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A NEW SPECIES OF *VAEJOVIS* (SCORPIONES, VAEJOVIDAE) FROM SONORA, MEXICO

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ABSTRACT. *Vaejovis pequeno,* a new species of scorpion previously confused with *V. waueri* Gertsch & Soleglad 1972, is described and illustrated from Sonora, Mexico and is compared to that species. A revised diagnosis and new distributional records for *V. waueri,* a member of the *eusthenura* group, are provided.

Keywords: Scorpion, Vaejovidae, Sonora, Mexico, systematics

Vaejovis is the most diverse genus of scorpions in North America with 66 described species and five recognized species groups (i.e., *eusthenura, intrepidus, mexicanus, nitudulus* and *punctipalpi;* Sissom 2000). To date, there is no single comprehensive revision of the genus, but a number of partial revisions and regional faunas can be found in the literature (Williams 1970a, 1970b, 1971, 1980; Soleglad 1973; Sissom & Francke 1985; Sissom 1991a; Capes 2001).

Gertsch & Soleglad (1972) described a small, attractive scorpion, *Vaejovis waueri,* on the basis of specimens from southern Texas in the USA, and from the states of Nuevo León and Sonora in Mexico. This species is well known in the eastern regions (i.e., Texas and Nuevo León), but the Sonoran record from Rio Cuchajaqui represents a significant disjunction. Sissom (1991b) suggested that humans may have accidentally introduced the species to Sonora, supported by the fact that no additional specimens had been collected from the well-sampled Alamos area in the southeastern corner of the state. At the time, only subtle differences in morphology were detected between the specimens from Sonora and Texas including slight variations in the ventrolateral carination of metasomal segment V. My findings, based on subsequent examination of the Rio Cuchajaqui material and some new material that has since accumulated, indicate that these specimens are distinct from *V. waueri* and represent a new species.

The superficial resemblance between the new species and *V. waueri* is striking, so it is understandable that the earlier authors believed these Sonoran specimens to be *V. waueri,* despite the disjunction. Both of these diminutive species possess relatively lustrous cuticles and exhibit similar color patterns (e.g., dusky, mottled appearance with lighter medial stripe), morphometrics, and carination. In addition to describing the new species and comparing it to *V. waueri,* it is my purpose here to provide a revised diagnosis for *V. waueri* and to review the species distribution based on many new records.

METHODS

Nomenclature and mensuration for the most part follow that of Stahnke (1970), with the following exceptions: carinal terminology is after Francke (1977) and trichobothrial terminology is after Vachon (1974), except that the fourth pedipalpal segment is considered the patella rather than the tibia, adhering to Stahnke's nomenclature. Morphometric characters were derived from measurements of a single adult male and nine adult females for the new species, and from 10 adult males and 10 adult females for *V. waueri;* several ($n > 50$) additional adult *V. waueri* were used to provide a revised diagnosis for that species. Hemispermatophore preparation follows that of Sissom et al. (1990). All measurements were taken using an ocular micrometer calibrated at 20×, and illustrations were carried out by the use of an ocular grid.

Specimen depository designations are as follows: American Museum of Natural History, New York (AMNH); Academy of Natural Sciences, Philadelphia (ANS); Appalachian State University, Boone, North Carolina

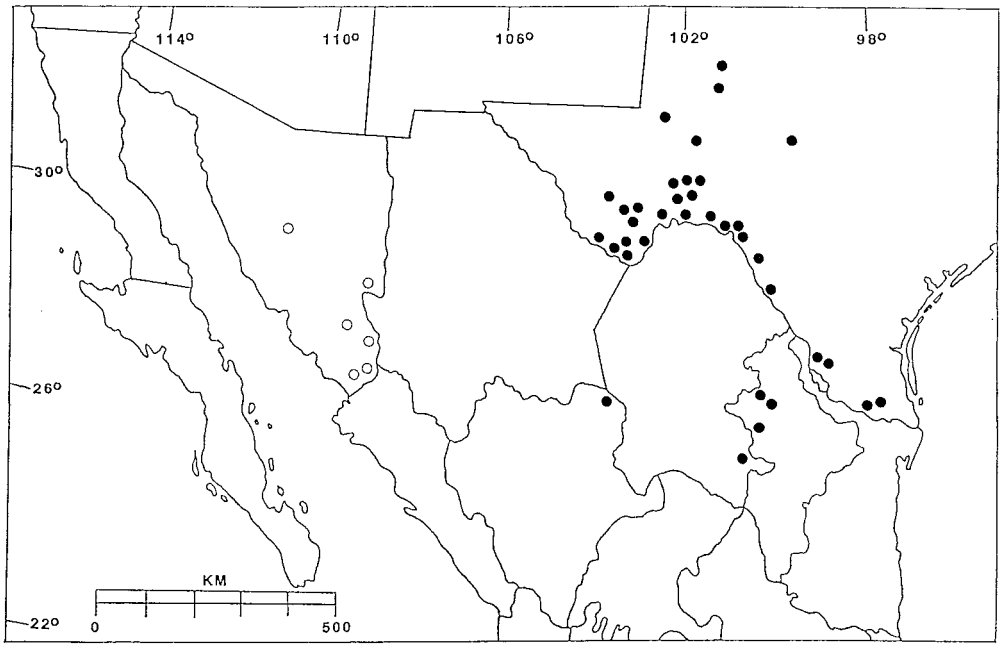


Figure 1.—Map of the southwestern United States and northern Mexico depicting the distribution of *Vaejovis pequeno* new species (○) and *V. waueri* (●).

(ASU); Florida State Collection of Arthropods, Gainesville (FSCA); California Academy of Sciences, San Francisco (CAS); personal collection of J. A. Nilsson (JAN); University of Arizona, Tucson (UA); University of Arkansas, Fayetteville (UAF); personal collection of W. David Sissom (WDS); West Texas A&M University, Canyon (WTAMU).

Vaejovis pequeno new species
Figs. 1, 2, 4–15

Vejovis waueri, in part: Gertsch & Soleglad 1972: 607 (misidentification).

Vaejovis waueri: Sissom 1991b: 215 (misidentification).

Type data.—Adult male holotype collected 15 mi W Yecora (4000 feet) (1200 m), Sonora, Mexico on 7 August 1986 by V. Roth; deposited at the California Academy of Sciences, San Francisco. For paratype data, see ''Specimens examined'' section.

Etymology.—The specific epithet comes from the Spanish *pequeño* (meaning ''little one'') and refers to the minute size of this species; *pequeno* is regarded as a noun in apposition.

Distribution.—Known from several localities in Sonora, Mexico (Fig. 1).

Diagnosis.—*Vaejovis pequeno* (Fig. 2) may be distinguished from *V. waueri* by being somewhat smaller in size (adults of *V. pequeno* to 19.85 mm and *V. waueri* to 24.8 mm); possessing weak, granular dorsal marginal and dorsointernal carinae on the pedipalp chelae in males (rather than all keels obsolete); the inner lobe of the hemispermatophoric capsule without barbs (rather than distinctly barbed); the chelicerae with a strongly developed serrula (rather than a weakly developed serrula); one pair of distal spinules flanking the ventromedian spinule row of the tarsi (rather than more than one pair); consistently lower setal counts on the metasoma (see Figs. 3, 4); and finely granular to weak, serrate ventral submedian carinae on metasomal segment IV (rather than obsolete). The holotype male can be differentiated from *V. waueri* males ($n = 10$) by the following morphometric ratios (*V. waueri* ratios in parentheses; slightly overlapping ratios have been included): pedipalp femur length/width 2.82 (2.46–2.82), carapace length/metasomal segment V length 1.00 (0.80–0.90), and chela fixed finger length/carapace length 0.59 (0.50–0.56). The paratype females ($n = 9$) can be differentiated from *V. waueri* females ($n = 10$) by the fol-

Figure 2.—Photograph showing dorsal view of paratype female (left) and holotype male of ***Vaejovis pequeno*** new species. Photograph by W.D. Sissom.

lowing morphometric ratios: pedipalp femur length/width 2.60–3.00 (2.41–2.60), chela movable finger length/chela length 0.60–0.63 (0.56–0.60), carapace length/metasomal segment V length 1.00–1.04 (0.90–0.98), and chela fixed finger length/carapace length 0.58–0.65 (0.50–0.56).

The placement of *V. pequeno* in an existing species group is problematic as its closest relative is unknown. Although superficially similar to *V. waueri*, a member of the *eusthenura* group as defined by Williams (1970b), *V. pequeno* clearly does not belong to that group based on the chelicerae possessing a strongly pronounced serrula, one pair of distal spinules flanking the ventromedian spinule row of the tarsi, and the absence of barbs on the capsule of the hemispermatophore. In addition, species of the *eusthenura* group that possess strong mottling and fairly robust metasomal segments [e.g., *V. waueri, V. bilineatus* Pocock 1898, *V. spinigerus* (Wood 1863), and *V. gravicaudus* Williams 1970], all have extremely setose metasomal carinae.

Vaejovis pequeno is also superficially similar to *Serradigitus agilis* Sissom & Stockwell 1991 of northern Sonora and southern Arizona, but does not possess the synapomorphies associated with that genus. In particular, *V. pequeno* does not bear serrated denticle rows on the pedipalp chela fingers, enlarged terminal denticles on the chela fingers, or enlarged proximal pectinal teeth devoid of sensilla in the female. Further, *S. agilis* has higher pectinal tooth counts than *V. pequeno* (14–17 in males instead of 12–13, and 14–15 in females instead of 11–13); and finally, trichobothria *ib* and *it* flank the sixth inner accessory denticle on the chela fixed finger in *S. agilis*, but *it* is slightly basal to the sixth inner accessory denticle in *V. pequeno.*

Description.– Based on adult male holotype (Fig. 2). *Coloration (in alcohol):* Base color orange-yellow to orange with underlying dusky pattern. Mesosomal dorsum with distinct medial, longitudinal stripe. Metasomal segments progressively darker distally from yellow-orange to reddish-brown. Telson yellow-orange; aculeus orange-red. Ventral surface cream colored. Pedipalp chela with dusky longitudinal stripes marking positions where keels generally occur. Legs yellow with some dusky mottling. *Prosoma:* Anterior edge of carapace slightly emarginate. Carapace surface densely, finely granular. *Mesosoma:* Sternite VII with weak, serrate lateral keels. Tergites densely, finely granular. Pectinal tooth count 13/12 (l/r). *Metasoma:* (Fig. 4) Segments I-III wider than long, IV longer than wide, V 1.76 times longer than wide. Segments I-IV: intercarinal regions finely to coarsely granular. Dorsolateral and lateral supramedian carinae strong, crenulate to serrate terminating in an enlarged, spinoid tubercle (except on lateral supramedians of IV, which are widely flared). Lateral inframedian carinae on I moderate, crenulate; on II-III weak to moderate, granular to crenulate; on IV absent. Ventrolateral carinae on I weak to moderate, crenulate; on II-III moderate, crenulate; on IV strong, crenulate. Ventral submedian carinae on I obsolete; II-III weak, smooth to granular; on IV weak, serrate. Segment V: intercarinal regions finely to coarsely granular. Dorsolateral carinae strong, irregularly crenulate. Lateromedian carinae moderate to weak, granular. Ventrolateral and ventromedian carinae strong, crenulate to serratocrenulate. Segments I-IV carinal setation (l/r): dorsolaterals,

1/0:1/1:1/1:2/2; lateral supramedians, 0/0:1/1:1/1:2/3; lateral inframedians, 1/1:0/0:0/0:0/0; ventrolaterals, 2/2:3/3:3/3:3/3; ventral submedians, 3/3:3/3:3/3:3/4. Segment V carinal setation: dorsolaterals, 5/5; lateromedians, 3/3; ventrolaterals, 5/5; ventromedians: 5/5. *Telson:* (Fig. 4) Surface smooth to weak, granular; moderately setose. Vesicle dorsoventrally compressed, flattened dorsally. Subaculear tubercle minute, rounded and flanked by two large setae. *Pedipalps:* Orthobothriotaxic, Type C (Vachon 1974). All surfaces densely, finely granular. Femur (Fig. 5) tetracarinate: moderate, granular to crenulate. Patella (Figs. 6, 7) with dorsointernal and ventrointernal carinae moderate, granular; internal carinae moderate, irregularly crenulate; dorsoexternal carinae weak, smooth to irregularly granular; ventroexternal carinae smooth. Chela (Figs. 8, 9) with finely granular dorsal marginal and dorsointernal carinae; others obsolete. Fixed finger (Fig. 10) with primary denticle row divided into five subrows by four enlarged primary row denticles; six inner accessory denticles present; trichobothria *ib* and *it* situated just basal to sixth inner accessory denticle. Movable finger (Fig. 11) with primary denticle row divided into six subrows by five enlarged primary row denticles; seven inner accessory denticles present. Cutting margin of both fingers straight (i.e., not scalloped). *Hemispermatophore:* (Figs. 12–15) Distal barb of mating plug without hooklets; distal flange present.

Measurements of male holotype: (mm) Total L, 14.55; carapace L, 2.20; mesosoma L, 3.35; metasoma L, 6.90; telson, 2.10. Metasomal segments: I L/W, 0.90/1.35; II L/W, 1.10/1.20; III L/W, 1.10/1.25; IV L/W, 1.60/1.25; V L/W,2.20/1.25. Telson: vesicle L/W/D, 1.30/1.10/0.60; aculeus L, 0.80. Pedipalps: total L, 6.00; femur L/W, 1.55/0.55; patella L/W, 1.80/0.70; chela L/W/D, 2.65/0.65/0.65; fixed finger L, 1.45; movable finger L, 1.55.

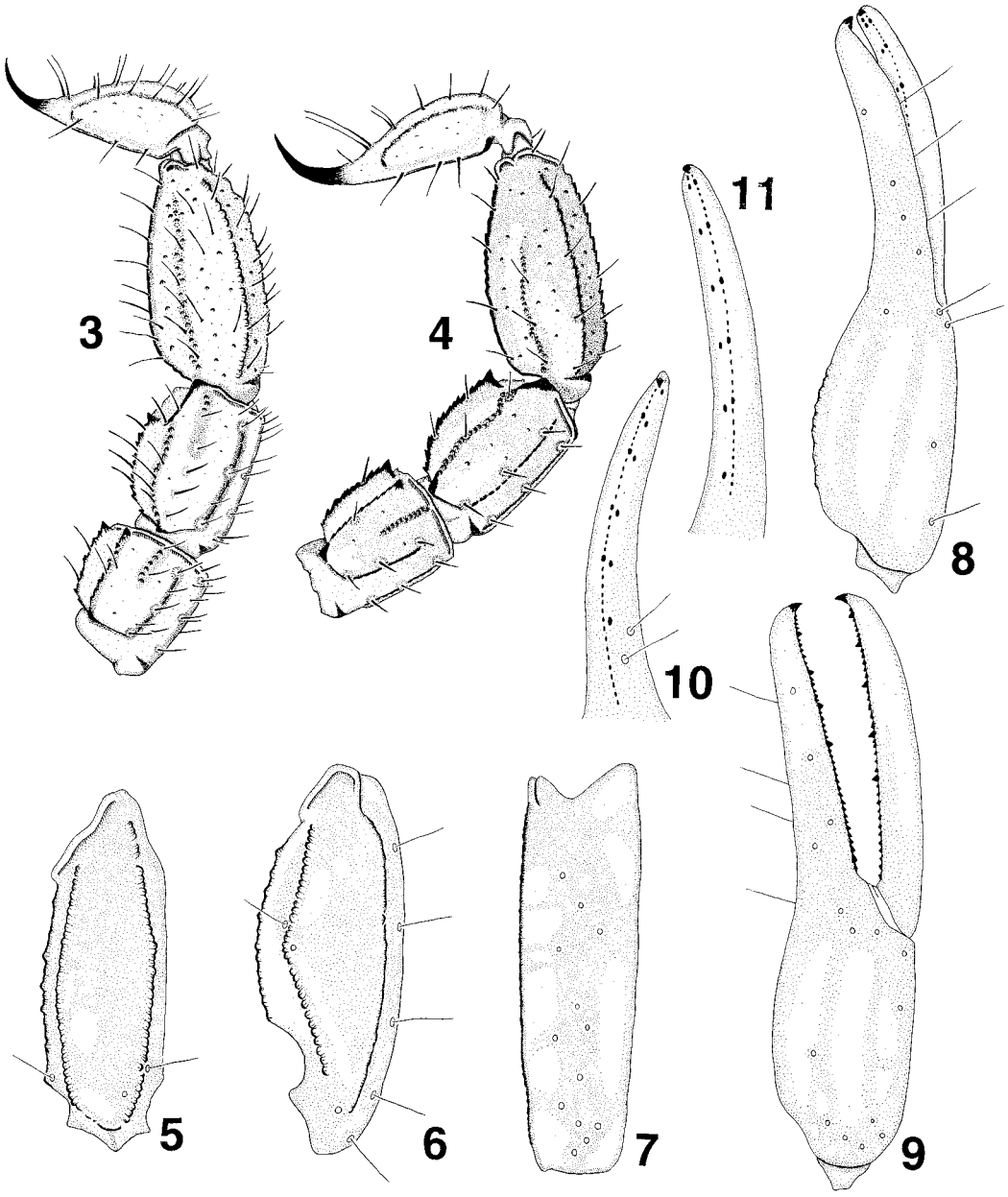
Measurements of female paratype from Yecora: (mm) Total L, 17.55; carapace L, 2.65; mesosoma L, 4.65; metasoma L, 7.85; telson, 2.40. Metasomal segments: I L/W, 1.10/1.65; II L/W, 1.25/1.50; III L/W, 1.30/1.50; IV L/W, 1.65/1.40; V L/W,2.55/1.45. Telson: vesicle L/W/D, 1.50/0.95/0.75; aculeus L, 0.90. Pedipalps: total L, 7.30; femur L/W, 1.90/0.75; patella L/W, 2.15/0.85; chela L/W/D, 3.20/0.80/0.85; fixed finger L, 1.55; movable finger L, 2.00.

Variation.—The single adult male differed from nine adult females in the following respects: body size is somewhat smaller (17.55–19.85 mm in females) and the carination of the pedipalp chela is more pronounced (weak, smooth to irregularly granular in females). In addition, the holotype male can be differentiated from the paratype females by the following morphometric ratios (female ratios in parentheses; slightly overlapping ratios have been included): chela movable finger length/chela length 0.58 (0.60–0.63) and carapace length/metasomal segment V length 1.00 (1.00–1.04). Pectinal tooth counts of the holotype male fell within the range of nine paratype females: 13/12 (l/r) pectinal teeth in the male, 11–13 (mode = 12) in females. Additional male material is needed to determine if pectinal tooth counts are significantly different between males and females.

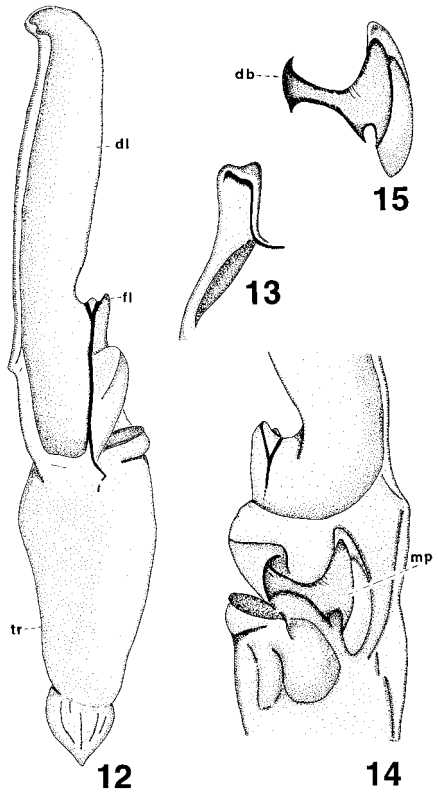
The following morphometric ratio ranges have been included to indicate intraspecific variation within the females (mean ± one standard deviation): chela length/width 3.81–4.62 (4.00 ± 0.28), pedipalp femur length/width 2.60–3.00 (2.74 ± 0.13), metasomal segment III length/width 0.81–0.93 (0.87 ± 0.04), and metasomal segment V length/width 1.61–1.80 (1.67 ± 0.07).

Metasomal carination slightly variable in strength of the keels; however, the difference was not determined to be significant. Metasoma carinal setation proved to be somewhat variable. Variation on segments I-IV is as follows: dorsolaterals, 0-1:1:1:2; lateral supramedians, 0-2:1-4:1-4:2-4; lateral inframedians, 1-2:0-1:0-1:0 (sometimes accessory setae were present where the lateral inframedian keel would be located); ventrolaterals, 2-3:3:3:3-4; ventral submedians, 3:3:3:3-4. Segment V carinal setation: dorsolaterals, 5; lateromedians, 3-5; ventrolaterals, 5; ventromedians, 5. One female possessed five (instead of the typical six) inner accessory denticles on the pedipalp chela fixed finger.

Specimens examined.—**MEXICO:** *Sonora:* 15–20 km E Baviacora (29.43N, 110.05W), 6 August, no year (V. & B. Roth), 1 paratype female (CAS); Rio Cuchajaqui, E of Alamos, 14 January 1968 (V. Roth), 2 paratype females (AMNH); 7 mi NE Teso Paco (28.50N, 109.40W; thorn forest), 16 September 1982 (V. Roth), 3 paratype females + 18 first



Figures 3–11.—3. External morphology of *Vaejovis waueri*, female from San Angelo, Texas. Metasomal segments III-V and telson, showing carinal setal pattern, lateral aspect. 4–11. External morphology of ***Vaejovis pequeno*** new species, holotype male from Yecora, Sonora, Mexico; 4. Metasomal segments III-V and telson, showing carinal setal pattern, lateral aspect; 5. Pedipalp femur, dorsal aspect; 6. Pedipalp patella, dorsal aspect; 7. Pedipalp patella, external aspect; 8. Pedipalp chela, dorsal aspect; 9. Pedipalp chela, external aspect; 10. Pedipalp chela fixed finger, showing dentition and trichobothrial pattern; 11. Pedipalp chela movable finger, showing dentition.



Figures 12–15.—Morphology of right hemispermatophore of ***Vaejovis pequeno*** new species. 12. Dorsal aspect; 13. Enlarged view of flange; 14. Ventral aspect showing capsule; 15. Mating plug (note the absence of hooklets on distal barb). *Abbreviations:* db = distal barb of mating plug; dl = distal lamina; fl = flange; mp = mating plug; tr = trunk.

instar young (CAS); 15 mi W Yecora (4000 feet), 7 August 1986 (V. Roth), 1 holotype male 1 paratype female (CAS); 3.2 mi NW Huicochi (under rocks; 5200 feet), 11–14 June 1989 (S. Prchal), 1 paratype female + 11 second instar young (WDS); Sierra Alamos above La Cieneguilla (1600–2000'), 11 October 1994 (P.H. Holm), 1 paratype female (UA).

Vaejovis waueri Gertsch & Soleglad
Figs. 1, 3

Vejovis waueri: Gertsch & Soleglad 1972: 605, fig. 145, 146.

Vaejovis waueri was originally described as a member of the *spinigerus* group by Gertsch & Soleglad (1972); however, *V. spinigerus* and its close relatives were actually placed in the *eusthenura* group by Williams (1980), and are still assigned there (Sissom 2000).

Diagnosis.—For characters separating *V. pequeno* from *V. waueri*, see diagnosis for *V. pequeno*. *Vaejovis waueri* is most closely related to *V. bilineatus* in the *eusthenura* group, but can be differentiated from that species by the following characters (*V. bilineatus* characters in parentheses; Yahia & Sissom 1996): somewhat smaller size, adults to 24.8 mm (22–32 mm); ventral submedian carinae of metasomal segments I-IV always obsolete (sometimes weak, crenulate on IV); a single dorsomedial stripe (two or four); modal pectinal tooth counts 14 in males, 12 in females (17 in males, 15 in females); metasomal segment V length width 1.67–1.90 in males, 1.62–1.84 in females (2.00–2.38 in males, 1.78–2.18 in females); and male chela fingers with cutting margin straight (moderately scalloped).

Distribution.—*Vaejovis waueri* was previously recorded from Texas in the USA (Gertsch & Soleglad 1972; Stockwell 1986) and from Nuevo León and Durango in Mexico (Sissom 2000). The current distribution, including old and new records, is shown in Fig. 1. This species has been collected between roughly 1000–2000 m in the Big Bend area of Texas where it is almost always located on rocky, boulder-strewn slopes. It is not known to burrow, but likely inhabits cracks and crevices among boulders and rocks during the day.

Stockwell (1986), in an unpublished Master's thesis, listed the following localities from Texas: *Brewster County:* Alpine, 8 mi S Alpine, 4 mi W Marathon, 21 mi S Marathon, Big Bend National Park (N base of Grapevine Mt., base of Nugent Mt., K-Bar Road, Chisos Basin Pass, Chisos Mts., Chisos Basin, Rio Grande Village, Bouquillas Canyon); *Crockett County:* 10 mi N Iraan, 11 mi N Iraan, 45 mi NW Ozona, 22 mi E Iraan; *Crosby County:* 24 mi SE Crosbyton; *Garza County:* 7 mi ENE Justiceberg, 3 mi S Justiceberg; *Jeff Davis County:* Davis Mts. State Park, Fort Davis, 1.2 mi SW Hwy 17 on Hwy 1832; *Kinney County:* 21 mi N Brackettville, Brackettville; *Maverick County:* 7 mi S Spofford, 14 mi S El Indio; *Pecos County:* 12 mi N Ft. Stockton, 4 mi E Sheffield, 4 mi SE Sheffield, 52.5 mi NW Dryden, 15 mi N Sanderson; *Starr County:* Rio Grande City; *Terrell County:* 19 mi S Sheffield, Chandler Ranch, 5 mi N Sanderson,

72 mi W Pecos River on Hwy 90; *Val Verde County:* 21 mi N Comstock, 14 mi N Comstock, 0.5 mi S Langtry; *Webb County:* 45 mi S El Indio, Laredo.

New records.—UNITED STATES: Texas: *Brewster County:* Big Bend National Park (BBNP), Chisos Basin (W face of Casa Grande), 29 August 1984 (Sissom et al.) 1♂ 1♀ (WDS); BBNP, Chisos Basin, 28 Sept 1950 (Gertsch), 1♂6♀ (AMNH); BBNP, Chisos Basin, 5 August 1938 (Mulaik), 1♂6♀ (AMNH); BBNP, Chisos Basin, 28 September 1950 (Gertsch), 2♂1♀ (AMNH); BBNP, Chisos Basin, 28 May 1952 (no collector), 18♀ (AMNH); BBNP, Chisos Basin, 26 July 1938 (Mulaik), 1♀ (AMNH); BBNP, Chisos Basin, 16 July 1921 (Duncan), 1♀ + young (AMNH); BBNP, Chisos Basin, 28 September 1950 (no collector), 2♀ (AMNH); BBNP, Chisos Basin (6000'), 25 August 1967 (Gertsch & Hastings), 2♂1♀ (AMNH); BBNP, Chisos Basin, 22 August 1959 (McAlister), 1♀ (AMNH); 10 mi N Hot Springs on Marathon Rd., 21 July 1938 (Mulaik) 1♀ (AMNH); BBNP, Hot Springs parking lot and trail to Hot Springs, 24 June 1998 (Henson et al.), 1♂ (ASU, Q-283A); BBNP, Basin, May 1983 (Henson), 1♀ (ASU, G-119, 1091); BBNP, Pine Canyon Trail-Grassland, 24 May 1987 (Henson et al.), 1♀ (ASU, A-94, 0092); BBNP, Lost Mine Trail, 23 May 1987 (Henson et al.), 1♀ (ASU, A-61, 0059); BBNP, Pine Canyon Road, 24 May 1987 (Henson et al.), 1♀ (ASU, A-83); BBNP, Pine Canyon, end of wooded area to parking lot, 27 May 1992 (no collector), 1♀ (ASU, L-203); BBNP, Pine Canyon, end of wooded area to parking lot, 27 May 1992 (no collector), 1♀ (ASU, L-205, 1916); BBNP, Dugout Wells, 19 May 1987 (Henson et al.), 1♀ (ASU, A-7, 0007); BBNP, Window Trail, 26 May 1987 (Henson et al.), 1♀ (ASU, A-118); BBNP, Glenn Spring Road, 19 May 1988 (Henson), 1♀ (ASU, B-2-a-1, 0248); BBNP, Pine Canyon Trail, edge of grassland and piñon pine, 24 May 1987 (Henson et al.), 1♀ (ASU, A-77, 0075); BBNP, Window Trail below group campground, 23 May 1987 (Henson), 1♀ (ASU, A-58, 0057); BBNP, Basin, May 1983 (no collector), 1 juv. ♀ (ASU, G-117, 1089); BBNP, Mine Trail (6350'), 9 June 1991 (Henson et al.), 1♀ (ASU, H-273, 1459); BBNP, end of Grapevine Hill Road near Grapevine Spring, 31 May 1990 (Henson & David), 1♀ (ASU, D-143, 0519); BBNP, Pine Canyon Trail above parking area, 27 May 1992 (Van Devender), 4♀ (ASU, L-292-295, 2009-2012); BBNP, Window Trail, 20 May 1988 (Henson), 1♀ (ASU, B-4-d-1, 0333); BBNP, Glenn Spring Road, 19 May 1988 (Henson), 1♀ (ASU, B-2-d-1, 0264); BBNP, Window Trail, 20 May 1988 (Henson), 1♀ (ASU, B-4-d-1, 0334); BBNP, end of Grapevine Hills Road near Grapevine Springs, 31 May 1990 (Henson & Davis), 1♀ (ASU, D-138, 0514); Mikibbe Springs off Lost Mine Trail, 23 June 1998 (Henson et al.), 1♀ (ASU, Q-260); Pine Canyon Road, 24 May 1987 (Henson et al.), 1♀ (ASU, A-82); 9 mi S Black Gap on FM 2627, 27 May 1991 (Davis), 1♂ (ASU, J-97, 1582); *Crockett County:* Hwy 195 E Iraan, 18 June 1998 (Henson et al.), 1♂ (ASU, Q-110); *Ector County:* 24 mi W Odessa, 7 June 1979 (Francke & Merickel) 1♂1♀ (WDS); *Hidalgo County:* Edinburg, December 1939 (Mulaik), 2♂1♀ (AMNH); *Jeff Davis County:* Davis Mountain State Park, behind campground, 16 July 1997 (Henson et al.), 1♂ (ASU, P-262); Fort Davis, 8 June 1902 (no collector), 1♀ (AMNH); *Pecos County:* Hwy 285, 12.6 mi N Ranch Road 2401, approx. 37 mi S Stockton roadside picnic area, 6 July 1997 (Henson et al.), 1♀ (ASU, P-75); Ranch Road, 4.2 mi from TX 385, 6 July 1997 (Henson et al.), 2♂2♀ + 2 young (ASU, P-67-70); *Presidio County (Big Bend Ranch State Park):* 3.4 mi W Sauceda (29.28.55N, 104.00.06W), 18 July 1993 (Henson et al.), 1♂ (WTAMU, SC-162); 2.2 mi W Sauceda (29.28.30N, 103.59.17W), 18 July 1993 (Henson et al.), 1♂ (WTAMU, SC-159); 1.1 mi W Sauceda (29.28.42N, 103.58.23W), 13 July 1993 (Henson et al.), 1♂3♀ (WTAMU, SC-134); vicinity of Sauceda (west of bunkhouse, 29.28.01N, 103.57.29W), 17 July 1993 (Henson & Sissom), 1♂ (WTAMU, SC-144); 0.35 mi NE Sauceda (29.28.23N, 103.57.08W), 18 July 1993 (Henson et al.), 2♂1♀ (WTAMU, SC-150,151); 0.9 mi NE Sauceda (29.28.30N, 103.56.38W), 18 July 1993 (Henson et al.), 2♂ (WTAMU, SC-156); 1.45 mi E Sauceda (29.28.25N, 103.56.11W), 11 July 1997 (Sissom), 1♂ (WTAMU, SC-205); FM 170, 1.1 mi W Lajitas (near boundary of park, 29.15.56N, 103.47.24W), 28 May 1997 (McWest & Sissom), 1♀ (WTAMU, SC-183); 7.4 mi inside gate toward Sauceda, 23 June 1999 (Henson et al.), 1♂ (ASU, M-337); 0.35 mi E Sauceda, 18 June 1993 (Henson et al.), 1♂ (ASU, M-116); 0.9 mi E Sauceda, 24 June 1993 (Henson et al.), 4♂ (ASU, M-340, 342, 347, 347A); 0.35 mi E Sauceda, 18 June 1993 (Henson et al.), 2♂ (ASU, M-122, 122A); 0.6 mi from Sauceda, 18 June 1993 (Henson et al.), 1♀ (ASU, M-146); 0.35 mi E Sauceda, 18 June 1993 (Henson et al.), 5♂ (ASU, M-114, 118–121); 6.4 mi from Sauceda, 23 June 1993 (Henson et al.), 1 juv. (ASU, M-323); Jackson Gate, 11 July 1997 (Zrell et al.), 1♂ (ASU, P-254); 1.1 mi from Sauceda, 13 June 1993 (Henson et al.), 1 juv. (ASU, M-21); near Jackson Gate leaving Solitario, 11 July 1997 (Henson et al.), 1♂1♀ (ASU, P-238-239); 0.3 mi from ''Y'' on east road out of Solitario, 11 July 1997 (Henson et al.), 3♂1♀ (ASU, P-200–203); 2.3 mi E of Big Hill, 5 June 1992 (no collector), 1♂ (ASU, L-340); 0.35 mi E Sauceda, 18 June 1993 (Henson et al.), 4♂1♀ (ASU, M-133, 136–138, 151); bottom of Big Hill, 5 June 1992 (no collector), 1♂ (ASU, L-338); 0.6 mi E gate to BBRSNA, 14 June 1993 (Henson et

al.), 2♂ (ASU, M-69–70); 0.9 mi E Sauceda, 18 June 1993 (Henson et al.), 2♂ (ASU, M-160–161); 0.3 mi E of gate, 14 June 1993 (Henson et al.), 1♂ (ASU, M-55); 1 mi inside gate, 14 June 1993 (Henson et al.), 2♂ (ASU, M-75–76); *Starr County:* FM 755, 2 mi N 83 (rock wall), 19 May 1992 (no collector), 1♂ (ASU, L-74); FM 755, 2 mi N 83, 19 May 1992 (no collector), 7♂1♀ (ASU, L-73, 80, 86, 1784, 1791–1797); Kelsay, hill SE Hwy 83, 24 Dec 1984 (Nilsson), 1♀ (WDS); 5 mi E Rio Grande City, 1 June 1939 (Mulaik), 1♀ + 14 young (AMNH); Rio Grande City, 21 Jan 1939 (Mulaik), 2♂3♀ (AMNH); Rio Grande City, no date (no collector), 1♀ (AMNH); *Terrell County:* Independence Creek/Oak Creek Campground, 7 mi off TX 349, 19 June 1998 (Henson et al.), 1♂ (ASU, Q-114); Independence Creek at SR 349, 26 August 1989 (Van Devender), 1♀ + 4 young (ASU, G-118, 1090); 1 mi S Pecos Co. line (S of Sheffield), 4 June 1986 (Manning), 1♀ (WDS); 19 mi S Sheffield, 16 May 1958 (McAlister), 1♀ (AMNH); 19 mi S Sheffield, 16–17 June 1958 (McAlister), 4♀ (AMNH); Sanderson, 26 May 1952 (Cazier et al.), 1♀ (AMNH); *Tom Green County:* Gun Club Road at 0.1 mi S Convergence in San Angelo (1900', 31.25N, 100.30W, under rock on rocky hillside), 24 May 1993 (McWest), 1♀ (WDS); *Upton County:* 3 mi S, 5 mi E McCarney, 7 June 1986 (Manning), 1♂ (WDS); *Val Verde County:* road to Amsted Recreation Area, E of Pecos River, 22 May 1996 (Henson et al.), 1♀ (ASU, D-2, 0376); 4.8 mi from Hwy 90, 4 July 1997 (Henson et al.), 1♂ (ASU, P-51); Devil's River State Park, under rock near headquarters, 13 May 1996 (Henson et al.), 1♀ (ASU, O-39); Devil's River State Natural Area, by old water tank, 30 June 1997 (Brunner et al.), 1♂ (ASU, P-15); Devil's River, old water tank, 15 June 1999 (Henson et al.), 7♂ (ASU, Q-5–6, 8, 10, 12, 14, 14A); Devil's River State Park, 1 mi from Nature Conservancy line, 17 June 1998 (Henson et al.), 1♂ (ASU, Q-88); Dolan Ranch Nature Conservancy, across river from Devil's River State Natural Area, 17 June 1998 (Henson et al.), 1♀ + 15 young (ASU, Q-67); Devil's River, windmill E of old water tank, 15 June 1999 (Henson et al.), 10♂3♀ (ASU, Q-15, 18, 21–24, 26, 28–33); 5.3 mi N Comstock on TX 1042, under rock outface, 16 May 1996 (Henson et al.), 1♀ (ASU, O-62); Devil's River State Park, across river at Nature Conservancy, 17 June 1998 (Henson et al.), 1♂ (ASU, Q-75); Dolan Ranch W of Devil's River, 2 July 1997 (Henson et al.), 1 juv. (ASU, P-29); Amsted Recreation Area, Pecos River Road to river, 22 May 1990 (Henson et al.), 1♀ (ASU, D-13, 0387); Seminole Canyon State Park, 30 September 1990 (Henson), 1♀ (ASU, F-283); Devil's River State Park, under rock, 13 May 1996 (Baldwin et al.), 1 juv. (ASU, O–38); Devil's River, 13 May 1996 (Henson et al.), 1♀ (ASU, O–40); 1 mi SSE Langtry, 7 June 1974 (Drape et al.), 6♂2♀, 1 juv. (WDS); Langtry, 19 March 1960 (Gertsch et al.), 3♀ (AMNH); *Webb County:* 32 mi E Laredo, 11 Nov 1934 (Mulaik), 5♀ (AMNH); 32 mi E Laredo, 9 Feb 1935 (Mulaik), 1♀ (AMNH); *Zapata County:* off US 83 near Environmental Oil and Gas Company, 12 May 1996 (Henson et al.), 1♂ (ASU, O-32); 2 mi N Zapata (under rock), 16 May 1995 (McWest), 1♂ (WDS). **MEXICO:** *Coahuila:* Saltillo, 22 Aug 1947 (Gertsch), 1♀ (AMNH); *Durango:* Tlahualilo, 1926 (no collector), 2♀ (UAF); *Nuevo León:* El Ebonito, nr. Mouth Sta. Roen w., no date (Pilsbry), 1♀ (ANS); 9 mi NNW, 2 mi N Mina, 15 July 1975 (Liner), 1♀ (FSCA); 10 km E Villa Aldama (steep cliff to north, much lava rock, 1pm), 18 December 1986 (Nilsson), 1♂ (JAN); *Unknown State:* 20 mi E San Pedro, 5 July 1936 (Davis), 1♀ (AMNH).

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