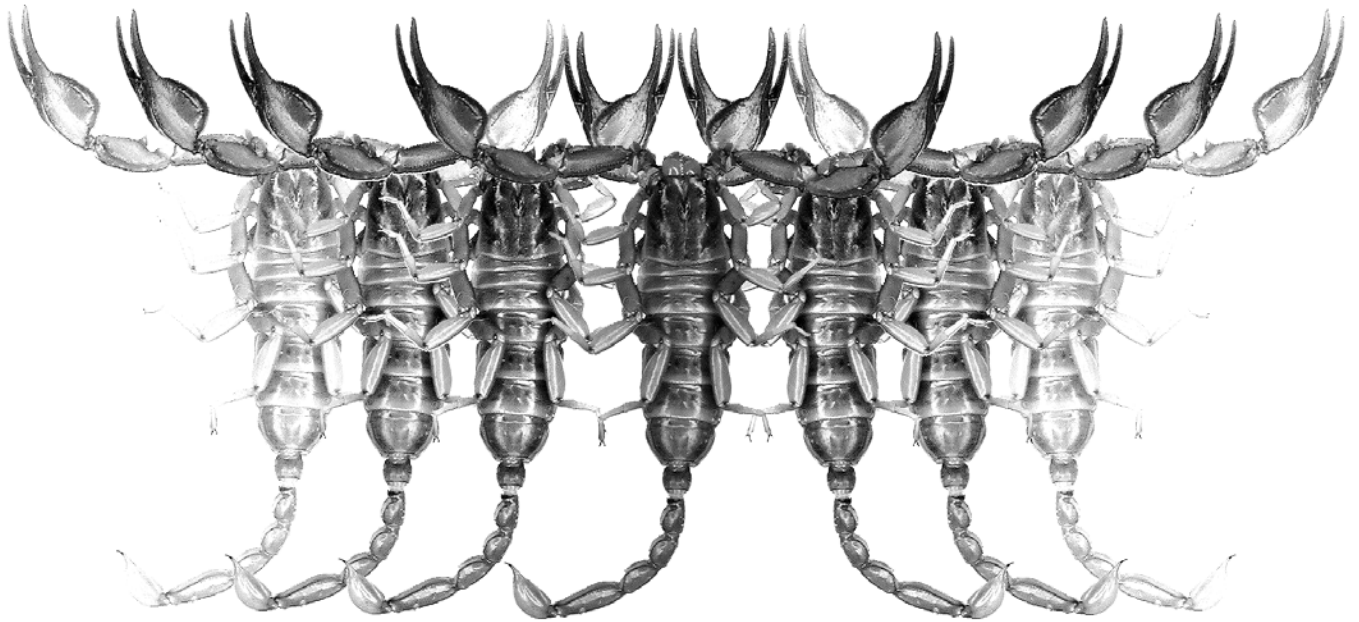


Euscorpium

Occasional Publications in Scorpiology



**Malformed Pedipalp Finger Dentition of the Scorpion
Superstitionia donensis (Scorpiones: Superstitioniidae)**

Matthew R. Graham

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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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- **ZISP**, Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia
- **WAM**, Western Australian Museum, Perth, Australia
- **NTNU**, Norwegian University of Science and Technology, Trondheim, Norway

Malformed pedipalp finger dentition of the scorpion *Superstitionia donensis* (Scorpiones: Superstitioniidae)

Matthew R. Graham

Department of Biological Sciences, Marshall University, Huntington, WV 25755-2510, USA.

Summary

A novel deformity of pedipalp finger dentition is presented from the scorpion *Superstitionia donensis*. This anomaly, present on the left pedipalp chela only, is herein described and discussed in regards to possible problems it could cause with species identification.

Introduction

It has long been known that scorpions are susceptible to teratological anomalies. Body duplication, or the development of two or more metasomas, telsons, and mesosomal segments, has been most often recorded. Specimens from embryos to adults have been documented with the anomaly from the families Buthidae and Euscorpiidae since the 1800's. Some of the first reports were from two euscorpiids, *Euscorpius germanus* (Koch, 1837) and *E. carpathicus* (Linnaeus, 1767) (Pavesi 1881, Brauer 1917). Body duplication has been

more frequently observed in buthids, however, and has been documented in the following species: *Androctonus crassicauda* (Olivier, 1807), *Buthacus leptochelys* (Ehrenberg, 1829), *C. gracilis* (Latreille, 1804), *Centruroides infamatus* (Koch, 1844), *C. margaritatus* (Gervais, 1841), *C. noxius* Hoffman, 1932, *C. sculpturatus* Ewing, 1928, *C. vittatus* (Say, 1821), *Hottentotta* (= *Buthotus*) *alticola* (Pocock, 1895), *Isometrus maculatus* (Greer, 1778), *Leiurus quinquestriatus* (Ehrenberg, 1828), *Tityus paraensis* (= *cambridgei*) Kraepelin, 1896, *Tityus serrulatus* Lutz et Mello, 1922 (Armas, 1977; Armas, 1995; Berland, 1913; Briseño, 1963; Campos,



Figure 1: Dorsal aspect of adult male *Superstitionia donensis* with aberrant pedipalp finger dentition.

1918; Franganillo, 1934; Matthiesen, 1978, 1979; Millot & Vachon, 1949; Sergent 1946; Shulov & Amitai 1955; Sissom & Shelley 1995; Vachon 1952, 1953, 1972; Vachon & Serfaty, 1950; Williams, 1971), and *Mesobuthus caucasicus* (Nordmann, 1840) (V. Fet, pers. comm.)

Other anomalies have not been as regularly documented. Only three sources recount observations of carapace, tergal and cheliceral abnormalities. Armas (1976) described a *Didymocentrus trinitarius* Franganillo, 1930 specimen with fusion of the carapace and tergite I. Divided and malformed tergites were illustrated by Mattoni (2005) from three specimens of the family Bothriuridae; two females of *Bothriurus coriaceus* Pocock and one female *Brachistosternus roigalsinae* Ojanguren-Affilastro, 2002. Teruel (2003) described several anomalies including divided tergites in *Cazierius parvus* Armas, 1984, *C. gundlachii* Karsch 1880, and *Euscorpium flavicaudis* (DeGeer, 1778). In addition, Teruel (2003) gave an account of a single specimen of *Lychas obsti* Kraepelin, 1913 with an extra cheliceral tooth (see discussion) and an individual *Microtityus jaumei* Armas, 1974 possessing two separate anomalies; a divided tergite and tergite VII fused to metasomal segment I.

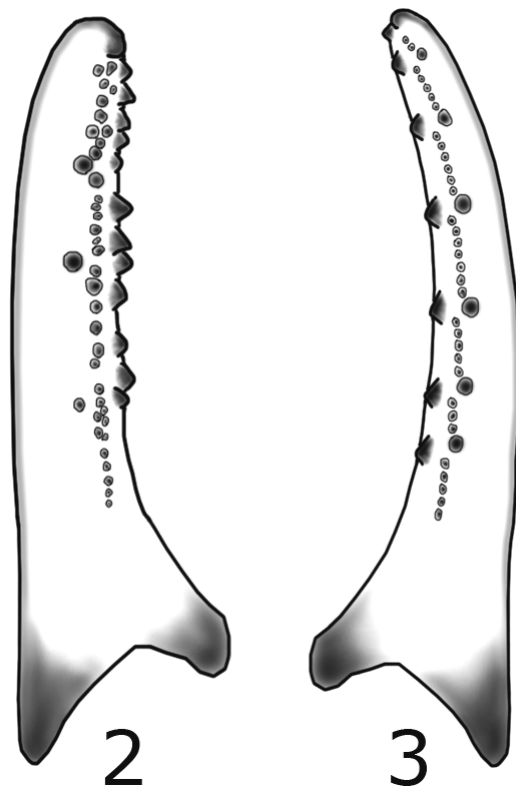
Reports of leg and pedipalp anomalies are somewhat limited. Armas (1977) described leg malformations of four Buthid species and Cao & Solórzano (1991) documented another Buthid species that possessed pedipalp fusion. More recently, Teruel (2003) documented the occurrence of pedipalp chela compression of females from 33 species, representing 10 families. No reports, however, involve the family Superstitioniidae and little exists on developmental anomalies of pedipalp finger dentition.

Results

Upon examination of several specimens of *Superstitionia donensis* Stahnke, 1940 in Dr. Victor Fet's personal scorpion collection at Marshall University, I came across an individual (Fig. 1) with pedipalp chela possessing asymmetrical movable fingers. The specimen, preserved in 95% ethanol, was notably brittle and the pedipalp segments and metasoma fell apart upon removal from the collection vial. No fragments were lost, however, and the specimen was still in sufficient condition to photograph and study.

Description

The adult male *S. donensis* was acquired 11 miles south of Cibola in Yuma County, Arizona by an unknown collector. Dentition of the left chelal movable finger is conspicuously malformed (Fig. 2). The median (*MD*) denticles are somewhat aligned forming three to four vague denticles groups (*DG*) of various sizes,



Figures 2–3: Denticle edge of chelal movable fingers showing arrangement of denticles. 2. left (malformed) movable finger. 3. right (normal) movable finger.

unlike the seven denticle groups (*DG*) of the right chelal finger (Fig. 3). More apparent even, are the presence of extra inner (*ID*) denticles. Twelve *ID* denticles of different sizes are arranged haphazardly, bearing little resemblance to the seven evenly spaced *ID* denticles of the more characteristic right chelal movable finger. Only three outer (*OD*) denticles flank the series of *MD* denticles, opposed to the normal six. In addition, the shape of the finger is also abnormal, being less curved and slightly more robust than the right chelal movable finger.

Overall shape and size of the pedipalp femurs, patellae, and chelae are the same on each side and dentitions of the right and left fixed chelal fingers bear no apparent differences. Measurements of pedipalps, femurs, patellae and chelae are given in Table 1.

Discussion

Since the pedipalps are an excellent source of taxonomic data, both descriptive and quantitative (Stahnke, 1970), developmental anomalies such as this can cause problems, if not careful, in identification. Many scorpion keys and diagnoses distinguish taxa based on dentition of the pedipalp chela fingers. One of the primary charac-

	Left Pedipalp	Right Pedipalp
Linear measurements		
Pedipalp, length	8.50	8.50
Femur (length/width)	2.00/0.85	2.00/0.85
Patella (length/width)	2.40/1.00	2.40/1.00
Chela, length	4.10	4.10
Palm (length/width/depth)	2.45/1.35/1.35	2.45/1.35/1.35
Fixed finger, length	1.65	1.65
Movable finger, length	2.15	2.15
Pedipalp finger dentition		
Fixed Finger		
Denticle groups	6	6
Inner denticles	6	6
Outer denticles	6	6
Movable finger		
Denticle groups	3-4 (no distinct rows)	7
Inner denticles	12	7
Outer denticles	3	6

Table 1: Measurements (mm.) and dentition of left and right pedipalps of malformed *Superstitionia donensis* specimen.

ters used to identify *S. donensis* in a key by Williams (1980) is the presence of five or six non-overlapping denticle groups (DG) on the pedipalp fingers. Scorpions with malformed denticles could therefore not be accurately identified with this key.

In a similar case, Teruel (2003) reported a cheliceral anomaly on a specimen of *Lychas obsti*, which also posed potential identification problems. The aberrant character, and extra tooth on the ventral surface of a cheliceral fixed finger, was only present on one side and therefore considered normal variation in morphology. Hjelle (1990) states that some particular anomalies appear on only one side of any particular specimen, but can occur on either side of the body. As suggested by Mattoni (2005), expression of both states in one specimen would be a rare abnormality and should not necessitate the need to abandon current character systems.

In light of this abnormality, it would be wise to examine characters on both sides of a scorpion before drawing any conclusions regarding its identification or morphology, as they are not always symmetrical.

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