González Santillán, Edmundo, W. David Sissom, and Tila María Pérez, 2004. Description of the male of *Vaejovis sprousei* Sissom, 1990 (Scorpiones: Vaejovidae). Texas Memorial Museum, Speleological Monographs, 6:9-12.

DESCRIPTION OF THE MALE OF *VAEJOVIS SPROUSEI* SISSOM, 1990 (SCORPIONES: VAEJOVIDAE)

Edmundo González Santillán

Colección Nacional de Ácaros y Arácnidos
Departamento de Zoología, Instituto de Biología, UNAM
Apartado Postal 70-153
Distrito Federal, C. P. 04510 México

W. David Sissom

Department of Life, Earth, and Environmental Sciences
West Texas A&M University
WTAMU Box 60808
Canyon, Texas 79016 USA

Tila María Pérez

Colección Nacional de Ácaros y Arácnidos
Departamento de Zoología, Instituto de Biología, UNAM
Apartado Postal 70-153
Distrito Federal, C. P. 04510 México

ABSTRACT

The male of *Vaejovis sprousei* Sissom, 1990 is described, based on a recently collected specimen from Cueva del Escorpion in Nuevo León, México. The hemispermatophore, which bears several distinctive features (a dorsal crest at the distal end of the distal lamina, a single blunt hook at the distal end of the dorsal trough margin, and a series of denticles associated with the sperm duct), is described and illustrated. This and a second record from Cueva del Mono near Dulces Nombres, Nuevo León, represent the first cave records for the species.

INTRODUCTION

Sissom (1990) redescribed *Vaejovis dugesi* Pocock, 1902 and described two related species from northeastern Mexico (*V. sprousei*) and the Chisos Mountains in Big Bend National Park, Texas (*V. chisos*). All three species, currently assigned to the *Vaejovis mexicanus* group (Sissom, 1990, 2000), are uncommon in museum collections. *Vaejovis dugesi* and *V. chisos* were represented

only by females, but in the case of *V. sprousei* a subadult male was also available. A few new specimens of *V. sprousei* have accumulated since the original description, including the first adult male, which is herein described. Two of the new records are from caves, the first such records for this species.

Group assignment of these three species is becoming questionable. As new species have accumulated, it is increasingly apparent that the *mexicanus* group of *Vaejovis* is a heterogeneous assemblage that may be divisible into several subgroups. Interspecific variation in hemispermatophores is noteworthy (Sissom 1990, 1991) and is expected to contribute to a refinement of our knowledge of phylogenetic relationships within and between the groups currently assigned to the genus *Vaejovis*. Therefore, descriptions of males and hemispermatophores of all taxa are highly desirable.

Hemispermatophore terminology follows that of Lamoral (1979) and the identification of the sperm duct floor is from Stockwell (1989:130). The convex surface, which would be exposed on the outside when the two hemispermatophores are joined to form the spermatophore, is termed the dorsal side. The concave (medial) surface is referred to as the ventral side. Orthobothriotaxia designation follows Vachon (1974).

Vaejovis sprousei Sissom, 1990
Figs. 1-5

Vaejovis sprousei Sissom, 1990:48, 51-53, fig. 3A-G.
Vaejovis sprousei, Kovarik, 1998:148; Sissom, 2000: 543; Beutelspacher, 2000:22, 110, map 90.

Type Data.—Holotype female taken from Conrado Castillo, Tamaulipas, Mexico, on 19 April 1981 (Peter Sprouse); deposited in AMNH; examined.

Distribution.—Known from the southern portions of Nuevo León and adjacent Tamaulipas, Mexico.

Description of Male.—Coloration. Carapace and tergites orange brown with underlying dusky markings. Metasomal segment I-V orangish brown. Telson orange, aculeus dark reddish brown. Cheliceral manus and teeth yellow. Pedipalp femur orange, patella orange brown. Chela palm orange brown. Fingers orange brown basally, yellowish distally. Keels of pedipalps brownish. Metasoma dark brown. Legs yellowish with dusky markings.

Prosoma. Carapace length greater than posterior width. Median ocular prominence slightly raised above carapacial surface. Anterior margin obtusely emarginate; median notch rounded. Entire carapacial surface finely granular interspersed with larger granules.

Mesosoma. Median carina obsolete on I-III; weak, smooth on IV-VI. Tergite VII with median carinae present on anterior one-third, weak, smooth; lateral carinae strong, granulose. Pectinal teeth numbering 18-18. Sternites III-VI smooth, sparsely setose. Sternite VII with pair of moderate, granular lateral carinae.

Metasoma. Segment I 0.91 times as long as wide; III 1.30 times longer than wide; V 2.88 times longer than wide. Segments I-IV: Dorsolateral carinae on I-IV strong serrate; distalmost denticle enlarged, spinoid on I-IV. Lateral supramedian carinae on I-IV strong serrate; distalmost denticle enlarged spinoid on I-III and on IV flared. Lateral inframedian carinae on I strong, complete, serrate; on II present on posterior half, strong, serrate; on III present on posterior one-third, moderate, serrate; on IV absent. Ventrolateral carinae on I-IV strong, serrate. Ventral submedian carinae on I-IV strong, serrate. Dorsal and lateral intercarinal spaces with scattered coarse granules. Segment V: Dorsolateral carinae moderate, serrate to granulate. Lateromedian carinae moderate, present on anterior two-thirds, irregularly crenulate. Ventrolateral and ventromedian carinae strong, serrate. Dorsal and lateral surfaces with scattered coarse granules. Metasomal I-IV carinal setation: dorsolaterals, 0:1:1:2; lateral supramedians, 0:0:1:2; lateral inframedians, 1:1:1:1; ventrolaterals, 2:3:3:3; ventral submedians, 3:3:3:3; ventromedian intercarinal spaces of segments II-IV without accessory seta. Setation of metasomal segment V: dorsolaterals, 2; laterals 3; ventrolaterals, 6.

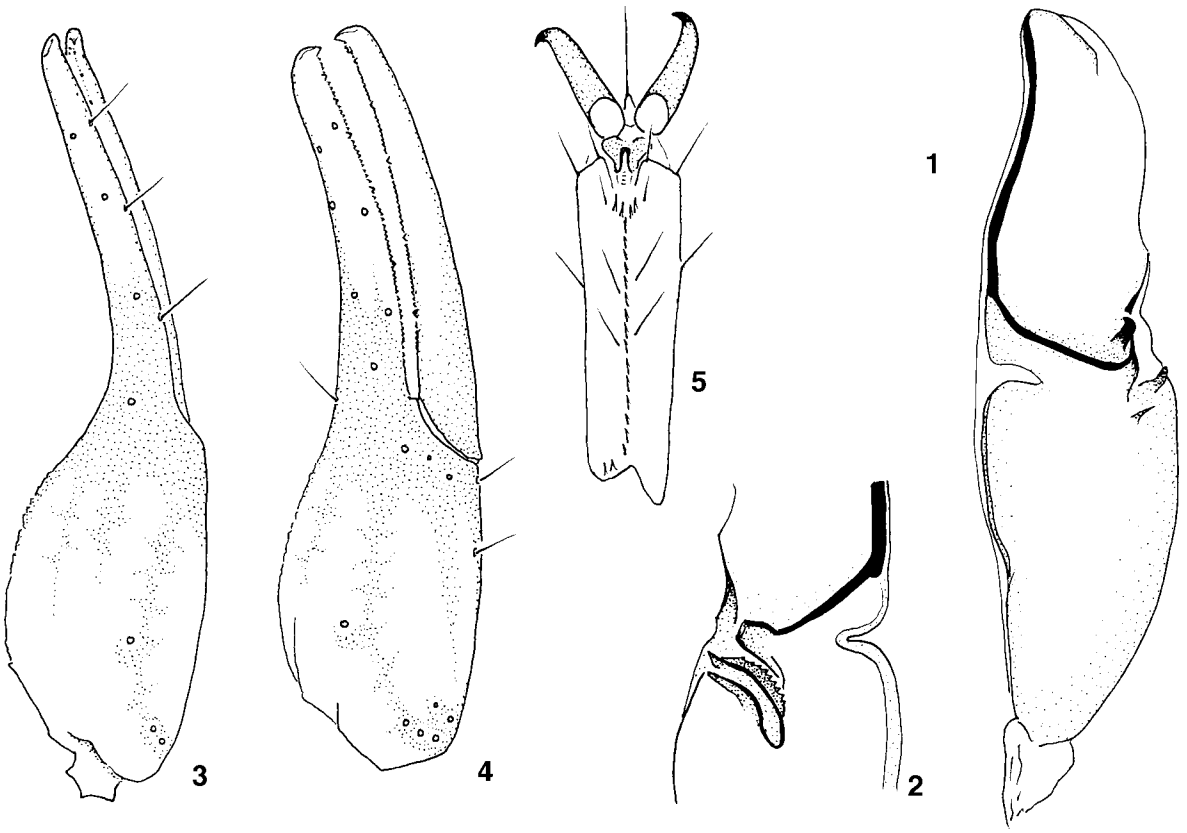
Telson. Dorsal surface of vesicle with a broad, elongate whitish patch (gland?); ventral surface with seven pairs very fine, long setae.

Hemispermatophore (Figs. 1-2). General appearance short and broad; distal lamina with a distal crest on dorsal surface and a single, blunt hook-like structure near the base. Capsular area with simple invaginated sperm duct floor, without conspicuous lobes or processes. Sperm duct flanked along distal edge by distinct denticle-like structures.

Pedipalps. Femur length/width ratio 3.43. Femur tetracarinate: Dorsointernal, dorsovexternal, and ventrointernal carinae strong, granulose; ventroexternal carina strong, composed of large, irregularly spaced, sharp granules. Internal face with 7-9 larger, pointed granules; ventral face with coarse granulation on proximal portion; dorsal face with sparse fine granulation. Orthobothriotaxia C.

Patella tetracarinate. All carinae strong, granulose. Internal face with moderate basal tubercle and 7-9 large, subconical granules arranged in longitudinal row. External, dorsal and ventral faces finely granular. Orthobothriotaxia C.

Chela (Figs. 3-4). Dorsal marginal, dorsal secondary, digital, external secondary, ventroexternal, ventromedian and ventrointernal carina weak and smooth. Dorsointernal carina slightly crenulate. Dentate margin



Figs. 1-5. 1, dorsal view of hemispermatophore; 2, ventral view of hemispermatophore; 3, dorsal aspect of pedipalp chela; 4, lateral aspect of pedipalp chela; 5, ventral aspect of left telotarsus III (for setal pattern, only pigmented macrochaetes shown).

of fixed finger with primary row divided into six subrows by five enlarged granules; six inner accessory granules. Dentate margin of movable finger with primary row divided into six subrows by five enlarged granules; apical subrow consisting of a single granule; seven inner accessory granules, of which all but the basalmost and distalmost are paired with a larger granule in the primary denticle row. Fingers without distinct scalloping. Chela length/width ratio 3.97; fixed finger length/carapace length ratio 0.77. Orthobothriotaxia C.

Legs. Ventromedian spinule row of telotarsus flanked distally by two pairs of larger spinules (Fig. 5).

Measurements (mm): Total L, 31.80; carapace L, 4.05; mesosoma L, 8.95; metasoma L, 14.45; telson L, 4.35. Metasomal segments: I L/W, 1.95/2.15; II L/W, 2.25/1.90; III L/W, 2.40/1.85; IV L/W, 3.10/1.75; V L/W, 4.75/1.65. Telson: vesicle L/W/D, 3.00/1.40/1.25; aculeus L, 1.35. Pedipalps: femur L/W, 3.60/1.05; patella L/W, 3.95/1.30; chela L/W/D, 6.15/1.55/1.80; fixed finger L, 3.10; movable finger L, 3.70; palm (underhand) L, 2.80.

Comments.—In general appearance, the hemispermatophore of *V. sprousei* is similar to those of certain other *mexicanus* group species for which the hemispermatophore is known (Sissom 1989). Like *Vaejovis monticola*, the hemispermatophore is robust. A distal crest on the distal lamina is also known in *V. rossmani* and *V. monticola*. As is typical of the group, the capsule of the ventral surface is simple, with the most conspicuous structure being the invaginated floor of the sperm duct. The denticle-like structures distal to the sperm duct invagination are thus far unique to *V. sprousei*. At the distal end of the dorsal trough margin is a hook-like structure, but in the case of *V. sprousei*, there is only a single, blunt hook (instead of a double hook, which is present in some species).

New Records.—*Nuevo León*: Cueva del Escorpión, Ejido Tinajas (UTM 446872 2647939 1515 NAD27), 1 January 1998 (J. Kreica), 1 male (AMNH); 7.8 mi N La Ascensión, 20 July 1979 (E. A. Liner), 1 juv. (FSCA); Cerro Potosí, 1.4 mi W 14 de Marzo, 25 July 1973 (Liner, Johnson), 1 female (FSCA); Cueva del Mono, 3 km E Garza, 8 km NW Dulces Nombres, 12 October 1987 (S. Lasko), 1 female (TMM). *Tamaulipas*: 24 km SW Ciudad Victoria, 26 July 2002 (Prendini, González Santillán, Francke), 1 female (UNAM, preserved in 95% ethanol).

ACKNOWLEDGMENTS

We are grateful to James R. Reddell of the Texas Memorial Museum (TMM), who made the new male specimen available for study. We also thank Douglas Rossman for the specimens that are being deposited at the Florida State Collection of Arthropods (FSCA), Gainesville. The specimen to be deposited at the Universidad Nacional Autónoma de México (UNAM) is part of a DNA study being conducted by Lorenzo Prendini, American Museum of Natural History (AMNH), New York.

A visit to WTAMU, for the senior author to study material was made possible by funding from the Cordinación de Posgrado en Ciencias Biológicas, UNAM. Oscar F. Francke and James C. Cokendolpher kindly reviewed the manuscript; their suggestions are greatly appreciated.

LITERATURE CITED

Beutelspacher, C. R. 2000. Catálogo de los alacranes de México. Universidad Michoacana de San Nicolás de Hidalgo, 175 pp.

Kovarík, F. 1998. Stiri. (Scorpions). Madagaskar, Jilhava. 175 pp. (in Czech).

Lamoral, B. H. 1979. The scorpions of Namibia (Arachnida: Scorpionida). Annals of the Natal Museum, 23(3):497-784.

Sissom, W. D. 1989. Systematic studies on *Vaejovis granulatus* Pocock and *Vaejovis pusillus* Pocock, with descriptions of six new related species (Scorpiones, Vaejovidae). Revue Arachnologique, 8(9):131-157.

Sissom, W. D. 1990. Systematics of *Vaejovis dugesi*, new status Pocock, with descriptions of two new related species (Scorpiones, Vaejovidae). Southwestern Naturalist, 35(1):47-53.

Sissom, W. D. 1991. Systematic studies on the *nitidulus* group of the genus *Vaejovis*, with descriptions of seven new species (Scorpiones, Vaejovidae). Journal of Arachnology, 19:4-28.

Sissom, W. D. 2000. Family Vaejovidae Thorell, 1876. Pp. 503-553 *in* Fet, V., W. D. Sissom, G. Lowe, and M. Braunwalder. Catalog of the scorpions of the world (1758-1997). New York Entomological Society, 690 pp.

Stockwell, S. A. 1989. Review of the phylogeny and higher classification of scorpions (Chelicerata). Ph.D. Dissertation, University of California, Berkeley, 413 pp.

Vachon, M. 1974. Étude des caractères utilisés pour classer les familles et les genres de Scorpions (Arachnides). 1. La trichobothriotaxie en Arachnologie, Sigles trichobothriaux et types de trichobothriotaxie chez les Scorpions. Bulletin du Muséum National d'Histoire Naturelle, Paris, (3), 140 (Zool. 104):857-958.