor margin flattened except at the ends and bearing setae only in the distal third; tibia with a long tactile seta located a little proximal to the center of the extensor margin, 0.306 mm. long, 0.069 mm. deep; metatarsus subcylindrical but gradually narrowing distally, with a long tactile seta on the extensor margin about one-fourth of the length of the segment from the proximal margin; metatarsus 0.155 mm. long, 0.051 mm. deep; telotarsus cylindrical, with a long tactile seta about one-fifth (slightly nearer to one-fourth in the paratype) of the length of the segment from the proximal margin, length 0.275 mm., depth 0.036 mm.

Genitalia essentially as in other members of the genus; number of setae variable, seven to 10 flanking the aperture on each side; posterior operculum with six to eight setae in a marginal row between the two spiracles; anterior operculum with a marginal row of six setae and with six to eight setae anterior to the row.

FEMALE: Description of the female is based on one specimen, the allotype. The female is very similar to the male in detailed structure, except for a somewhat larger size of body and appendages. Carapace of female 0.47 mm. long, 0.40 mm. wide; chaetotaxy and sculpturing of tergites and sternites as well as carapace essentially as in the male; body length about 1.7 mm. Chelicera larger than in the male, length of movable finger 0.277 mm. Chela of female like that of the male except for longer podomeres and a slightly stouter femur and chela; trochanter 0.21 mm. long, 0.115 mm. wide; femur 0.54 mm. long, 0.120 mm. wide; tibia 0.251 mm. long, 0.138 mm. wide; chela 0.85 mm. long and 0.183 mm. wide; chelal hand 0.31 mm. long, 0.189 mm. deep; movable chelal finger 0.57 mm. long. Legs of female with podomeres slightly larger than in the male. First leg with trochanter 0.136 mm. long, 0.101 mm. deep; pars basalis 0.299 mm. long, 0.068 mm. deep; pars tibialis 0.151 mm. in length, 0.064 mm. in depth; tibia 0.197 mm. long, 0.048 mm. deep; tarsus 0.338 mm. long, 0.040 mm. deep. Fourth leg with trochanter 0.179 mm. in length, 0.139 mm. in depth; entire femur 0.475 mm. long, 0.191 mm. deep; tibia 0.342 mm. long, 0.080 mm. deep; metatarsus 0.169 mm. in length, 0.064 mm. in depth; telotarsus 0.318 mm. long, 0.040 mm. deep; tactile seta of telotarsus about one-fourth of the podo-

mere length from the proximal margin, being 0.083 mm. removed from the proximal margin. The position of the abdomen precludes a study of the genitalia.

DEUTONYMPH: A single nymph, a deutonymph paratype, is present in the collections. Association of the nymph with the adult of *A. magnanimus* is easily made because of the similarity in the teeth of the chelal fingers. Movable finger of the deutonymph with about 30 teeth along slightly more than the distal one-half of the finger margin, teeth very similar to those of the adult, a little more than the distal one-half of the row consisting of triangular teeth of slightly varying size while the more proximal teeth of the row are acuspid, blunt, and rounded. Fixed finger with nearly 40 clearly discernible teeth along more than two-thirds of the finger margin and apparently with a few more proximal rudimentary teeth near the finger base; anterior teeth of the row subrectangular and apically truncate, teeth centrally placed along the finger margin more or less triangular and acute, a few proximal teeth rounded and acuspid. A more detailed description of the deutonymph is omitted, because, in the absence of other nymphal stages, such a description can have little value.

REMARKS: *Apochthonius magnanimus* is the fourth species to be assigned to the strictly North American genus *Apochthonius*. Our species has on the average a larger body size and more slender palps than the other three species of the genus. The slender nature of the palpal podomeres serves to separate our new species from *A. intermedius*, with the use for comparison of the original description given by Chamberlin (1929a). From *A. occidentalis*, a study of the original description by Chamberlin (1929b) indicates that our form is readily separated by the much larger body size and more slender palpal femur and tibia. It is unfortunate that Chamberlin does not give the actual measurements of the palpal podomeres of either of the above species, because this lack of data precludes a further comparison between each of these forms and our present species.

It is possible to make a more satisfactory comparison between our species and *A. moestus* (Banks, 1891) because of the work of Hoff (1944, 1945, 1946, 1949). On comparison of our species with *A. moestus* it is very evident that our form has larger and more slender palpal podomeres, although a very few specimens of *A. moestus* will extend into the inadequately known ranges of actual size and length/width ratios of the palpal podomeres of *A. magnanimus*. Close study indicates that size alone is not the only basis for separation of the two species, as there are definite differences in the shape of palpal podomeres. For instance, when the chela is examined in dorsal view, it is clear that the sinus

near the base on the inner or flexor side of the hand is much more pronounced in *A. magnanimus* than in *A. moestus*; and on examination of the chela of *A. magnanimus* in lateral view, it is evident that the hand of the chela has conspicuously greater depth near the level of the setae of the dorsum of the hand than occurs near the finger base. In *A. moestus*, on the contrary, the level of the hand at which the maximum depth occurs is somewhat variable. In some specimens of *A. moestus* the depth at the level of the tactile setae of the dorsum of the hand may be definitely greater than the depth near the base of the fingers (as shown by Chamberlin, 1929b, fig. 3-G), but the difference between the depths at the two levels on the hand is ordinarily not so pronounced as in our new species. Indeed in many specimens of *A. moestus* the hand distal to the level of the tactile setae of the dorsum of the hand is almost cylindrical (as shown by Hoff, 1946, fig. 7), while in a few specimens the depth of the hand near the finger base may equal or even slightly surpass the depth at the level of the tactile setae. In addition to the differences in the shape of the chelal hand, the marginal teeth of the chelal fingers are much different in the two forms under discussion. In *A. moestus* the teeth are somewhat quadrangular and blunt, and they appear to vary little in length among the teeth at any particular level in the row. In *A. magnanimus*, on the other hand, the teeth, with the exception of the proximal ones, are distinctly triangular in shape and apically acute, and at least in the distal half of the row on each finger there are teeth of two conspicuously different sizes, with one to five of the smaller teeth inserted between each of the larger teeth or between groups of two or three of the larger teeth. The difference in dentation in the two species is constant and decisive. From the literature one might gain the impression that the male genitalia are important in characterization of species in the genus *Apochthonius*, but it has been impossible in the present instance to discover constant and taxonomically usable differences in the male genitalia of *A. moestus* and *A. magnanimus*.

In connection with the teeth of the chelal fingers, it is interesting to note that in the original description of the genus *Apochthonius*, Chamberlin (1929b) makes no mention of the shape of the teeth. In another publication of the same year and month, Chamberlin (1929a) calls attention to the presence of alternating large and small teeth on the chelal fingers. As I have been unable to find instances of the occurrence of alternating large and small teeth in *A. moestus*, it seems advisable to follow the original description and omit all reference to the shape of the teeth in a diagnosis of the genus *Apochthonius*.

RECORDS: The species is known only from type specimens. The holo-

type male was taken just west of Cowles, San Miguel County, at 8400 feet elevation, the collection being made by sifting litter beneath a stand of Gambel oak. The female allotype, a male paratype, and a deutonymph paratype were taken northeast of Santa Fe along the Hyde Park road, Santa Fe County, at 8150 feet elevation, specimens being isolated from aspen litter (containing a few fir needles) by use of Berlese funnels. The two areas from which the collections were made are separated by only a few miles of rugged mountainous country.

MUNDOCHTHONIUS CHAMBERLIN

Mundochthonius CHAMBERLIN, 1929, Ann. Mag. Nat. Hist., ser. 10, vol. 4, p. 64.

Members of this genus may be recognized by the following combination of characters: chelal fingers with simple marginal teeth, a medially placed intercoxal tubercle bearing two setae and located between the coxae of legs three and four, and coxal spines (in the form of one or more terminally serrate and often deeply incised blades) on the medio-anterior portion of the coxa of each second leg. The genus has been recorded only from North America and Japan. A single species is known from New Mexico.

Mundochthonius montanus Chamberlin

Mundochthonius montanus CHAMBERLIN, 1929, Ann. Mag. Nat. Hist., ser. 10, vol. 4, p. 65. HOFF, 1952, Great Basin Nat., vol. 12, p. 40.

This species has previously been reported by Hoff (1952) in nine collections from aspen litter, Gambel oak litter, fir litter, and a decayed coniferous log in Tezano Canyon, 8300 feet elevation, Sandia Mountains, Bernalillo County. Attempts to collect the species elsewhere indicate that the form is possibly widespread in distribution in the north central part of New Mexico. However, the species is not frequently taken, probably as a result of small body size and low population density. So far all collections have been taken by means of Berlese funnels. Most collections, even when made from somewhat large amounts of litter and accompanying top soil, fail to produce more than two or three individuals. Because measurements of specimens from New Mexico have been given previously by Hoff (1952) and only one species of the genus *Mundochthonius* is known from the state, no species diagnosis is included here. It is advisable, however, to mention that, while the present specimens agree well with the specimens previously described (Hoff, 1952) from New Mexico, the specimens taken from northeast of Santa Fe have

palpal podomeres about one-twentieth larger than the upper limit of the range previously reported for New Mexico specimens.

RECORDS: In addition to the nine collections mentioned at the beginning of the preceding paragraph, our present material includes the following collections: *Bernalillo County*: Two females from Gambel oak litter taken at Sulphur Springs, 7300 feet elevation, Sandia Mountains; one tritonymph from mixed fir and aspen litter near the crest, 10,600 feet elevation, Sandia Mountains. *Rio Arriba County*: One female from Gambel oak litter at 7600 feet elevation 6 miles north of El Rito. *Santa Fe County*: One male from spruce litter at 10,900 feet elevation and one female from aspen litter at 9700 feet elevation, near the Santa Fe ski area, northeast of Santa Fe.

It is interesting to note the wide altitudinal band, 7300 to 10,900 feet, in which this species occurs. With the exception of one collection taken from a rotten log, the collections have all come from aspen, Gambel oak, spruce, and fir litter. Clearly the species is a litter-inhabiting form.

TRIBE LECHYTIINI CHAMBERLIN

This tribe is characterized by the presence of four tactile setae on the dorsum of the chelal hand. Two of these setae form a transverse pair, the other two form a longitudinal pair. At the present time, all pseudoscorpions with this characteristic are assigned to the genus *Lechytia*, there being but one genus described for the tribe.

LECHYTIA BALZAN

Lechytia BALZAN, 1891, Ann. Soc. Ent. France, vol. 60, p. 498. CHAMBERLIN, 1929, Ann. Mag. Nat. Hist., ser. 10, vol. 4, p. 77.

A single species of this genus occurs in the United States, and a small number of other species have been described from Africa, Asia, and South America.

Lechytia pacifica (Banks)

Roncus pacificus BANKS, 1893, Canadian Ent., vol. 25, p. 66.

Lechytia pacifica, BANKS, 1895, Jour. New York Ent. Soc., vol. 3, p. 13. CHAMBERLIN, 1929, Ann. Mag. Nat. Hist., ser. 10, vol. 4, p. 77. HOFF, 1952, Great Basin Nat., vol. 12, p. 43.

Measurements of a limited number of New Mexico specimens are given by Hoff (1952) who reported the occurrence of this species in four collections from the state. Outside New Mexico, the present species is known only from the states of Washington (Banks, 1893), California (Chamberlin, 1929b), and Utah (Hoff and Clawson, 1952).

RECORDS: At the risk of being repetitious and in order to correct the elevation given for a previous record, collections reported from New Mexico by Hoff (1952) are included in the following list. *Bernalillo County*: Cole Springs, Sandia Mountains, east of Albuquerque, from acorn hulls in a hollow yellow-pine stump in an area of Gambel oak, at about 7400 feet elevation. *Catron County*: Wall Lake, south of Beaverhead, from rotten yellow-pine bark near decaying stump, about 6500 feet elevation. *Lincoln County*: Nogal Canyon, near Nogal, under started bark of yellow-pine log, elevation about 7200 feet; south base of Gallinas Peak, west of Corona, from well-rotted yellow-pine log at an elevation of about 7500 feet. *Rio Arriba County*: East of Canjilon along the road to El Rito, under bark of large and very rotten yellow-pine stump, elevation 8650 feet. *Sandoval County*: North of Jemez, Jemez Mountains, from well-rotted, yellow-pine log, 7600 feet elevation; just west of San Pedro in the extreme southeast corner of Sandoval County, from juniper litter, 6600 feet elevation. *Torrance County*: From a clump of dead yucca in a pinyon-juniper area, 6800 feet elevation, just west of Mountainair. *Valencia County*: South base of Mt. Taylor, near Grants, from pinyon litter at an elevation of 7500 feet (elevation given previously by Hoff [1952] as about 6500 feet); just north of the above location, south base of Mt. Taylor, from pinyon litter, elevation 7600 feet.

Except for two collections, all our specimens have been taken by means of Berlese funnels. One of the exceptions is a collection consisting of one female taken beneath the started bark of a yellow-pine log; the other exception is a collection of a single female from beneath the bark of a well-rotted, yellow-pine stump. Collections are chiefly from areas of somewhat open yellow-pine and pinyon-juniper stands, especially in areas where disturbances of cutting or fire have left decaying logs and woody debris on the forest floor. All collections have been taken from a fairly narrow altitudinal band, from 6500 to 8650 feet elevation.

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