

## A new species of *Diplocentrus* (Arachnida: Scorpiones) from Oaxaca, Mexico

CARLOS E. SANTIBÁÑEZ-LÓPEZ & OSCAR F. FRANCKE

*Colección Nacional de Arácnidos, Departamento de Zoología, Instituto de Biología, Universidad Nacional Autónoma de México, Apartado Postal 70-153, México D. F. 04510, MEXICO. E-mail: csantibanez@ibiologia.unam.mx, offb@ibiologia.unam.mx*

### Abstract

*Diplocentrus tenango* **sp. n.** from the community of San Miguel Tenango in Southern Oaxaca is described. This is the eleventh species of the genus reported for Oaxaca. The tarsomere II spine formula is 5-6/6:6/6:7/7:7/7. Pectinal tooth counts are 12–13 in males, and 10–11 in females. It is clearly distinguished from its closest relatives: *D. rectimanus* Pocock 1898, and *D. tehuano* Francke 1977.

**Key words:** Scorpion, Diplocentridae, diversity, species

### Resumen

Se describe *Diplocentrus tenango* **sp. n.** de la comunidad de San Miguel Tenango en el sureste de Oaxaca. Esta es la undécima especie del género reportada para el estado de Oaxaca. La fórmula tarsal es 5-6/6:6/6:7/7:7/7, el conteo pectinal es de 12–13 en machos y 10–11 en hembras. Se diferencia claramente de *D. rectimanus* Pocock 1898 y de *D. tehuano* Francke 1977.

**Palabras clave:** Escorpión, Diplocentridae, diversidad, especies

### Introduction

The Mexican state of Oaxaca is recognized with having the highest diversity of the genus *Diplocentrus* Peters, 1861 by many authors (Francke 1977; Lourenço & Sissom 2000; Armas & Martín-Frías 2000, 2003; Teruel 2005) with 10 species described to date, representing about one-fifth of the total number of species in the genus (50). Despite the many works about the scorpion fauna of the state (Armas & Martín-Frías 2000; Hoffmann 1931; Francke 1977, 1978; Sissom 1994 and Sissom & Francke 1998) it still remains poorly studied, especially in the Isthmus of Tehuantepec area (Stockwell 1988).

*Diplocentrus tehuano* from the city of Tehuantepec is the only species described from the Southeast of Oaxaca, because *D. formosus* Armas & Martín-Frías 2003 has been synonymized under *D. tehuano* by Armas 2006. This area is recognized as one of the most biodiverse zones in the country (García-Mendoza *et al.* 2004), so more species of this genus are expected there. The present contribution provides the description of a second species from southeastern Oaxaca, specifically from the community of San Miguel Tenango.

### Material and methods

Nomenclature and mensuration follows Stahnke (1970), except for trichobotrial terminology after Vachon (1974) and metasomal carinal terminology after Francke (1977). Photography of the female and male chelae under black light follow Volschenk (2005). Measurements were taken with an ocular micrometer calibrated at

10X and are given in millimeters. Abbreviations for depositories: AMNH—American Museum of Natural History, New York, IBUNAM—Colección Nacional de Arácnidos, Instituto de Biología, Universidad Nacional Autónoma de México, México, D. F.

## Taxonomy

### *Diplocentrus tenango*, new species

(Figs 1–10)

**Type material.** Holotype male from 0.5 km west of San Miguel Tenango, Oaxaca; (N 16° 13' 30.9", W 95° 35' 57.2", elevation 1571 m) 2 November 2004, Oscar F. Francke, Gabriel A. Villegas and Ricardo Paredes. Deposited in the Colección Nacional de Arácnidos (CNAN-T0273), Departamento de Zoología, Instituto de Biología, Universidad Nacional Autónoma de México. Paratypes: same data as holotype; 2 adult females (CNAN-T0274 and CNAN-T0275), one juvenile male (CNAN-T0276) and one juvenile female (CNAN-T0277) deposited at IBUNAM; one adult female, one subadult female and one juvenile female deposited at AMNH. All the specimens were detected at night with the aid of ultraviolet lamps, inhabiting their burrows along the road cuts on a logging trail in a pine forest; all the specimens had to be dug out (at night) as they barely showed their pedipalp chela at the burrow entrances.

**Etymology.** The specific epithet is a noun in apposition derived from the type locality

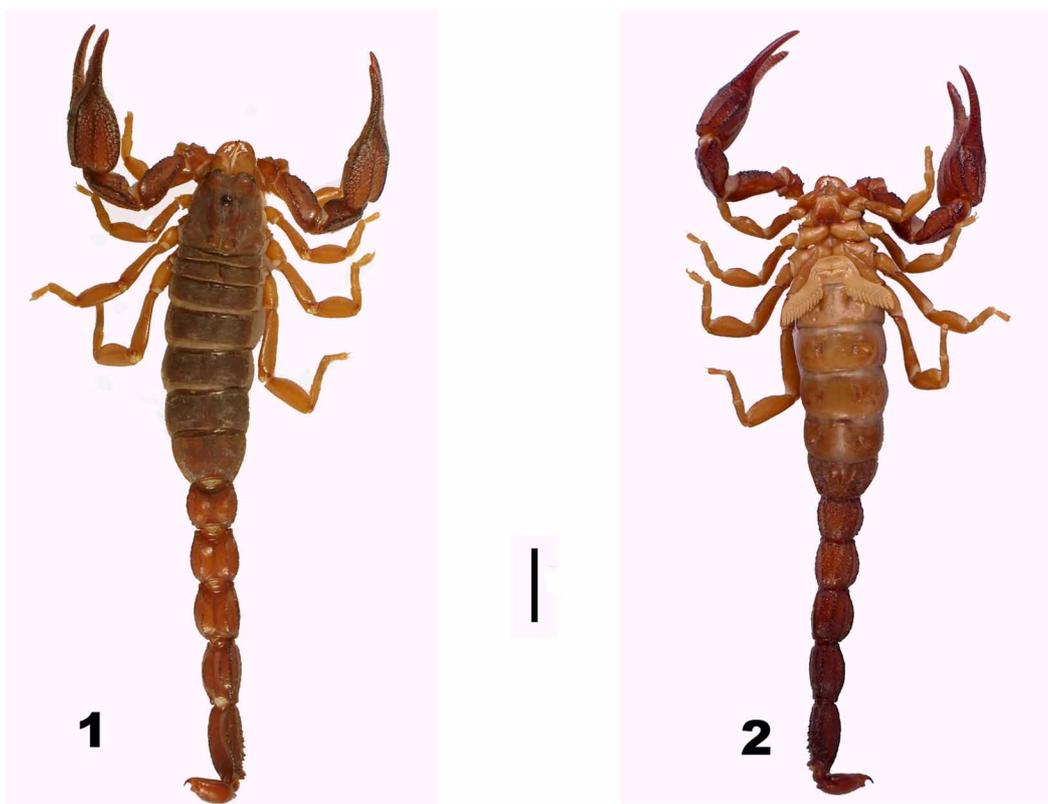
**Diagnosis.** Adults 40–43 mm long, carapace 5.6–5.8 mm long. Yellowish brown, weakly to moderately infusate throughout. Pedipalp femur shorter than carapace, wider than deep with dorsal surface convex; patella also shorter than carapace. Metasomal segment I wider than long. Cheliceral fixed finger almost as long as chela width. Pectinal tooth count 12–13 in males (n=2) and 10–11 in females (n=6). Tarsomere II spine formula 5–6/6:6/6:7/7:7/7; its closest relatives, *Diplocentrus rectimanus* and *Diplocentrus tehuano* have spine formulae of 6/6: 6/6 on the last two pairs of legs, and in *D. rectimanus* the pedipalp femur is deeper than wide.

**Description of the male holotype (Fig. 1–2).** Prosoma. Carapace medium brown, with moderate fuscosity throughout, uniform around median eyes and variegated elsewhere. Anterior margin V shaped, notch moderately deep; moderately setose, with 9–10 setae. Three pairs of subequal lateral eyes. Carapacial surface shagreened. Venter cream to pale yellow.

**Mesosoma.** Tergites medium brown, with moderately dense variegated fusco-piceous pattern; shagreened. Sternites light yellow brown; VII with submedian carinae vestigial, lateral carinae moderately strong, granulose.

**Metasoma.** Medium brown, carinae weakly to moderately infusate. Ventral submedian carinae: on I weak, weakly granulose; on II moderate, more granulose than on I; on III moderately strong, granulose; on IV strong, weakly granulose. Ventral lateral carinae: on I strong, granulose; on II moderately strong, granulose; on III–IV vestigial. Lateral inframedian carinae: on I–II weak, slightly sinuous; on III moderately strong, coarsely granulose; on IV strong, crenate. Lateral supramedian carinae: on I strong, crenate; on II–III moderately strong, crenate; on IV weak, feebly crenate. Dorsal lateral carinae: on I vestigial; on II–III weak, short; on IV moderate, weakly granulose.

Segment V longer than pedipalp femur. Ventral median and ventral lateral carinae moderate, granulose, with subconical granules. Ventral transverse carina moderately emarginated with 2 large subconical granules. Dorsal lateral carinae weak, moderately crenate. Anal arc circular: anal subterminal carina moderately strong, with 12 granules; anal terminal carina weak to vestigial, minutely dentate. Intercarinae: ventrals smooth, laterals and dorsal shagreened. Telson brown, uniformly fuscous, smooth. Subaculear tubercle strong, subconical. Aculeus short, moderately curved.



FIGURES 1–2. *Diplocentrus tenango* n. sp. Male holotype. 1. Dorsal view. 2. Ventral view. Scale bar = 5 mm

**Pedipalp.** Medium reddish brown, carinae and fingers darker. Orthobothriotaxia “C” (Vachon 1974); pattern typical for genus (see Francke, 1977). Femur wider than deep. Dorsal internal carina strong, granulose. Dorsal external carina: proximal half moderately strong, sparsely and poorly granulose; distal half tapering gradually to weak. Ventral internal carina strong and granulose. Ventral external carina weak, fading out distally. Dorsal face flat, sparsely granulose, with large strong dark granules. Ventral face flat, smooth. Internal face moderately granulose with large, dark, strong granules.

Patella weakly infusate. Dorsal internal carina obsolete, basal tubercle strong with two large granules. Dorsal medial carina strong, crenate. External carina weak to moderate, smooth. Ventral external carina strong, crenate. Ventral median carina strong, crenate. Ventral internal carina weak, sparsely granulose but with large granules. Internal and ventral faces flat, smooth. Dorsal and external faces shagreened, sparsely granulose, feebly reticulated.

Chela (Figs. 5, 7) with faint variegated fuscosity, carinae fusco-piceous. Dorsal margin of manus strongly carinate, coarsely granulose. Digital carina very strong, granulose. Dorsal secondary and external secondary carinae weak to moderate, subgranulose. Ventral external carina originating at external condyle of movable finger articulation, converging gradually towards ventral median carina and ending at approximately three quarters of underhand length from chela base. Ventral median carina very strong, crenate, directed towards midpoint of movable finger articulation. Three internal carinae weak, smooth; with a shallow longitudinal depression where chela flexes against patella. Dorsal face with submarginal reticulation moderately deep, ridges smooth. External face with moderately deep reticulation. Fixed finger base: Dorsal face granulose with moderate dense setation; external face flat, smooth; internal face moderately setose, feebly concave, fixed finger shorter than both femur and patella length. Movable finger smooth, with moderately dense setation.

**Legs.** Light yellow brown, weakly and uniformly infusate; pro lateral faces of femora and tibiae shagreened. Terminal spine directed ventro-apically rather than strictly apically. Tarsomere II spine formula: 5/5 X/X:6/6 6/6:6/6 7/7:7/7 7/7



FIGURES 3–4. *Diplocentrus tenango* n. sp. Female paratype. 1. Dorsal view. 2. Ventral view. Scale bar = 5 mm.

**Hemispermatothore (Fig. 9–10):** Lamellate, weakly sclerotized, 6.9 mm long with distal lamella about two thirds of the total length; sperm duct simple, without teeth or spines.

**Female (Fig. 3–4).** Differs from male as indicated in Table 1 and in the following:

**Mesosoma.** Darker than male; tergites medium brown, smooth and shiny, with strongly dense variegated fusco-piceous pattern.

**Metasoma.** dorsolateral carinae: on I moderately strong and granulose; on II–III strong and granulose; on IV moderate, granulose.

**Pedipalp** patella with external carina vestigial to obsolete. Chela rounder, deeper than on the male: carinae fusco-piceous; dorsal margin of manus weakly carinate, coarsely granulose. Digital carina weakly granulose. Dorsal secondary and external secondary carinae weak to moderate, subgranulose (Fig. 6).

**Legs.** Medium brown with dense variegated fusco-piceous pattern.

**Intraspecific variation:** *Diplocentrus tenango* shows marked sexual dimorphism. Males with metasoma longer than female, but male pedipalp as long as female pedipalp.

Pectinal tooth counts: males (n=2): 1 comb with 12 and 3 combs with 13 teeth; females (n=6): 4 combs with 10 teeth and 8 combs with 11 teeth. The typical formula appears to be 5-6/6/6/6/7/7/7/7. Tarsomere II spine counts (n=8):

Leg I prolateral: 1 tarsus with 1 spine, 8 tarsi with 5 spines, 7 tarsi with 6.

Retrolateral: 1 tarsus with 1 spine, 2 tarsi with 5 spines, 12 tarsi with 6, 1 with 7 spines.

Leg II prolateral: 16 tarsi with 6 spines.

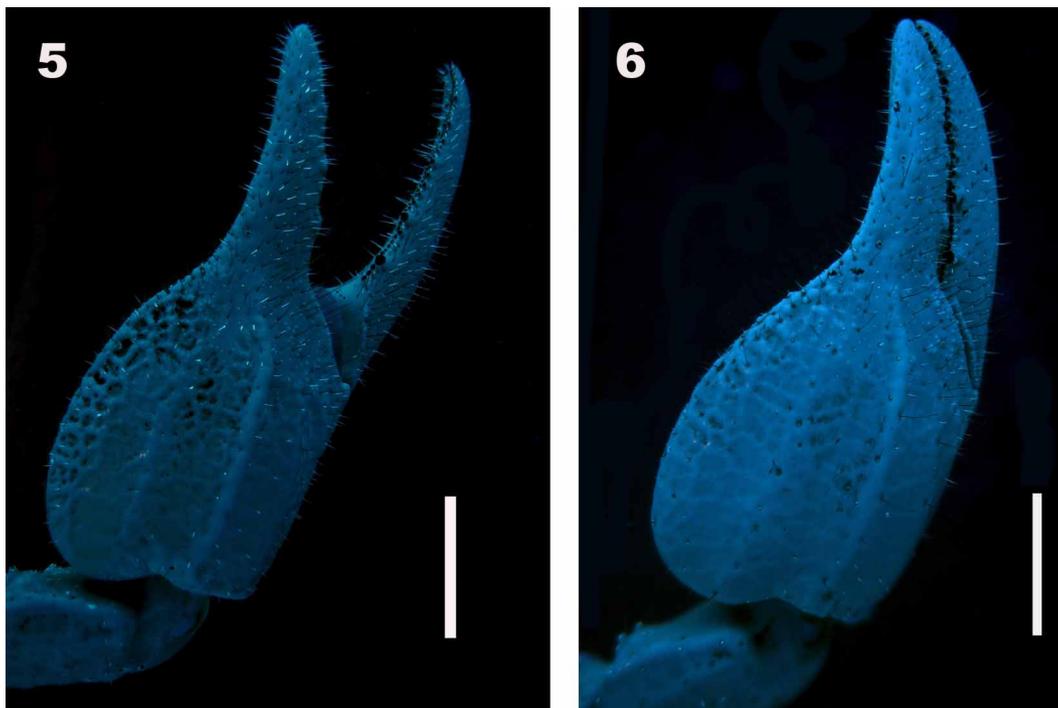
Retrolateral: 14 tarsi with 6 spines, 2 tarsi with 7 spines.

Leg III prolateral: 1 tarsus with 4 spines, 2 tarsi with 6 spines, 13 tarsi with 7 spines.

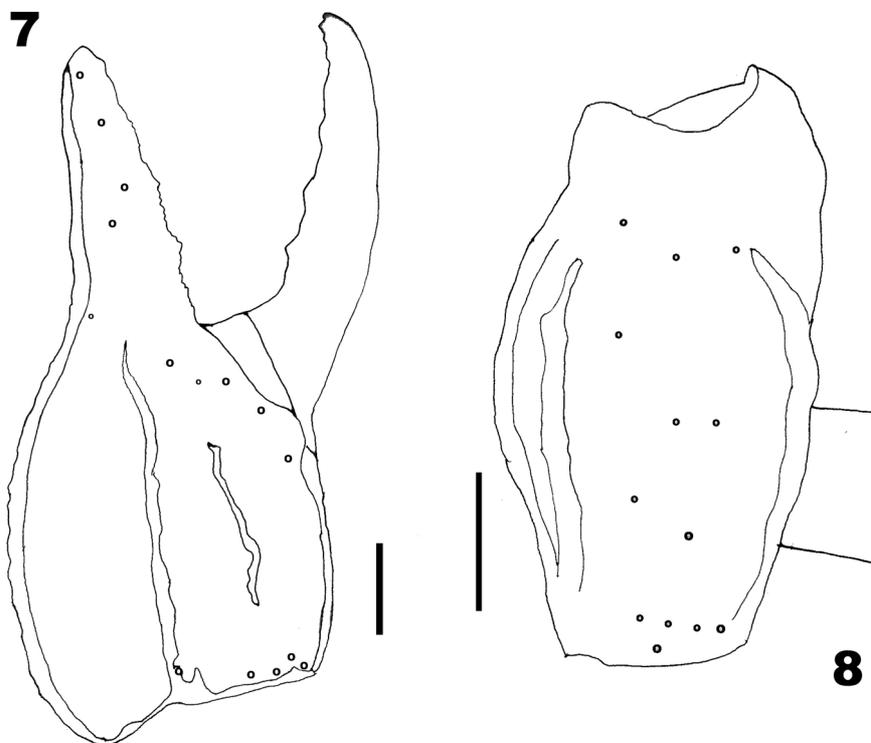
Retrolateral: 2 tarsi with 6 spines, 14 tarsi with 7 spines.

Leg IV prolateral: 2 tarsi with 6 spines, 13 tarsi with 7 spines, 1 missing.

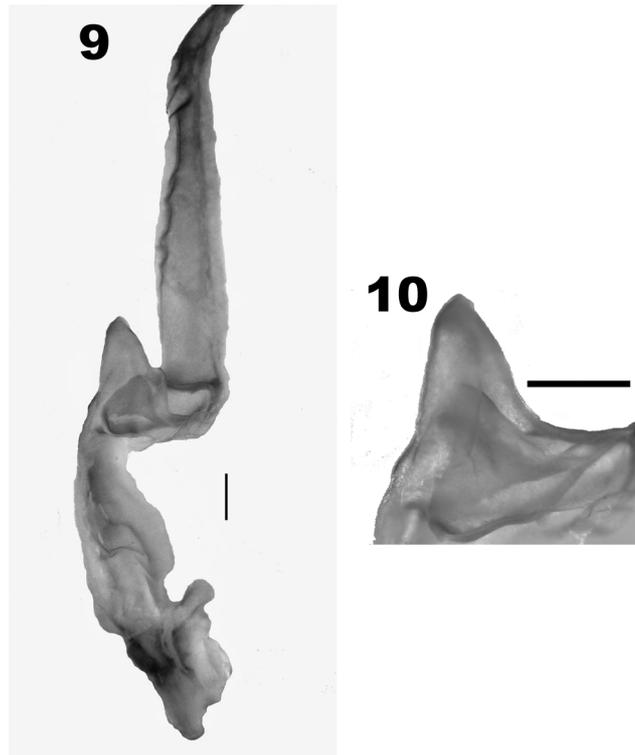
Retrolateral: 1 tarsus with 6 spines, 14 tarsi with 7 spines, 1 missing.



FIGURES 5–6. *Diplocentrus tenango* n. sp. Morphosculpture of the right pedipalp chela. External view. 5 Male. 6 female. Scale bar = 1 mm



FIGURES 7–8. *Diplocentrus tenango* n. sp. from Oaxaca. 7. External view of the right chela. 8. Ventral view of the right patella. Scale bars= 1mm



FIGURES 9–10. Ental view of the hemispermatothore. 10. Detail of the capsule. Scale bars= 1mm.

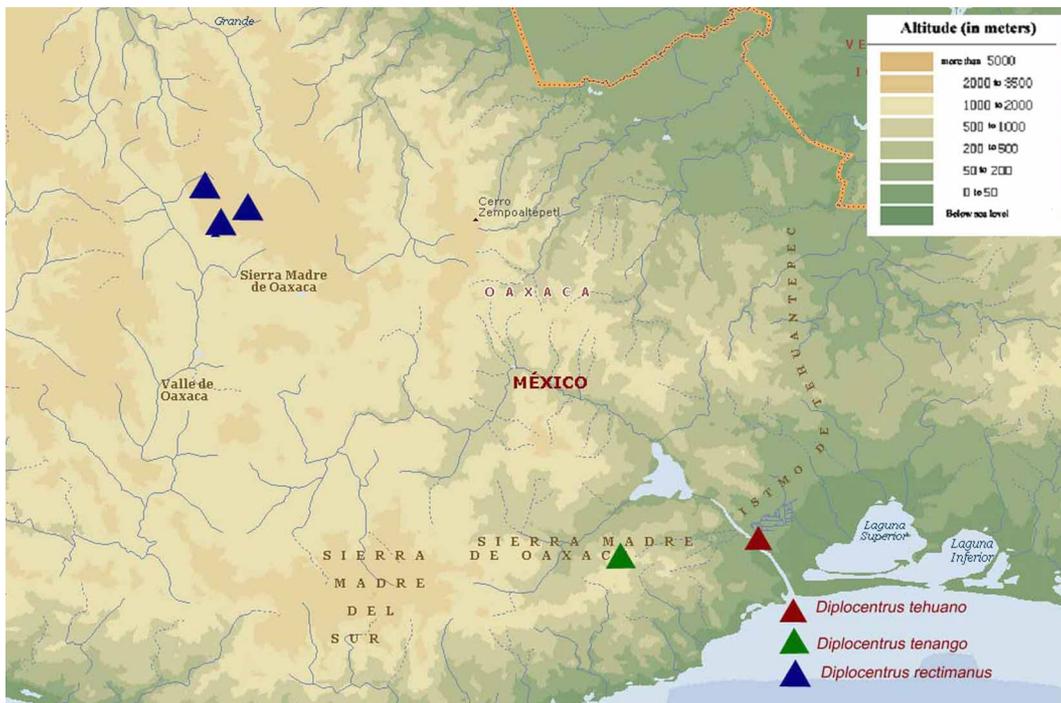


FIGURE 11. Comparative distribution among *Diplocentrus tenango* n. sp. (green triangle), *D. tehuanus* (red) and *D. rectimanus* (blue) (elevation ranges in meters; map from Microsoft Encarta 2007).

**Comparative description:** *Diplocentrus tenango* appears to be more closely related to *D. rectimanus* on account of similar pectinal tooth counts (both males and females) and *D. tehuanus* on account of geographical proximity (Fig. 11). Morphometric differences along with the pectinal tooth counts are shown in table 1.

Noteworthy is the fact that in *D. tenango* the pedipalp femur is wider than deep, the same as in *D. tehuano*, whereas on *D. rectimanus* it is deeper than wide. It differs also in the form of the movable finger of the chela: not as straight as in *D. rectimanus*, not as wide as in *D. tehuano*. The coloration in *D. tenango* is different from the others because it is darker than both *D. tehuano* and *D. rectimanus*. The ventral submedian carinae on segment I in *D. tehuano* are moderately strong and smooth, in *D. rectimanus* are moderately strong and coarsely crenate; whereas in *D. tenango* they are weak and weakly crenate. They also differ in the tarsomere II spine formulae which are presented here:

***D. tenango***: 5-6/6:6/6:7/7:7/7

***D. rectimanus***: 4-5/5:5/5:6/6:6/6

***D. tehuano***: 4/5:5/5:5-6/6:6/6

**Distribution.** Only known from the type locality.

**TABLE 1.** Morphometrics of *D. tenango*; *D. tehuano* and *D. rectimanus* from Francke (1977).

	<i>D. tenango</i>		<i>D. tehuano</i>		<i>D. rectimanus</i>	
	Male Holotype	Female Paratype	Male Holotype	Female Allotype	Male Holotype	Female
Total length	42.6	40.5	50.45	51.35	49.7	53.95
Carapace length	5.6	5.8	6.8	7.2	6.4	7.55
Mesosoma length	16	16.5	15.85	18.4	15.8	18.7
Metasoma length	21	18.2	27.8	25.75	27.5	27.7
Telson length	4.8	4.9	5.2	5.15	5.2	5.15
Vesicle length	3.1	3.7	4.3	4.2	4.3	4.2
Pedipalp length	15.6	15.7	24.2	21.3	20.65	22.5
Femur length	3.6	3.5	5.7	5.1	4.75	5.1
Width	1.5	1.8	2.4	2.3	1.85	2
Depth	0.9	1.5	1.75	1.9	2.65	2.6
Patella length	4	3.8	5.5	5.2	4.7	5.1
Width	1.4	1.5	2.4	2.4	2.05	2.3
Chela length	8	8.4	13	11	11.2	12.3
Width	2.5	2.7	5.4	5.9	5.5	6
Depth	3.9	4.1	2.7	3.3	3.1	3.8
Movable finger length	4.9	5	8.4	6.3	7.15	7.6
Fixed finger length	3.5	3.4	6.5	4.3	5.1	5.5
Chelicera length	2.4	2.5	1.95	2.2	2.25	2.75
Width	1.1	1.3	1.25	1.45	1.60	2.05
Movable finger length	1.4	1.5	1.7	1.75	2.30	2.95
Fixed finger length	0.9	1.2	0.95	1.1	1.70	2.10
Pectinal tooth count	12–13	10–11	12–13	10–12	10–10	8–8

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