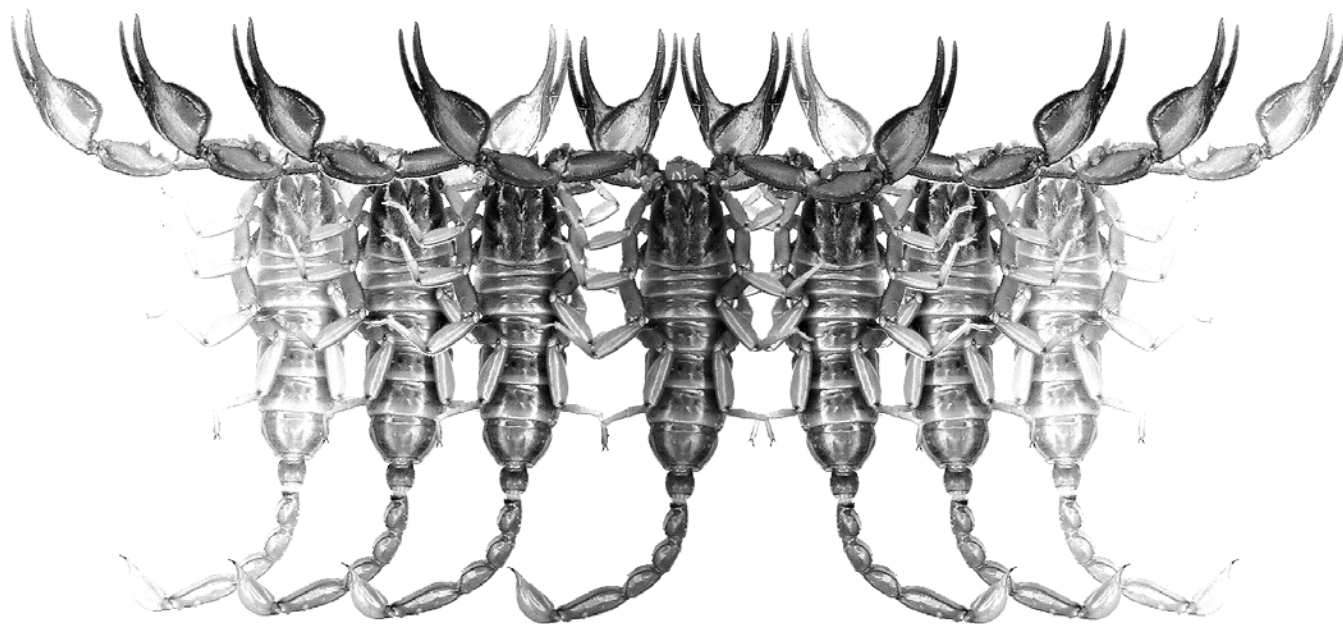


# *Euscorpius*

Occasional Publications in Scorpiology



**The True Identity of the Enigmatic Scorpion *Centruroides subgranosus* (Kraepelin, 1898), with Some Taxonomic Comments on *Centruroides vittatus* (Say, 1821) and *Centruroides suffusus* Pocock, 1902 (Scorpiones: Buthidae)**

**Rolando Teruel & František Kovařík**

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# *Euscorpius*

## Occasional Publications in Scorpiology

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- **NTNU**, Norwegian University of Science and Technology, Trondheim, Norway
- **OUMNH**, Oxford University Museum of Natural History, Oxford, UK
- **NEV**, Library Netherlands Entomological Society, Amsterdam, Netherlands

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# The true identity of the enigmatic scorpion *Centruroides subgranosus* (Kraepelin, 1898), with some taxonomic comments on *Centruroides vittatus* (Say, 1821) and *Centruroides suffusus* Pocock, 1902 (Scorpiones: Buthidae)

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## Summary

The true identity of *Centruroides subgranosus* (Kraepelin, 1898) is established based on the examination of the type series. A lectotype and paralectotype are designated. A taxonomic discussion on *C. vittatus* (Say, 1821) and *C. suffusus* Pocock, 1902 is provided.

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## Introduction

Back in 1898, the prominent German arachnologist Karl Kraepelin described under the name *Centruroides subgranosus* a scorpion from “Central America”. Its type series included an unspecified number of specimens, but at least it contained one adult male and one adult female of which measurements were actually given. This species was also mentioned later by the same author (Kraepelin, 1898, 1899). Thereafter, Pocock (1902) examined one “cotype” (i.e., syntype), and transferred this taxon to the genus *Centruroides* Marx, 1890. This species became one of the most enigmatic American scorpions, mostly because the types were apparently never examined again, and no additional specimens matching the available descriptions and figures were collected. During the 108 years that elapsed, only a few minor references to this species were published, all included in general catalogues or keys (Stahnke & Calos, 1977; Kovařík, 1998; Viquez, 1999; Armas & Maes, 2000; Fet & Lowe, 2000; Armas, Martín-Frías & Estévez-Ramírez, 2003).

## Observations

Many complete inventories of the scorpion fauna of North and Central America and the Caribbean have been

produced in the last three decades (Williams, 1980; Francke & Stockwell, 1987; Armas, 1988, 2001; Armas & Maes, 2000; Beutelspacher-Baigts, 2000; Teruel & Stockwell, 2002; Ponce-Saavedra & Moreno-Barajas, 2005), but no further findings of *C. subgranosus* were recorded. It became obvious that this scorpion was either a very rare and localized species, or a synonym of one of the many *Centruroides* described from this area. To clarify this situation, three syntypes of *C. subgranosus* were borrowed from the Zoologisches Institut und Zoologisches Museum in Hamburg, as well as two para-types of *Centruroides suffusus* Pocock, 1902 from The Natural History Museum in London (formerly British Museum), which were received by one of us (FK) in April 2002.

When the types were examined, it was evident at first that: (a) the color pattern was not the natural one, but severely altered prolonged preservation, and (b) the specimens were strikingly similar to two well-known North American species: *Centruroides suffusus* and *C. vittatus* (Say, 1821). After a careful comparison of the type series with well-preserved material of these two species (see below for detailed label data), it became clear that *C. subgranosus* is simply a junior synonym of the latter.

Except for the color pattern (see next paragraph), the types of *C. subgranosus* (Figs. 1–2) are identical to

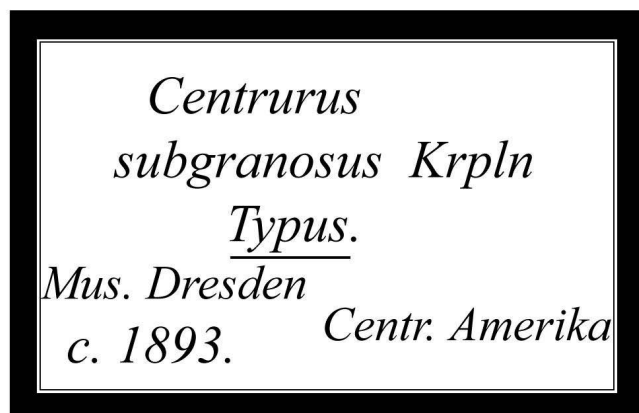
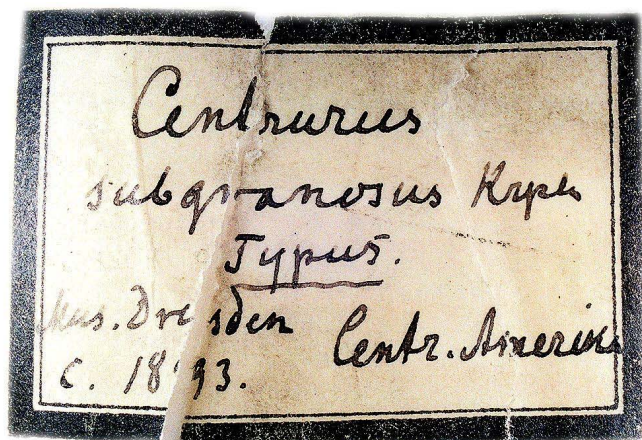


**Figure 1:** Adult male lectotype of *Centruroides subgranosus*, dorsal and ventral views.



**Figure 2:** Adult female paralectotype of *Centruroides subgranosus*, dorsal and ventral views.





**Figure 3:** Kraepelin's original label of the type series of *Centruroides subgranosus* (above, broken into two pieces), and its literal transcription (below).

the studied specimens of *C. vittatus* in all diagnostic characters: a) body size (males 57–62 mm, female 47 mm); (b) pedipalpal and metasomal attenuation (chela essentially as wide as patella in both sexes, metasomal segments very slender in males); (c) carination of metasomal and pedipalpal segments (finely serrate to serrate-crenulate in metasoma, subcostate to granular in pedipalps); (d) setation pattern of pedipalpal and metasomal segments (pedipalps with only a few short and scattered setae, metasoma II–IV with two pairs of ventrolateral macrosetae); (e) shape of male telson (oval and very elongate, with long and gently curved aculeus); (f) structure of the subaculear tubercle (small and conical); (g) pectinal tooth count (males 23–24, female 20–21); (h) structure of the basal pectinal plate in female (with a discal pit and posterior margin moderately convex); (i) and number of principal granular rows of the pedipalp fingers (eight, plus a short apical subrow in movable finger). Thus, the following formal synonymy is herein proposed: *Centrurus vittatus* Say, 1821 = *Centrurus subgranosus* Kraepelin, 1898, **new synonym**.

In reference to the color pattern, the uniformly brown hue currently exhibited by the types of *C. subgranosus* is an artifact due to the prolonged action of some preservative, possibly the mixture of ethanol and glycerol widely used to preserve scorpions during late

1800s and early 1900s (this has been personally confirmed by the present authors in many of such “old” museum samples). Additional support to this conclusion is given by the interesting comment of Pocock (1902: 27), who after having examined the female herein designated as paralectotype, wrote that “... the abdominal bands [...] are distinctly traceable in this specimen”; as such bands are no longer observable in this specimen, there is no doubt that they have vanished due to inadequate preservation.

An additional comment is needed for the type locality of *C. subgranosus*, which was given as “Central America” in accordance to the actual data present on the original label (Fig. 3). As demonstrated above, the type specimens are all conspecific with *C. vittatus*, but this species is endemic to south-central USA and north-central Mexico (Hoffmann, 1938; Shelley & Sissom, 1995; Armas & Martín-Frías, 2000; Beutelspacher-Baigts, 2000; Armas, Martín-Frías & Estévez-Ramírez, 2003; Ponce-Saavedra & Moreno-Barajas, 2005). Thus, it is evident that the collecting data of the type-series represent either a labeling error or a casual introduction. The first hypothesis seems more likely, as the only other species which is closely related (*C. suffusus*) is also endemic from northern Mexico (Hoffmann, 1938; Armas & Martín-Frías, 2000; Beutelspacher-Baigts, 2000; Ponce-Saavedra & Moreno-Barajas, 2005).

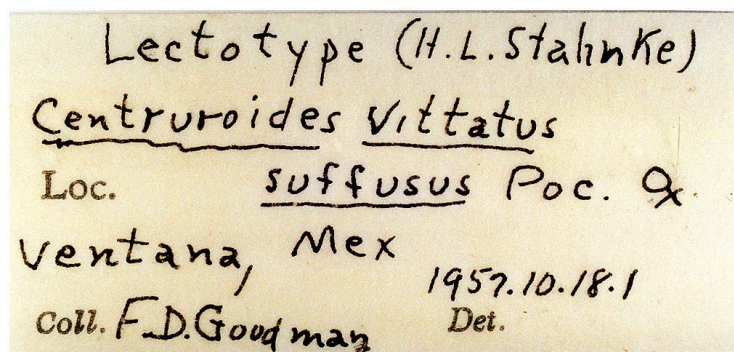


**Figure 4:** Adult male paratype of *Centruroides suffusus* from Durango, dorsal and ventral views.



**Figure 5:** Adult female paratype of *Centruroides suffusus* from Ventanas, dorsal and ventral views.





**Figure 6:** Stahnke's label of the female paratype of *Centruroides suffusus* from Ventanas.

On the other hand, a further clarification is needed about the name-bearing type of *C. suffusus*. The adult female paratype received from the BMNH bears the following label data (Fig. 6): "Lectotype (H. L. Stahnke) *Centruroides vittatus suffusus* Poc. ♀ Loc. Ventana, Mex Coll. F. D. Goodman Det. 1957.10.18.1" [sic]. Such a lectotype designation is invalid because of two reasons: it was never published, and most important, the original description of *C. suffusus* was based upon four specimens, but Pocock (1902: 25) explicitly declared one male from Durango collected by A. Dugès as the "type" (mentioned twice in text lines 14 and 17, respectively), a procedure that according to the Article 73.1.1 of the Code (Comisión Internacional de Nomenclatura Zoológica, 2000: 82) makes this specimen the holotype by original designation. Interestingly, this important fact was overlooked by Fet & Lowe (2000: 119), who listed only two "syntypes": a male from Durango and a female from Ventanas, probably the same two specimens herein studied by us.

It is important to note here that some data from Stahnke's handwritten label of this paratype female (Fig. 6) do not match the information given in the original description of *C. suffusus*: the collector appears as "F. D. Goodman" and the locality as "Ventana, Mex" [sic], but Pocock (1902: 25) explicitly declared instead "Forrer" and "Mexico, Ventanas in Durango", respectively. This female was originally regarded as "young" (i.e., immature) by Pocock (1902: 25), but our examination showed that it is actually a small-sized but adult specimen. Alfonse Forrer (1836–1899) was an American zoologist who collected in the 1880s in Ventanas (now Villa Corona, 23°52'N, 105°47'W) for the British Museum. Frederick D. Godman (not "Goodman") (1834–1919) was a famous English zoologist who collected for the same Museum in late 1880s; these collections served as a basis for 63 volumes of *Biologia Centrali-Americana* (1879–1915), where Pocock's contribution was published.

On morphological grounds, *C. suffusus* and *C. vittatus* are so similar that their identification is somewhat difficult. In fact, taxonomical history does illustrate this fairly well: first, Pocock (1902) described *C. suffusus* merely as a subspecies of *C. vittatus*; and

second, Armas & Martín-Frías (2000) demonstrated that *Centruroides suffusus chiaravigli* Borelli, 1915, was in turn a junior synonym of *C. vittatus*. To complicate things further, the geographic distribution of these species was traditionally thought to be widely allopatric, but reliable recent records (i.e., Armas & Martín-Frías, 2000) have actually shown that both areas almost overlap in Durango State. For the present, it is preferable to keep recognizing both species as distinct on the basis of the following four characters:

1. **The pedipalpal and metasomal attenuation in adult of both sexes:** specimens of *C. vittatus* have narrower chelae and are in general noticeably more slender than equally-sized specimens of *C. suffusus*. This is more evident in males.
2. **The shape of the adult metasomal segment V in lateral view:** both sexes of *C. suffusus* have the segment distally curved upwards due to markedly convex ventral surface, but in *C. vittatus* the segment is not curved and its ventral surface is essentially straight. Again, this is more evident in males.
3. **The shape of the adult male telson vesicle in lateral view:** in *C. vittatus* it is noticeably narrower and more slender, but in *C. suffusus* it is wider and somewhat inflate.
4. **The structure of the female basal pectinal plate:** in *C. suffusus* it has a deep discal pit and the posterior margin is moderately bilobed, but in *C. vittatus* it has a transversal slit-like depression and the posterior margin is convex.

Characters 1 and 3 were already used as diagnostic in the original description by Pocock (1902: 25), and were confirmed to remain valid for all the additional specimens herein studied.

Apart from this, it is well known that *C. suffusus* is one of the most highly toxic North American scorpions as opposed to *C. vittatus*, which seems not to have any medical importance (Hoffmann, 1938); this fact seems to support them as two separate species.

## Material Examined

***Centruroides subgranosus*:** “Centr. Amerika, c. 1893, Mus. Dresden” [*sic*]; 1♂ lectotype (Fig. 1), 1♂ and 1♀ (Fig. 2) paralectotypes (herein designated; ZMUH).

***Centruroides suffusus*:** MEXICO: Durango, [Ventanas], leg. [A.] Forrer, 1♂ paratype, 1♀ paratype (BMNH) (Fig. 4); Durango, Durango, December 2002, leg. R. and A.L. Barrios, 1♂, 1♀ topotypes (RTO: Sco-0232).

***Centruroides vittatus*:** USA: Missouri, Ozark County, Gainesville, 2006, 1♂, 2♀♀ (RTO: Sco-0343); Texas, Amarillo, 20 June 1992, leg. R. Simmons, 1♂ (RTO: Sco-0152); Oklahoma, 4 miles N of Oklahoma City, 26 August 1992, leg. W. Hamilton, 1♀ (RTO: Sco-0153).

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