

Four new species of the genus *Pseudocellus* (Arachnida: Ricinulei: Ricinoididae) from Mexico

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Abstract. Four new species of ricinuleids are described: *Pseudocellus chankin* from caves and surface collections in southern Mexico (Chiapas & Tabasco) and Guatemala (Petén); *Pseudocellus jarocho* from a single surface collection in Veracruz, México; *Pseudocellus oztotl*, a troglobitic and troglomorphic species from Cueva de Las Tres Quimeras in the Sierra Negra, Puebla, Mexico; and *Pseudocellus platnicki*, also troglobitic and troglomorphic, known from a single cave in Coahuila, Mexico. The number of known species in the genus increases to 24, and Mexican species to 14. An identification key for adult males of the species found in Mexico and southern USA is provided.

Keywords: Biodiversity, troglobites, troglomorphism, caves

The order Ricinulei is currently the smallest of Arachnida with two suborders: Paleoricinulei Selden 1992 with two families (Curculioididae Cockerell 1916 and Poliocheridae Scudder 1884), four genera and 16 fossil species; and Neoricinulei Selden 1992 with only one family (Ricinoididae Ewing 1929), three genera and 68 living species (Selden 1992; Harvey 2002, 2003; Botero-Trujillo & Pérez 2009; Tourinho & Azevedo 2007; Tourinho & Saturnino 2010; Tourinho et al. 2010). The three ricinoidid genera have distinct distributions in the world: the genus *Ricinoides* Ewing 1929 with 11 species is distributed in equatorial west and central Africa (Harvey 2003; Naskrecki 2008; Cokendolpher & Enriquez 2004; Botero-Trujillo & Pérez 2009); *Cryptocellus* Westwood 1874, with 35 species is known from Honduras southward through Central and tropical South America to Brazil (Bonaldo & Pinto-da-Rocha 2003; Harvey 2003; Pinto-da-Rocha & Bonaldo 2007; Tourinho & Azevedo 2007; Botero-Trujillo & Pérez 2008, 2009; Platnick & García 2008); and the genus *Pseudocellus* Platnick 1980, with 20 named species is distributed in North America (USA and Mexico), Cuba and Central America (Guatemala to Panama) (Gertsch & Mulaik 1939; Bolívar & Pieltain 1946; Gertsch 1971; Platnick & Pass 1982; Harvey 2003; Cokendolpher & Enriquez 2004; Teruel & Armas 2008).

Mexico has the highest diversity of ricinuleids in the world. Ten species of *Pseudocellus* are known from Mexico, not considering the four new species described in this work: *P. bolivari* (Gertsch 1971); *P. boneti* (Bolívar & Pieltain 1942); *P. gertschi* (Márquez & Conconi 1974); *P. mitchelli* Gertsch 1971; *P. osorioi* (Bolívar & Pieltain 1946); *P. pearsei* (Chamberlin & Ivie 1938); *P. pelaezi* (Coronado-Gutierrez 1970); *P. reddelli* (Gertsch 1971); *P. sbordonii* (Brignoli 1974); and *P. spinotibialis* (Goodnight & Goodnight 1952).

Ricinuleids are generally found in leaf litter and in the soil, under rocks and logs; and many of the species in the genus *Pseudocellus* inhabit caves (Cokendolpher & Enriquez 2004). Our knowledge of *Pseudocellus* in general is still very fragmentary because most of the species were originally described on the basis of few specimens or from single individuals; with few species known from male, female and immature stages (Pittard & Mitchell 1972; Platnick & Pass 1982; Cokendolpher & Enriquez 2004).

In this work four new Mexican species of *Pseudocellus* are described from the states of Chiapas, Coahuila, Puebla, and Veracruz. Two are known only from caves and are highly troglomorphic; one is known from both the surface and from two caves and shows no troglomorphisms, and the last one is known only from one location, collected under a large boulder in a pine forest, and does not have any troglomorphisms.

METHODS

The specimens, preserved in 80% ethanol, were examined and measured with a Nikon SMZ645 stereoscope. The measurements, given in mm, were made following Cooke and Shadab (1973). We named the segments of the legs following Gertsch (1971), Pittard & Mitchell (1972), and Platnick & Pass (1980) to facilitate cross-referencing. The names of copulatory structures follow Pittard & Mitchell (1972). Brief descriptions and complete measurements are provided for immature stages when available.

Dissecting microscopes (Zeiss Stemi SV11 and Nikon SMZ 800) fitted with a camera lucida were used to make the drawings. The tarsal processes and spermathecae were suspended in 96% gel alcohol (to permit proper positioning) and then covered with a thin layer of liquid ethanol (80%) to minimize diffraction during observation and drawing. The photographs of living specimens were taken with a Nikon Coolpix E4600 camera. The map was prepared with ArcView GIS Version 3.2 (Applegate 1999). Illustrations were edited with Adobe Photoshop 7.0.

The specimens are deposited primarily in the Colección Nacional de Arácnidos (CNAN) of the Instituto de Biología, Universidad Nacional Autónoma de México, Mexico City (IBUNAM); but some are in the Colección de Arácnidos de El Colegio de la Frontera Sur (ECOSUR-ECOTAAR), Tapachula, Chiapas, México; and in the Invertebrate Zoological Collection of the Texas Memorial Museum (TMM-IZC), University of Texas, Austin. Specimens used for comparative purposes and the elaboration of the key are listed in Appendix 1. For species not included in that list, the information was obtained from the literature, primarily from the original descriptions.

Abbreviations used in the figures are: AP, accessory piece of tarsal process; LT, lamina cyathiformis of tarsomere 2; MTP, metatarsal process; S, spermathecae; TP, tarsal process.

TAXONOMY

Family Ricinoididae Ewing 1929
Genus *Pseudocellus* Platnick 1980

Pseudocellus Platnick 1980:352.

Type species.—*Cryptocellus dorotheae* Gertsch & Mulaik 1939, by original designation.

KEY TO ADULT MALES OF *PSEUDOCELLUS* SPECIES FROM MEXICO AND USA

1. Troglomorphic species with all appendages elongated (Figs. 17, 24): femur II at least 1.5× longer than carapace; tibia II longer than carapace 2
Edaphomorphic species with short appendages (Figs. 1, 10): femur II less than 1.5× carapace length; tibia II shorter than carapace 8
2. Femur II length/width ratio greater than 9; femur II over twice as long as carapace 3
Femur II length/width ratio less than 9; femur II less than 2 × carapace length 6
3. Cheliceral fingers with 5 teeth *P. reddelli*
Cheliceral fingers with more than 5 teeth 4
4. Leg formula 2413; tibia II twice as long as patella II *P. sbordonii*
Leg formula 2431; tibia II less than two times patella length 5
5. Tibia I with a granulose prolateral hump (Figs. 24, 26); tibia II and tarsus II unarmed; body and appendages evenly, finely pitted *P. platnicki* new species
Tibia I without a granulose prolateral hump (Fig. 17); tibia II (Fig. 19) and tarsus II with two distinct rows of spines prodorsally and proventrally; body and appendages finely pitted *P. oztotl* new species
6. Leg formula 2341; cheliceral fixed finger with 4 teeth; tarsal claws asymmetrical, some spatulate *P. bolivari*
Leg formula 2431; cheliceral fixed finger with 6 teeth; tarsal claws symmetrical, none spatulate 7
7. Tibia II elongated, about 11× longer than wide, with few scattered spines prolaterally; cheliceral movable finger with teeth uniform in size *P. osorioi*
Tibia II shorter, about 6× longer than wide, with two distinct rows of spines prolaterally; cheliceral movable finger with basal tooth distinctly larger than the rest *P. boneti*
8. Tibia II armed with one or two distinct tubercles prolaterally 9
Tibia II without distinct tubercles prolaterally 11
9. Femur II moderately thickened, 4× longer than wide; tibia II with a single prodorsal tubercle, lacking a distinct proventral tubercle *P. pearseii*
Femur strongly thickened, less than 2.5× longer than wide; tibia II prodorsal and proventral tubercles subequal in size 10
10. Femur II shorter than carapace; tibia II with prodorsal and proventral tubercles aligned, medial *P. spinotibialii*
Femur II distinctly longer than carapace; tibia II with tubercles not aligned, proventral on basal one-third, and prodorsal on distal one-third (Figs. 1, 3) *P. chankin* new species
11. Leg formula 2431; carapace and opisthosoma distinctly and evenly pitted 12
Leg formula 2341; integument not distinctly pitted 13
12. Adult 3.2 mm in total length; tibia II slightly over 0.5× carapace length; patella II and tibia II subequal in length *P. dorotheae*
Adult 5.0 mm in total length; tibia II almost equal to carapace length; tibia II 1.5× longer than patella II *P. mitchelli*
13. Femora I and IV conspicuously enlarged, at least 1.5× thicker than preceding and following segments *P. gertschi*
Femora I and IV not enlarged, about same thickness as preceding and following segments 14
14. Femur II thickened, 2.5× longer than wide; tibia II 1.5× or more the length of patella II *P. pelaezii*
Femur II not thickened, slightly over 4× longer than wide; tibia II 1.2× longer than patella II *P. jarocho* new species

Pseudocellus chankin new species
Figs. 1–9

Pseudocellus sp. n. 2: Cokendolpher & Enriquez 2004:99.

Type material.—MEXICO: *Chiapas*: holotype male, Cueva Kolem-chen “Cueva Grande,” Reserva Chan-kin, Municipio Ocosingo (16.691389°N, 90.824028°W, 144 m), 10 August 2006, A. Valdez, H. Montaña, S. Rubio, N. Pérez, I. Mondragón (CNAN-T0263). Paratypes: 1 female, same locality as holotype, 19 October 2006, A. Valdez, H. Montaña, O. Francke, A. Ballesteros (CNAN-T0280); 1 female, Hidalgo Cortés, orillas de la Reserva Montes Azules, Municipio Ocosingo (16.689194°N, 90.930167°W, 150 m), 11 August 2006, A. Valdez, H. Montaña, S. Rubio, N. Pérez, I. Mondragón (CNAN-T0281); 2 females, same locality as holotype, 7 November 2006, A. Valdez, H. Montaña, R. Paredes, G. Montiel, F. Bertoni (CNAN-T0282).

Other specimens examined.—MEXICO: *Chiapas*: 2 deutonymphs, 4 tritonymphs, same data as holotype (CNAN-Ri0001); 2 ♀♀, 1 larva, 1 tritonymph, same locality as holotype, 7 November 2006, A. Valdez, H. Montaña, R. Paredes, G. Montiel, F. Bertoni (CNAN-Ri0020). *Tabasco*: 2 ♂♂, 1 ♀, 2 larvae, Parque Estatal Agua Blanca, Ejido Las Palomas Municipio Macuspana (17.62126°N, 92.47928°W, 124 m), 12 July 2010, O. Francke, J. Cruz-López, C. Santibáñez, G. Montiel, D. Barrales, G. Contreras (CNAN-Ri0021). GUATEMALA: *Petén*: 2 ♂♂, 1 larva, 1 protonymph, Cueva del Río Murciélagos, Dos Pilas, Sayaxche, 25 March 1993, A. Cobb, B. Luke (TMM-IZC #3,288); 2 ♀♀, Kaxon Pec (Cave), Dos Pilas, Sayaxche, May 1993, A. Cobb (TMM-IZC #3,287).

Etymology.—The specific name is a noun in apposition and refers to the name of the biological reserve that includes the type locality, Reserva Chan-kin.

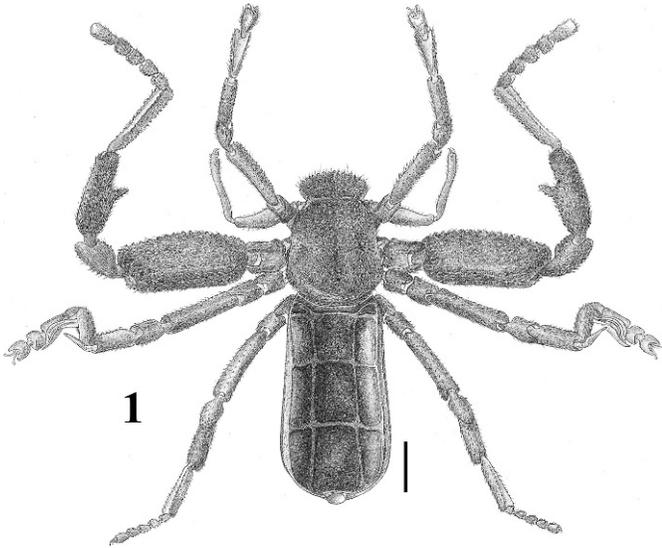


Figure 1.—*Pseudocellus chankin* new species. Male holotype. Habitus, dorsal view. Scale = 1 mm.

Diagnosis.—Males can be distinguished by the presence of two strong tubercles on tibia II, one prodorsal and the other proventral (Figs. 1, 3); by the very robust femur II (Fig. 1), 2.4 times longer than wide; by having the tarsal process curved, J-shaped (Figs. 4, 5) and the accessory piece of tarsal process of leg III (displaced position) thin, slightly curved and bifurcated distally (Fig. 5); metatarsal process conical, curved distally (Fig. 4), and cucullus trapezoidal (Fig. 2). Females can be distinguished by the curved and bifurcate spermathecae (Figs. 6, 7).

Description.—*Male (holotype)*: Carapace: Slightly longer than wide, wider in posterior part near coxae III. Covered uniformly with numerous and fine translucent setae; and numerous rounded granules, more visible on marginal pale areas, located on median part, corresponding to ocular areas, between coxae I and II (Fig. 1). Dorsal depressions near to pale marginal areas, and slight depressions on posterior and median parts.

Cucullus: Wider than long, notably wider distally, with numerous rounded granules larger than those on carapace. Densely covered with long, fine translucent setae, especially on distal part, where they are also longer (Fig. 1).

Chelicerae: Fixed finger shorter than movable; fixed finger with six teeth, the distal longer and the basal one shorter; movable finger with six teeth, the basal one longer, distally decreasing in size.

Sternal region: Coxae I meeting the tritosternum in a single point; coxae II meeting it along anterior third, coxae III considerably longer than others.

Pedipalps: Trochanters 1 and 2 with few rounded granules ventrally. Femora curved distally; with few, small basal granules retrolatero-ventrally. Tibiae with granules distally on dorsal and ventral surfaces. All segments densely covered with translucent, small setae, uniform in size (Fig. 1).

Legs: Femora I–IV with numerous sharp-tipped granules ventrally, with femur II having the most. Tibiae I–II with large granules ventrally; including those on the two strong, tubercles of tibiae II (Fig. 1); tibiae III–IV with smaller granules than on

I and II. Granules on metatarsi II larger than on metatarsi I. Metatarsi III–IV without granules.

Copulatory apparatus: Metatarsus short and wide, conical; tarsal process wider in distal half (Figs. 4, 5). Tarsomere 1 curved ventrally. Lamina cyathiformis of tarsomere 2 with slight notch basally; tarsomere 2 rectangular (Fig. 4).

Opisthosoma: Longer than wide, widest at posterior part, near tergite XIII (Fig. 1). Tergite XI as wide as long, tergites XII–XIII and lateral tergites longer than wide (Fig. 1). Lateral tergites in diagonal position, forming an ample concavity in median part (Fig. 1). Covered uniformly with numerous, small translucent setae both dorsally and ventrally, and without granules. Pygidium basal segment without notch on posterior dorsal and ventral margins.

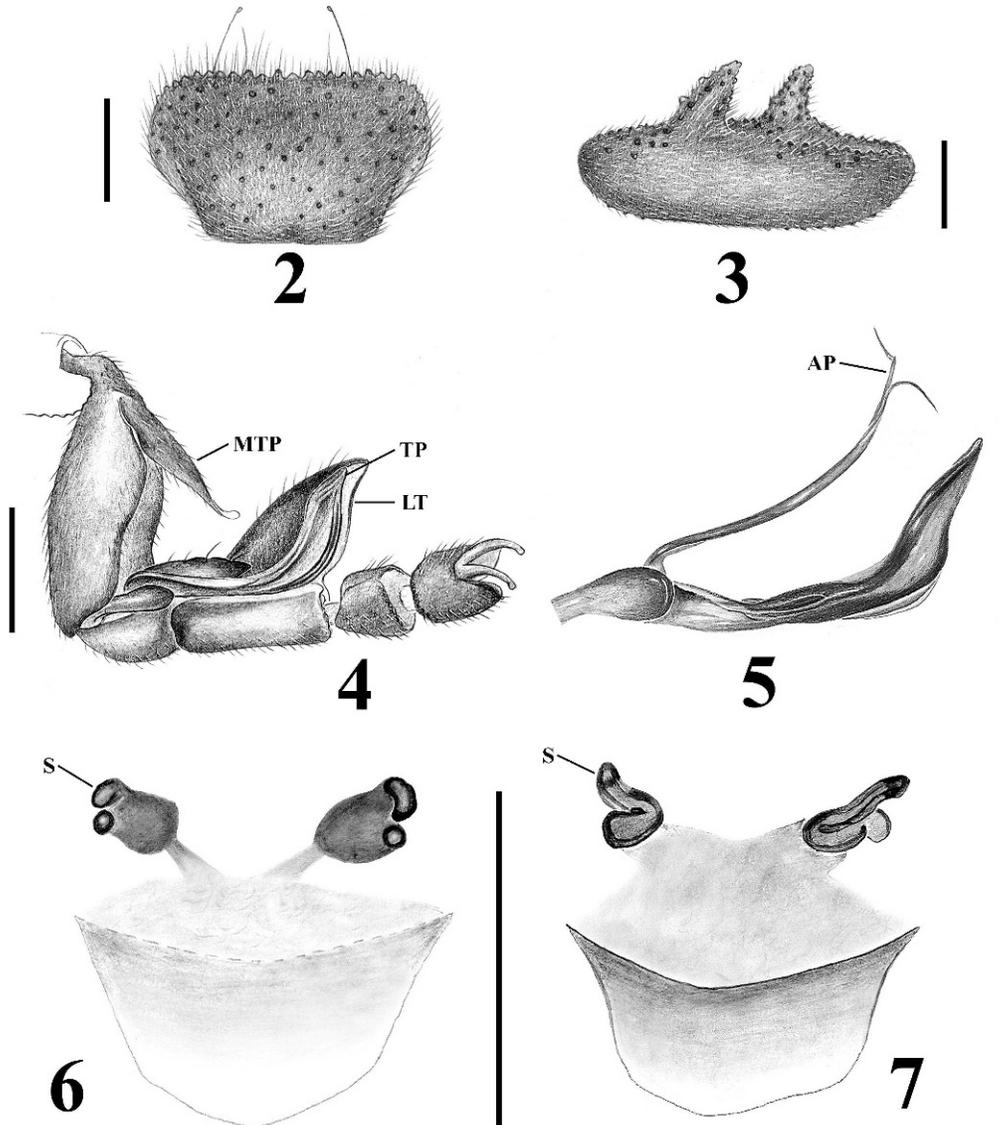
Coloration: Appendages and body reddish brown. Pedipalps lighter than other appendages; all appendages lighter red distally. Cucullus, carapace, opisthosoma and legs II dark reddish, legs II darker reddish than other appendages. Opisthosoma ventrally with dark region covering $\frac{3}{4}$ of its length.

Measurements: Total length (carapace + opisthosoma + pygidium) 6.15. Carapace 2.10 long, 1.95 wide (widest part). Cucullus 0.87 long, 1.42 wide. Opisthosoma 4.25 long, 2.20 wide (widest part). Robustness of leg II, ratio of male femur II: length / diameter (widest part) (femur II l/d): 2.37. Legs tarsal formula (legs I–IV): 1-5-4-5. Leg lengths, I: coxa 0.86/ trochanter 1 0.56/ trochanter 2 -/ femur 1.58/ patella 0.75/ tibia 1.15/ metatarsus 1.28/ tarsus 0.62/ total 6.80; II: 1.16/ 0.87/ -/ 2.87/ 1.23/ 2.00/ 1.85/ 2.2/ 12.18; III: 0.92/ 0.60/ 0.62/ 1.52/ 0.80/ 0.98/ 1.10/ 1.60/ 8.14; IV: 0.81/ 0.63/ 0.58/ 1.73/ 0.80/ 1.12/ 1.13/ 1.33/ 8.13; Pedipalp: 0.7/ 0.8/ 0.45/ 1.13/ -/ 1.60/ -/ 0.14/ 4.82. Leg formula: 2341.

Variation ($n = 5$): One male from Petén dark red, holotype and the other male from Petén lighter in color. Males from Tabasco lighter red than the others. Granules larger and more visible on males from Petén and Tabasco than on the other two males, especially on all segments of leg II. Movable finger of chelicerae with six teeth on the holotype, on one male from Petén and on one male from Tabasco; seven teeth on the other male from Petén; and five teeth on the other male from Tabasco. The two ventral tubercles on tibia II thinner and smaller on one male from Petén and males from Tabasco than on the other two males. Total length: 6.15–6.80 ($\bar{x} = 6.40 \pm 0.32$), Cucullus: width 1.45–1.60 ($\bar{x} = 1.56 \pm 0.10$), Carapace: width 1.95–2.10 ($\bar{x} = 2.00 \pm 0.07$), Opisthosoma: length 4.25–5.00 ($\bar{x} = 4.50 \pm 0.38$), width 2.20–2.45 ($\bar{x} = 2.35 \pm 0.13$), Femur II l/d: 2.27–2.80 ($\bar{x} = 2.53 \pm 0.21$).

Female (paratype): Differs from male as follows: Femur II not as robust, 3.7 times longer than wide. Left fixed finger of chelicerae with four teeth, right with five teeth. Femora I–IV with fewer and smaller ventral sharp-tipped granules than the male. Tibiae II with the two prolateral tubercles smaller than on the male. Tibiae III–IV with fewer granules. Opisthosoma wider than on the male. Tergite XI wider than long. Tergite XII as wide as long. Opisthosoma ventrally with two dark thin depressions, on sternites XI, XII and XIII.

Measurements: Total length 6.35. Carapace length 2.15, width 2.10 (widest part). Cucullus length 0.90, width 1.47. Opisthosoma length 4.50, width 2.75 (widest part). Femur II l/d: 3.50. Legs tarsal formula (legs I–IV): 1-5-4-5. Leg lengths, I:



Figures 2–7.—*Pseudocellus chankin* new species. Male holotype. 2. Cucullus, dorsal view; 3. Left tibia II, ventral view; 4. Left leg III, metatarsus and tarsal process, prolateral view; 5. Tarsal process (displaced position), prolateral view. Female paratype. Spermathecae; 6. Anterior view; 7. Posterior view. Scales = 0.5 mm.

coxae 0.92/ trochanter 1 0.50/ trochanter 2 -/ femur 1.45/ patella 0.70/ tibia 1.05/ metatarsus 1.23/ tarsus 0.66/ total 6.51; II: 1.15/ 0.77/ -/ 2.57/ 1.05/ 1.80/ 1.87/ 2.12/ 11.33; III: 0.93/ 0.53/ 0.66/ 1.58/ 0.78/ 1.00/ 1.10/ 1.00/ 7.58; IV: 0.86/ 0.55/ 0.56/ 1.71/ 0.72/ 1.10/ 1.15/ 1.10/ 7.75; Pedipalp: 0.75/0.38/ 0.46/ 1.12/ -/ 1.65/ -/ 0.16/ 4.52. Leg formula: 2431.

Variation ($n = 7$): Five females are dark reddish (two from Chiapas, two from Petén, and the female from Tabasco), and the other two females from Chiapas are lighter. Body granulation more conspicuous on lighter specimens. Chelicerae with a variable number of teeth, females from Chiapas: 1) fixed finger 4/ movable finger 6; 2) 6/8; 3) 5/7; 4) 5/6; females from Petén: 1) 5/6; 2) 5/7. Total length: 6.00–7.15 ($\bar{x} = 6.45 \pm 0.43$), Cucullus: width 1.42–1.67 ($\bar{x} = 1.54 \pm 0.10$), Carapace: width 1.95–2.25 ($\bar{x} = 2.09 \pm 0.11$), Opisthosoma: length 4.15–4.90 ($\bar{x} = 4.45 \pm 0.30$), width 2.60–2.95 ($\bar{x} = 2.72 \pm 0.13$). Femur II l/d: 3.50–3.86 ($\bar{x} = 3.72 \pm 0.15$).

Larva: Carapace wider than long, with numerous small rounded granules. Cucullus wider than long, with a small concavity distally, covered with numerous and fine translucent setae, longer distally. Legs with numerous small granules and abundant fine translucent setae. Opisthosoma slightly longer than wide, covered with numerous small rounded granules and translucent setae; tergites XI–XIII wider than long; sternites XI–XIII well visible and not fused in comparison with adults. Appendages and body coloration pale brown; paler in cucullus and carapace. Measurements: Total length 1.87. Carapace 0.86 long, 0.95 wide (widest part). Cucullus 0.40 long, 0.66 wide. Opisthosoma 1.28 long, 1.22 wide. Legs tarsal formula (legs I–III) (larva hexapod): 1-2-2. Variation: ($n = 4$). Total length 1.87–2.70 ($\bar{x} = 2.28 \pm 0.58$). Cucullus: width 0.65–0.66 ($\bar{x} = 0.655 \pm 0.007$), Carapace: width 0.93–0.95 ($\bar{x} = 0.94 \pm 0.01$), Opisthosoma: long 1.28–1.66 ($\bar{x} = 1.47 \pm 0.26$), wide 1.22–1.33 ($\bar{x} = 1.27 \pm 0.07$).



Figures 8–9.—*Pseudocellus chankin* new species. 8. Male holotype walking on the ground inside the cave; 9. Female paratype walking on a wall inside the cave. (Photos by Alejandro Valdez-Mondragón).

Protonymph: Carapace longer than wide. Carapace, cucullus, legs and opisthosoma covered with numerous rounded granules and translucent setae like the larva. Cucullus wider than long; with fine translucent setae longer distally, like the larva. Opisthosoma longer than wide, tergites XI–XIII wider than long; sternites XI–XIII visible like the larva, and not fused like on the adults. Appendages and body coloration brown, darker than the larva, but not as dark as adults. Measurements: Total length 3.25. Carapace 1.16 long, 1.13 wide (widest part). Cucullus 0.50 long, 0.77 wide. Opisthosoma 2.05 long, 1.60 wide. Legs tarsal formula (legs I–IV): 1-4-3-2.

Deutonymph: Carapace slightly longer than wide. Carapace, cucullus, legs and opisthosoma covered with numerous rounded granules and translucent setae like the previous life stages. Cucullus wider than longer; with fine translucent setae, longer distally, like the previous life stages. Opisthosoma longer than wide, tergites XI and XII wider than long, tergite XIII slightly longer than wide; sternites XI–XIII well visible and not fused in comparison to adults. Appendages and body coloration brown, opisthosoma brown darker than cucullus, carapace and appendages. Measurements: Total length 4.40. Carapace 1.37 long, 1.35 wide (widest part). Cucullus 0.61 long, 1.00 wide. Opisthosoma 2.80 long, 1.90 wide. Legs tarsal formula (legs I–IV): 1-5-4-4. Variation: ($n = 2$). One specimen with brown coloration paler than the other. Total length 4.40, 4.65 ($\bar{x} = 4.52$). Cucullus: width 1.00, 1.00 ($\bar{x} = 1.00$), Carapace: width 1.35, 1.40 ($\bar{x} = 1.37$), Opisthosoma: long 2.80, 3.00 ($\bar{x} = 2.90$), wide 1.90, 2.10 ($\bar{x} = 2.00$).

Tritonymph: Carapace slightly longer than wide, with two dorsal depressions on median part (one on each side) and four on posterior part (two on each side). Carapace, cucullus, legs, and opisthosoma covered with numerous rounded granules and translucent setae as in the previous life stages. Cucullus wider than long, with numerous fine translucent setae, longer distally, as in previous stages. Opisthosoma longer than wide, tergites XI and XII wider than long, tergite XIII longer than wide; sternites XI–XIII well visible, not fused together in comparison with adults. Appendages and body orange-brown, paler than adults. Measurements: Total length 5.95. Carapace 1.70 long, 1.65 wide (widest part). Cucullus 0.75 long, 1.22 wide. Opisthosoma 3.90 long, 2.45 wide. Legs tarsal formula (legs I–IV): 1-5-4-5. Variation: ($n = 4$). Two specimens orange-

brown coloration, the other two specimens lighter. Total length 5.35–5.95 ($\bar{x} = 5.66 \pm 0.24$). Cucullus: width 1.15–1.22 ($\bar{x} = 1.17 \pm 0.03$), Carapace: width 1.65–1.70 ($\bar{x} = 1.66 \pm 0.02$), Opisthosoma: long 3.75–3.90 ($\bar{x} = 3.85 \pm 0.07$), wide 2.45–2.55 ($\bar{x} = 2.50 \pm 0.05$).

Related species.—*Pseudocellus chankin* resembles *Pseudocellus seacus* Platnick & Pass 1982 from Finca Seacté, near Cobán, Alta Verapaz, Guatemala, by having the similar shape of the two large tubercles of tibia II, but on *P. chankin* these tubercles are larger than on *P. seacus*; on *P. seacus* both of these tubercles are aligned, on the basal one-third of the tibia, whereas on *P. chankin* they are offset; one is dorsomedian and the other one ventrodial (Fig. 3). *Pseudocellus chankin* has very robust femur II, approximately 2.4 times longer than wide, whereas on *P. seacus* it is relatively thinner, “about three times as long as wide” (Platnick & Pass 1982:5). There is a considerable difference in size, the new species larger: the total length of male holotype of *P. chankin* is 6.15 mm, whereas the total length of the male of *P. seacus* is only 3.67 mm. In addition, the tarsal process of the copulatory apparatus on *P. seacus* is trifurcated distally, whereas on *P. chankin* it is wider distally and is conical-shaped with a single, blunt end (Figs. 4, 5); the accessory piece on *P. chankin* is bifurcated distally, whereas on *P. seacus* it is not. The metatarsal process in the new species is longer, about two-thirds the length of the metatarsus, whereas on *P. seacus* it is only about one-third the length of the metatarsus. Finally, the spermathecae are similar in both species, but on the new species they are thinner than on *P. seacus* (Figs. 6, 7).

Distribution.—This species is known from Chiapas and Tabasco in Mexico, and Petén in Guatemala (Fig. 31).

Natural history.—Specimens of *P. chankin* from Chiapas were collected at 144 m elev., deep inside the cave, except the female from Hidalgo Cortés which was collected under a rock in the tropical rainforest of the Reserva de Montes Azules. The specimens from the cave were collected approximately 50 m inside it, on the walls and under rocks, near bat guano (Figs. 8, 9). The cave had high humidity, ca 70%, and was fairly warm. The habitat outside the cave is tropical rainforest, in the Lacandona region located in eastern Chiapas, near the border with Guatemala.

Remarks.—Cokendolpher & Enríquez (2004) reported the specimens from Guatemala (see Other Specimens Examined,

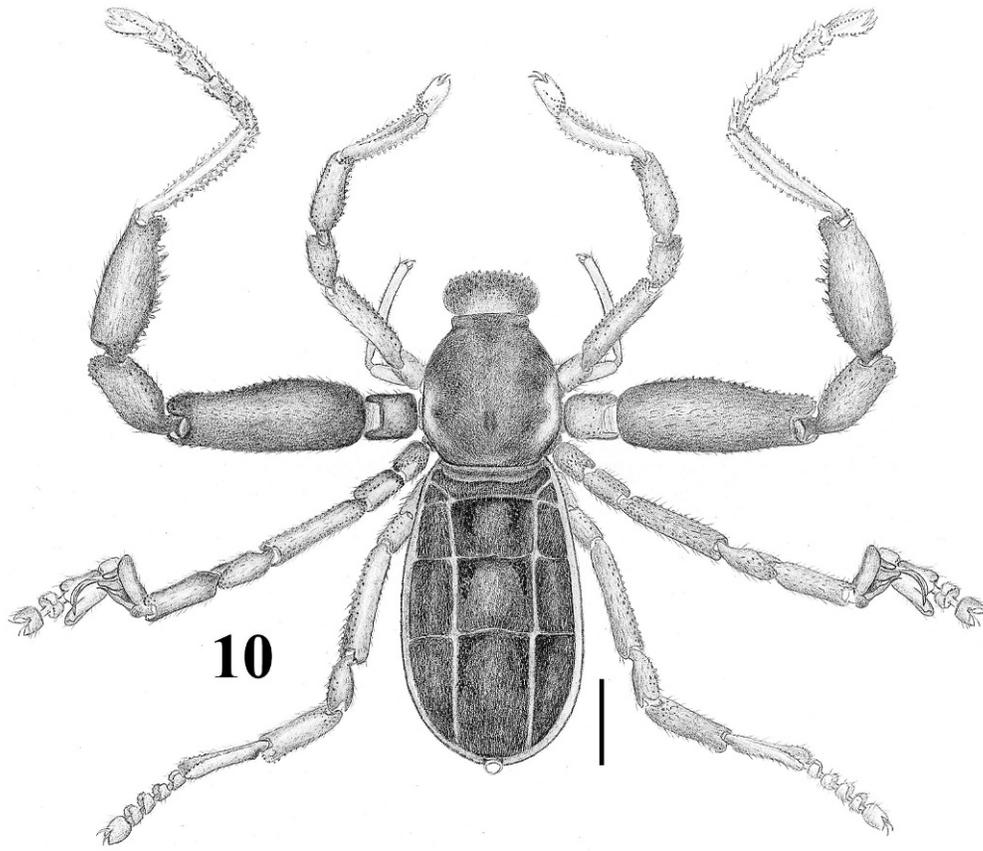


Figure 10.—*Pseudocellus jarocho* new species. Male holotype. Habitus, dorsal view. Scale = 1 mm.

above) as a new species of *Pseudocellus*, but the species was not described.

Pseudocellus jarocho new species
Figs. 10–16

Type material.—MEXICO: Veracruz: holotype male, 5 km E of Tlaquilpa (18.64103333°N, 97.10725°W, 2169 m), 24 March 2007, A. Valdez, O. Francke, H. Montaña, C. Santibáñez, A. Ballesteros, pine-oak forest (CNAN-T0627). Paratypes: 1 female (CNAN-T0628), 1 male, 2 females, 2 tritonymphs (CNAN-T0629), same data as holotype.

Etymology.—The specific name is a noun in apposition and refers to the common name given to people born in the state of Veracruz: Jarocho.

Diagnosis.—Males can be distinguished by the two ventral rows of curved spines on tibia II (Fig. 12); by having tarsal process with two tips distally, and the accessory piece of tarsal process of leg III (displaced position) bifurcated (Fig. 14); metatarsal process relatively long and curved (Fig. 13); and by the evenly oval shape of the cucullus (Fig. 11). Females can be distinguished by the double receptacle of the spermathecae in each side, and rounded distally (Figs. 15, 16).

Description.—*Male (holotype)*: Carapace: Slightly longer than wide, wider posteriorly, at level of coxae II and III. Covered with numerous, long, fine translucent setae; and numerous, small round granules, visible on ocular areas or marginal pale areas, located near coxae II (Fig. 10). Dorsal depression shallow, longitudinal, medial.

Cucullus: Wider than long, rounded laterally, with a slight notch distally. With numerous small, round granules; with moderately dense, fine and long translucent setae, especially on distal part where they are longer (Fig. 11).

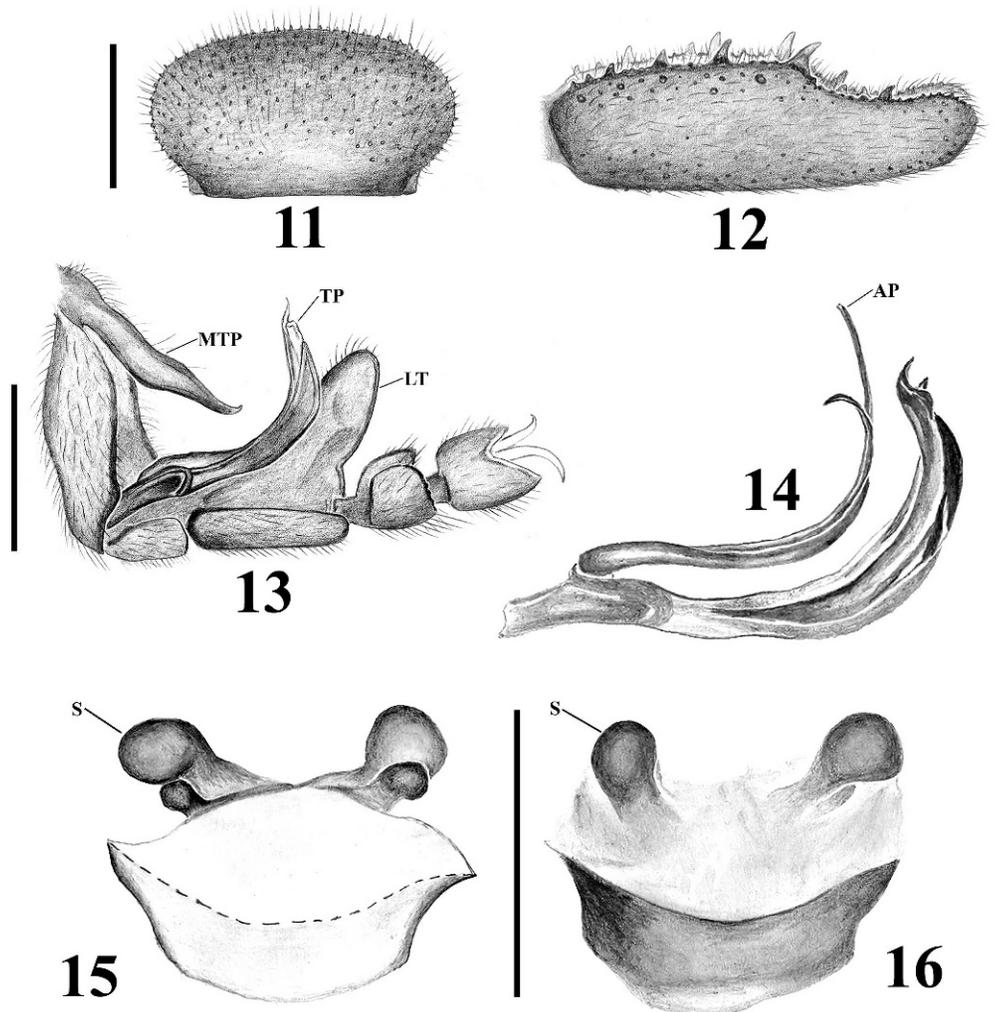
Chelicerae: Fixed finger shorter than movable, right fixed finger with six teeth, left with five, increasing in size distally. Both movable fingers with six teeth, basal-most longest.

Sternal region: Coxae I meeting the tritosternum in a single point; coxae II meeting it along anterior quarter, coxae II longer than others.

Pedipalps: Trochanters 1 and 2 with few ventral rounded granules. Femora curved distally; without granules; with fine, translucent setae, distally decreasing in size. Tibiae with rounded granules ventro-distally; with fine, translucent setae, mostly uniform in size but some longer ones distally.

Legs: Femora I, III and IV with two ventral rows of spines. Femur II with dispersed ventral spines. Tibia I with two ventral rows of small spines. Tibia II with two ventral rows of large spines (Fig. 12). Tibiae III–IV with few spines. Metatarsus I with two dorsal rows of spines, ventrally with dispersed granules. Metatarsus II with numerous proateral, retrolateral, and ventral spines, and with two ventral rows of spines, shorter than on tibia II. Metatarsus IV distally with two dorsal rows with few spines, ventrally without granules.

Copulatory apparatus: Metatarsus short and wide, ventrally with one slight notch distally. Metatarsal process long and sigmoidal; tarsal process curved, widest at $\frac{3}{4}$ of its length (Fig. 13). Lamina cyathiformis of tarsomere 2 rounded



Figures 11–16.—*Pseudocellus jarocho* new species. Male holotype. 11. Cucullus, dorsal view; 12. Left tibia II, dorsal view; 13. Left leg III, metatarsus and tarsal process, prolateral view; 14. Tarsal process (displaced position), prolateral view. Female paratype. Spermathecae; 15. Anterior view; 16. Posterior view. Scales = 0.5 mm (Figs. 11–14), 0.3 mm (Figs. 15, 16).

distally, with slight notch basally; tarsomere 2 wider basally than distally (Fig. 13).

Opisthosoma: Longer than wide, widest at posterior part, between tergites XII and XIII (Fig. 10). Tergite XI wider than long, tergites XII–XIII and lateral tergites longer than wide (Fig. 10). Lateral tergites inclined up and outwards, forming an ample concavity in median region (Fig. 10). Ventrally and dorsally covered uniformly with numerous fine, translucent setae. Tergites X–XIII with granules, vestigial on tergite XIII. Pygidium basal segment without notches posteriorly on dorsal and ventral margins.

Coloration: Body reddish-brown; pedipalps, legs I, III–IV dark brown, lighter distally. Cucullus, carapace, opisthosoma and legs II dark reddish. Opisthosoma dark ventrally.

Measurements: Total length (carapace + opisthosoma + pygidium) 5.15. Carapace 1.70 long, 1.60 wide (widest part). Cucullus 0.73 long, 1.15 wide. Opisthosoma 3.42 long, 2.05 wide (widest part). Femur II l/d: 2.58. Legs tarsal formula (legs I–IV): 1-5-4-5. Leg lengths, I: coxa 0.80/ trochanter 1 0.48/ trochanter 2 -/ femur 1.37/ patella 0.62/ tibia 1.00/ metatarsus

1.17/ tarsus 0.52/ total 5.96; II: 0.97/ 0.72/ -/ 2.27/ 1.10/ 1.67/ 1.62/ 1.90/ 10.25; III: 0.76/ 0.51/ 0.55/ 1.38/ 0.73/ 0.86/ 0.90/ 1.42/ 7.11; IV: 0.70/ 0.57/ 0.53/ 1.45/ 0.65/ 1.00/ 1.01/ 1.07/ 6.98. Pedipalp: 0.55/ 0.32/ 0.30/ 0.93/ -/ 1.37/ -/ 0.15/ 3.62. Leg formula: 2341.

Variation: ($n = 2$). Paratype male reddish-brown, darker than holotype. Granules on body and legs more developed on holotype than on paratype. Movable finger of chelicerae with six teeth on holotype, five teeth on paratype. The number of long spines on the two ventral rows on tibia II variable but similar in shape on both males. The number of spines on the two ventral rows on metatarsus II variable and longer on the holotype than on the paratype. Total length: 5.10, 5.15 ($\bar{x} = 5.12$), Cucullus: width 1.13, 1.15 ($\bar{x} = 1.14$), Carapace: width 1.55, 1.60 ($\bar{x} = 1.57$), Opisthosoma: length 3.37, 3.42 ($\bar{x} = 3.39$), width 1.92, 2.05 ($\bar{x} = 1.98$), Femur II l/d: 2.58, 3.14 ($\bar{x} = 2.86$).

Female (paratype): Differs from male as follows: Cheliceral right fixed finger with six teeth, left with nine teeth. Femur II with dispersed ventral spine-shaped granules, faint. Tibia II with two ventral rows of spines smaller than on the male.

Metatarsus I with ventral dispersed granules, only basally. Numerous prolateral, retrolateral, and ventral spine-shaped granules, and the two ventral rows of spines of metatarsus II smaller than the male. Opisthosoma ventrally lighter than on the male.

Measurements: Total length 5.40. Carapace 1.72 long, 1.70 wide (widest part). Cucullus 0.73 long, 1.20 wide. Opisthosoma 3.70 long, 2.20 wide (widest part). Femur II l/d: 4.10. Legs tarsal formula (legs I–IV): 1-5-4-5. Leg lengths, I: coxa 0.75/ trochanter I 0.46/ trochanter II -/ femur 1.28/ patella 0.60/ tibia 0.93/ metatarsus 1.16/ tarsus 0.53/ total 5.71; II: 1.00/ 0.71/ -/ 2.05/ 0.96/ 1.60/ 1.63/ 1.83/ 9.78; III: 0.85/ 0.50/ 0.50/ 1.35/ 0.68/ 0.98/ 1.00/ 0.90/ 6.76; IV: 0.73/ 0.58/ 0.53/ 1.41/ 0.67/ 1.06/ 1.05/ 1.02/ 7.05; Pedipalp: 0.62/0.38/ 0.42/ 1.02/ -/ 1.51/ -/ 0.15/ 4.10. Leg formula: 2431.

Variation: ($n = 2$). One female reddish, darker than the other one. Granules more prominent on lighter female. Variable number of ventral spine-shaped tubercles on femur II. Variable number and size of spines on ventral rows of tibia and metatarsus II. Total length: 5.25, 5.40 ($\bar{x} = 5.32$), Carapace: width 1.62, 1.70 ($\bar{x} = 1.66$), Opisthosoma: length 3.60, 3.70 ($\bar{x} = 3.65$), width 2.10, 2.20 ($\bar{x} = 2.15$). Femur II l/d: 4.10, 4.60 ($\bar{x} = 4.35$).

Tritonymph: Carapace as long as wide, with two inconspicuous dorsal depressions on median part (one on each side) and four inconspicuous on posterior part (two on each side). Carapace, cucullus, legs, and opisthosoma covered with numerous rounded granules and translucent setae. Cucullus wider than long, covered with fine translucent setae, longer distally. Opisthosoma longer than wide, tergites XI and XII wider than long, tergite XIII longer than wide; sternites XI–XIII well visible, not fused in comparison with adults. Appendages and body brown-orange, darker on opisthosoma. Measurements: Total length 5.00. Carapace 1.45 long, 1.45 wide (widest part). Cucullus 0.61 long, 1.00 wide. Opisthosoma 3.32 long, 2.22 wide. Legs tarsal formula (legs I–IV): 1-5-4-5. Variation: ($n = 2$). One specimen orange-brown in color, the other brown. Total length 4.25, 5.00 ($\bar{x} = 4.62$). Cucullus: width 1.00, 1.00 ($\bar{x} = 1.00$); Carapace: width 1.45, 1.45 ($\bar{x} = 1.45$); Opisthosoma: length 3.32, 2.97 ($\bar{x} = 3.14$); width 2.22, 1.95 ($\bar{x} = 2.08$).

Related species.—*Pseudocellus jarocho* resembles *Pseudocellus dorotheae* from Edinburg, Texas, USA, and *P. pelaezi* from San Luis Potosí, Mexico. The resemblance with *P. dorotheae* is in the similar overall shape and in the ventral spines of patella and tibia II, but on *P. jarocho* the patella is convex ventrally, whereas on *P. dorotheae* it has a deep medial concavity; *P. dorotheae* has patella II longer than *P. jarocho*, with larger spines, particularly distally; *P. jarocho* has the spines along the two ventral rows of the tibia II larger than on *P. dorotheae* (Fig. 12), and that species has more spines than *P. jarocho*. Tibia II of *P. jarocho* has a distal concavity deeper than *P. dorotheae* (Fig. 12). The new species is larger: the total length of holotype male of *P. jarocho* is 5.15 mm, whereas the male of *P. dorotheae* is 3.15 mm long. Metatarsus III is proportionally two times slightly longer on *P. jarocho* than on *P. dorotheae*, and the metatarsal process in that species is curved, whereas on *P. jarocho* it is sigmoidal (Fig. 13). Finally, the tarsal process on *P. dorotheae* is S-shaped whereas on *P. jarocho* it is J-shaped (Figs. 13, 14).

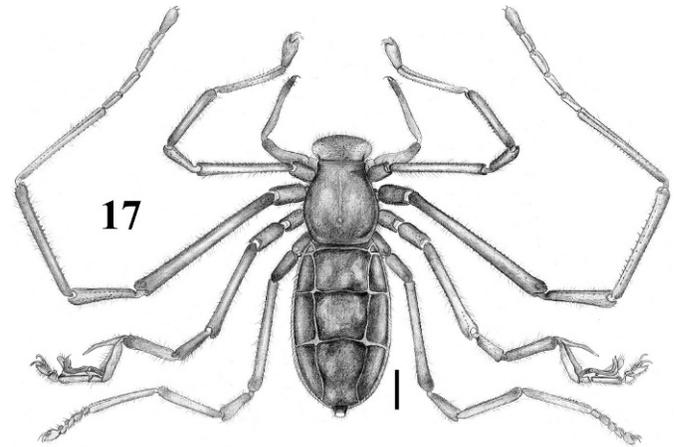


Figure 17.—*Pseudocellus oztoti* new species. Male holotype. Habitus, dorsal view. Scale = 1 mm.

The resemblance with *P. pelaezi* is in the similar shape of tibia II and in the two ventral rows of spines of tibia II, but on *P. jarocho* tibia II has a distal concavity deeper than *P. pelaezi* and the two ventral rows of spines are longer and stronger than on *P. pelaezi* (Figs. 10, 12). *Pseudocellus jarocho* is larger than *P. pelaezi*: total length of holotype male is 5.15 mm, whereas the male of *P. pelaezi* has a total length of 3.90 mm. *Pseudocellus jarocho* has femur and patellae II stronger than *P. pelaezi* (Fig. 10), although the patellae II of *P. pelaezi* has more granules ventrally than *P. jarocho*. *Pseudocellus jarocho* has two dorsal rows of strong spines on metatarsus II (Fig. 10), while *P. pelaezi* has only numerous dorsal granules, not distinctly aligned. *Pseudocellus jarocho* has small spines dorsally on tarsomeres I–III of tarsus II (Fig. 10), while *P. pelaezi* has small dorsal granules on these tarsomeres. Finally, *Pseudocellus jarocho* has metatarsus III of male longer than on *P. pelaezi*, and also *P. jarocho* has the metatarsal process thinner than on *P. pelaezi* (Fig. 13).

Distribution.—This species is known only from the type locality (Fig. 31).

Natural history.—All specimens of *P. jarocho* were collected under the same boulder, around 80 cm in diameter. The type locality is in pine-oak forest, located in an extensive karstic zone with many rocks and boulders, 2,169 m elev.

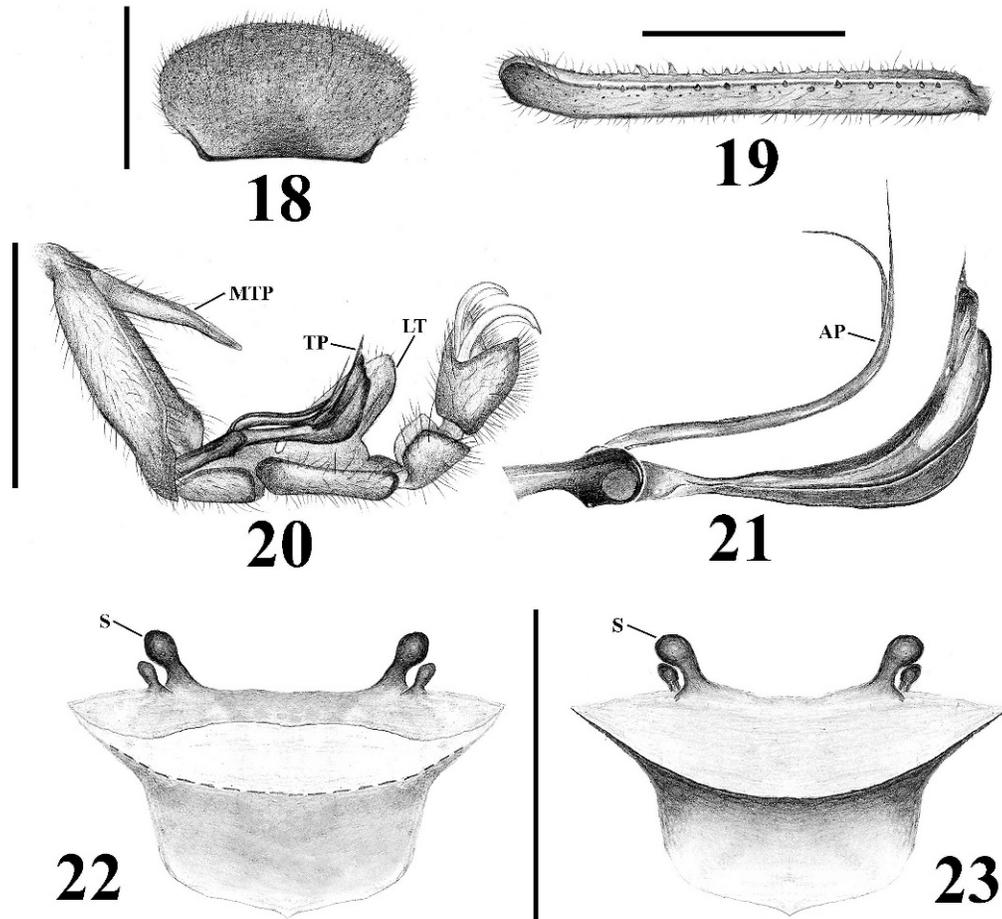
Pseudocellus oztoti new species

Figs. 17–23

Type material.—MEXICO: Puebla: holotype male, from “Cueva de Las Tres Quimeras” (18.31168°N, 96.84589°W), Tlacotepec de Díaz, Municipio de San Sebastián Tlacotepec, 1 April 2009, B. Shade (CNAN-T0680). Paratypes: 1 female (CNAN-T0681), 1 male (CNAN-T0682), same data as holotype.

Etymology.—The specific name is a noun in apposition, and refers to their cave habitat, ‘*oztotl*’ means ‘cave’ in the Nahuatl language, an ancient language currently spoken by some native people from Central Mexico, including the State of Puebla and the mountainous region around the type locality.

Diagnosis.—Troglomorphic, pale and elongated: femur II 11 times longer than wide on males (Fig. 17), 12.5 times on female. Males can be distinguished by the two ventral rows of



Figures 18–23.—*Pseudocellus oztoti* new species. Male holotype. 18. Cucullus, dorsal view; 19. Left tibia II, dorsal view; 20. Left leg III, metatarsus and tarsal process, prolateral view; 21. Tarsal process (displaced position), prolateral view. Female paratype. Spermathecae; 22. Anterior view; 23. Posterior view. Scales = 1 mm (Figs. 18–20), 0.5 mm (Figs. 21–23).

short spines on the thin tibiae II (Fig. 19); the tarsal process wider distally and evenly curved (Fig. 21); by the distally bifurcated accessory piece of the tarsal process (displaced position) and by the shape of cucullus (Fig. 18). Females can be distinguished by the small and double rounded spermathecae (Figs. 22, 23).

Description.—*Male (holotype)*: Carapace: Longer than wide, noticeably wider posteriorly, near coxae IV; covered with numerous, long, translucent setae (Fig. 17). Median longitudinal groove distinct; dorsal concavity point-shaped, located in posterior part of longitudinal groove (Fig. 17). With four inconspicuous marginal depressions.

Cucullus: Wider than long, with numerous rounded granules, larger than those on carapace. Long translucent setae, increasing in size distally (Fig. 18).

Chelicerae: Fixed finger shorter than movable; fixed finger with six teeth, distal tooth longer than others; movable finger with seven teeth, basal tooth longer than others.

Sternal region: Coxae I meet the tritosternum distally; coxae II meet it along anterior fourth; coxae II considerably longer and wider than others.

Pedipalps: Trochanter 1 with numerous rounded granules, trochanter 2 with rounded granules ventrodistally. Femur

curved distally, without rounded granules. Tibia with few, rounded granules ventrodistally. Femur and tibia with numerous translucent setae; on femur longer ventrally, on tibia longer distally.

Legs: Femora I–IV with few ventral spines. Femur II wider than others (Fig. 17). Tibia I and II with few ventral spines, longer in tibia II (Fig. 19). Tibia III and IV without spines. Metatarsus I with few dorsal spines. Metatarsus II with numerous ventral spines. Metatarsus III without granules, metatarsus IV with few dorsal spines distally.

Copulatory apparatus: Metatarsus with metatarsal process long (Fig. 20). Tarsal process wide and curved (Figs. 20, 21). Lamina cyathiformis of tarsomere 2 with slight notch basally (Fig. 20).

Opisthosoma: Longer than wide (Fig. 17). Covered uniformly with numerous, small translucent setae dorsal and ventrally. Tergites XI and XII wider than long, tergite XIII longer than wide (Fig. 17). Lateral tergites longer than wide (Fig. 17). All tergites with numerous small, rounded granules. Tergites XI–XIII with paired shallow concavities.

Coloration: Cucullus, carapace, and opisthosoma brownish, opisthosoma darker. Pedipalps and legs light brown, legs II darker. Tarsomeres on all legs pale brown.

Measurements: Total length (carapace + opisthosoma + pygidium) 6.70. Carapace 2.00 long, 1.90 wide (widest part). Cucullus 1.00 long, 1.63 wide. Opisthosoma 4.70 long, 2.66 wide (widest part). Femur II l/d: 10.25. Legs tarsal formula (legs I–IV): 1-5-4-5. Leg lengths, I: coxa 0.98/ trochanter 1 0.65/ trochanter 2 -/ femur 2.50/ patella 1.05/ tibia 1.75/ metatarsus 2.00/ tarsus 0.82/ total 9.75; II: 1.05/ 1.00 / -/ 4.10/ 1.95/ 3.00/ 3.05/ 3.25/ 17.40; III: 0.90/ 0.80/ 0.95/ 2.55/ 1.10 / 1.50/ 1.27/ 1.65/ 10.72; IV: 0.80/ 0.83/ 0.86/ 2.85/ 1.16/ 1.95/ 1.70/ 1.55/ 11.70; Pedipalp: 0.83/ 0.50/ 0.45/ 1.28/ -/ 1.88/ -/ 0.23/ 5.17. Leg formula: 2431.

Variation: ($n = 2$). Holotype male darker than paratype. Paired concavities on tergites XI–XIII less inconspicuous on paratype than on holotype. Total length: 6.40, 6.70 ($\bar{x} = 6.55$), Cucullus: width 1.55, 1.63 ($\bar{x} = 1.59$), Carapace: width 1.85, 1.90 ($\bar{x} = 1.87$), Opisthosoma: length 4.70, 4.71 ($\bar{x} = 4.705$), width 2.57, 2.66 ($\bar{x} = 2.61$). Femur II l/d: 10.25, 10.75 ($\bar{x} = 10.50$).

Female (paratype): Differs from male as follows: Femora I–IV with fewer and smaller ventral spines. Tibiae I, III–IV without ventral spines. Tibiae II with fewer and smaller ventral spines. Sternites XI, XII and XIII with paired dark, thin depressions.

Measurements: Total length 6.50. Carapace 1.90 long, 1.85 wide (widest part). Cucullus 0.96 long, 1.53 wide. Opisthosoma 4.80 long, 2.87 wide (widest part). Femur II l/d: 11.42. Legs tarsal formula (legs I–IV): 1-5-4-5. Leg lengths, I: coxa 0.95/ trochanter 1 0.63/ trochanter 2 -/ femur 2.45/ patella 0.97/ tibia 1.80/ metatarsus 1.92/ tarsus 0.76/ total 9.48; II: 1.08/ 0.95/ -/ 3.97/ 1.77/ 2.90/ 3.03/ 2.95/ 16.65; III: 0.90/ 0.75/ 0.86/ 2.73/ 1.10 / 1.82/ 1.60/ 1.26/ 11.02; IV: 0.83/ 0.85/ 0.85/ 2.86/ 1.11/ 1.92/ 1.78/ 1.38/ 11.58; Pedipalp: 0.83/0.47/ 0.43/ 1.33/ -/ 1.91/ -/ 0.26/ 5.23. Leg formula: 2431.

Related species.—*Pseudocellus oztotl* resembles *P. osorioi* from Cueva de Los Sabinos, San Luis Potosí, México, and the other new troglomorphic species described below (see discussion in the descriptions of those species below). *Pseudocellus oztotl* is longer than *P. osorioi*: the total length (carapace + opisthosoma + pygidium) of *P. oztotl* is 6.55, whereas *P. osorioi* is 5.50 mm long. It is similar to *P. osorioi* in the shape of the spines of tibia II on the male, but on *P. oztotl* the spiniform granules are bigger than on *P. osorioi* (Fig. 19). The cucullus is more rounded on *P. oztotl* than on *P. osorioi* (Fig. 18). The ocular areas are visible in *P. osorioi*, but in *P. oztotl* are not present (Fig. 17). The metatarsal process on *P. oztotl* is straight distally, whereas on *P. osorioi* it is hooked and shorter (Fig. 20). Metatarsus on leg III of male *P. oztotl* is rectangular, whereas on *P. osorioi* it is triangular. Tarsomere 1 of leg III on male *P. oztotl* is proportionately longer than on *P. osorioi* (Fig. 20). The basal part of tarsal process is longer on *P. oztotl* than on *P. osorioi* (Fig. 21). Finally, the tarsal process on *P. oztotl* is wider than on *P. osorioi*, and the tip is thin and straight in *P. oztotl* (Figs. 20, 21), and on *P. osorioi* it is wider and curved.

Pseudocellus oztotl is the fourth known species in which femur II is twice as long or longer than the carapace on adult males, i.e., which shows pronounced troglomorphism. In decreasing order of relative elongation (Femur II L/ Carapace L), first comes *Pseudocellus krejcae* Cokendolpher & Enriquez 2004, from Cebada Cave in Belize, with a ratio of 3.5, followed by *P.*

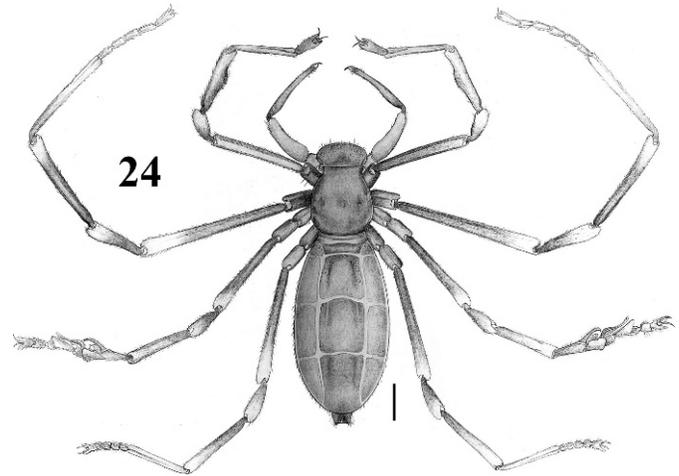


Figure 24.—*Pseudocellus platnicki* new species. Male holotype. Habitus, dorsal view. Scale = 1 mm.

sbordoni from Cueva de Las Canicas, Chiapas, with a ratio of 2.44, then *P. oztotl* with a ratio of 2.1, and finally *P. reddelli* from Cueva de Los Riscos, Durango, with a ratio of 2.0. Compared with *P. oztotl*, in *P. osorioi* the ratio is only 1.84; and in other cavernicolous, but slightly less troglomorphic species, the ratio is even lower, as follows: in *P. bolivari* from Grutas de Zapaluta, Chiapas 1.8; in *P. silvai* Armas 1977, from Cueva del Pirata, Cuba, it is 1.7; in *P. boneti* from Grutas de Cacahuamilpa, Guerrero, it is 1.5, as it is in *P. pearsei* from the Yucatan Peninsula.

Distribution.—This species is known only from the type locality (Fig. 31).

Natural history.—Cueva Las Tres Quimeras was explored by the Société Québécoise de Spéléologie in four separate expeditions from 2005 to 2009. The entrance is at 1,440 m elev.; it is 5,212 m long and drops to a depth of 815 m below entrance level. The ricinuleids were most abundant closer to the surface, where there were still big pieces of surface debris and insects floating in the water. They were found on gravel piles close to the water level (Beverly Shade, collector of the types, pers. comm., January 2011).

Pseudocellus platnicki new species

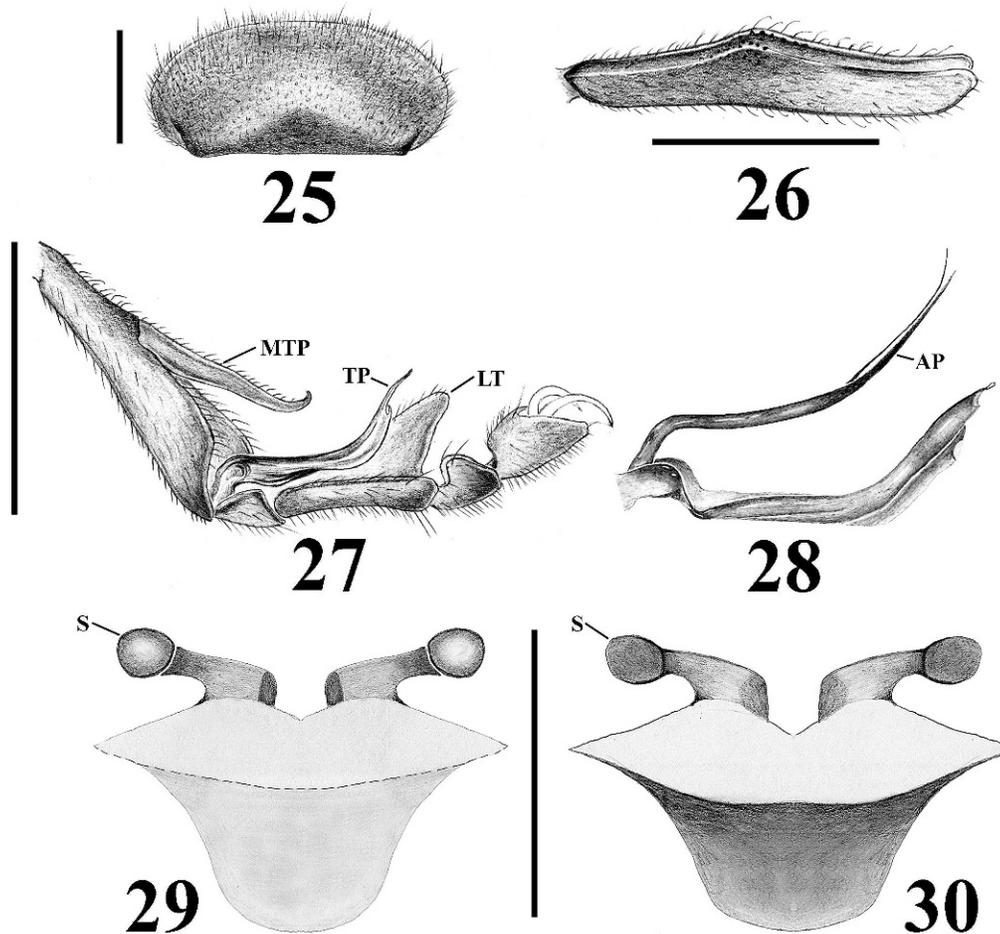
Figs. 24–30

Pseudocellus sp. nov. 1: Cokendolpher & Enriquez 2004:99.

Type material.—MEXICO: *Coahuila*: holotype male, Cueva Sasaparilla, Rancho Las Pilas, 130 km WSW de Ciudad Acuña (28.816667°N, 102.0000°W), 23 August 1997, D. A. Hendrickson, J. Krejca, J. C. Brown (CNAN-T0687). Paratype: 1 female (CNAN-T0688), same data as holotype.

Etymology.—This species dedicated to Dr. Norman I. Platnick (American Museum of Natural History), for his contribution to the knowledge of ricinuleids in the New World.

Diagnosis.—Males can be distinguished by a granulose prolateral hump on tibia I (Figs. 24, 26); by the long femur II (Fig. 24), 10.5 times longer than wide; by having metatarsal process long, slender and curved distally (Fig. 27); and by having the tarsal process with a sharp basal bend (Fig. 28). Females can be distinguished by the long and distally rounded spermathecae (Figs. 29, 30).



Figures 25–30.—*Pseudocellus platnicki* new species. Male holotype. 25. Cucullus, dorsal view; 26. Left tibia I, ventral view; 27. Left leg III, metatarsus and tarsal process, prolateral view; 28. Tarsal process (displaced position), prolateral view. Female paratype. Spermathecae. 29. Anterior view; 30. Posterior view. Scales = 1 mm (Figs. 26–28), 0.5 mm (Figs. 25, 29, 30).

Description.—*Male (holotype)*: Carapace: Longer than wide, wider posteriorly near coxae III. Evenly pitted, with few rounded granules present along inconspicuous dorsal depression: one central, two on median part (one on each side of midline) and two on posterior part (one on each side of midline). Covered with numerous small, translucent setae (Fig. 24). Ocular areas located along coxae II and III.

Cucullus: Wider than long. Evenly pitted; with few, scattered small round granules basally (Fig. 25); covered with small translucent setae, some longer than others (Fig. 25).

Chelicerae: Fixed finger shorter than movable. Left fixed finger with six teeth, right finger with five teeth, the last two teeth longer than the others on both fingers. Left movable finger with five teeth of different sizes; right finger with five teeth, basal tooth distinctly longest.

Sternal region: Coxae I meet tritosternum in a single point; coxae II meet it along anterior third, coxae II longer than the others. All coxae evenly pitted, without granules.

Pedipalps: Coxa evenly pitted. Trochanter 1 pitted, with 1–5 granules distally. Trochanter 2, femur and tibia evenly pitted, without granules. All segments covered with translucent setae, shorter on tibia; tibia distally with a few setae longer than on other segments.

Legs: Covered with small translucent setae. All segments elongated and thin, evenly pitted, without spines and granules (Fig. 24), except granules on retrolateral part of coxa I and tibia I with a granulose prolateral hump (Figs. 24, 26). Tarsus III covered ventrally with numerous, long setae. Tarsal claws long. Tarsi I and II with a distal projection between the tarsal claws.

Copulatory apparatus: Metatarsus elongate, conical; metatarsal process elongate, curved distally (Fig. 27). Tarsomere 2 elongate, square (Fig. 27). Lamina cyathiformis of tarsomere 2 triangular (Fig. 27). Tarsal process ending in thin tip (Fig. 27).

Opisthosoma: Longer than wide, widest at midpoint along tergite XII (Fig. 24). Pitted, with few small granules anteriorly on tergites X–XII and first two marginal tergites (Fig. 24). Tergite XI wider than long, tergites XII and XIII longer than wide. Sternites evenly pitted, on sternites XI and XII quite conspicuously. Pygidium basal segment distally with small dorsal notch.

Coloration: Cucullus, carapace, pedipalps, and coxae of legs pale orange. Trochanters I and II orange, trochanters III and IV pale orange. Femorae, patellae, tibiae and metatarsi brownish, on each segment paler distally. Tarsi pale orange. Opisthosoma yellowish, sternites XI and XII dark orange. Pygidium brownish.

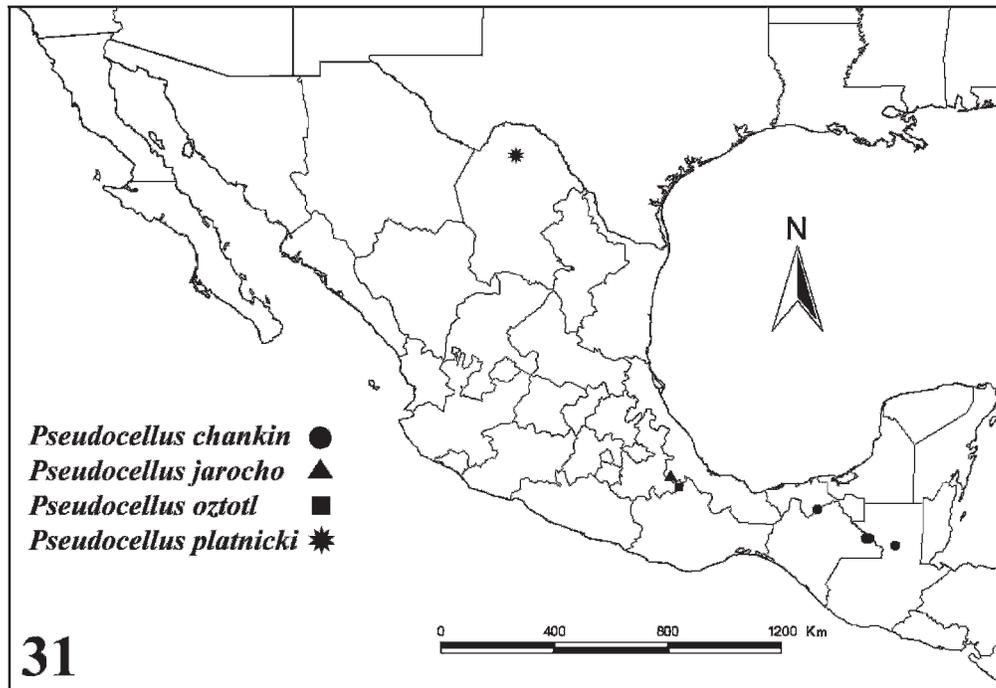


Figure 31.—Distribution records of *Pseudocellus chankin*, *P. jarocho*, *P. oztotl* and *P. platnicki*.

Measurements: Total length (carapace + opisthosoma + pygidium) 6.20. Carapace 1.70 long, 1.55 wide (widest part). Cucullus 0.87 long, 1.42 wide. Opisthosoma 4.30 long, 2.35 wide (widest part). Femur II l/d: 10.57. Legs tarsal formula (legs I–IV): 1-5-4-5. Leg lengths, I: coxa 0.80/ trochanter 1.06/ trochanter 2 -/ femur 2.30/ patella 0.82/ tibia 1.65/ metatarsus 1.77/ tarsus 0.73/ total 8.68; II: 0.90/ 0.80/ -/ 3.67/ 1.45/ 2.65/ 2.52/ 2.37/ 14.36; III: 0.81/ 0.70/ 0.81/ 2.45/ 1.07/ 1.62/ 1.25/ 1.45/ 10.16; IV: 0.73/ 0.78/ 0.76/ 2.85/ 1.05/ 1.90/ 1.75/ 1.27/ 11.09; Pedipalp: 0.7/ 0.47/ 0.32/ 1.32/ -/ 1.80/ -/ 0.30/ 4.91. Leg formula: 2431.

Female (paratype): Differs from male as follows: Tibia I without granulose prolateral hump. Cheliceral fixed finger with five teeth, distal tooth longer than the others. Both movable fingers of chelicerae with five teeth, decreasing in size distally. Cucullus, carapace and legs brown. Opisthosoma, tergites and sternites orange; sternite XI paler than the others.

Measurements: Total length 6.40. Carapace length 1.82, width 1.67 (widest part). Cucullus length 0.85, width 1.40. Opisthosoma length 4.55, width 2.50 (widest part). Femur II l/d: 10.71. Legs tarsal formula (legs I–IV): 1-5-4-5. Leg lengths, I: coxae 0.76/ trochanter 1.05/ trochanter 2 -/ femur 2.37/ patella 0.90/ tibia 1.75/ metatarsus 1.85/ tarsus 0.70/ total 8.89; II: 0.95/ 0.80/ -/ 3.75/ 1.50/ 2.65/ 2.55/ 2.40/ 14.60; III: 0.86/ 0.63/ 0.73/ 2.65/ 1.06/ 1.77/ 1.70/ 1.18/ 10.58; IV: 0.80/ 0.78/ 0.80/ 2.90/ 1.06/ 1.96/ 1.80/ 1.27/ 11.37; Pedipalp: 0.75/ 0.47/ 0.43/ 1.46/ -/ 1.92/ -/ 0.35/ 5.38. Leg formula: 2431.

Related species.—*P. platnicki* resembles *P. osorioi* from Cueva de Los Sabinos, San Luis Potosí, México, and *P. oztotl* from Cueva Las Tres Quimeras, Puebla, México. The resemblance with *P. osorioi* lies in the overall shape, both are large species of similar size, elongated appendages: *P. platnicki* has a total length of 6.20 mm whereas *P. osorioi* is 6.30 mm long; however, *P. platnicki*

has the body and appendages evenly pitted and with very few granules, while *P. osorioi* is not pitted and has numerous granules. On *P. platnicki* the cucullus is oval (Fig. 25), whereas on *P. osorioi* it is pentagonal. Tibia I on *P. platnicki* has a granulose prolateral hump (Fig. 26), which is lacking on *P. osorioi*; tibia II on *P. osorioi* has ventral spines, whereas on *P. platnicki* it lacks spines and granules (Fig. 24). Both species resemble in the shape of the copulatory apparatus of leg III of male: *P. platnicki* has the metatarsal process thinner than *P. osorioi*; finally, *P. platnicki* has the tarsal process wider on the distal half, whereas on *P. osorioi* the tarsal process is slender and conical distally.

Pseudocellus platnicki is similar to *P. oztotl* in overall shape; also, both species have elongated appendages and similar size, *P. platnicki* is 6.20 mm long, whereas *P. oztotl* is 6.70 mm (Figs. 17, 24). Tibia I on *P. platnicki* has a granulose prolateral hump (Figs. 24, 26), while *P. oztotl* has tibia I with spines ventrally and without a granulose prolateral hump (Fig. 17); tibia II on *P. oztotl* has spines ventrally (Fig. 19), whereas on *P. platnicki* it lacks spines and granules (Fig. 24). The metatarsal process on *P. platnicki* is slender and curved distally, whereas on *P. oztotl* it is conical and straight distally (Figs. 20, 27); the tarsal process is thinner on *P. platnicki* than on *P. oztotl* (Figs. 20, 28). Finally, on females the shape of the spermathecae is very different between *P. platnicki* and *P. oztotl* (Figs. 22, 23, 29, 30).

Distribution.—This species is known only from the type locality (Fig. 31).

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Appendix 1.—Material examined to make the key for identification of Mexican *Pseudocellus*:

- Pseudocellus boneti*: México: Guerrero: 1 ♂ (CNAN-Ri0009) from Gruta de Acuitlapan (cave); 1 ♀ (CNAN-Ri0010), same location; 1 ♂ (CNAN-Ri0011) from Gruta de la Mariposa, Tetipac (cave); 1 ♀ (CNAN-Ri0012), same location.
- Pseudocellus gertschi*: México: Veracruz: 3♀, 3 nymphs (CNAN-Ri0002) from Estación Biológica de la UNAM “Los Tuxtlas” (litter).
- Pseudocellus osorioi*: México: San Luis Potosí: 3 ♀, 1 nymph (CNAN-Ri0004) from Sótano del Tigre, Sierra del Abra (cave); Tamaulipas: 1 ♀ (CNAN-Ri0008) from Cueva de Quintero (cave).
- Pseudocellus pearsei*: México: Quintana Roo: 1 ♂ (CNAN-Ri0013) from Caverna “Aktum Chen” (cave); Yucatán: 2 ♂, 4 ♀, 12 nymphs (CNAN-Ri0007) from Cenote Mayapan (cave); 3 ♂, 2 ♀, 2 nymphs (CNAN-Ri0014) from Acutun Isban, 1.3 km SE of San Francisco Grande (litter); 1 ♂, 2 ♀, 1 nymph (CNAN-Ri0015), same location; 4 ♀ (CNAN-Ri0016) from Cenote Xcoptiel, Xcoptiel, 4.5 km SSW Dzeal. (cave); 6 ♂, 3 ♀, 3 nymphs (CNAN-Ri0017) from Actun Olem, 1.4 km N Xbohóm (litter); 2 ♂, 3 ♀, 1 nymph (CNAN-Ri0018) from Actun Yax, 5.2 km SSW Kaua (cave); 4 ♀, 2 nymphs (CNAN-Ri0019) from Grutas de San Daniel, 1.6 km N of Quintana Roo Plaza (cave).
- Pseudocellus pelaezi*: México: Tamaulipas: 2 ♂, 2 ♀, 4 nymphs (CNAN-Ri0005) from Cueva de la Florida, Sierra del Abra (cave).
- Pseudocellus spinotibialis*: México: Chiapas: 1 ♂ (ECOTAAR-Ri00001), 1 ♂ (ECOTAAR-Ri00002), 1 ♀ (ECOTAAR-Ri00003), 1 ♀ (ECOTAAR-Ri00007), 1 ♀ (ECOTAAR-Ri00009) from Unión Juárez, Talquian C. (cave).