

Redescription of *Oecobius juangarcia* Shear, 1970 and new records of other species of *Oecobius* Lucas, 1846 from Mexico

(Araneae, Oecobiidae)

Joel Jair Alcántar-Valenzuela, David Chamé-Vázquez & María-Luisa Jiménez

Alcántar-Valenzuela, J. J., Chamé-Vázquez, D. & Jiménez, M.-L. 2023. Redescription of *Oecobius juangarcia* Shear, 1970 and new records of other species of *Oecobius* Lucas, 1846 from Mexico (Araneae, Oecobiidae). *Spixiana* 46(1): 47–54.

The oecobiid spider *Oecobius juangarcia* Shear, 1970 was described more than fifty years ago based on specimens of both sexes collected from Oaxaca, Mexico. Since the vulva was neither described nor illustrated in the original description, we redescribe and illustrate *O. juangarcia* based on specimens from Chiapas, Mexico. Furthermore, we provide the first SEM images of the copulatory organs of both sexes. Additionally, we report new distributional records of *O. concinnus* Simon, 1893 and *O. maculatus* Simon, 1870, based on specimens from Chiapas and Coahuila, respectively.

Joel Jair Alcántar-Valenzuela, Licenciatura en Biología, Instituto Tecnológico de Los Mochis, C.P. 81259, Los Mochis, Sinaloa, México;
e-mail: joelalcantar9@gmail.com

María-Luisa Jiménez (corresponding author) & David Chamé-Vázquez, Laboratorio de Aracnología y Entomología, Centro de Investigaciones Biológicas del Noroeste S.C., La Paz, 23096, Baja California Sur, México;
e-mail: ljimenez04@cibnor.mx; chamevazquez@gmail.com

Introduction

Oecobiidae Blackwall, 1962 is a family of tiny-sized spiders that comprises six genera and 120 species worldwide (World Spider Catalog 2023). *Oecobius* Lucas, 1846 is the most diverse genus with 90 species (World Spider Catalog 2023). Some species have broad distribution and are synanthropic (Shear & Benoit 1974, Santos & Gonzaga 2003, 2008, Magalhães & Santos 2018). In Mexico, there are 14 known species of *Oecobius* (Gertsch & Davis 1937, 1942, Shear 1970, Jiménez & Llinas 2005, Gómez-Moreno et al. 2023), of which *O. concinnus* Simon, 1893, *O. maculatus* Simon, 1870, *O. navus* Blackwall,

1859, and *O. putus* O. Pickard-Cambridge, 1876 are synanthropic (Shear 1970, Gómez-Moreno et al. 2023). Conversely, *O. juangarcia* Shear, 1970 is only known from its type locality at Juan García, central Oaxaca. This species was described based on a few specimens collected in 1964 by J. and W. Ivie. Since only one female was available at the time of species description, the internal female genitalia were not examined nor illustrated by Shear (1970).

In this paper, we provide a complementary description of *O. juangarcia* with details of the female internal genitalia. Moreover, we provide new distributional records of *O. concinnus* and *O. maculatus* in Mexico.

Materials and methods

All specimens studied are deposited in the Colección de Arácnidos e Insectos (CARCIB), Centro de Investigaciones Biológicas del Noroeste S.C. (CIBNOR), Baja California Sur, Mexico. Measurements were obtained using a Zeiss Stemi SR stereomicroscope with an ocular micrometer; all measurements are given in millimeters (mm). Total body length is the sum of the carapace plus opisthosoma lengths. The coloration is based on specimens preserved in ethanol at 80%. Females epigyna were dissected using needles, cleaned with enzymatic contact lens cleaner (Bolzern et al. 2015), and cleared with clove oil for 5 minutes (Levi 1965). The format of the description mostly follows Shear (1970), the terminology of the palpus follows Coddington (1990), and that of the epigyne and vulva follows Baum (1972). The photographs of copulatory organs were taken with an AmScope-MU500 camera coupled to an AmScope B660B microscope, whereas the habitus images were photographed with a Nikon SMZ25 stereoscopic microscope. The multiple images at different focal lengths were stacked using Helicon Focus 8.0.2 software or NIS Elements Advanced Research version 4.50 software, following Álvarez-Padilla (2012). Scanning electron microscope (SEM) images were taken using a Hitachi S-3000N at CIBNOR. The SEM samples were prepared following the steps recommended by Álvarez-Padilla & Hormiga (2007), except the cleaning, see above. The map was prepared with QGIS 3.26.3 software. Abbreviations: Male copulatory organs: E, embolus; OTA, oecobiid tegular apophysis; OTL I, oecobiid tegular lobe I; AS, subterminal apophysis. Female copulatory organs: CO, copulatory openings; CD, copulatory duct; BA, blind appendix; FD, fertilization ducts; R, receptacle.

Taxonomy

Family Oecobiidae Blackwall, 1862
Genus *Oecobius* Lucas, 1846

Oecobius juangarcia Shear, 1970
Figs 1–16

O. juangarcia – Shear (1970: 154, figs 23, 40, 66–67; female holotype and male paratype from Juan Garcia, Oaxaca, Mexico, in American Museum of Natural History – NOT EXAMINED).

Material examined. MEXICO, Chiapas, Tuxtla Gutiérrez, El Sumidero National Park (16.792400°N, 93.077975°W, 852 m), 15.X.2020, hand collection by sifting leaf litter, leg. E. R. Chamé & D. Chamé, 2 ♀, 1 immature (CARCIB-Ar-4972); same data except 05.X.2021, hand collection on stones, leg. D. Chamé, G.M. Suárez & E.R. Chamé, 1 ♂, 7 ♀, 5 immatures (CARCIB-Ar-4969).

Diagnosis. The epigyne of *O. juangarcia* is quite distinct compared to its Mexican congeners by having the scape short, wider than long. It partly resembles

that of *O. beatus* Gertsch & Davis, 1937, but the central atrium on the scape easily characterizes it (Figs 5–7). Male palp of *O. juangarcia* resembles that of *O. civitas* Shear, 1970 by the lack of a tegular apophysis, but it is easily distinguishable by the digitiform distal part of the tegular lobe I, and the curved, spine-shaped embolus and subterminal apophysis, both opposed in direction (Figs 8–10).

Complementary description

Female habitus, as in Figs 1–2.

Coloration. Carapace dark brown with light brown usually broken lines, radiating from the fovea. Legs pale yellow and annulated: femora with two rings, patellae with one, tibiae with two, metatarsi with two, and tarsi with one distal ring, which may be incomplete, those of tarsi usually diffuse. Sternum brown. Endites, labium, and coxae pale yellowish. Opisthosoma with a black background, profusely suffused with white spots except in the middle at cardiac mark (Fig. 1). Venter black, with a broad transverse patch of white spots usually partially interrupted at the middle (Fig. 2). Epigastric area brownish.

Measurements. Total length 2.48. Carapace 0.86 long, 0.99 wide. Opisthosoma 1.62 long, 1.22 wide. Tibiae length: I 0.63, II 0.61, III 0.60, IV 0.66.

Epigyne (Figs 5, 15). Scape short, about half of epigynal length, posteriorly directed, wider than long, with a broad central atrium, posterior margin notched; the area around scape excavated, deeper anteriorly. Posterior half of epigyne with grooves.

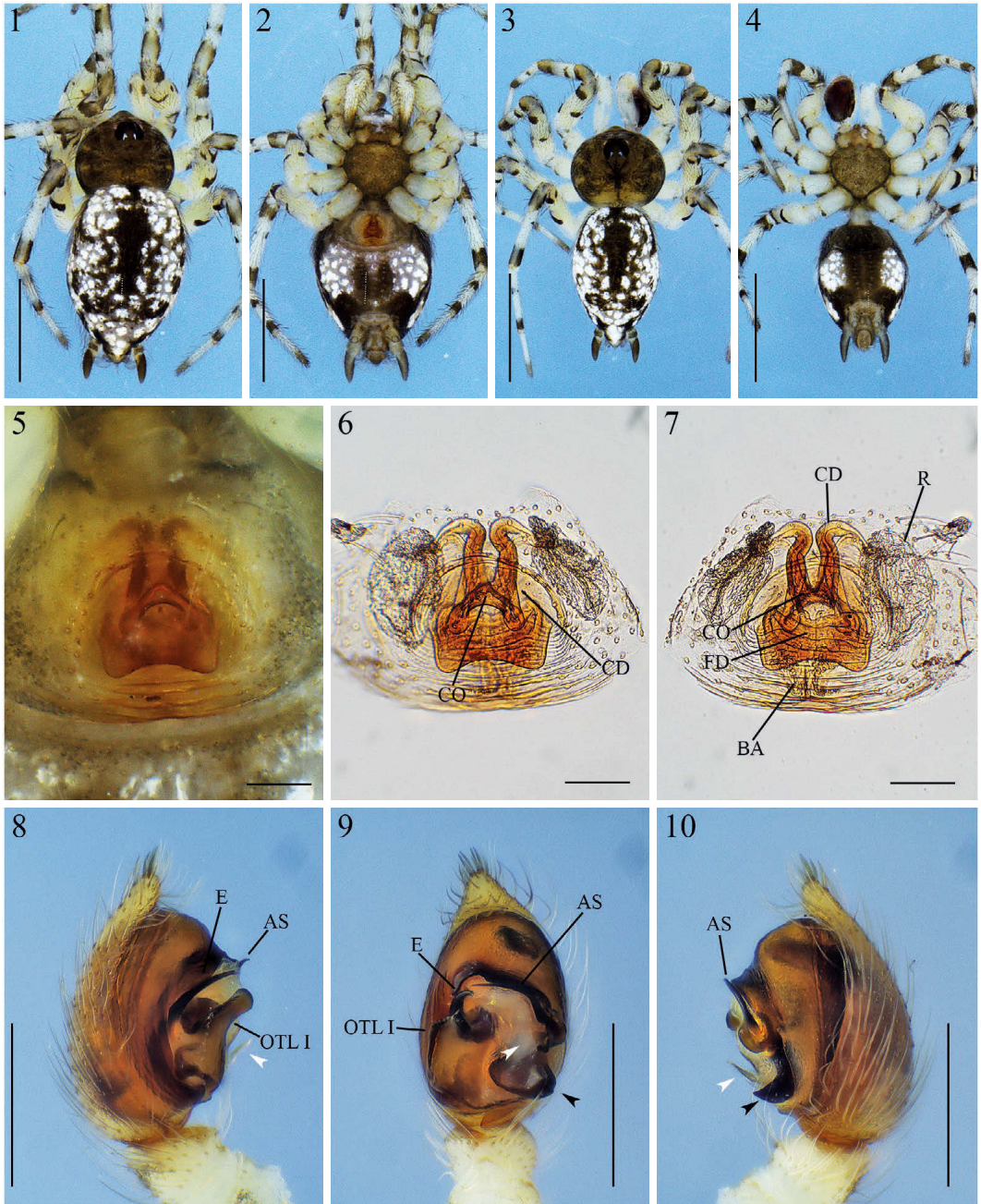
Vulva (Figs 6–7, 16). Thick copulatory ducts (CD) directed anteriorly from epigynal hood. Globose and hyaline receptacles (R) located lateral to copulatory ducts (CD) and scape. Fertilization ducts (FD) sinuous, mostly behind the copulatory ducts (CD) and scape. Small blind appendages (BA) restricted to posterior third of the epigyne.

Male.

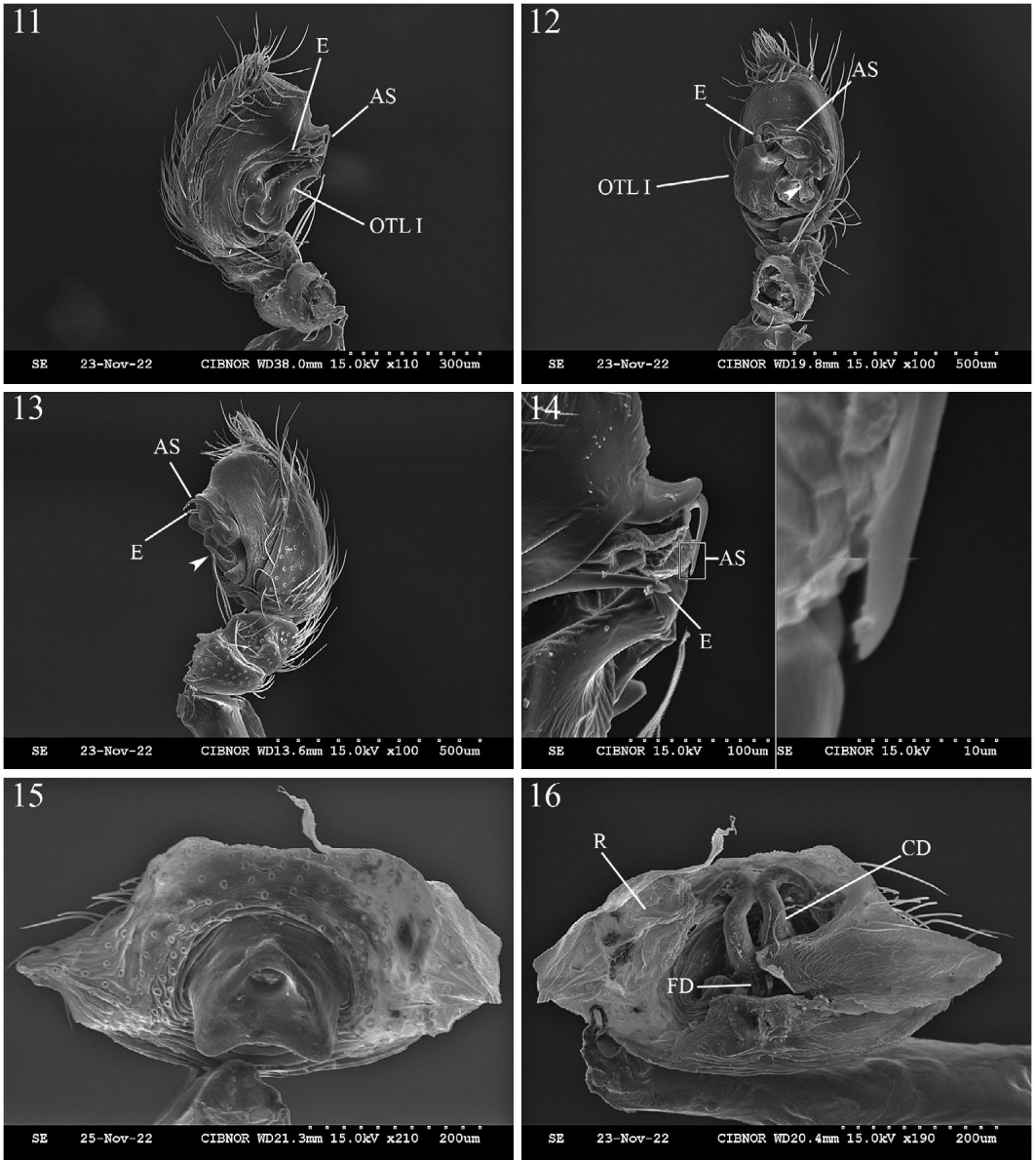
Coloration as the female, but thoracic lines are broken, seen as submarginal light brown spots (Fig. 3). Venter of opisthosoma as the female, but transverse patch interrupted, reduced to two broad patches of white spots (Fig. 4).

Measurements. Total length 2.45. Carapace 0.83 long, 0.99 wide. Opisthosoma 1.62 long, 0.89 wide. Tibiae length: I 0.59, II 0.60, III 0.59, IV 0.63.

Palp (Figs 8–14). Tegular apophysis absent; tegular lobe I (OTL I) lengthened, with a broad base and apical half digitiform as seen prolaterally. Embolus (E) long, curved, its base just above tegular lobe I (OTL I). In ventral view, embolus (E) runs mostly



Figs 1-10. *Oecobius juangarcia*: 1. female habitus, dorsal view; 2. same, ventral view; 3. male habitus, dorsal view; 4. same, ventral view; 5. epigyne, ventral view; 6. same, cleared; 7. vulva, dorsal view; 8. male palp, prolateral view; 9. same, ventral view; 10. same, retrolateral view (white arrow: hyaline apophysis; black arrow: sclerotized apophysis). Scales: 1-4: 1.0 mm; 5-7: 0.1 mm; 8-10: 0.3 mm. Abbreviations: E, embolus; AS, subterminal apophysis; OTL I, oecobiid tegular lobe I; CO, copulatory openings; CD, copulatory ducts; BA, blind appendix; FD, fertilization ducts; R, receptacle.

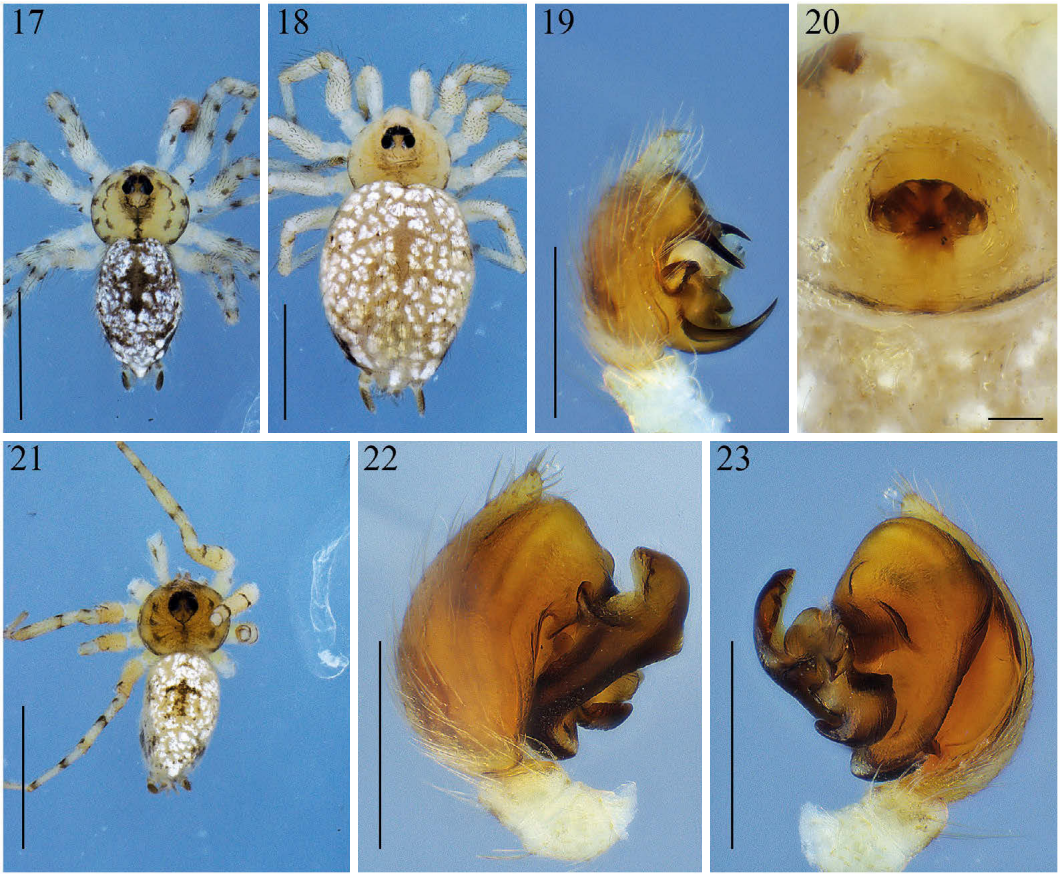


Figs 11-16. *Oecobius juangarcia*: 11. male palp, prolateral view; 12. same, ventral view; 13. same retrolateral view (white arrow: hyaline apophysis); 14. detail of bulb, prolateral view; 15. epigyne, ventral view (slightly anterior); 16. vulva, dorsal view. Abbreviations: E, embolus; AS, subterminal apophysis; OTL I, oecobiid tegular lobe I; CD, copulatory ducts; FD, fertilization ducts; R, receptacle.

behind tegular lobe I (OTL I), but its tip is visible and directed retrolaterally; subterminal apophysis (AS) is thinner and longer than embolus, directed prolaterally. In retrolateral view, tegulum with two basal claw-shaped apophyses, one short and heavily sclerotized (arrow black in Figs 9,10), the

other hyaline and long (arrow white in Figs 8-10, 12-13); subterminal apophysis runs next to apical protruding part of tegulum, and its base oval.

Variation. Female (N=8): total length 2.35-2.75. Carapace 0.83-0.89 long, 0.94-1.06 wide. Opisthosoma 1.52-1.85 long, 1.06-1.36 wide. Tibiae length:



Figs 17–20. *Oecobius concinnus*; **21–23.** *O. maculatus*: 17–18,21. habitus, dorsal view (17,21 male; 18 female); 19,22. male palp, prolateral view; 20. epigyne, ventral view; 23. male palp, retrolateral view. Scales: 17–18,21: 1.0 mm; 19,22,23: 0.3 mm; 20: 0.1 mm.

I 0.60–0.66, II 0.63–0.67, III 0.60–0.66, IV 0.63–0.68. The specimens that Shear (1970) studied have the carapace entirely brown, but the spiders from Chiapas have light brown lines or dots on the sides (see above).

Natural history. Some specimens were found in tropical deciduous forest leaf litter, but most were found on boulders. Moreover, this species shares its microhabitat with *Phonotimpus* sp. (Phrurolithidae), *Pescemina* sp., *Scaphiella* sp. (Oonopidae), *Lygromma* sp. (Prodidomidae), *Ochyrocera* sp. (Ochyroceratidae), *Selenops* sp. (Selenopidae), among other spiders.

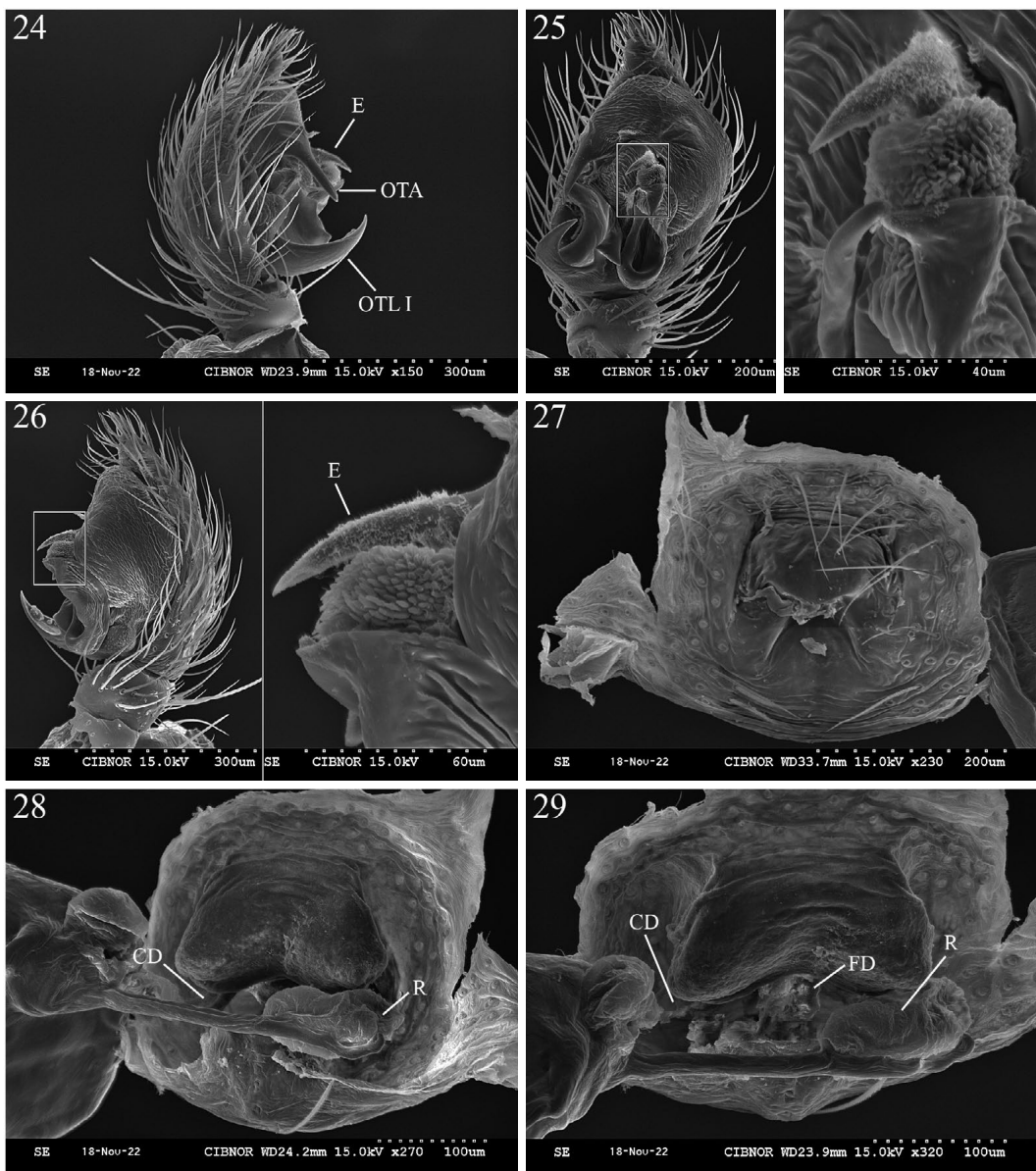
Distribution. MEXICO: Oaxaca (Shear, 1970) and Chiapas (data provided here, Fig. 30). This is the first record outside the type locality.

New records:

Oecobius concinnus Simon, 1893 Figs 17–20, 24–29

For a complete taxonomic reference list, see World Spider Catalog (2023: https://wsc.nmbe.ch/species/22911/Oecobius_concinnus).

Material examined: MEXICO, Chiapas, Ocosingo, Lacanjá-Chansayab (16.757071° N, 91.132143° W, 340 m), 16.IV.2019, hand collection outside of house, leg. G. Suárez & D. Chamé, 1 ♂ (CARCIB-Ar-4971); Tapachula, Ejido Raymundo Enriquez (14.873897° N, 92.309956° W, 90 m), 04.VII.2017, hand collection outside of house near abandoned old cocoa crop, leg. E. Chamé, 1 ♀ (CARCIB-Ar-4967); Tuxtla Gutiérrez, Tuxtla Gutiérrez City (16.743124° N, 93.057530° W, 584 m), ?? .III.2022, hand collection inside of house,



Figs 24–29. *Oecobius concinnus*: 24. male palp, prolateral view; 25. same, ventral view (inset, detail of bulb); 26. same, retrolateral; 27. epigyne, ventral view; 28. vulva, dorsal view (slightly lateral); 29. same, dorsal view (slightly anterior). Abbreviations: E, embolus; OTA, oecobiid tegular apophysis; OTL I, oecobiid tegular lobe I; CD, copulatory ducts; FD, fertilization ducts; R, receptacle.

leg. D. Chamé, 1 ♀ (CARCIB-Ar-4973); same data except 22.III.2022, leg. D. Chamé & G. Suárez, 1 ♀ (CARCIB-Ar-4968).

Diagnosis. Females of *O. concinnus* can be differentiated by having a wide, median, heavily sclerotized bridge (scape sensu Shear, 1970) over the epigynal

depression, which is deeper anteriorly (Figs 20, 27, 28). The males can be distinguished by having the distal two third of tegular apophysis long and tubiform, while the tegular lobe is a long-pointed projection with a broad concave base, as seen prolaterally (Figs 19, 24).

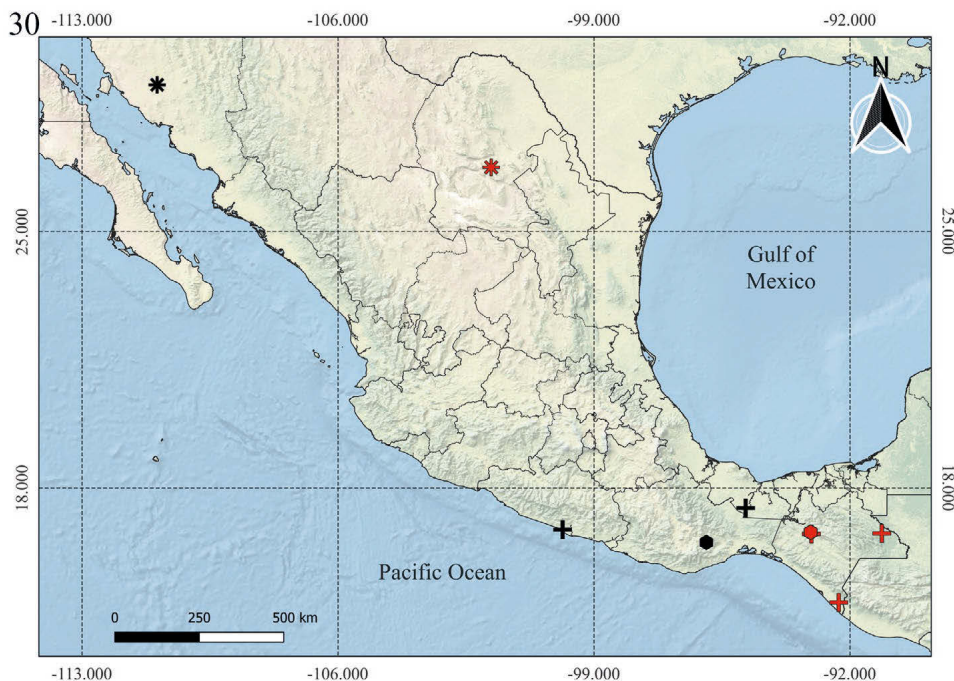


Fig. 30. Distribution records of *Oecobius juangarcia* (hexagon), *O. concinnus* (cross), and *O. maculatus* (asterisk) in Mexico. The black symbols are from previous studies, while the red ones are the new records.

Distribution. Known from the United States (Florida) to Brazil, introduced in Seychelles, Laos, and Japan (World Spider Catalogue 2023). In Mexico, it has been recorded in Veracruz and Guerrero (Gertsch & Davis 1942, Bryant 1948, Shear 1970), and Chiapas (data provided here, Fig. 30). It is a new state record in Chiapas, Mexico.

Remarks. This species has been found under rocks, boards, and bark (Bryant 1948, Shear 1970), but it is ubiquitous inside and outside buildings and occurs at all times of the year (Shear 1970). All specimens studied here were found outside of houses. This species may have a broader distribution in Mexico since it is synanthropic.

***Oecobius maculatus* Simon, 1870**
Figs 21–23

For a complete taxonomic reference list, see World Spider Catalog (2023: https://wsc.nmbe.ch/species/22942/Oecobius_maculatus).

Material examined: MEXICO, Coahuila, Cuatrociénegas, Churince (26.7500° N, 101.813610° W, 740 m), 05.IV.2012, mezquital with dominance of *Prosopis* sp. (Fabaceae), leg. M. Bizuet, 1 ♂ (CARCIB-Ar-4970).

Diagnosis. Males of this species can be easily distinguished from other introduced and native species by the massive tegular lobe, widened distally and with subdorsal notch as seen prolaterally (Fig. 22), while females by the relatively small scape restricted to the anterior half of the epigynal plate (Schneider et al. 2020: fig. 2).

Distribution. Known from the Mediterranean to Azerbaijan, introduced to the United States (World Spider Catalogue 2023). In Mexico, it was first recorded in the state of Sonora by Gómez-Moreno et al. (2023), Coahuila (data provided here, Fig. 30). It is a new state record in Coahuila, Mexico.

Remarks. For ecological information on this species in Coahuila see Bizuet-Flores et al. (2015), since we examined the same specimen. Schneider et al. (2020) found this species in California and Arizona, US. Therefore, this species could be found in other border states of both Mexico and the US.

Acknowledgements

The research stay of JJAV at CIBNOR was partially supported by The Vincent Roth Fund for Systematics Research from the American Arachnological Society and

Programa de Formación de Recursos Humanos Externos (PFRHE-CIBNOR), while DCV was partially supported by CONACYT through Estancias Posdoctorales por México 2020-2023. We are grateful to E. R. Chamé (ECOSUR) and G. M. Suárez (ECOSUR) for their help during the field trips in Chiapas. C. J. Pérez Estrada (CIBNOR) provided access to microscope equipment, and A. A. Cruz Villacorta (CIBNOR) helped us acquire SEM images. To R. Escalante and I. Serrano (CONANP), who provided access to the National Park El Sumidero. All specimens from El Sumidero were collected under the scientific permit SEMARNAT FAUT-0363 (SGPA/DGVS/01401/21 and 07834/21) granted to MLJ.

References

- Álvarez-Padilla, F. 2012. Laboratorio de Aracnología Facultad de Ciencias UNAM, online at <http://www.unamfcarcnolab.com> [accessed 05-July-2023].
- & Hormiga, G. 2007. A protocol for digesting internal soft tissues and mounting spiders for scanning electron microscopy. *Journal of Arachnology* 35 (3): 538–542.
- Baum, S. 1972. Zum “Cribellaten-Problem”: Die Genitalstrukturen der Oecobiinae und Urocteinae (Arach.: Aran: Oecobiidae). *Abhandlungen und Verhandlungen des Naturwissenschaftlichen Vereins in Hamburg (NF)* 16: 101–153.
- Bryant, E. B. 1948. Some spiders from Acapulco, Mexico. *Psyche* 55 (2): 55–77.
- Bizuet-Flores, M. Y., Jiménez, M. L., Zavala-Hurtado, A. & Corcuera, P. 2015. Diversity patterns of ground dwelling spiders (Arachnida: Araneae) in five pre-vailing plant communities of the Cuatro Ciénegas Basin, Coahuila, Mexico. *Revista Mexicana de Biodiversidad* 86: 153–163.
- Bolzern, A., Platnick, N. I. & Berniker, L. 2015. Three new genera of soft-bodied goblin spiders (Araneae, Oonopidae) from Mexico, Belize, and Guatemala. *American Museum Novitates* 3824: 1–59.
- Coddington, J. A. 1990. Ontogeny and homology in the male palpus of orb-weaving spiders and their relatives, with comments on phylogeny (Araneocladae: Araneoidea, Deinopoidea). *Smithsonian Contributions to Zoology* 496: 1–52.
- Gertsch, W. J. & Davis, L. I. 1937. Report on a collection of spiders from Mexico. I. *American Museum Novitates* 961: 1–29.
- & Davis, L. I. 1942. Report on a collection of spiders from Mexico. IV. *American Museum Novitates* 1158: 1–19.
- Gómez-Moreno, K. G., Chamé-Vázquez, D. & Jiménez, M.-L. 2023. Contribución al conocimiento de las arañas (Arachnida: Araneae) en Sonora, Noroeste de México. *Acta Zoológica Mexicana (N.S.)* 39: 1–16. <https://doi.org/10.21829/azm.2023.3912583>
- Jiménez, M. L. & Llinas G. J. 2005. Especie nueva de *Oecobius* (Araneae: Oecobiidae) de Baja California, México. *Revista Mexicana de Biodiversidad* 76: 45–48.
- Levi, H. W. 1965. Techniques for the study of spider genitalia. *Psyche* 72 (2): 152–158.
- Magalhães, M. D. F. & Santos, A. J. 2018. The spider family Oecobiidae in Madagascar, including four new species and a new record. *Zootaxa* 4527 (1): 37–48.
- Santos, A. J. & Gonzaga, M. O. 2003. On the spider genus *Oecobius* Lucas, 1846 in South America (Araneae, Oecobiidae). *Journal of Natural History* 37 (2): 239–252.
- & Gonzaga, M. O. 2008. Two new Neotropical spiders of the genera *Oecobius* and *Platoecobius* (Araneae: Oecobiidae). *Zootaxa* 1786: 61–68.
- Schneider, K. R., Vitanza, S., Kameda, H. & Hollenbeck, J. 2020. *Oecobius maculatus* Simon 1870 distribution in North America. *American Arachnology* 83: 17–18.
- Shear, W. A. 1970. The spider family Oecobiidae in North America, Mexico, and the West Indies. *Bulletin of the Museum of Comparative Zoology* 140: 129–164.
- & Benoit, P. L. G. 1974. New species and new records in the genus *Oecobius* Lucas from Africa and nearby islands (Araneae: Oecobiidae: Oecobiinae). *Revue Zoologique Africaine* 88: 706–720.
- World Spider Catalog 2023. World Spider Catalog Version 24. Natural History Museum Bern, online at <http://wsc.nmbe.ch> [accessed 02-may-2023].