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Article *in* Zootaxa · February 2022

DOI: 10.11646/zootaxa.5115.2.7

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ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

https://doi.org/10.11646/zootaxa.5115.2.7
http://zoobank.org/urn:lsid:zoobank.org:pub:A33E7563-28AC-43E0-8B6D-2DE7E571AB07

A new species of *Copa* (Araneae: Corinnidae: Castianeirinae) from dry forests in the north west of Madagascar

BROGAN L. PETT[1,2,3*] & PAUL BIENVENU RABEMANANJARA[4,5]
[1]*SpiDivERse, Biodiversity Inventory for Conservation (BINCO), Walmersumstraat 44, 3380 Glabbeek, Belgium.*
[2]*Centre for Ecology and Conservation, College of Life and Environmental Sciences, University of Exeter, Penryn Campus, Penryn, Cornwall, TR10 9FE, UK.*
[3]*Operation Wallacea, Lincolnshire, UK.*
[4]*Development and Biodiversity Conservation Action for Madagascar (DBCAM), Antananarivo, Madagascar.*
[5]*Faculté des Sciences, de Technologies et de l'environnement (FSTE), Université de Majunga, Mahajanga, Madagascar.*
https://orcid.org/0000-0001-6395-917X
[*]*Corresponding author.* *brogan.pett@outlook.com; Spidiverse@binco.eu;* *https://orcid.org/0000-0002-0461-3715*

Abstract

A new species of the castianeirine spider genus *Copa* Simon, 1885, is described from northwestern Mahamavo region in Madagascar. *Copa sakalava* **sp. nov.** (♂♀) is illustrated and diagnosed against continental Afrotropical congeners.

Key words: Species discovery, taxonomy, Mahamavo, cryptic, spider

Introduction

Castianeirinae (Araneae: Corinnidae) is a group of predominantly tropical, slender, fast-running spiders that often mimic ants. In the Afrotropical region, a few genera have cryptic colouration and instead resemble wolf spiders (Lycosidae). *Copa* Simon, 1885 is one such genus, containing six species distributed throughout Africa and southern Asia, and *Copa kabana* Raven, 2015 from Australia (WSC, 2022). *Copa* is the only described primarily leaf-litter dwelling genus of the lycosiform castianeirines in the Afrotropical region (Haddad, 2013).

Haddad (2013) revised the continental Afrotropical species of *Copa* and alluded to a rich fauna on the island of Madagascar with more than (now) 40 undescribed species of the genus (Haddad, *pers. comm.*). Research on castianeirines on Madagascar lags substantially behind that of continental Africa. Although, Haddad (2021) recently described the monotypic endemic genus *Griswoldella* to accommodate *Griswoldella aculifera* (Strand, 1916). Two species of *Copa* were described from Madagascar over a hundred years ago, with *Copa lineata* Simon, 1903 described from a single juvenile and the holotype is now lost, thus will likely be declared a *nomina dubia* (Haddad, *pers. comm*). *Copa auroplumosa* Strand, 1907 was declared *nomina dubia* already due to a poor description coupled with destroyed type material (see: Nentwig *et al*. 2020).

A biodiversity inventory focussing on the spider fauna of an area of the enigmatic dry forests of north-western Madagascar was initiated in 2017 between the Biodiversity Inventory for Conservation (BINCO: www.binco.eu) and Operation Wallacea (www.opwall.com). Previous research discovered a new *Ocyale* Audouin, 1826 (Lycosidae) in the region (Jocque *et al*. 2017).

In this paper, we describe a new species: *Copa sakalava* **sp. nov.** (♂♀) from the north-western dry forests of the Mahajanga region.

Materials and methods

Spiders were collected at night in June-August 2018 during an Operation Wallacea expedition in north-western Madagascar (Fig.1). All material is preserved in 70% ethanol. The left pedipalp of the male holotype was dissected

Accepted by R. Raven: 22 Feb. 2022; published: 14 Mar. 2022

and illustrated. The illustrated female paratype epigyne was first dissected using a custom-made fine hooked needle to excise the epigynal plate, digested in warm lactic acid solution for 3-5 minutes before being observed in methyl salicylate. The cleared epigyne was temporarily prepared on a slide and examined with a compound microscope. Examinations were carried out with an AmScope ZM-4T stereomicroscope or an Olympus BX61. Images were taken using either a Leica M125C automontage system or an Olympus BX61 with a DP74 camera. All images were z-stacked with between 10–30 images merged into a single photomontage using Helicon Focus 6.7 (www.helicon-soft.com). Images were adjusted in Adobe Photoshop version 21.0.1 for contrast and white balance. Plates were also composed in Adobe Photoshop.

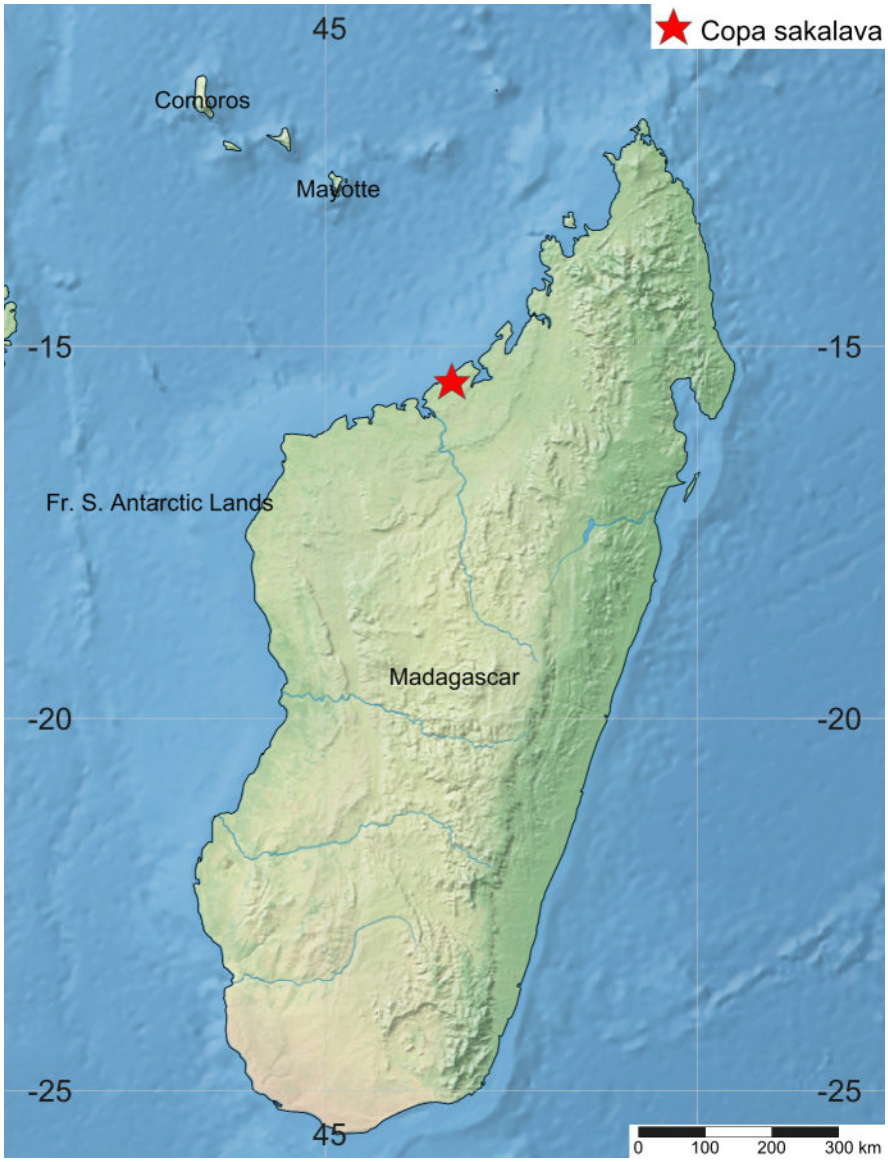


FIGURE 1. Type locality of *Copa sakalava* **sp. nov.**

Abbreviations: AER = anterior eye row, AL = abdomen length, AME = anterior median eyes, ALE = anterior lateral eyes, AW = abdomen width, CD = copulatory ducts, CH = carapace height, CL = carapace length, CO = copulatory openings, CW = carapace width, PME = posterior median eyes, PLE = posterior lateral eyes, PER = posterior eye row, SL = sternum length, ST I & ST II = spermathecae I (posterior) and II (anterior), SW = sternum width, TL = total length.

Collection abbreviation: **RMCA**—Royal Museum for Central Africa, Tervuren, Belgium (R. Jocqué).

Nomenclatural acts. This published work and the nomenclatural acts it contains have been registered in Zoobank: urn:lsid:zoobank.org:act:81D387D6-DC60-481A-A22A-0C47100F7985. The LSID for this publication is: urn:lsid:zoobank.org:pub:C57D9FEC-26EB-4AD9-9004-426ADAF29F87.

Results

Taxonomy

Family Corinnidae Karsch, 1880

Subfamily Castianeirinae Reiskind, 1969

Genus *Copa* Simon, 1885

Type species: *Copa flavoplumosa* Simon, 1885, by monotypy.

Diagnosis. Recognised from other cryptic lycosiform Castianeirinae by the presence of fine proximal and distal dorsal setae on the anterior patellae and proximal and distal spines on the posterior patellae that are clearly shorter than the particular leg segment. Additionally, the AME are *ca.* 1.25-1.50 times ALE diameter and the carapace is typically 3.30-3.75 times broader than PER (Haddad, 2013).

Copa sakalava Pett, sp. nov.

http://zoobank.org/81d387d6-dc60-481a-a22a-0c47100f7985
Figs 2–10

Material Examined. Holotype ♂. MADAGASCAR: -15.504529, 46.708601, Mariarano, 19 June 2018, forest, 21:07h, Brogan L. Pett leg (RMCA_ARA_ 247355).

Paratypes: 2 ♀, MADAGASCAR: -15.478513, 46.683486, Mariarano, 17 June 2018, forest patch near river-bank, 20:00h, Brogan L. Pett leg (RMCA_ARA_247356).

Etymology. The species epithet honours the Sakalava ethnic group of Madagascar from the region of the type locality. It is a noun in apposition.

Diagnosis. *Copa sakalava* **sp. nov.** is readily distinguished from all other *Copa* by: broad embolus with 1.5 turns, with the final half turn directed prolaterally, extending around 1/3rd to ½ of the length back across the basal embolus coil (rather than long, thin, and extending to apex of cymbium in *C. flavoplumosa,* or relatively straight and medium width, extending to cymbial apex in *C. kei* Haddad, 2013). Additionally, *Copa sakalava* **sp. nov.** has a sharp but stubby paracymbial spine retrolaterally. Females are distinguished primarily by the lateral chamber of the CD that joins the median path of CD mid-way between the CO and connection between ST and CD, in ventral view the large semi-circular epigynal hood is also unique in the genus.

Taxonomic notes. *Copa sakalava* **sp. nov.** is the only species in the genus currently known to have a mostly uniform orangish brown habitus and, at present, it may be utilised as a diagnostic character. However, with a revision with more than 40 new species from Madagascar pending, we consider the apparent uniqueness of this character may quickly lose value.

Description

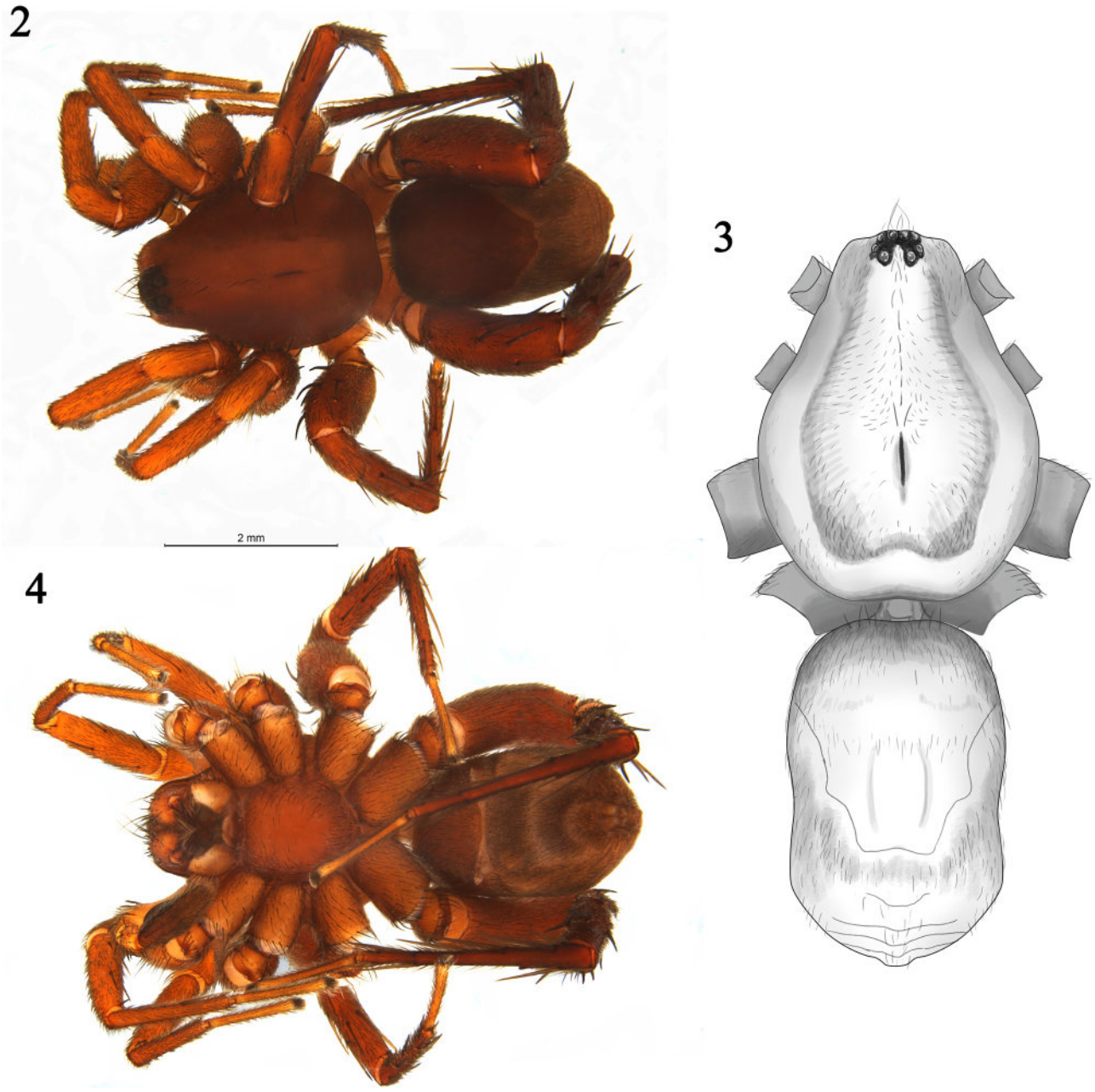
Male (holotype: RMCA_ARA_ 247355)

Measurements. TL 5.30, CL 2.68, CW 2.07, CH 1.12, SL 1.34, SW 1.12, AL 2.62, AW 1.72, chelicera length 0.77, chelicera width 0.43. Legs. I: 1.76, 0.71, 1.42, 1.36, 1.16. II: 1.69, 0.48, 1.20, 1.38, 1.10. III: 1.80, 0.79, 1.24, 1.67, 0.98. IV: 2.50, 1.02, 1.90, 2.58, 1.17. Eyes: AME—0.10, ALE—0.08, PME—0.09, PLE—0.08.

Colouration: Carapace orange to brownish-orange (Figs. 2, 4), slightly darker at margins and lighter around fovea. Ocular region black. Broad, indistinct line of feathery black setae from PER to posterior slope of carapace. Black erect setae in line extending straight from just posterior of PME to just anterior to fovea. Sternum bright yellowish-orange (Fig. 3), coxae all paler. Dorsal sclerite deep reddish-orange, otherwise abdomen dorsally beige to greyish, venter beige to cream, epigastric region orangish. Legs I & II generally yellowish-brown, legs III & IV generally brownish-orange and clearly darker than first two pairs. Mt III & IV deep orangish-red.

Carapace: Broad, width about 4/5th length. Highest point at fovea, sloping abruptly posterior to fovea.

Sternum: Broad, shield-shaped, anterior ridge straight. Widest between coxae II and III.



FIGURES 2–4. *Copa sakalava* **sp. nov.** Male holotype habitus. 2 dorsal, 3 line drawing of dorsal habitus detail, 4 ventral.

Eyes: AER procurved with AMEs largest, close to touching ALE. PER strongly procurved, with PME slightly larger larger than PLE. Strong, short, ocular setae in horizontal rows of six between PLE and PME.

Legs: Dorsal, prolateral and retrolateral spines absent from tibiae I, II. All femora with sparse erect ventral setae, patellae with and fine, long setae dorsally. Femur IV distinctly broader than others. Ti, Mt and Ta with dorsal, prolateral and retrolateral trichobothria.

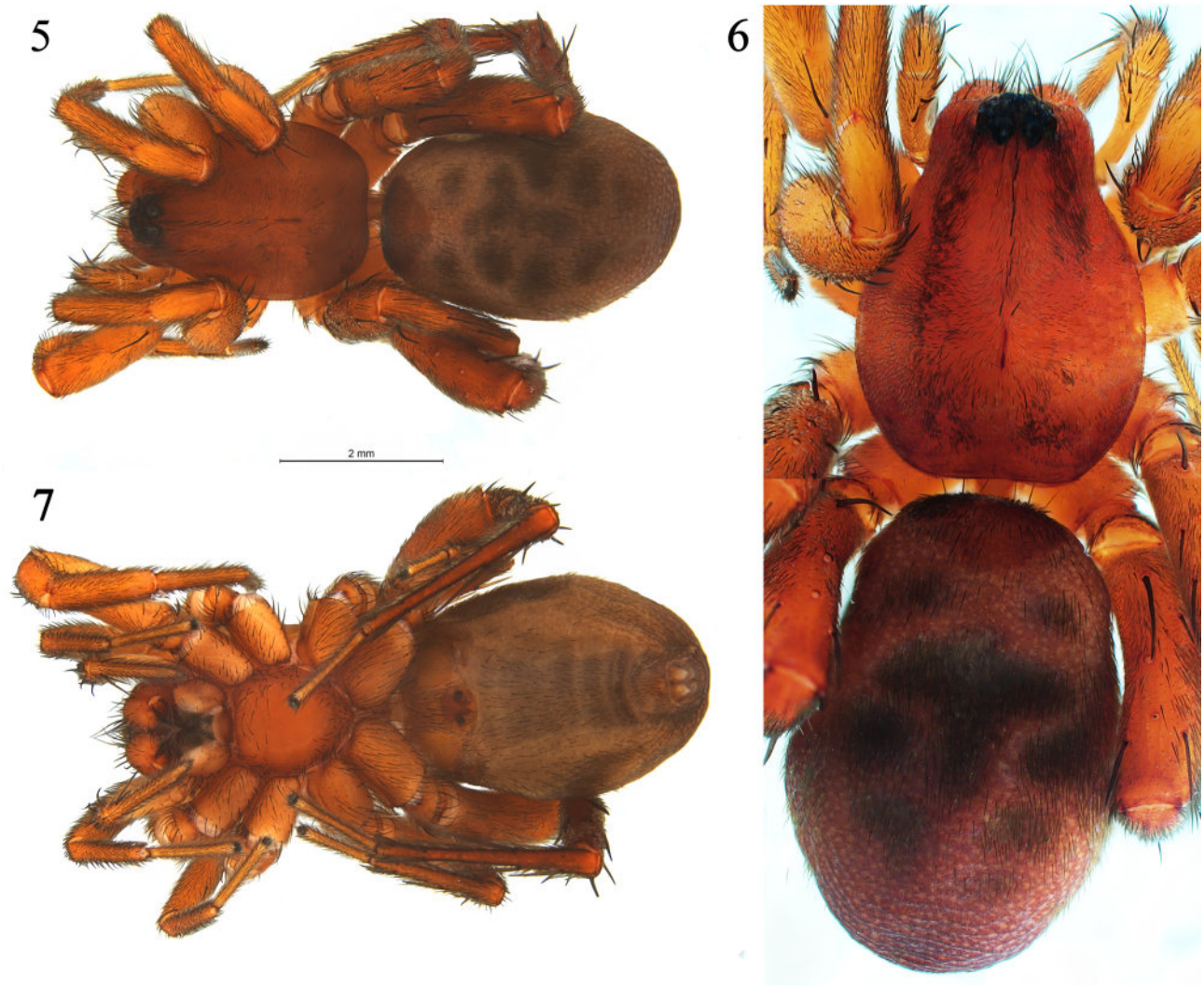
Chelicerae: Covered with relatively long, erect setae on anterior face. Two teeth on retromargin, well-spaced, about equal-sized, distal tooth slightly larger.

Abdomen: Six strong straight setae on anterior margin of dorsal sclerite. Dorsal sclerite around half length of abdomen and posterior margin bifid. Dorsum covered by short straight black setae and feathery black setae, denser at lateral margins. Venter with sparser black setae. Inframamillary sclerite small, circular, with dense short setae. Epigastric region with moderate sclerotisation and straight black setae medially, absent laterally.

Palp: (Figs. 8, 9) Cymbium orange to brown. One large prolateral spine on tibia, one on prolateral edge of cymbium. Retrolateral paracymbial spine sharp but stubby. Tegulum pear-shaped with sperm duct deep purple to black.

Embolus with relatively broad basal ridge around 2/3 width of cymbium, distally to ridge-embolic turn broader, around ¾ width of cymbium, turning 1½ times with embolus tip directed prolaterally and extending between 1/3 and ½ length of distal coil. Several thicker short setae at apex of cymbium.

Leg spination: I: F = pl1 do3 rl1, P = d1, Ti = plv2 rlv2 (one additional much smaller spine plv), Mt = plv2 rlv2 . II: F = pl1 do3 rl1, P = d1, Ti = plv2 rlv2 (one additional much smaller spine plv), Mt = plv2 rlv2. III: F = pl2 do3 rl2, P = do1, Ti = pl2 d1 rl3 plv3 rlv3, Mt = pl1 do4 rl1 plv2 rlv2. IV: F = pl2 d3 rl2, P = d1, Ti = pl2 d1 rl3 plv2 rlv2, Mt = pl2 d4 rl2 plv2 rlv2.



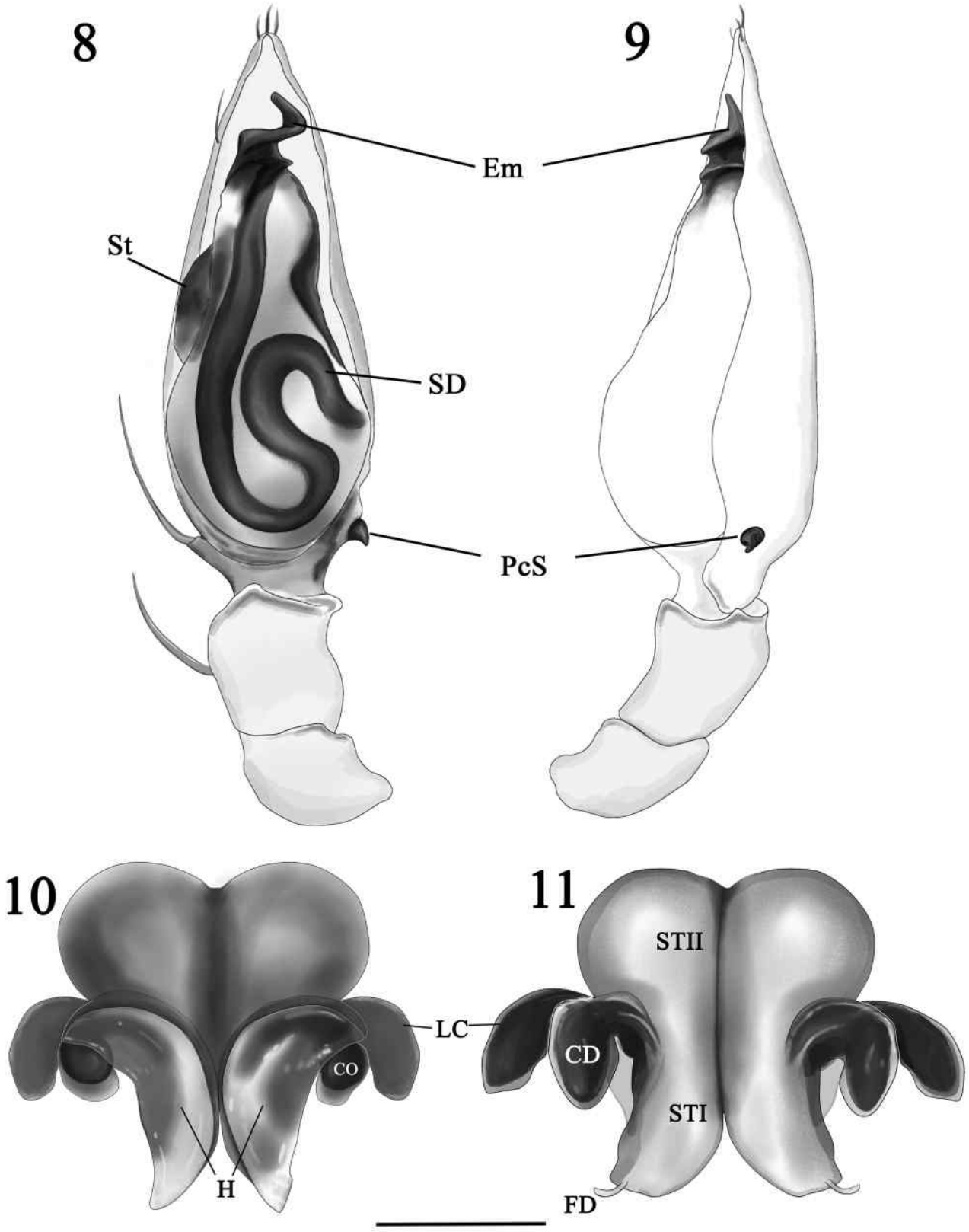
FIGURES 5–7. *Copa sakalava* **sp. nov.** Female paratype habitus. 5 dorsal, 6 detail of dorsal habitus, 7 ventral.

Female (paratype)

Measurements. TL 6.36, CL 2.82, CW 2.12, CH 1.12, SL 1.42, SW 1.24, AL 3.54, AW 2.68, chelicera length 1.00, chelicera width 0.52. Legs. I: 1.82, 0.78, 1.48, 1.28, 1.00. II: 1.78, 0.70, 1.36, 1.30, 0.86. III: 1.73, 0.70, 1.22, 1.60, 0.88. IV: 2.04, 0.80, 1.44, 2.38, 1.10. Eyes: AME—0.10, ALE—0.08, PME—0.10, PLE 0.08. AME—ALE 0.02, PLE—PME—0.05, AME-PME—0.14, ALE-PLE—0.04.

Shape, colouration, details of eyes, legs and chelicerae all as in male, except: dorsal sclerite very small, covering only around 1/8th of dorsum, light brownish orange.

Epigyne: (Figs. 10, 11). Roughly square due to lateral chamber of CD, large semi-circular external ridges with lightly translucent hood around midpoint of epigyne, hood margin anteriorly at lateral margin of ST and touching at their mid-point for 1/3 their length posteriorly; CO just posterior to anterior apex of hood, CD highly distinctive, directed dorsally and slightly obliquely toward both ventral portion of CD and lateral chamber of CD (in anterior view) situated between CO and distinctive looped connection of CD to posterior end of ST II.



FIGURES 8–11. *Copa sakalava* **sp. nov.** genitalia illustrations. 8-9 male pedipalp, 10-11 female epigyne. 8, 10 ventral, 9 retrolateral, 11 dorsal. CO = copulatory openings, CD = copulatory duct, Em = embolus, FD = fertilisation duct, H = epigynal hood, LC = Lateral chamber of copulatory duct, PcS = paracymbial spine, SD = sperm duct, St = subtegulum, ST I & ST II = spermathecae I and II. Scale bar for 10 & 11 = 0.25mm.

Leg spination: I: Ti = plv2 rlv2 (one additional much smaller spine at plv apex), Mt = plv2 rlv2. II: F = pl1 do3 rl1, P = d1, Ti = plv1 rlv2 (one additional much smaller spine at plv apex), Mt = plv2 rlv2. III: F = pl2 do3 rl2, P = d1, Ti = pl2 d1 rl2 plv3 rlv2, Mt = pl3 d4 rl1 plv2 rlv2 (4 distal spines around apex of segment). IV: F = pl2 do3 rl2, P = d1, Ti = pl2 d1 rl3 plv3 rlv2, Mt = pl2 d4 rl2 plv2 rlv2.

Acknowledgements

We would like to thank the people living around Mariarano for their collaboration and guidance on the numerous excursions in this region. Many thanks also to DBCAM for supporting the expedition of Operation Wallacea, and also to the enthusiastic volunteers who assisted with sample collection in the field. Amanda Morgan Riley (www.amandarileyart.com) made the exceptional illustrations. Joseph Faulks is thanked for allowing BLP to access the bioimaging facilities at the University of Exeter's Penryn campus. Zoë Simmons is especially thanked for hosting BLP on a research visit and for use of the automontage system at Oxford University Museum of Natural History, sponsored by the A. McRae bequest. Thanks to Robert Douglas (also OUMNH) for assistance during the visit. BLP thanks Dr Merlijn Jocque of the RBINS and BINCO (Belgium) for supporting the spider workgroup of BINCO (SpiDivERse). Dr Mark Alderweireldt (Ghent University, Belgium) is thanked for some comments on an early draft. Thanks to Danni Sherwood (Natural History Museum, London) for assistance and discussion on Latin nomenclature. Sincere thanks to handling editor Dr Robert J. Raven (Queensland Museum, Australia) for useful comments that improved the manuscript.

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