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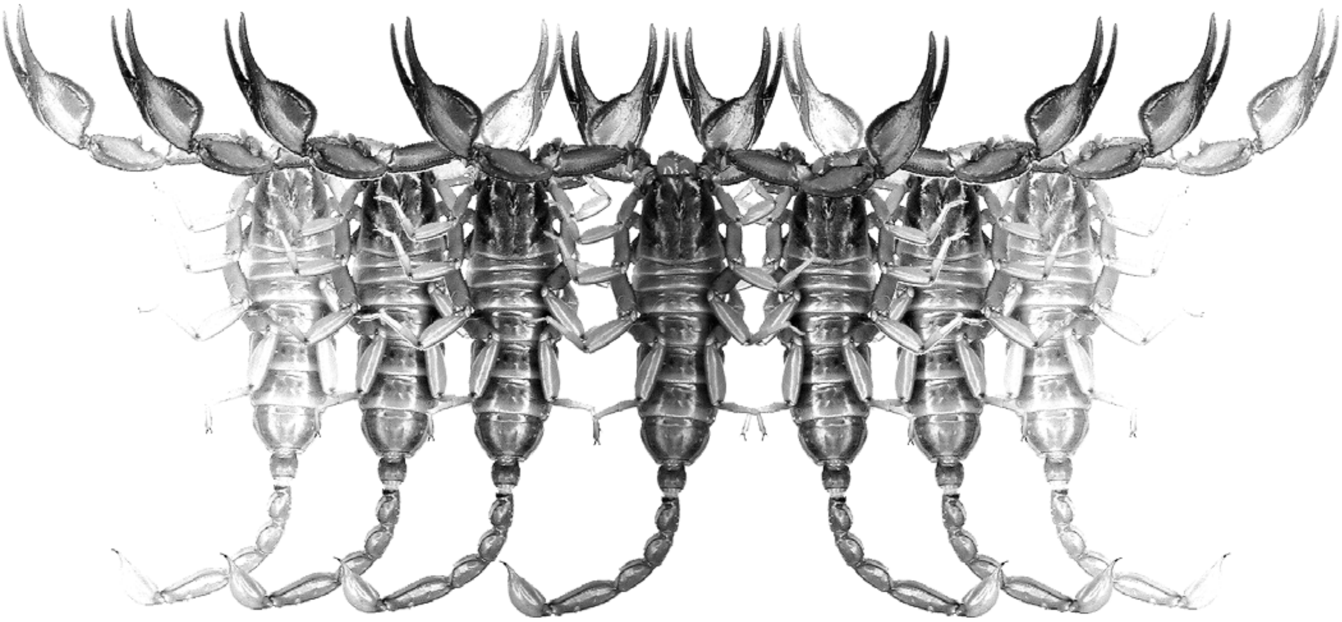

A New Scorpion Genus (Scorpiones: Vaejovidae) from Mexico

Michael E. Soleglad and Victor Fet

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EDITOR: **Victor Fet**, Marshall University, **'fet@marshall.edu'**

ASSOCIATE EDITOR: **Michael E. Soleglad, 'soleglad@la.znet.com'**

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Euscorpius — **Occasional Publications in Scorpiology. 2005, No. 24**

A new scorpion genus (Scorpiones: Vaejovidae) from Mexico

Michael E. Soleglad [1] and Victor Fet [2]

[1] P. O. Box 250, Borrego Springs, California 92004, USA
[2] Department of Biological Sciences, Marshall University, Huntington, WV 25755-2510, USA

Summary

A new vaejovid genus from Mexico, *Franckeus*, **gen. nov.**, is described based on unique neobothriotaxy. Species placed in this genus are from the *Vaejovis* "nigrescens" group (previously called the "nitidulus" group). Six species comprise this new genus, distributed throughout Mexico (mainland as well as Baja California Sur): *Franckeus nitidulus*, *F. rubrimanus*, *F. platnicki*, *F. minckleyi*, *F. kochi* and *F. peninsularis*. A new species of the *Vaejovis* "nigrescens" group, *Vaejovis davidi*, **sp. nov.**, is also described.

Introduction

In the early 1970s Oscar Francke called to the attention of the senior author the unusual trichobothrial patterns of *Vaejovis minckleyi* Williams, 1968, in particular, the neobothriotaxy present on the external surface of the pedipalp patella. Neobothriotaxy is quite rare in the vaejovids (see Soleglad & Fet, 2003: 41) and therefore, Francke believed the character was important enough to place *V. minckleyi* in its own genus. However, after further analysis, Francke decided that *V. minckleyi* was closely related to several other Mexican species that did not exhibit this unusual neobothriotaxy and therefore did not erect a new genus at that time.

Since Francke's early observation of neobothriotaxy in *V. minckleyi*, no less than five additional species have been described from Mexico (Williams, 1980; Sissom & Francke, 1985; Sissom, 1991), each exhibiting the *identical* neobothriotaxy as that seen in *V. minckleyi*. These species are widely distributed in the eastern Mexico (from north-eastern to central eastern states) as well as in Baja California Sur. Soleglad & Fet (2003: 41, Fig. 80) also stressed the importance of the unusual neobothriotaxy found in these species.

In this paper we establish a new genus, *Franckeus*, to accommodate the six Mexican species exhibiting the neobothriotaxy originally identified by Francke. With the removal of *V. nitidulus* from the "nitidulus" group, we have opted to rename it as the *Vaejovis* "nigrescens" group. Below we discuss in detail the diagnostic characters of the new genus *Franckeus*, a distribution map of its species, review of the current diagnostic characters of the *Vaejovis* "nigrescens" group, and the description of a new species in this group, *Vaejovis davidi*. In addition, illustrations of select structures, including the trichobothrial patterns, of species *Franckeus peninsularis* (Williams, 1980) and *Vaejovis janssi* Williams, 1980 are provided here for the first time.

Methods & Material

Terminology and conventions

Terminology describing pedipalp chelal ornamentation follows that described and illustrated in Soleglad & Sissom (2001). Terminology for the pedipalp patella follows that described in Soleglad & Fet (2003).

SEM microscopy

To investigate the chelal fingers, the chela was removed from the animal and fixed for 12 hours in 0.1M sodium cacodylate with 2.5% glutaraldehyde (freshly prepared). After rinse/soak for 12 hours in plain 0.1 M sodium cacodylate, specimens were post-fixed for 2 hours in freshly prepared 1% osmium tetroxide again in sodium cacodylate. Specimens were rinsed three times with distilled water and dehydrated in an ethanol series (50, 75, 95, and two changes of 100%) before being dried and coated with gold/palladium (ca. 10 nm thickness) in a Hummer sputter coater. Digital SEM images were acquired with a JEOL JSM-5310LV at Marshall University, West Virginia. Acceleration voltage (10–20 kV), spot size, and working distance were adjusted as necessary to optimize resolution, adjust depth of field, and to minimize charging.

Abbreviations

List of depositories: AMNH, American Museum of Natural History, New York, New York, USA; CAS, California Academy of Sciences, San Francisco, California, USA; MES, Personal collection of Michael E. Soleglad, Borrego Springs, California, USA.

Other: ABDSP, Anza-Borrego Desert State Park, San Diego and Riverside Counties, California, USA.

Material examined

The following material was examined for analysis and/or illustrations provided in this paper. Refer to this section for locality and gender data of species-level illustrations. Note, this material reflects the taxonomic changes established in this paper: *Franckeus*, **gen. nov.**, and *Vaejovis davidi*, **sp. nov.** See appropriate section below for official emendations.

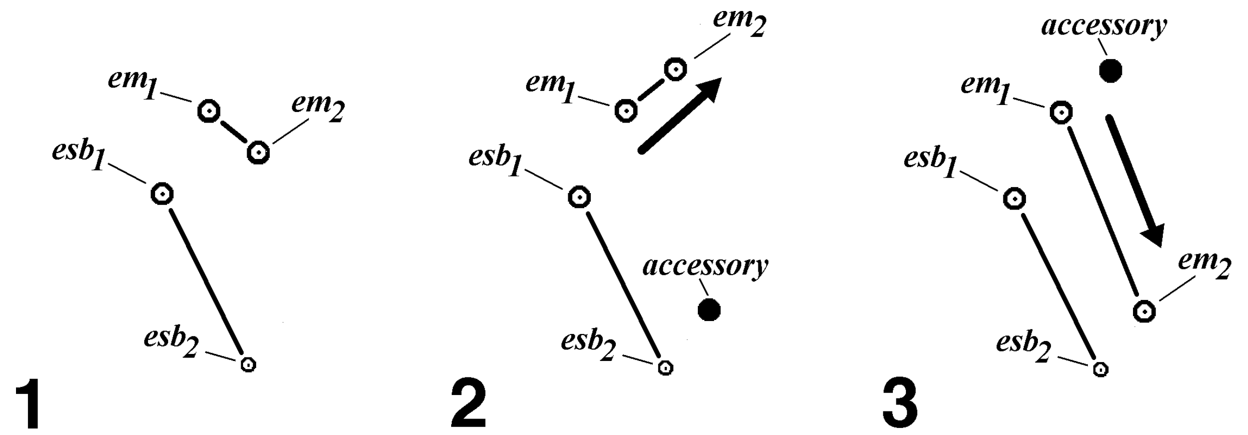
Vaejovidae: *Franckeus minckleyi* (Williams, 1968), Cuatro Cienegas, Coahuila, Mexico, 1 ♂ 2 ♀ (CAS); *Franckeus peninsularis* (Williams, 1980), San Raymundo, Baja California Sur, Mexico, 3 ♂ 1 ♀ paratypes (CAS); *Pseudouroctonus reddelli* (Gertsch & Soleglad, 1972), Conal County, Texas, USA, ♀ (MES); *Serradigitus adcocki* (Williams, 1980), Isla Cerralvo, Baja California Sur, Mexico, ♀ (CAS); *Serradigitus calidus* (Soleglad, 1974), Cuatro Cienegas, Coahuila, Mexico, ♀ paratype (MES); *Serradigitus deserticola* (Williams, 1970), Saratoga Springs, Death Valley, California, USA ♀ (MES); *Serradigitus gertschi gertschi* (Williams, 1968), Chariot Canyon, ABDSP, California, USA, ♀ (MES); *Serradigitus joshuaensis* (Soleglad, 1972), ABDSP, California, USA ♂ (MES); *Serradigitus minutis* (Williams, 1970), Cabo San Lucas, Baja California Sur, Mexico, ♂ (MES); *Serradigitus subtilimanus* (Soleglad, 1972), ABDSP, California, USA, ♀ (MES); *Serradigitus wupatkiensis* (Stahnke, 1940), Wupatki National Monument, Coconino Co., Arizona, USA, ♀ (MES); *Vaejovis carolinianus* (Beauvois, 1805), Haralson Co., Georgia, USA, ♀ (MES); *Vaejovis davidi* Soleglad & Fet, **sp. nov.**, Cuelzalan, Puebla, Mexico, ♀ holotype (AMNH); *Vaejovis decipiens* Hoffmann, 1931, Chinipas, Chihuahua, Mexico, ♀ (MES); *Vaejovis intermedius* Borelli, 1915, Monclova, Coahuila, Mexico, ♀ (MES); *Vaejovis janssi* Williams, 1980, Isla Socorro, Mexico, 3 ♂ 1 ♀ (MES), 2 ♂ 2 ♀ (CAS); *Vaejovis jonesi* Stahnke, 1940, Sedona, Coconino Co., Arizona, USA, 2 ♀ (MES); *Vaejovis lapidicola* Stahnke, 1940, Williams, Coconino Co., Arizona, USA, ♂ (MES); *Vaejovis mexicanus mexicanus* (C.L. Koch, 1836), Aculco, Distrito Federal, Mexico, ♀ (MES); *Vaejovis nigrescens* Pocock, 1898, Pachuca, Hidalgo, Mexico, 2 ♀ (MES); *Vaejovis paysonensis* Soleglad, 1973, Payson, Gila Co., Arizona, ♀ (MES); *Vaejovis pococki* Sissom, 1991, Rioverde, San Luis Potosí, Mexico, ♂ (MES); *Vaejovis solegladi* Sissom, 1991, Cuicitlan, Oaxaca, Mexico, ♀ (MES), Teotitlan, Oaxaca, Mexico, ♀ (MES).

Systematics

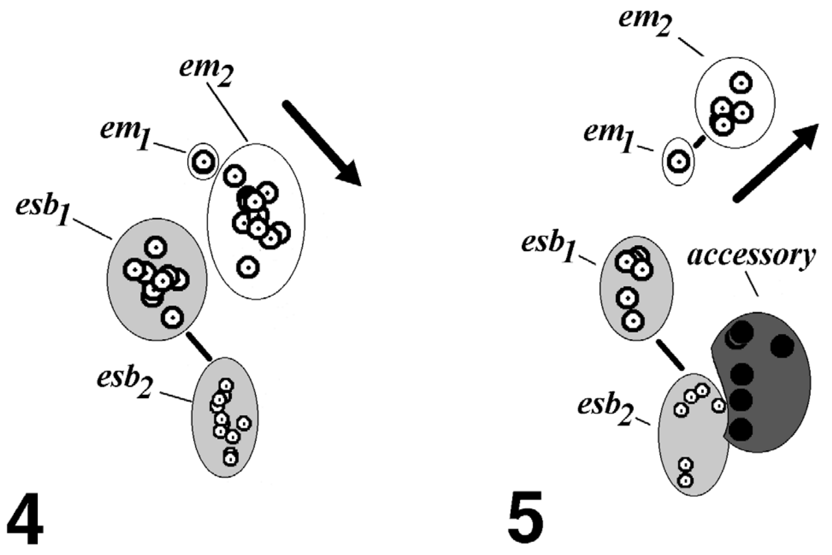
Character analysis

Neobothriotaxy. Sissom & Francke (1985: Figs. 3, 11-13, 46) illustrated for the first time the unique neobothriotaxy exhibited in the species *Vaejovis nitidulus* and *V. minckleyi*, which we now include in the genus *Franckeus*. Sissom (1991: Figs. 14, 34, 54) illustrated this neobothriotaxy for three additional species, *Vaejovis kochi*, *V. platnicki* and *V. rubrimanus*. In a key, Sissom & González (2004) stated that *V. peninsularis* also exhibited this unique neobothriotaxy (illustrated for the first time in this paper, Figs. 6, 11). What is interesting and crucial about these illustrations is that the neobothriotaxy formation is essentially *identical* across all six species. In Figs. 6 and 7 we contrast the trichobothrial pattern of the pedipalp patella extern for all species of the new genus *Franckeus* and the *Vaejovis* "nigrescens" group (only *V. norteno* is not represented). These figures alone show the consistency within and the differences between the two assemblages in the *em* and *esb* trichobothrial series. It is important to point out here, except for the *em* and *esb* series, the trichobothrial patterns are essentially identical across *Franckeus* and the *Vaejovis* "nigrescens" group.

Soleglad & Fet (2003: 41, Fig. 80) suggested that the single accessory trichobothrium most likely belonged to the *em* series (i.e., not the *esb* series as suggested by Sissom & Francke, 1985). They reasoned that in order to realize Sissom & Francke's (1985) interpretation, the *em* series would slant towards the distal aspect of the segment, unprecedented in the vaejovids. In their interpretation, the *em* series angles proximally, as in most vaejovids, but the distance between em_1 and em_2 increases considerably. In Figs. 1-3, we illustrate the typical *em* and *esb* configurations found in the *Vaejovis* "nigrescens" group, and two interpretations of the neobothriotaxy exhibited in *Franckeus*. What is clear from these figures (and the patterns illustrated in Figs. 6



Figures 1-3: Patellar trichobothrial configurations for external series *em* and *esb*. **1.** Typical configuration for *Vaejovis* "nigrescens" group, showing *em* series angling towards the proximal aspect of the patella. **2.** Configuration for *Franckeus*, hypothesizing *em* series slanting towards distal aspect of the patella, *accessory* trichobothria positioned adjacent to esb_1 (after Sissom & Francke, 1985). **3.** Configuration for *Franckeus*, hypothesizing *em* series slanting towards proximal aspect of the patella, *accessory* trichobothria positioned adjacent to em_1 (after Soleglad & Fet, 2003).



Figures 4-5: Clustered trichobothrial patterns of the patellar external series *em* and *esb*. **4.** *Vaejovis* "nigrescens" group. **5.** *Franckeus*. Each cluster is anchored at trichobothrium em_1, the other trichobothria clusters are plotted from this trichobothrium. *em* series is shaded white, *esb* series is shaded light gray and the *accessory* trichobothrium is shaded dark gray. Trichobothria plots, 11 species for "nigrescens" group and six species for *Franckeus*, are based on patterns illustrated in Figs. 6-7, only species *Vaejovis norteno* is not represented.

and 7) is that we can identify with some certainty trichobothria em_1, esb_1 and esb_2 (which is petite), only em_2 and the *accessory* trichobothrium are in question --- that is, the two remaining trichobothria in the five-trichobothria configuration must be chosen from these two designations. Contrary to our argument presented in Soleglad & Fet (2003), we have decided that the original designation of Sissom & Francke (1985) is the most likely to be correct. We base this conclusion on the distances that em_2 must migrate (Fig. 3) versus the slight angling distally (Fig. 2). In either situation, this neobothriotaxy, a single accessory trichobothrium, is augmented with the movement of the em_2 trichobothrium, hypothesize here as a movement distally, thus the series em_1-em_2 angles toward the distal aspect of the segment. Consequently, from a cladistics point of view, we consider the *accessory* trichobothrium and em_1-em_2 slanting distally as two separate derivations. Alternatively, one may choose to consider these as a single character, hypothezing some inherent dependency between the two. We disagree with this however, and therefore adopt the former thesis.

The consistency of the five-trichobothria pattern found in *Franckeus* is remarkable. As stated above, we see all six species complying to this pattern, exhibiting only small dislocations of trichobothria. Figures 4 and 5 show the tight clustering of these trichobothria for both the *Vaejovis* "nigrescens" group and *Franckeus*. These

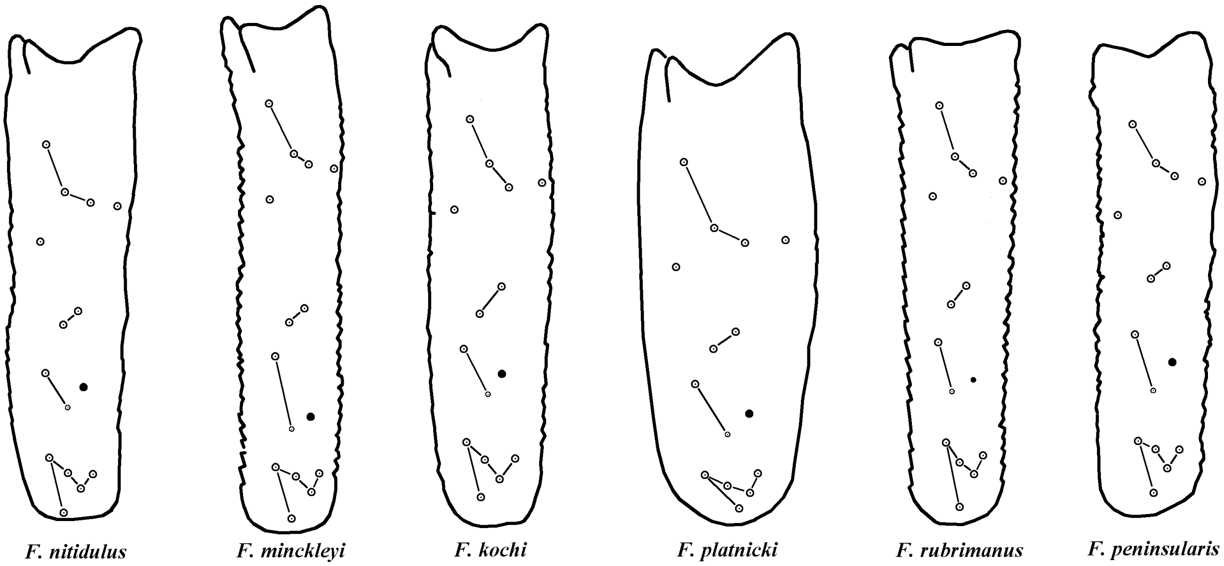


Figure 6: Trichobothrial patterns of external aspect of pedipalp patella for genus *Franckeus*. Patterns based on specimen of *F. peninsularis* and, in part, on Sissom & Francke (1985: Figs. 11, 46) and Sissom (1991: Figs. 14, 34, 54). Orthobothriotaxy depicted as opened circles and *accessory* trichobothrium depicted as a closed circle.

figures are based on the patterns depicted in Figs. 6 and 7, which, in turn, were based, in most part, from published patterns of type specimens (i.e., Soleglad, 1975; Sissom & Francke, 1985; Sissom, 1986, Sissom, 1986, 1991; Capes, 2001). Sissom & Francke (1985: Figs. 11-13) illustrated the variability found in the *em*/*esb* configurations for *F. nitidulus*. In these patterns we see the angling of the *em* series exhibiting the most variability, from angling proximally, parallel, to angling distally. We consider the distal slant typical of the genus, however, since it is illustrated in all other species described. In addition, in the material we examined, 14 samples in all: three specimens of *F. minckleyi* (six samples, both patellae) and four specimens of *F. peninsularis*, the *em* series always slants distally.

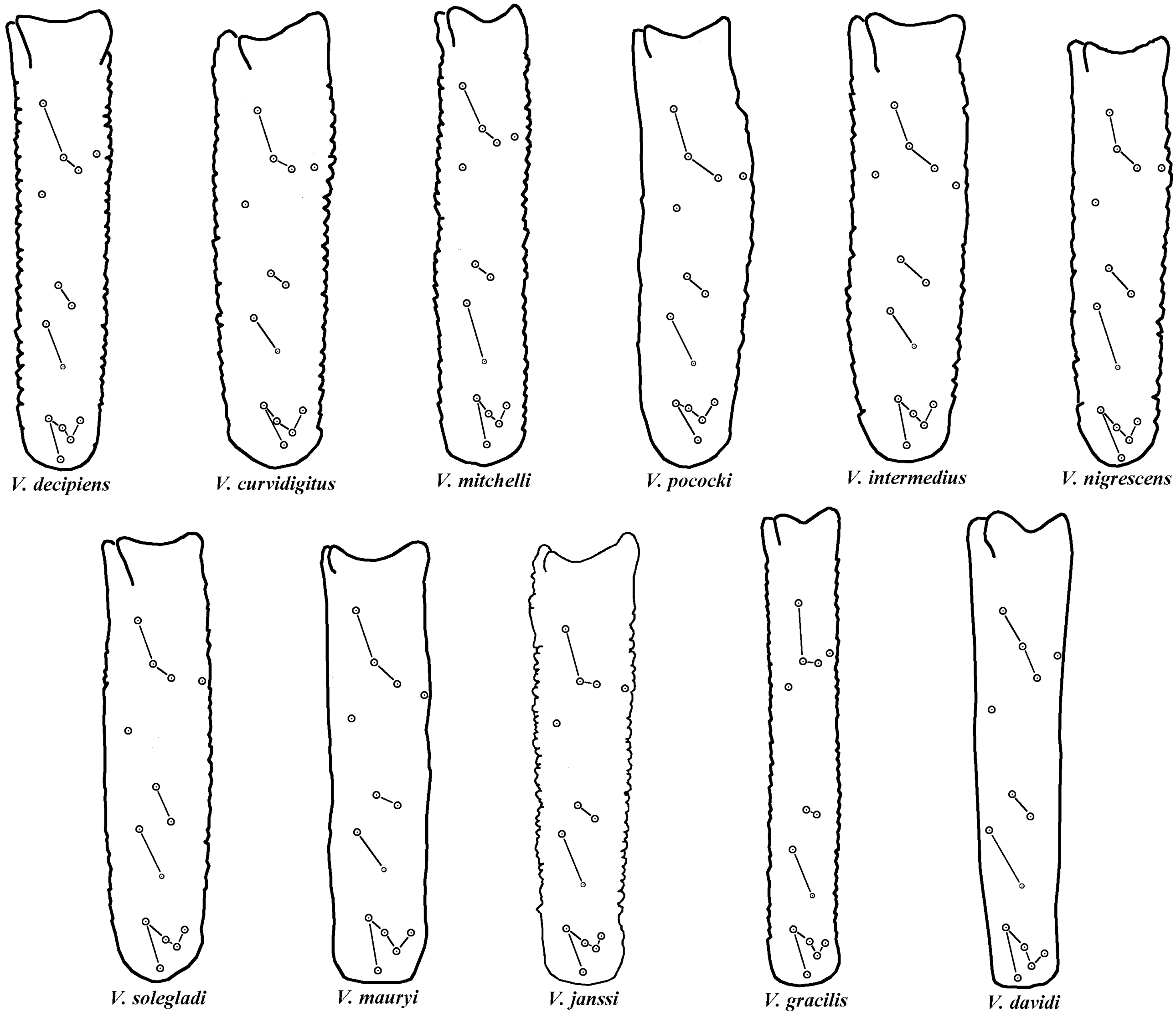
***Vaejovis* "nigrescens" group + *Franckeus*.** Sissom & Francke (1985) first defined the *Vaejovis* "nigrescens" group + *Franckeus* (originally termed "nitidulus" group). They provided seven diagnostic characters for the definition of this *Vaejovis* group. Sissom (1991) refined these seven diagnostic characters, adding an additional seven characters, three of which were characteristics of the hemispermatophore. Capes (2001) again presented the diagnostic characters for this group, this time listing thirteen characters (eliminating one of the hemispermatophore characters). Stockwell (1989), in his unpublished PhD dissertation, characterized this group (which he assigned to an unpublished genus, "*Sissomius*") with ten diagnostic characters. In general, Stockwell's (1989) diagnosis was consistent with the current definition of this assemblage.

It is interesting to note here that a large majority of these thirteen diagnostic characters (we use the list of Capes, 2001, since it is the latest to date) are not exclusive to the *Vaejovis* "nigrescens" group + *Franckeus*. That is, they cannot necessarily be considered as derived (i.e., synapomorphic) for this group. We now discuss each character with respect to other vaejovid genera and *Vaejovis* groups.

"the anterior margin of the carapace is obtusely emarginate, with a distinct median notch": This character excludes, in general, *Paruroctonus*, *Smeringurus*, and *Vejovoidus* and members of the *Vaejovis* "eusthenura" group. Other vaejovids, such as *Pseudouroctonus*, *Vaejovis* "mexicanus" group (as defined by Soleglad, 1973), comply to this character. *Serradigitus* and the *Vaejovis* "punctipalpi" group also have emarginate carapaces and usually exhibit a slight anterior indentation, though not as wide as seen in the *Vaejovis* "nigrescens" group + *Franckeus*.

"the genital opercula of the female possess a membranous longitudinal connection on the anterior two-thirds to four-fifths": This character, as stated, pertains to a wide spectrum of vaejovids, including *Paruroctonus*, *Smeringurus*, *Vejovoidus*, *Pseudouroctonus*, *Uroctonites* and members of the *Vaejovis* "mexicanus" group (as defined by Soleglad, 1973). As stated, *Serradigitus*, *Syntropis* and the "eusthenura" and "punctipalpi" groups of *Vaejovis* are excluded by this character.

"the pectinal teeth of the female are all subequal in size": This character excludes only the genus *Serradigitus*, whose basal pectinal teeth (1-3) of the female are, in most cases, elongate, smooth, and lacking senso-



V. decipiens *V. curvidigitus* *V. mitchelli* *V. pococki* *V. intermedius* *V. nigrescens*

V. solegladi *V. mauryi* *V. janssi* *V. gracilis* *V. davidi*

Figure 7: Trichobothrial patterns of external aspect of pedipalp patella for “nigrescens” group of genus *Vaejovis*. Patterns based on specimen of *V. janssi* and, in part, on Soleglad (1975: Fig. 25), Sissom & Francke (1985: Figs. 16, 26, 36), Sissom (1986: Fig. 4), Sissom (1991: Figs. 4, 24, 44, 64) and Capes (2001: Fig. 3).

rial areas (see Soleglad, 1974: Figs. 1-6, and Sissom & Stockwell, 1991: Figs. 1, 14, 27, 36, for illustrations of varied manifestations of this character in *Serradigitus*).

“the ventral submedian carinae of the metasoma are obsolete to moderate and crenulate”: This character is quite curious indeed, since it spans almost the complete spectrum of a carina’s development — from obsolete to crenulate (only vaulted and/or serrulate is more defined). In the original statement of this character (Sissom & Francke, 1985), we see “… usually obsolete …” . It appears as more species were identified and described in this group, this character was expanded to be more general. For example, *Vaejovis davidi* **sp. nov.** described in this paper has crenulated ventromedian carinae on segments I-IV. We consider this character to be of questionable diagnostic value. In general, any scorpion genus with a sizable number of species will reflect a wide spectrum of carinal development. It might be added here that Hoffmann (1931) used the relative development of the ventral metasomal carinae to partition the various Mexican species of *Vaejovis* into three “sections”: carinae essentially obsolete — *V. spinigerus*, *V. bilineatus*, *V. punctatus* and *V. nitidulus*; carinae present but smooth — *V. intrepidus* and *V. subcristatus*; and carinae present and granulose — *V. granulatus* and *V. mexicanus*.

“the cheliceral movable finger bears a well developed serrula on the ventrodistal aspect”: Only the related genera *Paruroctonus*, *Smeringurus, Vejovoidus* and *Paravaejovis* are excluded by this character. If “well developed” is emphasized, then some members of the

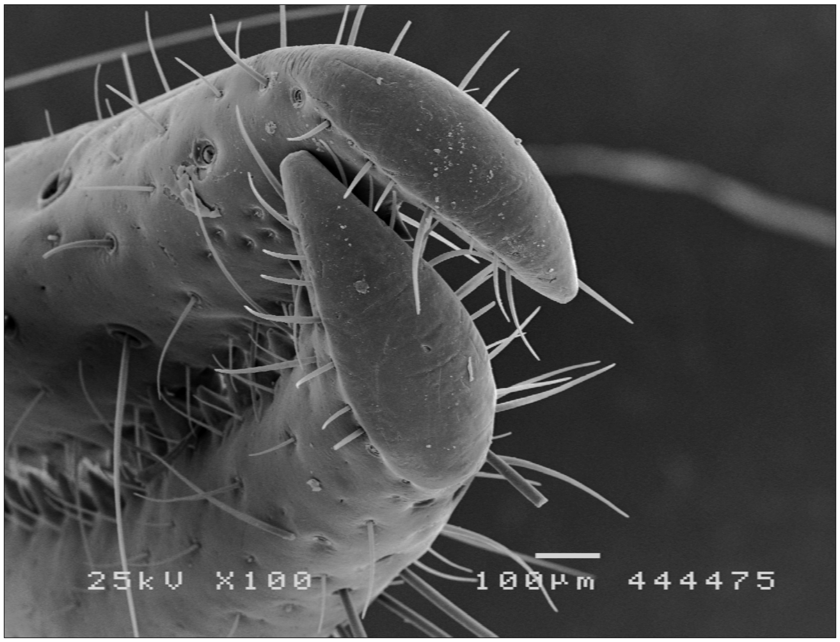


Figure 8: Chelal finger terminus of *Serradigitus subtilimanus* showing the apical "white patch" of the fixed and movable fingers.

"eusthenura" and "punctipalpi" groups may be partially excluded as well. Again, *Serradigitus*, *Pseudouroctonus*, *Uroctonites* and the *Vaejovis* "mexicanus" group have well developed serrulae.

"the pedipalps are relatively elongated, with chela length/width ratios greater than 3.3 and usually greater than 4.0": This is an interesting morphometric ratio and seems to hold up for the species of this group. However, in general, morphometric ratios are not good diagnostic characters for taxonomic levels above the species (there are exceptions, of course). As with carinal development, genera with large species sets usually exhibit the spectrum of small to large, and stocky to slender species. *Serradigitus* complies with this character as well: we measured the chelae of eight species spanning a wide spectrum of geographical localities, the ratio ranging 4.250-5.857 (4.805). Slender species such as *Syntropis* and *Vaejovis viscainensis* ("eusthenura" group) would not be excluded by this character as well.

"the pedipalp chela fingers in most species terminate in enlarged claw-like denticles bearing an apical white patch": This character is present in the *Vaejovis* "nigrescens" group + *Franckeus* as well as in *Serradigitus*, both typically lithophilic scorpions. It excludes *Paruroctonus*, *Smeringurus*, *Vejovoidus*, and the *Vaejovis* "eusthenura" and "punctipalpi" groups. We might add that *Pseudouroctonus reddelli* also has well developed apical "white patches" on the chelal fingers. Figure 8 illustrates this curious structure for *Serradigitus subtilimanus*. Of particular note, we see that it is somewhat simplistic not exhibiting additional microstructures such as setae or sensory pores. Its purpose is unknown, but one may suspect it involves adaptation, in part, to the common microhabitat of these two similar looking but phylogenetically different groups of vaejovids.

"chela trichobothria *ib* and *it* are located at the base of the fixed finger": This character excludes genus *Serradigitus* and, in part, the "eusthenura" and "punctipalpi" groups of *Vaejovis*. It also excludes *Smeringurus*, *Vejovoidus*, and most *Paruroctonus* except species *Paruroctonus gracilior* (Hoffmann, 1931) and *P. stahnkei* (Gertsch & Soleglad, 1966). However, *Paravaejovis, Pseudouroctonus*, *Uroctonites* and the *Vaejovis* "mexicanus" group (as defined by Soleglad, 1973) comply to this character as well. In *Serradigitus*, we see that the relative position of the *ib*-*it* trichobothrial series is based, in part, on the species size. For the larger species, such as *S. subtilimanus* and *S. adcocki*, we see the trichobothria pair situated roughly midfinger, and for small species, such as *S. joshuaensis*, they are more basal on the finger. See Soleglad & Fet (2003: Figs. 67-78) for the illustration of *ib*/*it* finger alignments for vaejovid species spanning a large majority of currently recognized genera and *Vaejovis* groups.

"the denticle row of the pedipalp chela fixed finger is divided into six or seven subrows": We are not clear of the significance of this character since all vaejovids exhibit a straight median denticle (*MD*) row on the chelal fingers which is broken up into denticle groups (*DG*) by larger intervening outer denticles (*OD*). In the genus *Serradigitus*, whose *MD* is composed by highly serrate flattened denticles, the *DG*s are not that obvious, especially at the base of the fingers. The number of "subrows" is not particularly diagnostic as well, except at the species level (i.e., as used in Sissom & González's

(2004) key to the *Vaejovis* "nigrescens" group + *Francheus* species).

"the dorsointernal carina of the pedipalp chela is strong and, in most species, bears enlarged, sharp granules": This character appears to be legitimate, since most species in the *Vaejovis* "nigrescens" group + *Franckeus* assemblage have a well developed dorsointernal (*D5*) carina. However, genus *Serradigitus* also has a well developed granulated *D5* carina (only in *S. joshuaensis* is it weakly developed).

"the ventral spinule row of the telotarsus is flanked distally by a single pair of larger spinules": Sissom was the first systematist to analyze and quantify the terminal aspect of the tarsal median spinule row in the vaejovids. This is an important character and manifests itself into two basic configurations: single distal pair (sometimes two) and multiple distal pairs (2-3 (3) pairs). This character as stated excludes the *Vaejovis* "eusthenura" and "punctipalpi" groups, *Syntropis*, *Pseudouroctonus* and *Uroctonites*, but not *Serradigitus*, *Paruroctonus*, *Smeringurus*, *Vejovoidus*, or the "mexicanus" group of *Vaejovis*.

"the male hemispermatophore bears a two pronged hook at the base of the distal lamina": This character appears to be specific to this assemblage, but it has also been reported for *Vaejovis* "mexicanus" group species *V. rossmani* and *V. monticola* (Sissom, 1989: Figs. 76, 78).

"the distal margin of the sperm plug is smooth, i.e., devoid of hooks or spines" (observations and terminology after Stockwell, 1989): This character implies the presence of a sclerotized sperm plug (= mating plug) where the distal barb margin is smooth. Except for the *Vaejovis* "mexicanus" group, whose sperm plug is presumably gelatinous, most vaejovids have a well developed sclerotized sperm plug. The smooth margin of the distal barb is also found in genus *Serradigitus*, whereas the other genera and *Vaejovis* groups exhibit a toothed margin.

Of the *thirteen* characters listed by Capes (2001), only one shows potential as a synapomorphy for this assemblage, the unusual two pronged hook of the hemispermatophore lamina. Interestingly, many of the characters discussed above are used to contrast the *Vaejovis* "nigrescens" group + *Franckeus* from its ecological counterpart, the genus *Serradigitus*. These two assemblages of scorpions are similar looking to a degree, such that Williams (1980) synonymized *Serradigitus* with *Vaejovis* apparently based on these similarities. Williams & Berke (1986) finally recognized the legitimacy of *Serradigitus*.

Taxonomy

Franckeus Soleglad & Fet, gen. nov.

Diagnosis. Closely related to the "nigrescens" group of *Vaejovis* from which it can be distinguished by the following two synapomorphic characters: pedipalp patella external surface exhibiting neobothriotaxy, one *accessory* trichobothrium located near the *esb* series, closest to esb_2; patellar trichobothrial series em_1-em_2 angles towards the distal aspect of the segment.

Etymology. This genus is named after our colleague Oscar F. Francke whose many varied contributions to scorpion systematics have advanced considerably the knowledge in this area. In particular, Oscar was the first to point out the diagnostic characters defining this genus and, as well, recognized their importance.

Type species. *Vaejovis nitidulus* C. L. Koch, 1843 [= *Franckeus nitidulus* (C. L. Koch, 1843)].

Distribution. Mexico (northeastern and central-eastern states; Baja California Sur).

Species list. The following six species comprise this genus (general locality data based on Williams, 1980; Sissom & Francke, 1985; Sissom, 1991; Sissom & González, 2004. See map in Fig. 9):

F. kochi (Sissom, 1991), **comb. nov.** Distrito Federal, Hidalgo, México.

F. minckleyi (Williams, 1968), **comb. nov.** Coahuila.

F. nitidulus (C. L. Koch, 1843), **comb. nov.** Hidalgo, México, Querétaro.

F. peninsularis (Williams, 1980), **comb. nov.** Baja California Sur (Figs. 10-19).

F. platnicki (Sissom, 1991), **comb. nov.** San Luis Potosí, Tamaulipas.

F. rubrimanus (Sissom, 1991), **comb. nov.** Nuevo León.

Vaejovis "nigrescens" group

With the removal of *Franckeus nitidulus* from the *Vaejovis* "nitidulus" group, we suggest a new name for the remaining species comprising this truncated group: *Vaejovis* "nigrescens" group. We choose this name because *V. nigrescens* is the oldest named species remaining in the group. The species groups are informal conventions, and their names are not regulated in any way by the International Code of Zoological Nomenclature. To emphasize this point, we prefer not to italicize the species epithet when addressing the species group but rather use this epithet in quotes, in non-italicized form: i.e. ["nigrescens" group] rather than [*nigrescens* group].

Below, we describe an additional new species for this group, formerly misidentified as *V. gracilis* Gertsch & Soleglad, 1972.

Vaejovis davidi Soleglad & Fet, sp. nov.

Vejovis gracilis: Soleglad, 1975: 108-119 (in part: Puebla specimens only).

Diagnosis (based on female). Slender member of *Vaejovis* "nigrescens" group. Metasoma slender, segment I length/width >= 1.0, segment II length/width >

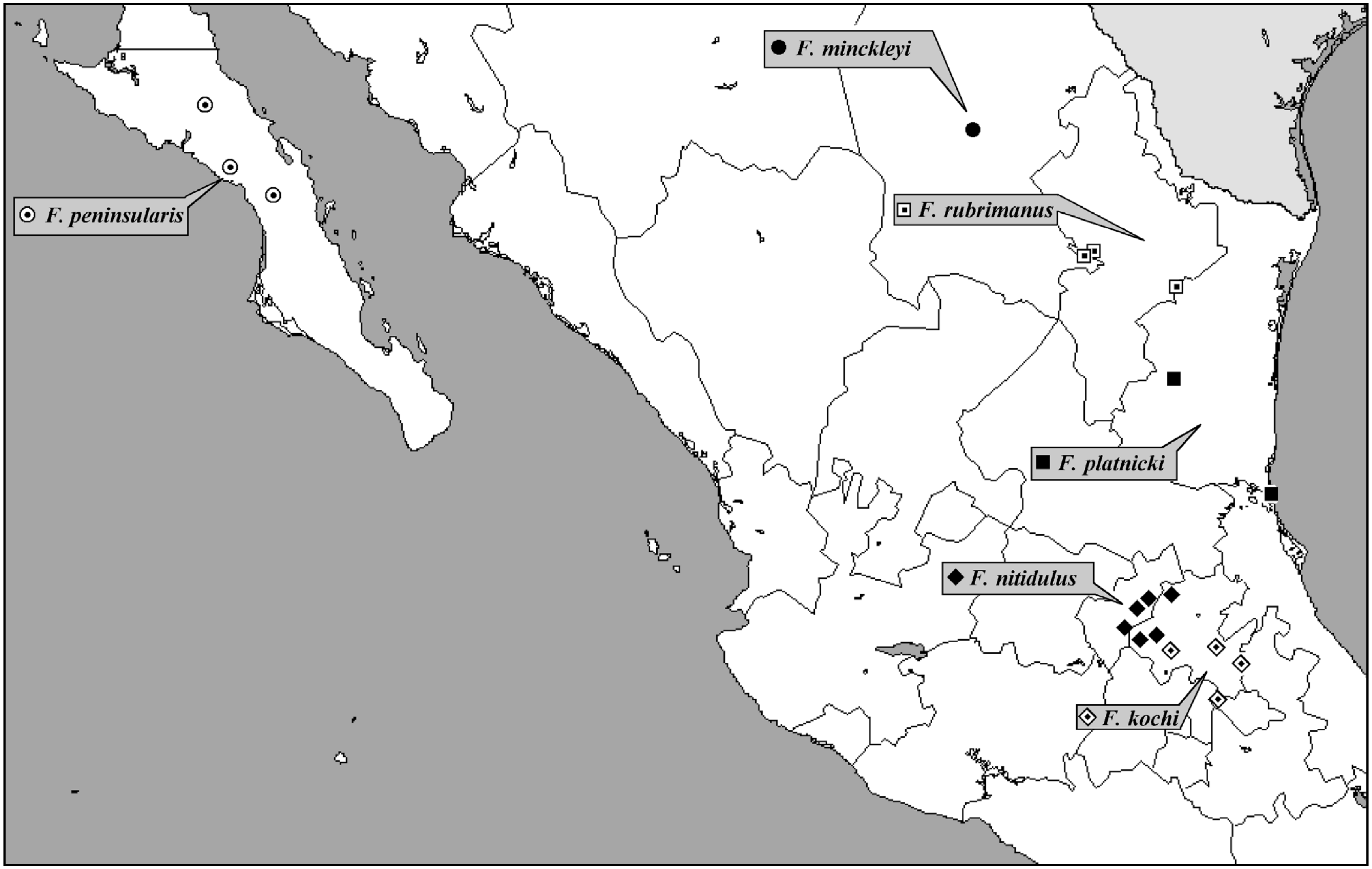
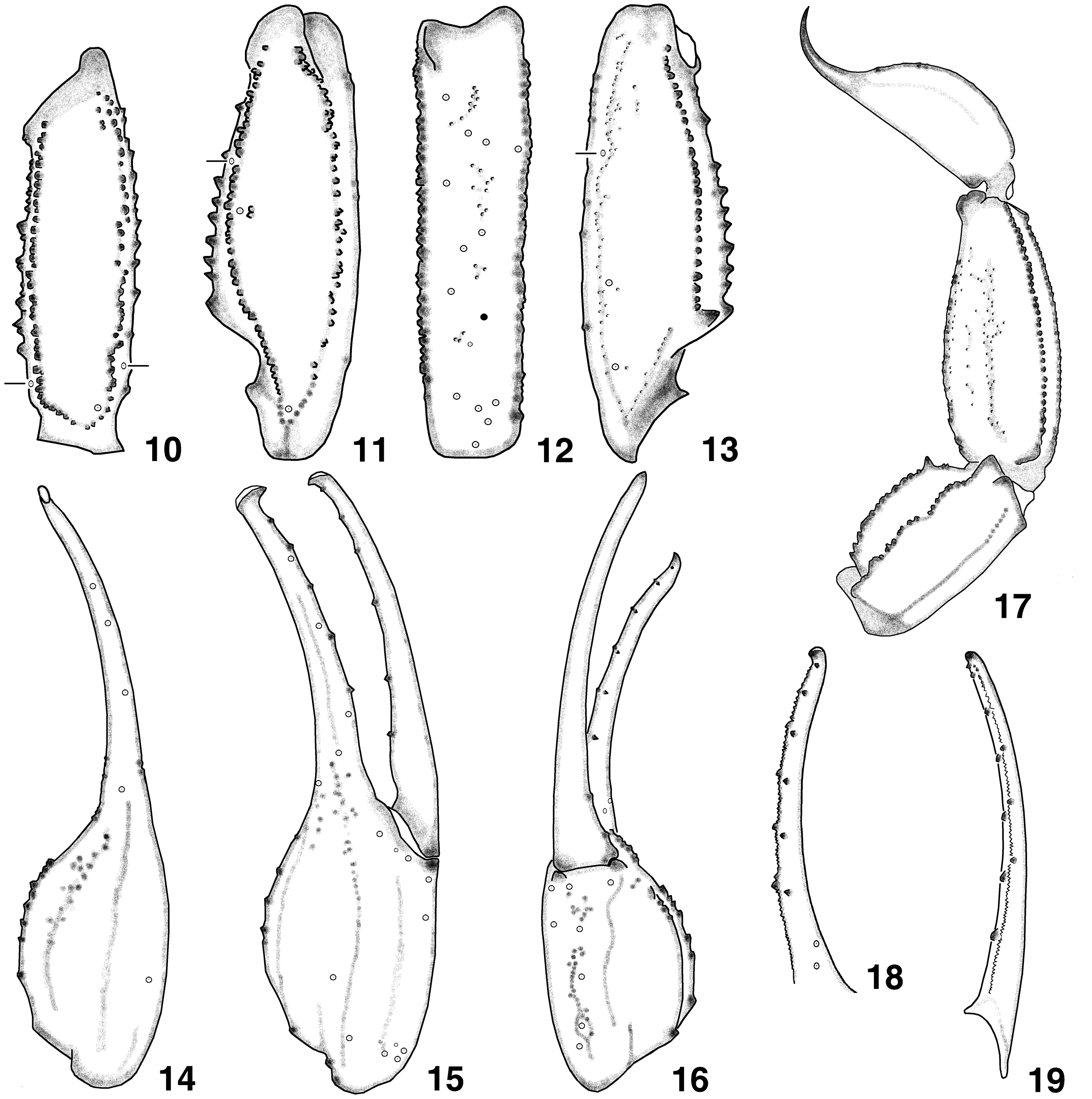


Figure 9: Map of Mexico (partial) showing general distribution of genus *Franckeus*. Locality data based on Williams (1980), Sissom & Francke (1985), Sissom (1991) and Sissom & González (2004).



Figures 10-19: *Franckeus peninsularis*, male. **10-16.** Pedipalp showing trichobothrial pattern and carinal development. **17.** Telson and metasomal segments IV-V, lateral view. **18-19.** Chelal fixed and movable fingers, showing denticle organization.

1.2, segment V length/width >= 3.00; telson vesicle elongated, telson length/vesicle length < 1.45; chelal movable finger longer than carapace; ventrolateral and ventromedian carinae of metasomal segments I-IV well developed and crenulate; posterior termination of dorsal carinae of metasomal segment IV not formed in conspicuous spine; carapace finely granulate; median denticle (MD) row groups of chelal fixed finger number six; carinae of chela irregularly granulose; chelal finger denticle edges not noticeably scalloped; lateral carinae of sternite V well developed and granulose; pectinal tooth counts 17-19 (18.17) [n = 6]. Male unknown.

Etymology. Named after our colleague and friend W. David Sissom, who has contributed considerably to the knowledge of the vaejovids, in particular, the "nigrescens" (formerly "nitidulus") group of *Vaejovis*.

Type locality. Cueva de la Barranca, 8 km. SW Cuelzalan, Puebla, Mexico, 25 December 1973 (D. McKenzie), holotype female, deposited in AMNH.

Material (type specimen and after Soleglad, 1975: 117-118). Cueva de la Barranca, 8 km. SW Cuelzalan, Puebla, Mexico, 25 December 1973 (D. McKenzie), 2 females (holotype and paratype); Grutas de Jonotla, 7 km. SW Cuelzalan, Puebla, Mexico, 26

	Metasomal Segments L/W			Chela L/ Palm W	Telson L/ Vesicle L
	I	II	V		
V. davidi	1.029	1.219	2.964	5.684	1.434
	1.061	1.323	3.037	5.400	1.434
	1.063	1.258	3.037	5.350	1.436
V. gracilis **♂**	1.227	1.737	4.313	7.538	1.475
V. curvidigitus	0.680	0.769	1.760	4.188	1.615
V. decipiens	0.846	1.014	2.309	5.550 *	1.613
V. intermedius	0.816	0.919	2.000	4.000	1.545
V. janssi	0.897	1.092	2.366	5.707 *	1.609
V. mauryi	-	-	2.304	4.840	-
V. mitchelli	0.848	1.022	2.375	-	1.500
V. nigrescens	0.773	0.867	1.886	4.500	1.549
V. norteno	0.952	1.154	2.543	4.500	1.544
V. pococki	0.789	0.944	2.057	4.773	1.650
V. solegladi	0.743	0.882	2.000	5.111	1.526

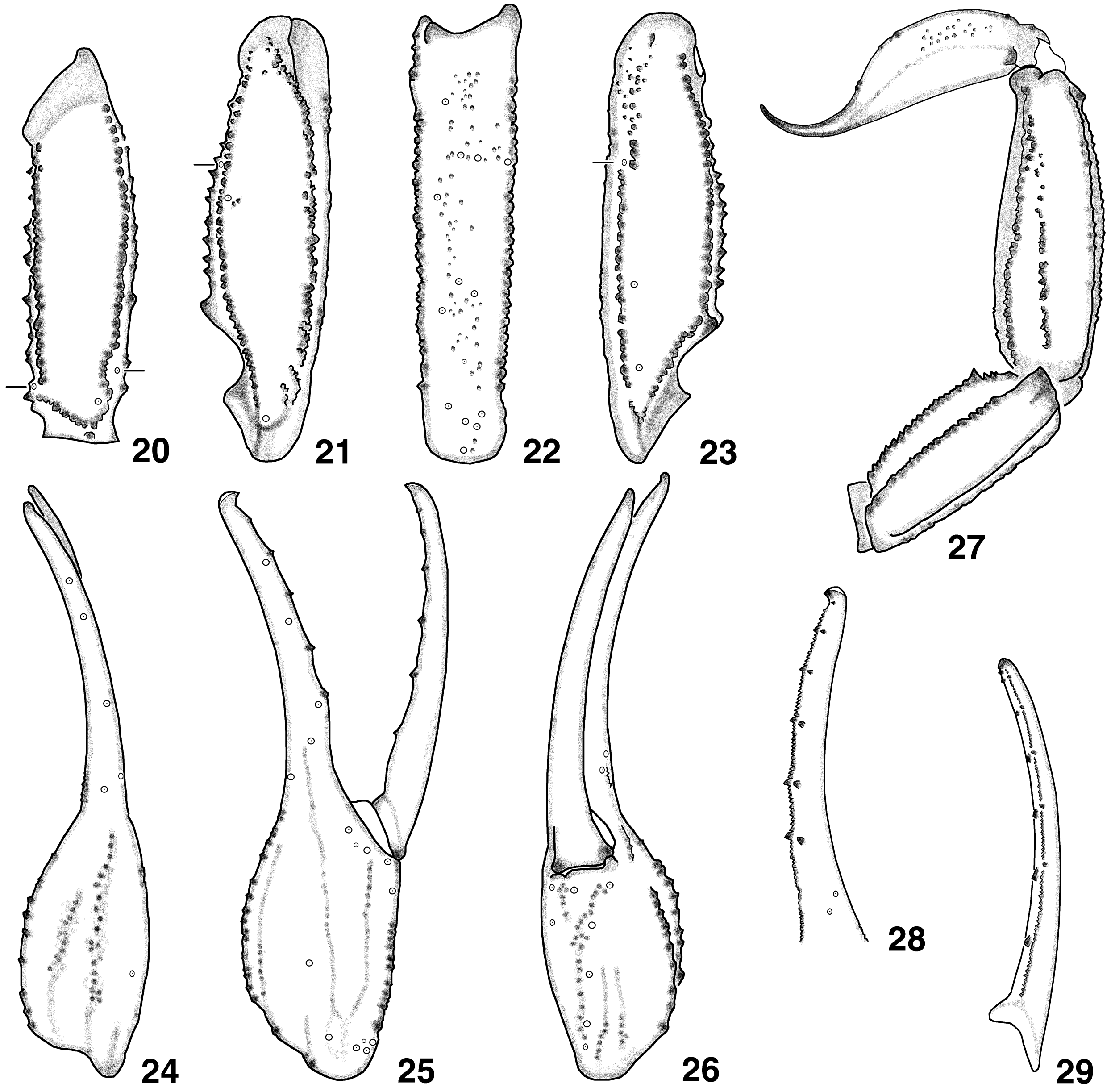
Table 1: Morphometric ratios (females only) contrasting *Vaejovis davidi* **sp. nov.**, with other members of the *Vaejovis* "nigrescens" group. Note the slender metasoma of *V. davidi*, segment I L/W >= 1, segment II L/W > 1.2, segment V L/W = 3; slender chela, L/Palm W > 5.3; elongated telson vesicle, Telson L/Vesicle L < 1.45. Ratios from male *V. gracilis* shown for comparison only. Ratios calculated from specimens as well as published morphometrics in Soleglad (1975), Sissom & Francke (1985), Sissom (1991), Capes (2001) and Sissom & González (2004). * Ratios (female) within range of *V. davidi*.

December 1973 (J. Reddell, R. Jameson, D. McKenzie), 1 female paratype. Except for the female holotype, which was recently located, the other two type series specimens are apparently lost (Sissom, 1986: 11).

Description (Fig. 6). For detailed description, morphometrics and structure illustrations see Soleglad (1975). Note, only the three female specimens from Puebla are included in this species, the other two female specimens from Veracruz and Oaxaca are excluded, presumably a different specie(s). Therefore, the following figures in Soleglad (1975) are applicable for this species: Fig. 1, dorsal view; Fig. 2, carapace; Fig. 3, stigmata; Fig. 4, chela, lateral view; Figs. 5-7, chelicerae, dorsal, external and ventral views; Figs. 8-9, denticle configurations of chelal fixed and movable fingers; Fig. 10, sternum, genital operculum and pectines; Figs. 11-12, telson, ventral and lateral views; Fig. 16, lateral eyes; Fig. 18, tarsus III, exterolateral view; Fig. 20, metasoma, lateral view; Figs. 21-32, trichobothrial patterns. Tables 1 and 2 (Puebla specimens only).

Discussion. Member of ***Vaejovis*** **"nigrescens" group** based on the following characters (male unknown, for figure references see Soleglad, 1975): genital operculum of female separated on posterior ¼ (Fig. 10); chelal trichobothria *ib* and *it* situated on base of fixed finger, posterior of basal inner (*ID*) and outer denticles (*OD*) (Fig. 24); basal pectinal teeth formed normally, not elongate and/or lacking sensorial areas (Fig. 10); carapace with noticeable anterior notch (Fig. 2); ventral edge of cheliceral movable finger with well developed serrulae (Figs. 6-7); dorsointernal (*D5*) carina of chela well developed with conspicuous granulation; ventral spinule row of leg tarsus terminates distally in a single pair of spinules; chelal fingers elongate, terminating in a "white patch"; chela elongate, length/width ratio > 5.0 (Fig. 4). Male unknown, therefore hemispermatophore structure unknown.

Using Sissom & González's (2004) species key as a basis, *V. davidi* keys out to couplet 13, where *V. gracilis* is contrasted with other species by its conspicuous slenderness. *V. davidi* is also more slender than other species of this group, but presumably not as slender as *V. gracilis* (see Table 1 for species comparisons). However, morphometrics are difficult to contrast since a sexually mature male is known for *V. gracilis* whereas only females are known for *V. davidi* (i.e., the metasoma of sexually mature males is usually more slender than that of a female). By creating a relative difference-ratio for the metasoma, using species *V. mitchelli*, a slender species, we can determine with some certainty, that the metasoma of a male *V. davidi* in all probability would not be as thin as that found in *V. gracilis*, especially segment V. In *V. mitchelli*, metasomal segments I and V are 11.3 % and 2.8 % thinner in the male, respectively. Using this for a comparative basis, we see that segment I of *V. davidi* would be quite close to that in *V. gracilis*, however segment V is not, exhibiting a hypothetical L/W ratio of 3.122 vs. 4.313. In addition, *V. davidi*, though found in caves, is more pigmented, not exhibiting noticeable cave adaptedness as seen in *V. gracilis*; and, the



Figures 20-29: *Vaejovis janssi*, male. **20-26.** Pedipalp showing trichobothrial pattern and carinal development. **27.** Telson and metasomal segments IV-V, lateral view. **28-29.** Chelal fixed and movable fingers, showing denticle organization.

carapace is finely granulose in *V. davidi*, whereas in *V. gracilis*, it is basically smooth.

Species list. The following twelve species comprise the *Vaejovis* "nigrescens" group (general locality data based on specimens examined; Gertsch & Soleglad, 1972; Soleglad, 1975; Williams, 1980; Sissom & Francke, 1985; Sissom, 1991; Capes, 2001; Sissom & González, 2004):

V. curvidigitus Sissom, 1991. Guerrero, Morelos, Oaxaca.
V. davidi Soleglad & Fet, **sp. nov.** Puebla.
V. decipiens Hoffmann, 1931. Chihuahua.
V. gracilis Gertsch & Soleglad, 1972. Veracruz.
V. intermedius Borelli, 1915. Texas (SW), USA; Chihuahua, Coahuila, Durango.
V. janssi Williams, 1980. Isla Socorro (Figs. 20-29).
V. mauryi Sissom, 1991. Sonora.
V. mitchelli Sissom, 1991. Querétaro, San Luis Potosí.
V. nigrescens Pocock, 1898. Aguascalientes, Distrito Federal, Guanajuato, Hidalgo, Jalisco, Michoacán, México, Querétaro, Zacatecas.

V. norteno Sissom & González, 2004. Coahuila, Nuevo Leon.

V. pococki Sissom, 1991. Guanajuato, Querétaro, San Luis Potosí.

V. solegladi Sissom, 1991. Oaxaca, Puebla.

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