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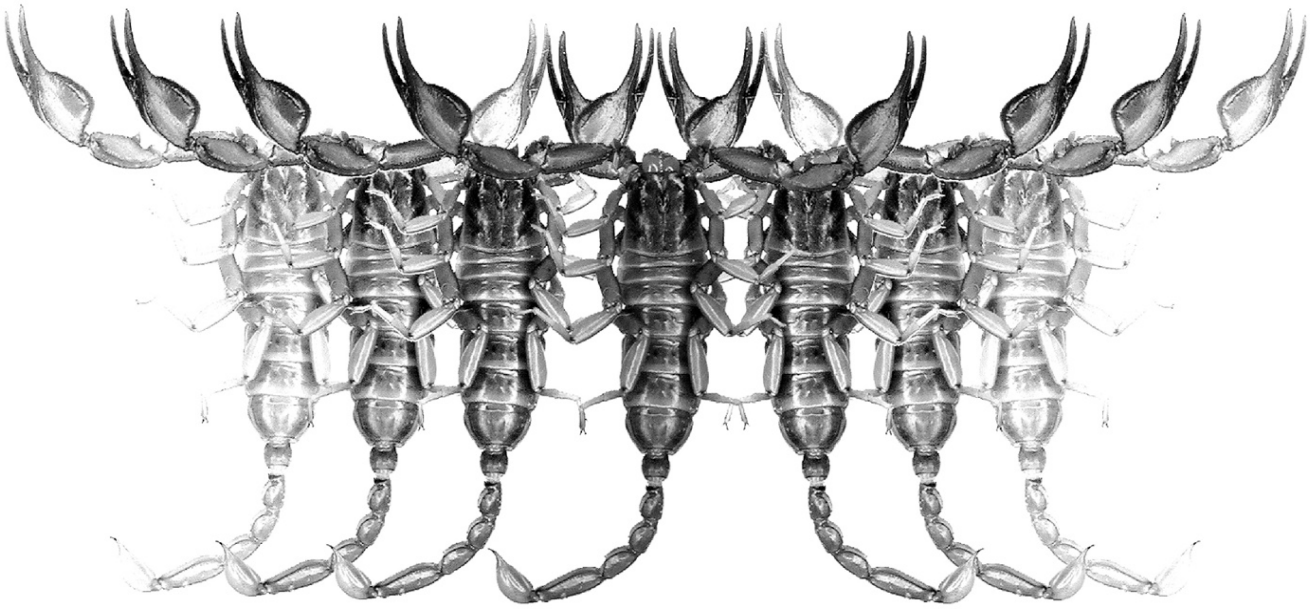

Description of the adult female of *Diplocentrus lachua* (Scorpiones: Scorpionidae: Diplocentrinae) from northeastern Alta Verapaz, Guatemala

Rony E. Trujillo, Luis F. de Armas & Carlos A. Gaitán

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Description of the adult female of *Diplocentrus lachua* (Scorpiones: Scorpionidae: Diplocentrinae) from northeastern Alta Verapaz, Guatemala

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Summary

The female of the scorpion *Diplocentrus lachua* Armas, Trujillo & Agreda, 2011 is herein described, on the basis of a single specimen collected at Parque Nacional Laguna Lachuá, Alta Verapaz Department, Guatemala, type locality for this species. An emended diagnosis is provided and the known distribution of all described Guatemalan *Diplocentrus* species is graphically presented.

Introduction

The scorpion fauna of Guatemala currently contains eight species in the genus *Diplocentrus* Peters, 1861, which represents 42% of all the known scorpion species for this Central American country. Most of these species have been described in the last 10 years; nevertheless, various Guatemalan species of this genus remain undescribed (Armas & Trujillo, unpublished data).

Taxonomic and biological information for the known species of Guatemalan *Diplocentrus* is unequal. For only three species, both sexes are known: *D. maya* Francke, 1977, *D. motagua* Armas & Trujillo, 2009, and *D. izabal* Armas & Trujillo, 2016. Three species are mainly known on the basis of adult male specimens: *D. taibeli* (Caporiacco, 1938) (an adult male and an immature female), *D. lachua* Armas, Trujillo & Agreda, 2011 (two specimens), and *D. popti* Trujillo & Armas, 2016 (a single specimen). For the other two species (*D. landelinoi* Trujillo & Armas, 2012 and *D. oxlajujbaktun* Trujillo & Armas, 2012), the male is unknown (Caporiacco, 1938; Francke, 1977; Armas & Trujillo, 2009, 2016; Armas et al., 2011; Trujillo & Armas, 2011, 2012, 2016e). In the present contribution, the female of *D. lachua* is described, based on a single topotypic specimen.

Methods and Material

The examined specimen is deposited in Sistema de Colecciones Biológicas (USAC), Escuela de Biología, Universidad de San Carlos de Guatemala, Guatemala City, Guatemala. Observations, photographs and measurements were made using an AmScope SM-2TZ-P dissecting microscope, fitted with a 10 MP digital camera and an ocular micrometer.

Measurements and nomenclature follows Stahnke (1971), except for trichobothriotaxy (Vachon, 1974), metasomal carinae (Francke, 1977) and pedipalp chela carinae (Prendini, 2000). All the measurements are given in millimeters (mm).

Systematics

Diplocentrus lachua Armas, Trujillo & Agreda, 2011
(Figures 1–8, Table 1)

Diplocentrus lachua Armas, Trujillo & Agreda, 2011: 113–117, fig. 1 A–J, 2 A–D, 3, table I; Trujillo & Armas, 2012: 131, 138; Armas & Trujillo, 2016: 2.

Type material (USAC). **Guatemala**, Alta Verapaz, Cobán municipality, Parque Nacional Laguna Lachuá, 15º53'54" N 90º41'31" W, 187 m a.s.l., 12.X. 2010, 1♂ (holotype), leg. R. Sunun, M. Quezada & E. Agreda, under rotten log; Cobán

Dimensions (MM)		*Diplocentrus lachua* ♀	*Diplocentrus lachua* ♂ holotype
Carapace	L / W	7.1 / 7.7	6.7 / 7.1
Metasoma + telson	L	28.9	31.3
Segment I	L / W / D	3.8 / 4.0 / 3.1	4.2 / 3.9 / 2.7
Segment II	L / W	4.0 / 3.6	4.4 / 3.5
Segment III	L / W	4.2 / 3.4	4.7 /3.2
Segment IV	L / W	4.4 / 3.1	5.2 / 2.9
Segment V	L / W / D	6.3 / 2.8 / 2.6	6.7 / 2.7 /2.5
Telson	L / W / D	6.2 / 3.1 / 2.6	6.1 / 2.7 / 2.3
Vesicle	L	5.1	4.5
Pedipalp	L	26.6	30.5
Femur	L / W / D	6.2 / 2.5 / 2.0	7.0 / 2.4 / 1.7
Patella	L / W	6.8 / 2.7	7.9 / 2.4
Chela	L	13.6	15.6
Manus	L / W / D	6.5 / 3.7 / 6.0	6.6 / 2.5 / 4.5
Movable finger	L	7.1	9.0
Total	**L**	**49.2**	**53.0**

Table 1. Measurements (mm) of *Diplocentrus lachua*. L, length; W, width; D, depth. Data of the holotype after Armas et al. (2011).

municipality, Reserva Natural Privada Chajumpec, 16º00'17" N 90º39'37" W, 200 m a.s.l., 16.X. 2003, 1♂ (paratype), leg. B. González, D. Ortiz, A. L. Ambrosio & E. Agreda, UV detection, manual collection.

Additional material examined (USAC). **Guatemala**, Alta Verapaz, Cobán municipality, Parque Nacional Laguna Lachuá, 15º55'33" N 90º39'25" W, 180 m a.s.l., 23.III.2015, 1♀, leg. C. Gaitán, 800 m from "muelle 2".

Emended diagnosis. Medium sized species (49-53 mm). Predominantly brown, with moderately dense variegated fuscosity, mainly on the carapace, pedipalps and legs. Carapace smooth, with numerous small and medium size granules, more noticeable on the interocular triangle. Anterior median notch wide and deep. Pedipalp femur wider than its height, with a flat dorsal surface. Pedipalp patella and chela manus markedly reticulated, primarily on dorsal, external and ventral surfaces (the reticulations are more conspicuous on the males). Digital carina strongly developed, in the form of a smooth flange that reaches out towards the level of the trichobothrium *Et5*. Pectinal tooth count 13/13. Trichobothrium *Dt* clearly on the base of the fixed finger. Carinae of metasomal segments I-IV mostly strong and subserrate. Subaculear tubercle stout and remarkably conical, as long as its basal width. Tarsomere II spine formula: 4/4: 4/4: 5/5: 5/5. Its closest relative seems to be *D. maya*, from which it differs by having: (1) darker pattern, with reticulate chelicerae (in *D. maya* the chelicerae are not reticulate); (2) trichobothrium *Dt* on the fixed finger (in *D. maya* it is on the hand); (3) distance between trichobothria *Et5* and *Dt* is 1.2 times the distance that exists between trichobothria *Dt* and *eb* (it is 0.8 in *D. maya*); (4) subaculear tubercle most conical and sharp that in *D. maya*; and (5) male pedipalp femur most granulose.

Description of the female. Carapace and tergites brown, with moderately dense variegated fuscosity; ocular tubercle and lateral eyes black; anterior margin of the carapace dark brown; chelicerae orange brown, with a darker reticulation pattern. Coxosternal region light yellow to pale brown. Pedipalps: femur, patella and chelae reddish brown. Legs orange brown, moderately infuscate. Metasoma: reddish brown, carinae darker.

Carapace. The carapace smooth, with abundant and disperse fine granules, predominantly towards the interocular triangle (there are also small to moderate granules in the interocular triangle and around the anterior median notch); anterior median notch deep and wide (twice as wide as long), reaching the level of the second pair of lateral eyes; ocular tubercle located in the anterior third of the carapace; superciliary carinae smooth, subgranular; anterior median furrow vestigial; lateral ocular, posterior median, posterior marginal and posterior lateral furrows deep and wide; sternum pentagonal (1.4 times longer than wide).

Mesosoma. Pretergites smooth. Tergites finely granular (granules more or less uniformly dispersed); posterior margin

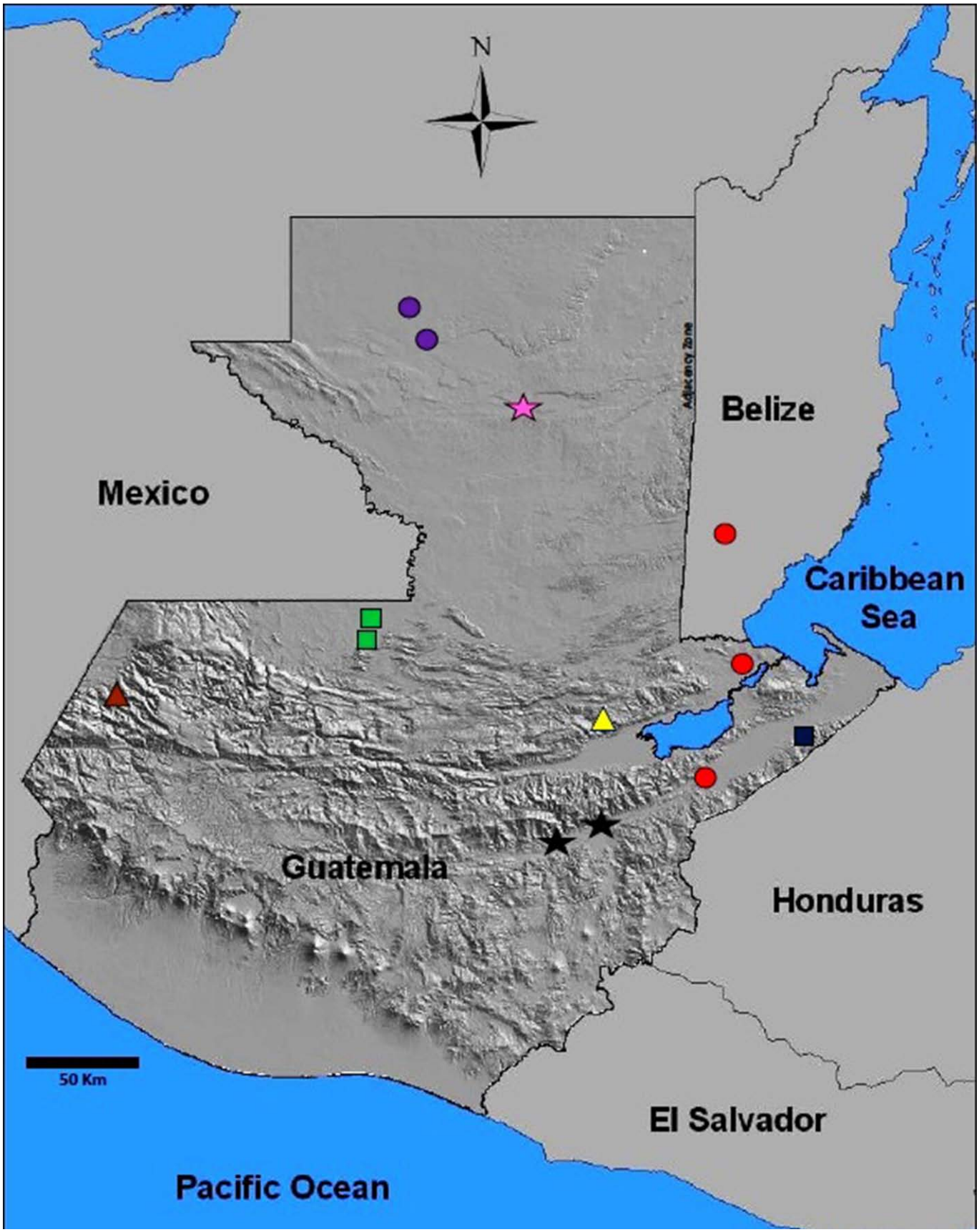
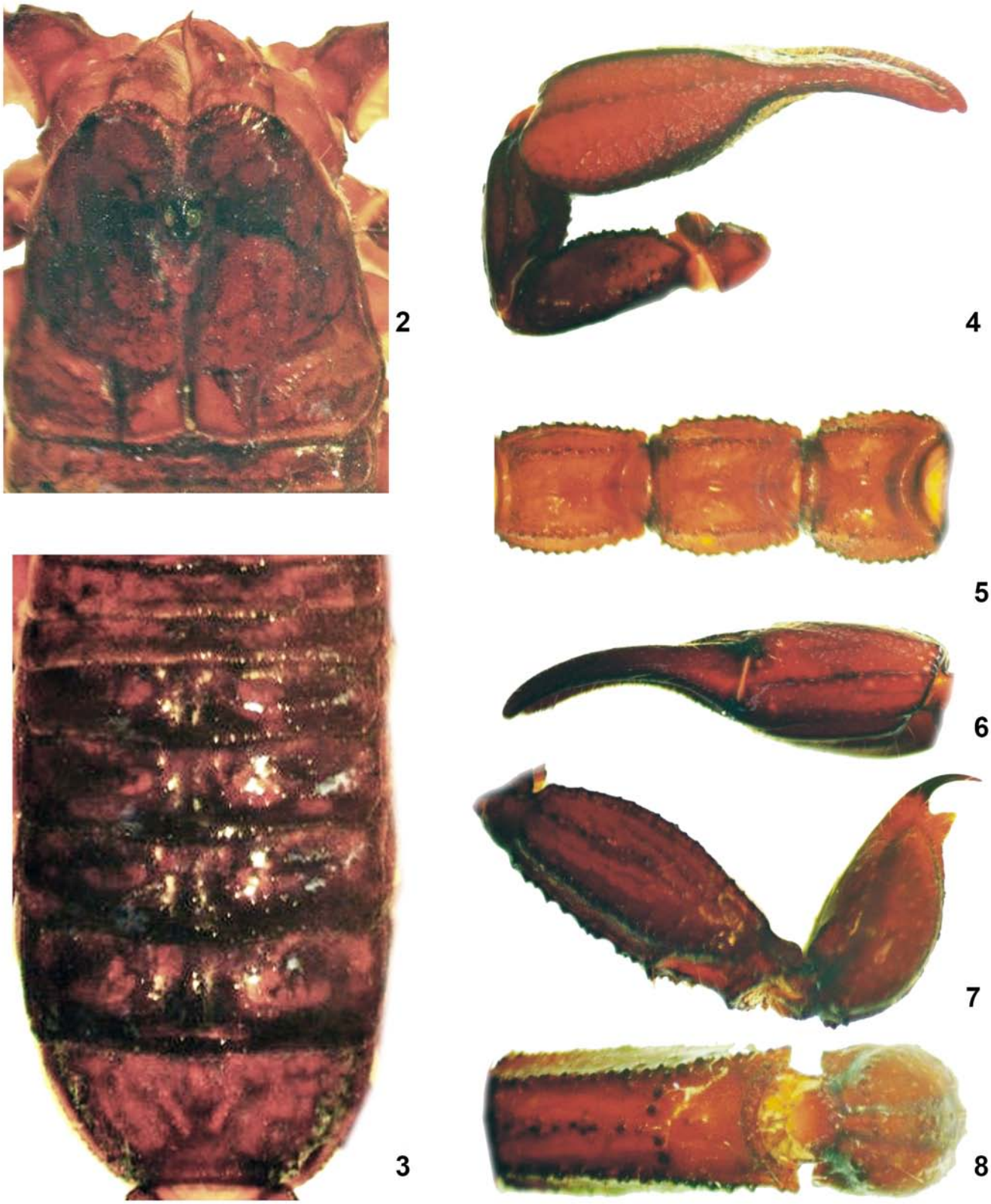


Figure 1. Geographical distribution of the Guatemalan species of the genus *Diplocentrus*: *D. taibeli* (pink star), *D. maya* (red circles), *D. motagua* (black stars), *D. lachua* (green squares), *D. landelinoi* (blue square), *D. oxlajujbaktun* (purple circles), *D. popti* (brown triangle) and *D. izabal* (yellow triangle).



Figures 2–**8**. *Diplocentrus lachua*. Topotypic female, carapace (2), mesosoma dorsal (3), pedipalp dorsal (4), metasoma I–III, dorsal (5), pedipalp chela ventral (6) metasoma V and telson, lateral (7) and ventral (8) views.

of the tergites with a parallel row of fine granules (more conspicuous in tergites I-II); longitudinal median carina absent in I-II, vestigial and subgranular in III-VII. Tergite VII: moderately bilobed postero-laterally; lateral carinae weak to moderate, granulose. Genital operculum elliptical. Pectines with 13/13 teeth. Sternites smooth; linear spiracles (five times longer than wide); submedian carinae moderate; lateral carinae strong, subgranular.

Metasoma and telson. Intercarinal surfaces finely granular; dorsolateral and lateral supramedian carinae strong and subserrate in I-IV, with moderate to large conical granules; lateral inframedian carinae strong and subserrate in I-III (one of the carinae absent in I), moderate to strong in IV, subgranular; ventrolateral carinae strong and subserrate in I-IV; ventral submedian carinae moderate in I, weak in II-IV, subgranular to granulose. Segment V: lateral surfaces with some small scattered granules; dorsolateral carina moderate, subserrate; ventral median carina strong, subserrate; ventral transverse carina moderate, with five conical granules; anal arch moderate, with dentiform granules. Telson: vesicle ovate, smooth in appearance, sparsely punctate, moderately pilose on the ventral surface and the base of the aculeus, granulose to subgranular ventrobasally; aculeus short and curved; subaculear tubercle stout and remarkably conical (as long as its basal width), directed towards the tip of the aculeus.

Chelicerae. Dentition characteristic of genus; fixed finger shorter than cheliceral manus width; movable finger slightly shorter than cheliceral manus; fingers and manus moderate to densely pilose, mainly in the ventral surface.

Legs. Legs are smooth in appearance; femur, patella and tibia with fine scattered granules (more uniform and abundant on femur). Tarsomere II spine formula: 4/4 4/4: 4/4 4/4: 5/5 5/5: 5/5 5/5.

Pedipalps. Pedipalps orthobothriotaxic, type C. Femur wider than its height; dorsal surface flat, with small to moderate dispersed granules (the larger granules grouping towards the central portion of the femur); internal surface granulose; external surface smooth; ventral surface primarily smooth, with some small to moderate granules towards its inner edge; dorsoexternal carina moderate and granulose on its basal half, vestigial and mostly smooth on the rest; ventrointernal carina weak to moderate, with conical granules; ventroexternal carina rudimentary. Patella: dorsal and external surfaces moderately reticulated; ventral surface predominantly smooth, with weak reticulation towards its inner face; internal surface finely granulose, with a strong proximal tubercle and large and moderate conical granules; dorsointernal carina strong, subgranular; dorsoexternal carina weak, smooth; ventrointernal carina weak, granulose; ventroexternal carina weak to vestigial. Chela: manus oblong, moderately reticulated on dorsal and external surfaces, weakly reticulated on ventral and internal surfaces; internal surface with dispersed fine granules, mainly towards the base of the fixed finger; dorsal secondary carina moderate to weak; digital carina strongly developed, in the form of a smooth flange that reaches out towards the level of the trichobothrium *Et5*; external secondary carina weak to moderate, smooth; dorsal marginal carina weak to vestigial; internodorsal and interomedian carinae weak to moderate, smooth; ventromedian carina strong, in the form of a smooth flange that reaches out distally towards the middle portion between the two condyles of the movable finger; internoventral carina strong to moderate, primarily smooth. Fingers moderately pilose. Trichobothrium *Dt* clearly located on the base of the fixed finger.

Measurements. See Table 1.

Natural history. The Lachuá Ecoregion has very high levels of rainfall and humidity, conditions that gave rise to evergreen tropical rain forests. According to Miranda (1978), the characteristic arboreal species of this type of ecosystem are *Terminalia amazonia, Vochysia guatemalensis, Dialium guianense* and *Swietenia macrophylla*. Lachuá Ecoregion belongs to the Biogeographic Region II (Méndez, 2007), comprising high and intermediate lands from Northwestern and Northeastern Guatemala. This biogeographic region supports high levels of endemism, with the highest species richness for mammals, birds, amphibians and reptiles in the country (Méndez, 2007). Although it is recognized as a wetland of international importance under the Ramsar Convention (Ramsar Site No. 1623), currently the ecological integrity of the area is under serious threat, mainly as result of deforestation and illegal encroachments.

Remarks. The female herein described greatly resembles the males (holotype and paratype) of *D. lachua*, excepting by having shorter pedipalps (pedipalp length/metasoma length ratio 0.88 *vs.* 0.97-0.98 in the males), with more globose and most slightly reticulate chelae. It also has a more globose telson than the males.

On the other hand, it is possible that *D. lachua* might also be distributed in Mexico, taking into account that the distance from Laguna Lachua National Park (type locality) to Chiapas is about 13 km, and that the distance from the paratype locality (Chajumpec Private Natural Reserve) to Chiapas is less than 4 km.

Distribution. Only known from Lachuá Ecoregion (Fig. 1).

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