

***Smeringopus cylindrogaster* (Simon, 1907)**

Simon, E. 1907. Arachnides recueillis par L. Fea sur la côte occidentale d'Afrique. Ann. Mus. Civ. Genova 43: 218-323.

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50. ***C. cylindrogaster***, sp. nov. — ♀ long. 6 mm. — Cephalothorax laevis, pallide luteo-rufescens. Oculi laterales sat magni, medii inter se spatio oculo non multo latiore distantes. Oculi antici in lineam leviter recurvam, medii nigri lateralibus paulo minores et a lateralibus spatio oculo minore distantes. Oculi quatuor medii aream trapeziformem, paulo latiore postice quam longiore, occupantes. Abdomen longum, cylindraceum, postice laud prominulum, pallide fulvo-testaceum, utrinque albo-guttulatum, subtus regione epigastri utrinque fusco-marginata, regione ventrali punctis nigris binis obliquis submediis, postice lineola transversa tenui et ante mamillas vitta longitudinali latiore, sed postice attenuata, pallide fuscis, notatum. Chelae fulvae, antice ad basin minute fusco-notatae. Sternum latius quam longius, pallide luteum utrinque maculis trinis, postice macula longitudinali olivaceis, notatum. Pedes longissimi, pallide lutei, patellis apiceque tibiis fulvo-rufulis, femoribus, tibiis metatarsisque punctis nigerrimis, alteris rotundis alteris longis et obliquis, in femoribus densioribus, conspersis. Pedes-maxillares albido-lutei, femore subtus in medio, patella tibiaque extus ad apicem, minute nigro-punctatis, tarso parvo, tibia multo minore, infuscato, apice setis spiniformibus nigris armato.

Guinée portugaise: Rio Cassine.

NOTA. Cette espèce, qui représente le genre *Crossopriza* sur la côte occidentale d'Afrique, diffère surtout de ses congénères de l'Inde (*C. Lyoni* Blackw.), d'Egypte (*C. semicaudata* Cambr.) et d'Arabie (*C. pristina* E. S.) par son abdomen étroit et cylindrique, ressemblant à celui d'un *Smeringopus*.

Huber, B. A. 2009. Life on leaves: leaf-dwelling pholcids of Guinea, with emphasis on *Crossopriza cylindrogaster*, a spider with inverted resting position, pseudo-eyes, lampshade web, and tetrahedral egg-sac (Araneae: Pholcidae). J. Nat. Hist. 43: 2491-2523.

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Crossopriza cylindrogaster Simon, 1907

(Figures 1–6, 15–23, 45–62, 148)

Crossopriza cylindrogaster Simon 1907, p. 252.

Type

Female holotype from “Guinée portugaise: Rio Cassine” [Guinea Bissau: Rio Cacine, ~11°05'N, 15°05'W]; ~1904 (L. Fea), no further data; apparently lost (could not be found in MNHN).

Note

Apart from the cylindrical abdomen, Simon's (1907) description is largely restricted to the colour pattern which agrees well with that of the specimens described below. Nevertheless, material from the type locality should be checked to support the assignment of the new material to Simon's species.

Diagnosis

Easily distinguished from known congeners by the cylindrical abdomen (Figures 15–19), the coloration (very pale greenish when alive, with distinctive pattern of black spots ventrally on abdomen, Figures 1, 3, 19), the male chelicerae (two pairs of apophyses, Figure 47), and the male palp (procursus, bulb, Figures 45, 46). The female genitalia are simple and barely sclerotized, but also distinctive (pair of pockets, internal structures, Figures 19, 48, 49, 58).

Male (Ziama)

Total body length 4.3, carapace width 1.2. Leg 1: 43.7 (11.2 + 0.5 + 10.6 + 20.1 + 1.3), tibia 2: 6.7, tibia 3: 4.5, tibia 4: 6.8, tibia 1 L/d: 92. Habitus as in Figures 15–17; carapace pale ochre-yellow with some black lateral marks, clypeus with some small black specks below triads, chelicerae without dark marks, sternum with black marks at bases of coxae 2–4, slightly darkened medially, legs pale whitish-grey, with many small black marks distributed irregularly, patellae and tibia–metatarsus joints brown, abdomen pale ochre-grey, dorsally with large white spots in two bands, ventrally with distinctive pattern of black marks. Distance PME–PME 120 µm, diameter PME 145 µm, distance PME–ALE 65 µm, distance AME–AME 20 µm, diameter AME 120 µm. Each lateral eye accompanied by small “pseudo-eye” (Figures 22, 56; see later). Ocular area slightly elevated, thoracic furrow deep, restricted to central area of carapace (Figure 50), clypeus unmodified. Chelicerae as in Figure 47, two pairs of frontal



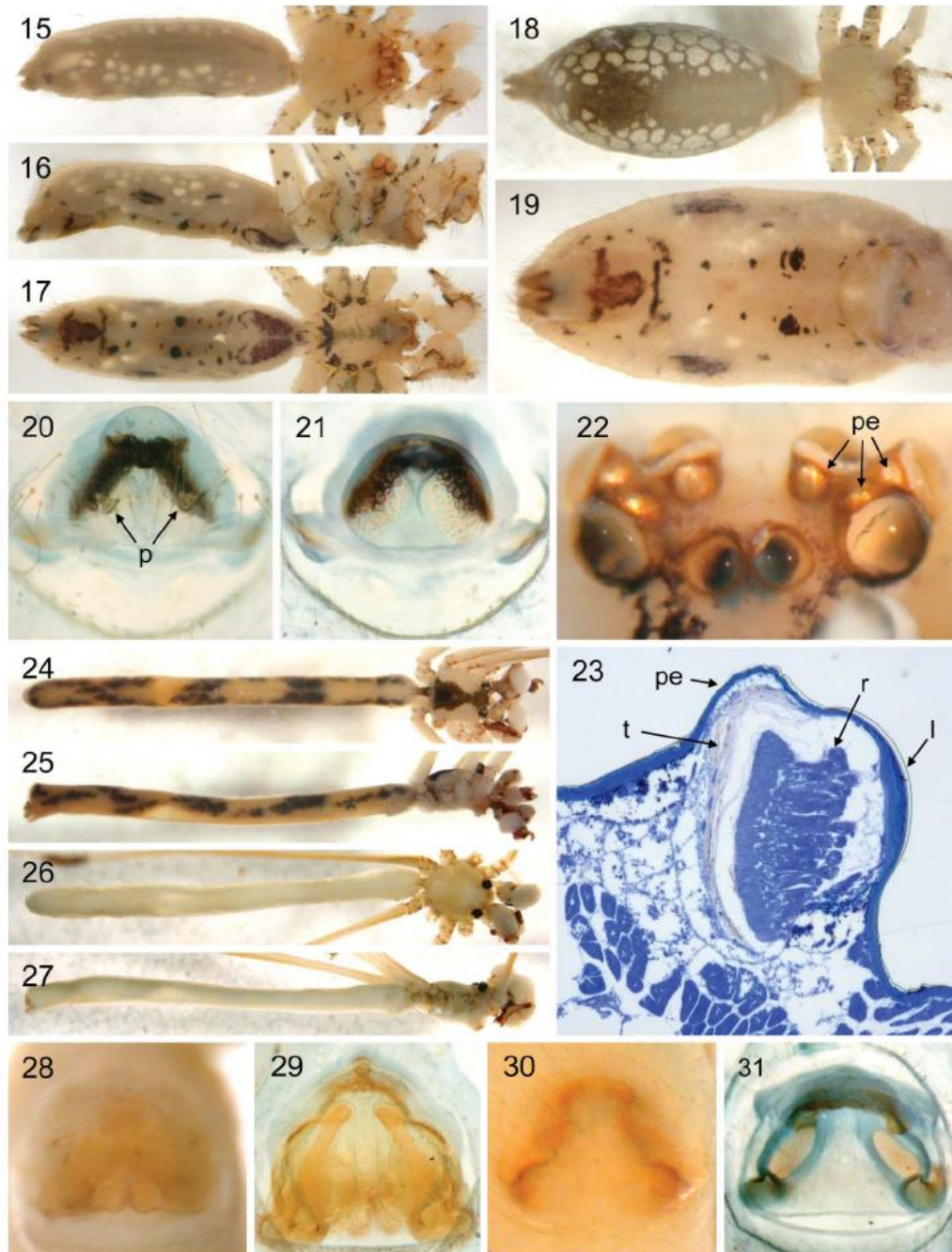
Figures 1–6. *Crossopriza cylindrogaster*. (1) Male, in typical resting position, with the back against the leaf; (2) juvenile with “spotted” web; (3) female with tetrahedral egg-sac; (4) female with newly hatched spiderlings; (5) lampshade web; (6) male and female, sharing one leaf.

apophyses, distal apophyses with one modified hair each; without stridulatory ridges. Sternum wider than long (0.95/0.65), unmodified. Palps as in Figures 45 and 46, coxa with retrolateral apophysis, trochanter unmodified, femur with retrolateral hump and ventral bulge distally, tibia almost globular, cymbium with several macrosetae, tarsal organ capsulate (Figure 52), procursus rather simple, only distally with some distinctive membranous and sclerotized elements (Figures 53, 54), bulb with short membranous embolus and basally attached to it a distinctive bulbal apophysis (Figure 53). Legs without spines and curved hairs, few vertical hairs; retrolateral trichobothrium on tibia 1 at 2%; prolateral trichobothrium present on all tibiae; tarsal pseudosegments very indistinct, only distally very few visible in dissecting

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microscope; tarsus 4 with two rows of comb-hairs prolatero-ventrally (Figures 61, 62). Anterior lateral spinneret (ALS) with one widened, one pointed, and five cylindrically shaped spigots (Figure 59); posterior median spinneret (PMS) with two small spigots. Gonopore with two epiandrous spigots (Figure 51).

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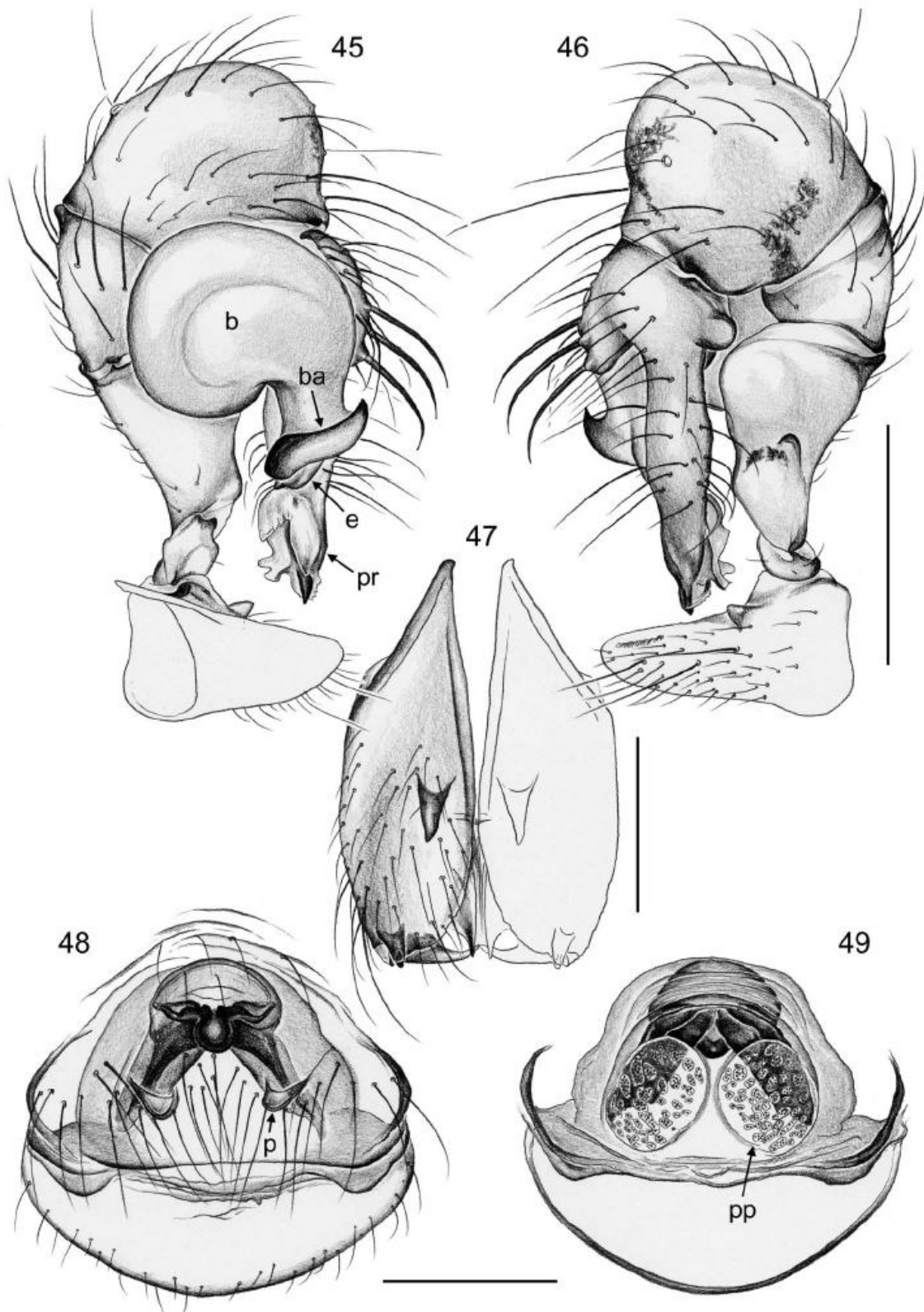
Figures 15–31. *Crossopriza* and *Leptopholcus*. (15–23) *C. cylindrogaster*; (15–17) male, dorsal, lateral, and ventral views; (18) female, dorsal view; (19) female abdomen, ventral view; (20, 21) cleared epigynum, ventral and dorsal views; (22) female eyes and “pseudo-eyes”, frontal view; (23) semithin section of ALE with associated “pseudo-eye”; (24–27) males in dorsal and lateral views of *L. guineensis* (24, 25) and *L. tipula* (26, 27); (28–31) epigyna in ventral and cleared dorsal views of *L. guineensis* (28, 29) and *L. tipula* (30, 31). Notes: l, cuticular lens; p, epigynal pocket; pe, “pseudo-eye”; r, retina; t, tapetum.

Variation

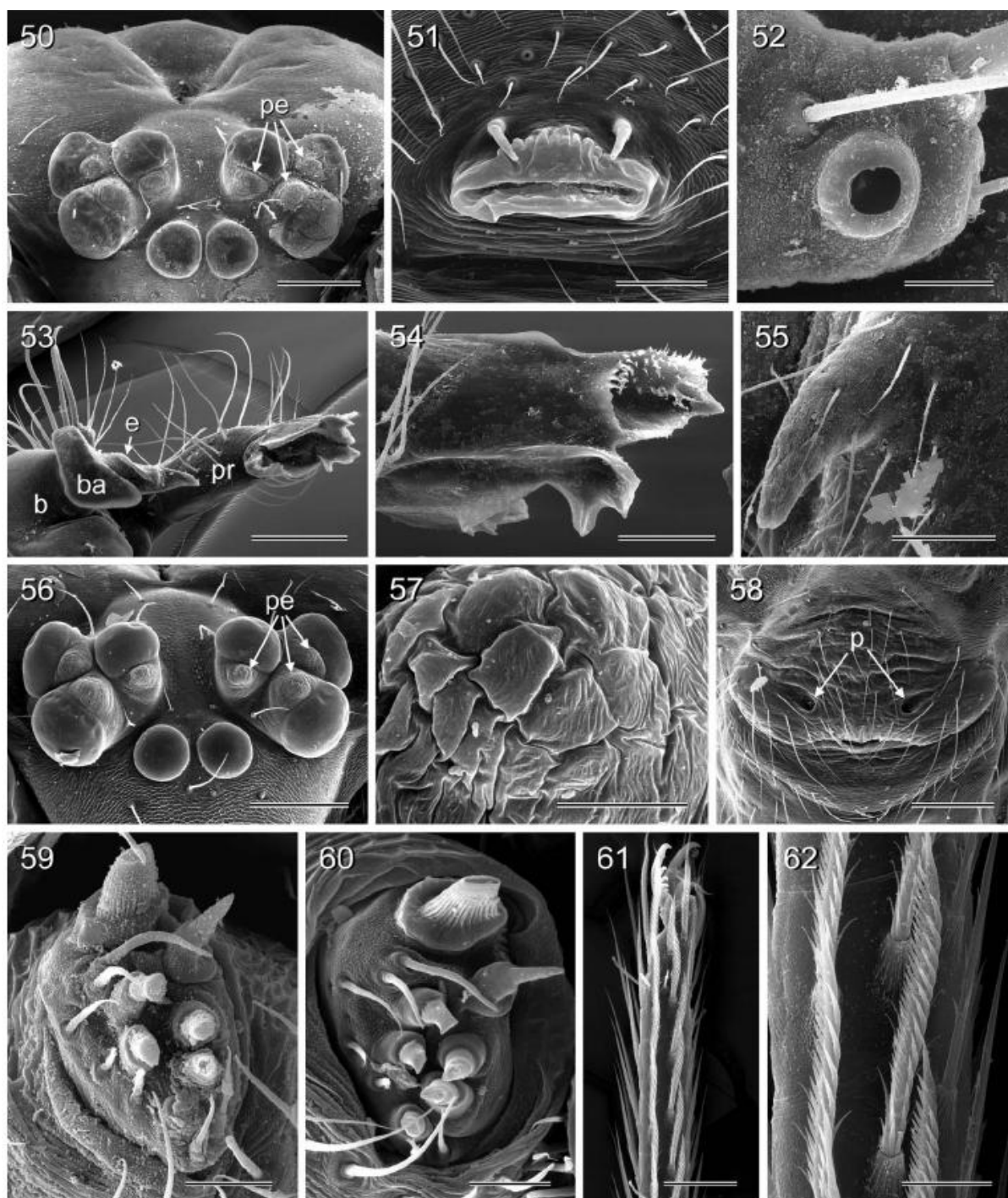
Tibia 1 in six other males: 10.0–11.0 (mean 10.5). The extent of black pigment varies, may include large parts of chelicerae, clypeus and sternum, and larger parts of palps, but never dorsal side of abdomen.

Female

In general similar to male, same colour pattern but usually with less black pigment; distance PME–PME almost as in males (110 μ m); tibia 1 in 20 females: 7.2–8.7 (mean 7.9). Epigynum weakly elevated, barely sclerotized (Figure 19), with pair of pockets (Figures 20, 48, 58); internal genitalia as in Figures 21 and 49. Spinnerets and spigots as in male (Figure 60).



Figures 45–49. *Crossopriza cylindrogaster*. (45, 46) Left palp, prolateral and retrolateral views; (47) male chelicerae, frontal view; (48, 49) cleared female genitalia, ventral and dorsal views. Notes: b, bulb; ba, bulbal apophysis; e, embolus; p, epigynal pocket; pp, pore plate; pr, procurus. Scale lines: 0.3 mm (47–49), 0.5 mm (45, 46).



Figures 50–62. *Crossopriza cylindrogaster*. (50) Male carapace and eyes, frontal view; (51) male gonopore with epiandrous spigots; (52) right male palpal tarsal organ; (53) left bulb and procursus, prolatero-distal view; (54) right procursus tip, retrolateral view; (55) left proximal cheliceral apophysis, lateral view; (56) female eyes and “pseudo-eyes”; (57) wrinkled cuticle of “pseudo-eye”; (58) epigynum; (59) male ALS; (60) female ALS; (61) male left tarsus 4 tip, prolatero-ventral view; (62) comb-hairs, enlarged from Figure 61. Notes: b, bulb; ba, bulbal apophysis; e, embolus; p, epigynal pocket; pe, “pseudo-eyes”; pr, procursus. Scale lines: 20 μm (52, 57, 59, 60, 62), 60 μm (51, 54, 55, 61), 200 μm (50, 53, 56, 58).

Pseudo-eyes

In both sexes and in juveniles, each of the six lateral eyes is accompanied by a distinct elevation that has a characteristic golden shine (Figures 22, 56). Serial sections show that the tapetum extends into this elevation, lying close to the cuticle (Figure 23), which explains the strong reflectance of light. In contrast to the cuticle of the lenses which is smooth, the cuticle of the pseudo-eyes is strongly sculptured (Figure 57). Obviously, each “pseudo-eye” is just an elaboration of a lateral eye, and light enters this part only through the lens of the lateral eye. The function of these structures remains a mystery. Such pseudo-eyes seem to be widespread among the genera close to *Crossopriza* (*Holocnemus*, *Cenemus*, *Hoplopholcus*, *Stygopholcus*, *Smeringopus*, *Smeringopina*), but in most species they are very indistinct (B.A. Huber, unpublished data).

Natural history

The resting position of *C. cylindrogaster* is extremely unusual: the dorsal side of the abdomen is pressed against the leaf, the prosoma is at a right angle to the abdomen and directed away from the leaf, the legs are in a more or less usual position (femora towards dorsal) except that they are all tightly pressed against the leaf and thus approximately in one plane (Figure 1). A comparable position has not to my knowledge been described in any other pholcid, but the Brazilian leaf-dwelling *Mesabolivar luteus* seems to have much the same resting position (see http://www.uni-bonn.de/~bhuber1/pholcidae_photos.html). In *C. cylindrogaster*, the unusual position probably explains why most of the spider's body but not the dorsal side of the abdomen is covered with small black marks. When disturbed, the spiders barely react. Only when the web is strongly moved or the spider itself touched does it assume a “normal” position (hanging upside down) and slowly walk away. I could never see the shaking or whirling so typical of many other long-legged pholcids.

The web resembles that of hypochilids, the “lampshade weavers” (Figure 5). It could actually be seen as a variant of the typical pholcid domed sheet where the apex of the dome is broadly connected with the underside of the leaf. The diameter of the web is unusually small, apparently reflecting the fact that the spider's legs are to touch the wall of the lampshade. Figure 5 shows a web where the silk lines were made visible by white powder, and where the lighting conditions were adjusted for this purpose. Usually, the web is barely visible with the naked eye, as shown in Figures 1 and 6. A few webs were seen to contain large numbers of silk puffs (Figure 2). Such “ornaments” have been described previously in an unidentified *Crossopriza* species from Morocco (Hajer and Řeháková 2003), and in two species of the closely related genus *Holocnemus* (Wiehle 1933; Sedey and Jakob 1998; Hajer and Řeháková 2003). They also seem to occur in *Hoplopholcus*, another probably closely related genus (unpublished photo of *H. minous*(?) by John and Frances Murphy).

As in other pholcids (Eberhard and Briceño 1983), males were often found to rest close to females (Figure 6). However, while in other pholcids male and female share the same web, *C. cylindrogaster* males build their own web close to the female web. Sharing a single web is apparently precluded by the small size of the web. Another common pholcid trait that is uniquely modified in *C. cylindrogaster* concerns the egg-sacs. As in all pholcids, females carry the egg-sac in their chelicerae until the spiderlings hatch and even a short while after that (Figures 3, 4). Only two females with egg-sacs were collected, and in both the shape of the egg-sac was a tetrahedron (triangular pyramid) with an edge length of four eggs. Unfortunately, both egg-sacs fell apart in the collecting jar,

making exact egg counts impossible. However, the tetrahedral shape seems to predict a relatively constant number of 20 eggs [$T_n = n(n+1)(n+2)/6$]. For the spider, this egg-sac shape may result from a simple sphere packing problem (i.e. the problem to find an arrangement in which the spheres fill as large a proportion of the space as possible). The proportion of space filled by the spheres is called the density of the arrangement, and a face-centred cubic packing as in a tetrahedron fills a maximum of ~74% of space (Hales 2000). However, face-centred cubic packing need not necessarily result in a tetrahedron, so the biological reason for the tetrahedron remains largely unclear.

Distribution

Apparently widely distributed in West African rainforests (Figure 148).

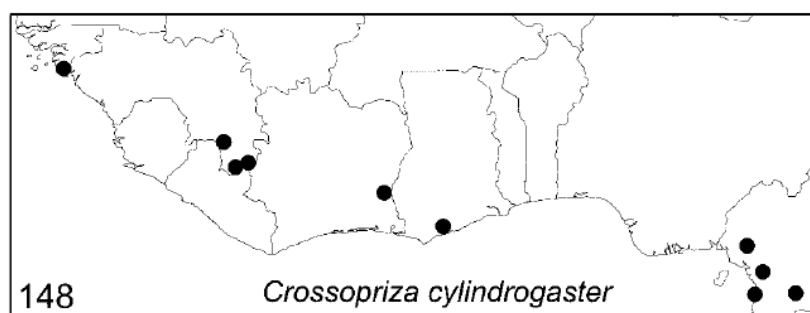
Material examined

GUINEA: *Guinée Forestière*: Forêt Classée de Diéké (7°32.0'N, 8°49.9'W), 430 m above sea level (a.s.l.), 1.xii.2008 (B.A. Huber), 2♂ 6♀ in ZFMK; same data, 1♂ 1♀ 3 juv. in pure ethanol, in ZFMK; Forêt Classée de Ziamba (8°24.2'N, 9°19.3'W), 640 m a.s.l., 2.xii.2008 (B.A. Huber), 4♂ 6♀ in ZFMK; same data, 3♀ 1 juv. in pure ethanol, in ZFMK; Mount Nimba (~7°41.5'N, 8°24.5'W), ~600 m a.s.l., forest, 29.xi.2008 (B.A. Huber), 3♀ in ZFMK; same data, 2♀ 3 juv. in pure ethanol, in ZFMK.

CÔTE D'IVOIRE: Apouesso, FC Bossematié (6°35'N, 3°28'W), rain forest, station 1, glue trap, 12.-13.xi.1995 (R. Jocqué), 2♂ in MRAC (202553).

GHANA: Kakum forest (5°20'N, 1°23'W), secondary forest, 15.xi.2005 (R. Jocqué, D. de Bakker, L. Baert), "fog 4", 3♂ in MRAC (217697); same data but primary forest, 21.xi.2005, "fog 9", 5♀ in MRAC (217733); 18.xi.2005, "fog 7", 1♀ in MRAC (217728); 23.xi.2005, "fog 11", 1♀ in MRAC (217684); 25.xi.2005, "fog 13", 3♀ in MRAC (217717).

CAMEROON: *South Region*: near Kribi (2°54.0'N, 9°54.4'E), 20 m a.s.l., 9.iv.2009 (B.A. Huber), 4♂ 4♀ in ZFMK; same data, 5♀ 4 juvs. in pure ethanol, in ZFMK. Between Kribi and Campo, "site 1" (2°42.2'N, 9°51.8'E), 10 m a.s.l., 10.iv.2009 (B.A. Huber), 1♀ in pure ethanol, in ZFMK. Near Ebolowa (2°54.9'N, 11°08.3'E), 620 m a.s.l., 11.-12.iv.2009 (B.A. Huber), 2♀ in ZFMK; same data, 2♀ 2 juvs. in pure ethanol, in ZFMK. North of Mengong (3°03.0'N, 11°25.0'E), 690 m a.s.l., 13.iv.2009 (B.A. and J.C. Huber), 1♀ in pure ethanol, in ZFMK. *Littoral Region*: near Loum, forest with banana plants (4°43.6'N, 9°42.5'E), 400 m a.s.l., 24.iv.2009 (B.A. and J.C. Huber), 4♂ 4♀ in ZFMK; same data, 2♀ 2 juvs. in pure ethanol, in ZFMK. Near Edéa, Koukoué (3°41.2'N, 10°06.4'E), 50 m a.s.l., 8.iv.2009 (B.A. Huber), 1♀ in pure ethanol, in ZFMK.



Huber, B. A. 2012. Revision and cladistic analysis of the Afrotropical endemic genus *Smeringopus* Simon, 1890 (Araneae: Pholcidae). *Zootaxa* 3461: 1-138.

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13. *S. cylindrogaster* (Guinea, Dieke).

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Smeringopus cylindrogaster (Simon, 1907) new combination

Fig. 13

Crossopriza cylindrogaster Simon 1907: 252. Huber 2009: 2494–2502, figs. 1–6, 15–23, 45–62, 148.

Distribution: Widely distributed in western and central Africa (Fig. 545).

New records. LIBERIA: Grand Bassa Co. [$\sim 6^{\circ}15'N$, $9^{\circ}55'W$], ii.1896 (Beulak), 1♂ in USNM.

GABON: *Ogooué-Ivindo*: Monts de Belinga, NE Makokou ($0^{\circ}47.0'N$, $13^{\circ}08.3'E$), 530 m a.s.l., degraded forest along road, 15.viii.2011 (B.A. & S.R. Huber) 2♂3♀ in ZFMK (Ar 8504); same data, 1♀ in pure ethanol, in ZFMK (Gab 223). Monts de Belinga, forest near Mayebout ($1^{\circ}06.7'N$, $13^{\circ}06.6'E$), 500 m a.s.l., 13.–14.viii.2011 (B.A. & S.R. Huber), 1♀ 2 juvs in pure ethanol, in ZFMK (Gab 198). Ivindo N.P. near Simintang ($0^{\circ}32.2'N$, $12^{\circ}41.3'E$), 545 m a.s.l., forest, 16.viii.2011 (B.A. & S.R. Huber), 2♀ in ZFMK (Ar 8505). *Ngounié*: near Mouladoufouala ($1^{\circ}38.1'S$, $10^{\circ}42.5'E$), 110 m a.s.l., forest along road, 27.viii.2011 (B.A. & S.R. Huber) 1♂ in ZFMK (Ar 8506).

CONGO D.R.: *Mongala Prov.*: Mbangi ($2^{\circ}07'N$, $21^{\circ}44'E$), old secondary forest, 23./25.vi.2009 (D. de Bakker), 3♀ 3 juvs. (3 vials) in MRAC.

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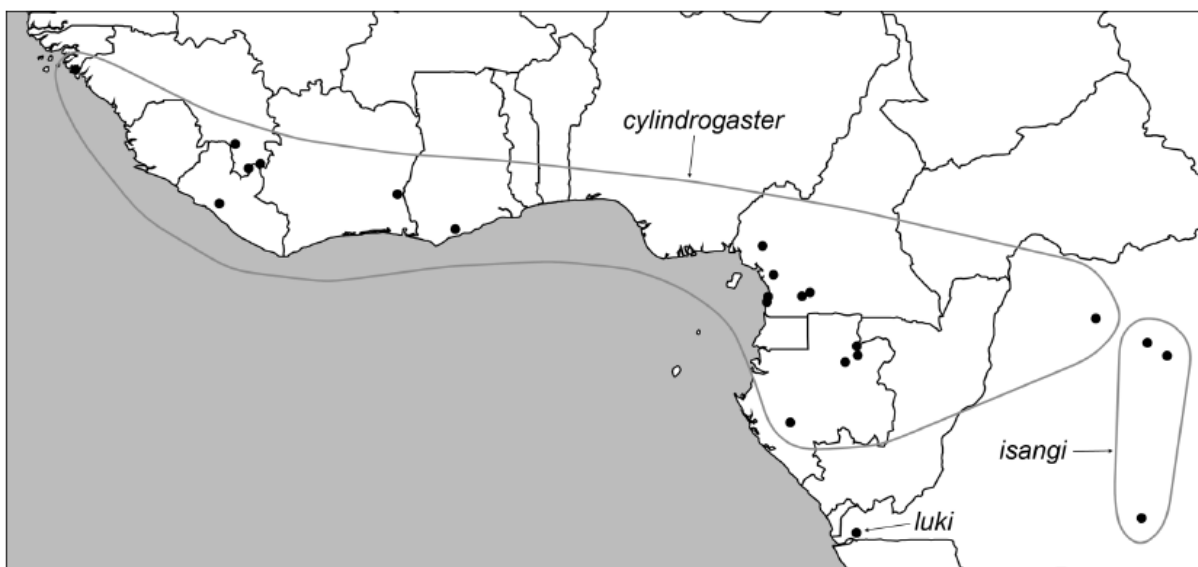


FIGURE 545. Known distribution of the *cylindrogaster* group.