

DESCRIPTION OF THE MALE OF *DIPLOCENTRUS LOURENCOI* (SCORPIONES, DIPLOCENTRIDAE)

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ABSTRACT. The male of *Diplocentrus lourencoi* Stockwell 1988 is described and illustrated from a specimen collected west of San Pedro Sula, Honduras, and compared to the holotype female and the males of other *Diplocentrus* Peters 1861 in the region. The hemispermatophore is described, illustrated, and compared to other *Diplocentrus* in the region. Unique new characters on the male, posterolateral recesses on tergite VII, are described and illustrated. New descriptive information is given for the holotype female. Complete measurements and morphometrics are given for the male and female. A comparative diagnosis is offered based on this new information.

The original description of *Diplocentrus lourencoi* Stockwell 1988 was based on a single adult female from Río Santa Ana Canyon (3500 ft.), San Pedro Sula, Departamento Cortés, Honduras, collected during the Field Museum Expedition into Central America in the spring of 1923. Recently, Thomas G. Anton of the Field Museum (FMNH) discovered undetermined scorpion material that included an additional specimen from the expedition that was not studied previously. This specimen is an adult male collected by K. Schmidt and L. Walters on 1 April 1923 at “Mt. Camp, 4500 ft. El., W. of San Pedro Sula, Honduras,” several days after the female holotype was collected. (According to Mr. Anton [pers. comm.], “Mt. Camp” refers to the campsite location and not a geographic place name.) Examination of the holotype female was necessary to confirm that this male specimen is referable to *D. lourencoi*. This specimen brings the total number of reported diplocentrids from Honduras to a mere 12 individuals assignable to four species in two genera: *Diplocentrus coddingtoni* Stockwell 1988, *D. santiagoi* Stockwell 1988, *D. lourencoi*, and *Didymocentrus krausi* Francke 1978.

Because the male of this species is previously undescribed and distinct sexual dimorphism in diplocentrids is well documented, it is important that comparisons are made to complete the diagnosis of the species and to aid in separating *D. lourencoi* from related species. Male morphology tends to provide

more diagnostic characters for the genus at the species level than do female characters (Francke 1977).

Due to the brevity of the original description it became necessary to examine the female holotype. Upon examination of the holotype, the drawings of the female pedipalp chela in the original description were found to depict inaccurately the nature of the chelal reticulation, granulation, and keel structure. The pattern of chela reticulation and texture observed in the holotype female is extremely similar to that seen in the male, which is herein described and illustrated. In addition, the notable slenderness of the chelicerae and length of the cheliceral fingers of *Diplocentrus lourencoi* were not included in the original description: cheliceral morphometrics have been found to have diagnostic importance in diplocentrid scorpions (Francke 1977). Complete measurements for the holotype female are published here for the first time.

Nomenclature and mensuration essentially follow that of Stahnke (1970), except that cheliceral measurements and carinal terminology are after Francke (1975, 1977) and trichobothrial terminology is after Vachon (1974).

Diplocentrus lourencoi Stockwell 1988

Diplocentrus lourencoi Stockwell 1988: 161–163, figs. 19–24.

Type data.—Holotype female from Río Santa Ana Canyon (3500 ft.), San Pedro Sula,

Departamento Cortés, Honduras, 21 March 1923 (K. Schmidt and L. Walters), Capt. Field Mus. Exped., deposited in the Field Museum, Chicago; examined (*Note*: The original data label with the specimen does not indicate San Pedro Sula or Departamento Cortés: this information was thoughtfully provided in the original description by Stockwell, apparently after a thorough investigation of Honduras geography).

Description of male.—*Coloration (in alcohol)*: Carapace dark orange brown to mahogany with weak underlying marbling of light patches. Tergites dark orange brown to mahogany, infuscate. Metasoma dark orange brown, with each segment gradually darker distally; dorsal keels at least proximally nigrocarinate; telson dark orange brown, grading to light yellow brown at subaculear tubercle. Venter of prosoma reddish brown becoming yellow brown laterally with faint infuscation; genital opercula, pectines, and basal piece yellowish. Sternites II–VI light orange brown to light yellow brown; sternite VII slightly darker. Chelicera manus light yellow brown becoming slightly darker distally with faint reticulate pattern proximally; fingers yellowish, with teeth somewhat transparent under magnification, appearing light orange brown. Pedipalp external surfaces deep mahogany gradually becoming lighter distally to light red-brown fingers; internal surfaces light yellow brown at dorsal lobe becoming darker distally. Legs dark yellow brown proximally with marbled pattern, distal segments light yellowish.

Prosoma: Carapace only slightly longer than posterior width: length/width ratio 1.05. Surface feebly reticulate. Anterior margin of carapace and anterior median furrow moderately coarsely granular (Fig. 1); remainder of carapace with dense fine granulation interspersed with coarser granules. Sternum with 14 setae; each genital operculum with seven setae. Coxosternal region finely punctate, somewhat lustrous; coxae sparsely setose.

Mesosoma: Tergites I–VI with very dense fine granulation, shagreened. Tergite VII weakly bilobed posteriorly with moderate to coarse granulation (Fig. 2). Pre-posterolateral recess moderate, shallow; posterolateral recess strong, deep (Fig. 2). Pectinal tooth count 9–10. Sternites III to VI finely punctate and somewhat lustrous, smooth. Sternite VII with

submedian carinae vestigial, smooth, provided with four pairs of setae; lateral carinae weak, smooth, provided with five pairs of setae.

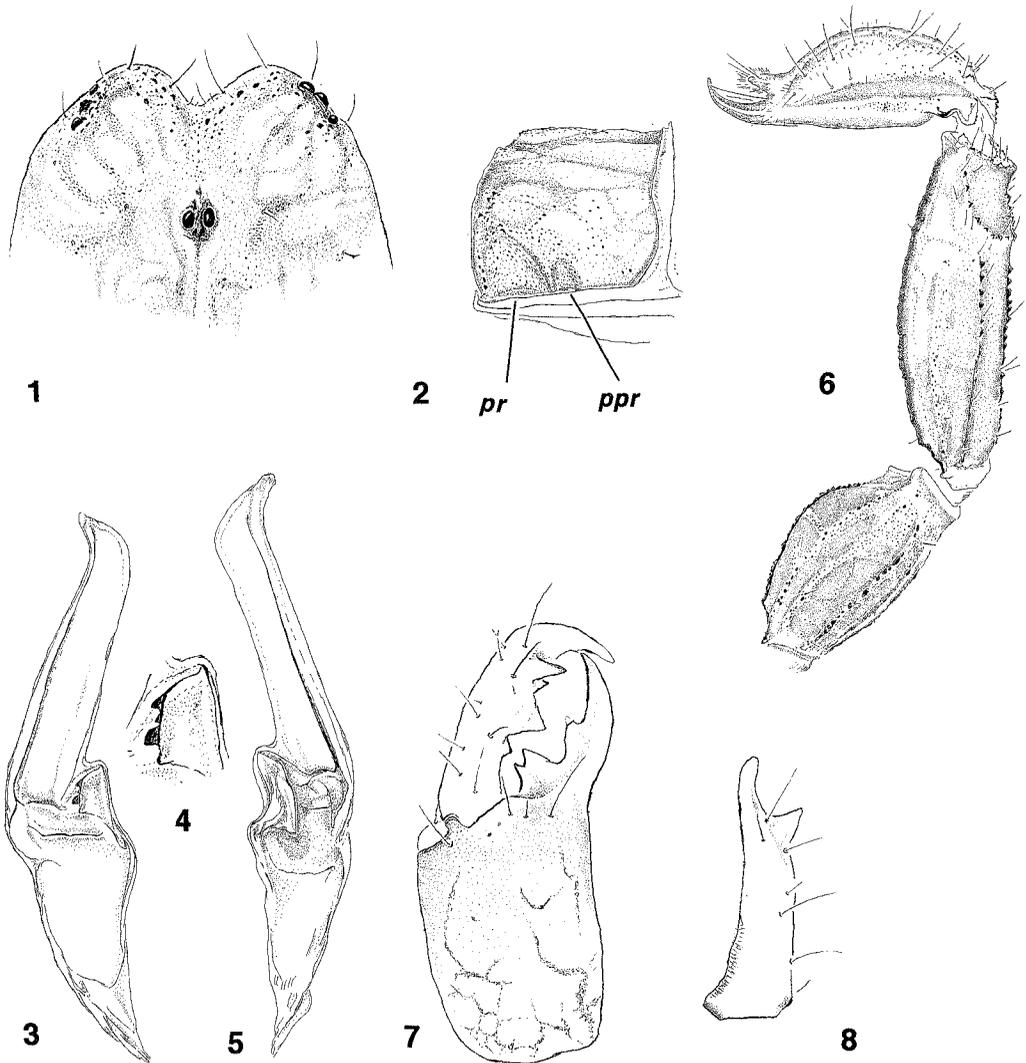
Hemispermatothore: Lamelliform; inner margin of median lobe with a moderate ridge with four teeth. Distal lamina not broad, tapering only at distal end (Figures 3–5).

Metasoma: Segments I–IV: Dorsolateral carinae moderate, granular, increasing in strength on distal segments. Lateral suprmedian carinae on I–IV strong, on I–II smooth to granular, on III–IV granular throughout. Lateral inframedian carinae on I–III moderate, smooth to granular; on IV (Fig. 6) represented by an irregular row of granules. Ventrolateral carinae on I moderate, smooth; on II–IV weak, granular. Ventral submedian carinae on I and II weak, smooth to granular; on III moderate, smooth on proximal one-half, vestigial with irregularly scattered granules on distal half; reduced on IV to two narrowly separated irregular rows of granules on proximal two-thirds. Intercarinal spaces feebly reticulate. Segment V: Dorsal surface densely finely granular medially with coarser granulation laterally; dorsolateral carinae moderate, densely moderately granular; lateromedian carinae present only on anterior two-thirds, strong, granular; lateral intercarinal surfaces feebly reticulate, smooth distally (Fig. 6); ventrolateral, ventromedian, and ventral transverse carinae moderate to strong with subconical granules, with cluster of seven ventromedian granules beyond ventral transverse row.

Telson: Ventral surface hirsute with short, white microchaetes outnumbering light-red setae; densely covered with extremely fine granules, increasingly coarser ventrally and proximally (Fig. 6). Subaculear tubercle densely hirsute, strong, laterally compressed, subconical in profile, with three pairs of long, light-red setae.

Chelicerae: Dentition as in Fig. 7. Smooth and relatively long, slender; fixed finger shorter than chela width (0.82×); movable finger subequal to chela length (0.93×). Other ratios in morphometric ratios section. Ventral brushes thick, long. Teeth largely transparent with only slight coloration on *di* of movable finger; *di* and *de* not in apposition (Fig. 8).

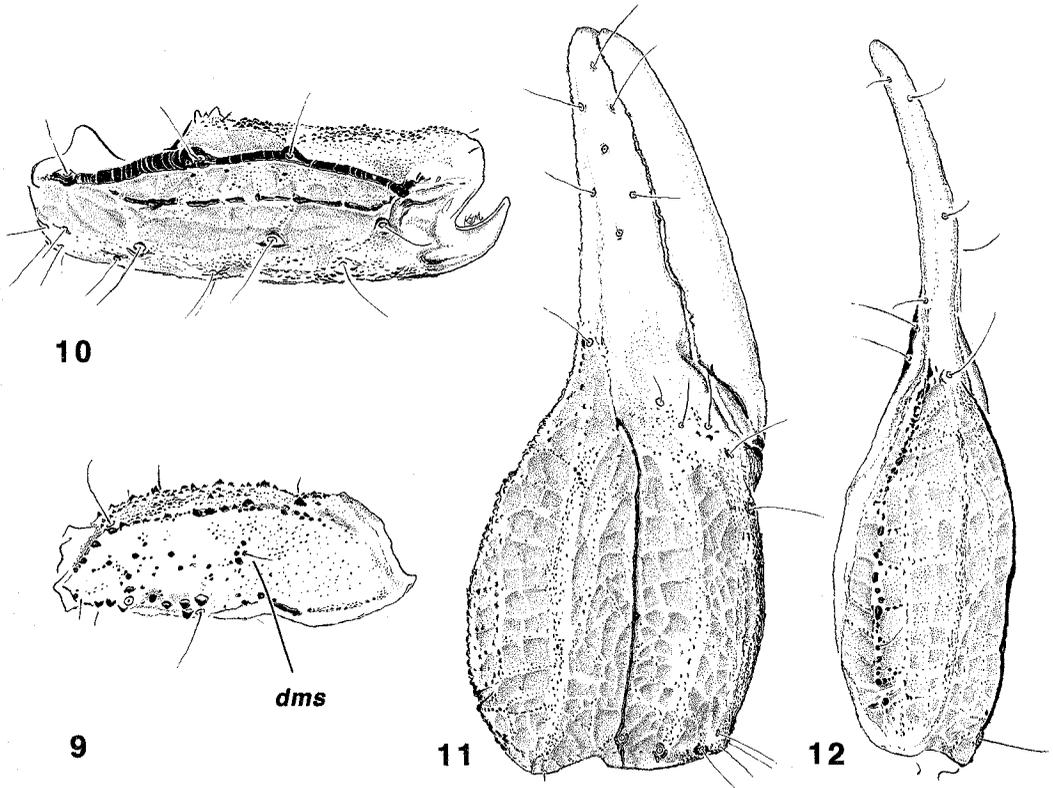
Pedipalps: Trichobothria pattern Type C, orthobothriotaxic (Vachon 1974). Femur: Wider than deep, with dorsointernal and ventrointernal carinae strong, granulose; dorsoex-



Figures 1-8.—Morphology of male of *Diplocentrus lourencoi* Stockwell. 1, Dorsal aspect of anterior region of carapace; 2, Oblique view of right lateral aspect of tergite VII, showing posterolateral recesses, *ppr* = pre-posterolateral recess; *pr* = posterolateral recess; 3, Dorsal aspect of right hemispermatophore; 4, Detail of inner margin of median lobe, showing positions of teeth; 5, Ventral aspect of right hemispermatophore; 6, Left lateral aspect of metasomal segments IV, V, and telson; 7, Dorsal aspect of left chelicera; 8, External aspect of left cheliceral movable finger.

ternal carina strong, irregularly granulose on basal two-thirds, moderately granulose on distal third; ventroexternal carina vestigial to obsolete, moderately granulose at proximal one-fifth. Dorsal surface of femur flat, with moderate and coarse granules scattered mostly for $\frac{2}{3}$ of length, dorsomedian seta situated centrally (Fig. 9). Internal face covered with coarse granules, several of these granules rather large. Ventral surface finely granulose externally, gradually becoming coarsely granular

toward internal face. Patella: Dorsomedian keel moderate, smooth; dorsoexternal keel moderate, irregular, smooth to granular (Fig. 10); ventrointernal keel moderate, smooth to coarsely granular; ventromedian keel reduced, with scattered fine to moderate granules; ventroexternal keel moderate, smooth, distal third comprised of strong reticular costae. Chela: Palm (Fig. 11) with distinct reticulate pattern formed by weak, unpigmented costae; costae lustrous, interspersed with moderate to coarse



Figures 9–12.—Morphology of the pedipalps of *Diplocentrus lourencoi*. 9, Dorsal aspect of right pedipalp femur, *dms* = dorsomedian seta; 10, Dorsal aspect of right pedipalp patella; 11, External aspect of right pedipalp chela; 12, Dorsal aspect of right pedipalp chela.

granules; intercostal areas extremely finely granular (shagreened); dorsal margin (Fig. 12) moderately granular basally to strongly, coarsely granular to base of fixed finger; digital keel moderate and smooth for most of length, granulose and fading at trichobothrium *D*; dorsal and external secondary keels reduced, wide, and moderately granulose; outer surface above imaginary line between trichobothria *Esb* and *Est* reticulate, below line granulose; ventral keel strong, coarsely granular; ventrointernal keel moderate, granulose; internal surface of palm smooth, feebly reticulate with all keels greatly reduced and interspersed with fine to moderate granules. Fixed and movable fingers punctate, setose.

Legs: Tarsomere II spine formula 4/5 4/5: 5/5 5/5: 5/5 5/5: ?/5 5/5.

Measurements: Total L, 53.8; carapace L/W, 6.5/6.2; mesosoma L (specimen fragile and longitudinally compacted), 14.5; metasoma L, 26.9; telson L, 5.9. Metasomal segments: I L/W, 4.1/3.8; II L/W, 4.7/4.0; III L/W,

5.0/3.4; IV L/W, 5.7/3.0; V L/W, 7.4/2.7. Telson: vesicle L/W/D, 4.4/2.8/2.4; aculeus L, 1.5. Pedipalps: Femur L/W, 6.2/2.2; patella L/W, 6.6/1.2; chela L/W/D, 12.8/3.2/5.0; fixed finger L, 6.2; movable finger L, 8.4; palm (underhand) L, 4.4. Chelicerae: Manus L/W, 2.01/1.35; fixed finger L, 1.11; movable finger length *dil/de*: 1.86/1.47.

Comparison with holotype female.—The male is similar in appearance to the female with notable exceptions. Following are the morphometric ratios, with female ratios in parentheses. Pedipalp proportionately longer and more slender, pedipalp femur length/width, 2.82 (2.35); patella length/width, 3.14 (2.20); chela length/width, 4.00 (3.43); length/depth, 2.56 (2.26); metasomal segment II slightly shorter, length/width, 1.18 (1.22); metasomal segment V considerably longer, length/width, 2.74 (2.38). (Other ratios provided below.) Pedipalps: Granules noticeably more reduced, especially on dorsal surfaces of femur and chela, rarely encountered in diplocentrid sys-

tematics but known to occur in *Diplocentrus rectimanus* Pocock (Francke 1977). Dorsal surface of femur flat on male, distinctly convex on female. Reticulation of chela less distinct. Telson distinctly less granulose. Female slightly lighter in color, being a more yellowish brown than reddish brown, keeping in mind that the specimens are old and that some integumental separation has occurred in the female. Integument of carapace and tergites shagreened in male, somewhat lustrous in female.

Tergite VII: The female has a more typically shaped disc. The male, on the other hand, has strong, deep, posterolateral recesses (Fig. 2). Upon further comparisons with several species of *Diplocentrus*, *Bioculus* Stanke 1968, *Didymocentrus* Kraepelin 1905, and *Nebo* Simon 1878 (made available by W. David Sissom and Chad M. Lee), it became evident that the extreme depth of this feature is unique to at least this male specimen. Unfortunately, only a single male specimen of *D. lourencoi* is known so the utility of this feature in diplocentrid systematics will require confirmation as new material accumulates. Future descriptions should, therefore, include a brief statement regarding this feature.

Measurements of holotype female: Total L, 50.9; carapace L/W, 6.3/6.4; mesosoma (distended) L, 16.6; metasoma L, 22.3; telson L, 5.7. Metasomal segments: I L/W, 3.5/3.4; II L/W, 3.9/3.2; III L/W, 4.1/3.1; IV L/W, 4.6/2.9; V L/W, 6.2/2.6. Telson: Vesicle L/W/D, 4.4/2.8/2.3; aculeus L, 1.3. Pedipalps: Femur L/W, 5.4/2.3; patella L/W, 5.5/1.7; chela L/W/D, 12.0/3.5/5.3; fixed finger L, 5.1; movable finger L, 7.4; palm (underhand) L, 4.6. Chelicerae: Manus L/W, 1.95/1.47; fixed finger L, 1.11; movable finger length *dil/de*: 1.89/1.53.

Morphometric ratios: (Female ratios are in parentheses.) Carapace L/W 1.05 (0.98); metasoma II L/W 1.18 (1.22); metasoma III L/W 1.47 (1.32); metasoma V L/W 2.74 (2.39); chelicera chela L/W 1.49 (1.33), fixed finger L/chela W ratio 0.82 (0.76), movable finger L/chela L ratio 0.93 (0.97); pedipalp femur W/D (at dorsomedian seta) 1.22 (1.15), chela fixed finger L/carapace L 0.95 (0.81), movable finger L/carapace L 1.29 (1.17), chela L/W 4.00 (3.43), chela L/D 2.56 (2.26), chela W/D 0.64 (0.66), movable finger L/chela D 1.68 (1.40), movable finger L/metasoma

V L 1.14 (1.19), fixed finger L/carapace L ratio 0.95 (0.81).

Comparative diagnosis.—The female of *Diplocentrus lourencoi* was compared to other *Diplocentrus* in the region by Stockwell 1988. Comparisons of the male with other species are based on the original descriptions and illustrations (i.e., the specimens were not examined). The hemispermatophore of *D. lourencoi* does not bear spines on the anterior margin of the median lobe as do those of *D. steeleae* and *D. ornatus*. The hemispermatophore of *D. coddingtoni* differs by lacking denticles on the inner margin of the median lobe. The pedipalp chela of *D. lourencoi* differs from that of *D. ornatus* by its greater width/depth ratio (0.64 versus 0.43) and greater length/depth ratio (2.56 versus 2.16); it differs from *D. coddingtoni* by its longer, more robust chela (length/depth ratio 2.56 versus 2.98; chela length/fixed finger length ratio 2.04 versus 2.44).

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LITERATURE CITED

- Francke, O.F. 1975. A new species of *Diplocentrus* from New Mexico and Arizona (Scorpionida, Diplocentridae). *J. Arachnol.*, 2:107-118.
- Francke, O.F. 1977. Scorpions of the genus *Diplocentrus* from Oaxaca, Mexico (Scorpionida, Diplocentridae). *J. Arachnol.*, 4:145-200.
- Stahnke, H.L. 1970. Scorpion nomenclature and mensuration. *Entomol. News*, 81:297-316.
- Stockwell, S.A. 1988. Six new species of the genus *Diplocentrus* Peters from Central America (Scorpiones, Diplocentridae). *J. Arachnol.*, 16:153-175.
- Vachon, M. 1974. Étude des caractères utilisés pour classer les familles et les genres de Scorpions. (Arachnides). *Bull. Mus. Nat. Hist. Nat., Paris, 3^{nt} séries, No. 140, Zool.*, 104:857-958.
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