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West African pholcid spiders: an overview, with descriptions of five new species (Araneae, Pholcidae)

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Abstract. This paper summarizes current knowledge about West African pholcids. West Africa is here defined as the area south of 17°N and west of 5°E, including mainly the Upper Guinean subregion of the Guineo-Congolian center of endemism. This includes all of Senegal, The Gambia, Guinea Bissau, Guinea, Sierra Leone, Liberia, Ivory Coast, Ghana, Togo and Benin. An annotated list of the 14 genera and 38 species recorded from this area is given, together with distribution maps and an identification key to genera. Five species are newly described: *Anansus atewa* sp. nov., *Artema bunkpurugu* sp. nov., *Leptopholcus kintampo* sp. nov., *Spermophora akwamu* sp. nov., and *S. ziama* sp. nov. The female of *Quamtana kitahurira* is newly described. Additional new records are given for 16 previously described species, including 33 new country records. Distribution patterns of West African pholcids are discussed, as well as possible explanations for relatively low West African pholcid species diversity as compared to Central and East Africa.

Keywords. Pholcidae, West Africa, taxonomy, identification key, diversity.

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Introduction

In a recent overview on African rain forest ecology and conservation (Weber *et al.* 2001), one of the major "strikingly similar principles" emerging from studies of "lesser known taxa" was the lack of basic information such as species lists, species distributions, and basic ecology. These "lesser known taxa" were not invertebrates though, but birds, fishes, amphibians, and reptiles (in contrast to mammals and plants). Invertebrates are barely mentioned in this otherwise superb book, probably because our knowledge of most groups is not even close to sufficient to track basic questions of rain forest ecology and conservation. While the lack of data is beyond question and may sometimes even appear hopelessly overwhelming, it is also worth to focus on the progress that has been made. The present paper adopts the latter position, concentrating on pholcid spiders and showing that many of the patterns found in plants and vertebrates are replicated in this particular taxon.

While Pholcidae admittedly make up just a small fraction of the megadiverse spiders (about 3% of described species; Platnick 2013), our knowledge about this family has increased substantially over the last decade. Advances include alpha taxonomy (species numbers for African taxa have more than tripled since 2002, from 88 to now 287; Huber 2013, herein), but also phylogenetic data (summary in Huber 2011a), distribution patterns (e.g., Huber 2011b, 2012, 2013) and basic ecology (e.g., Huber 2009, 2013; Huber *et al.* 2013). Pholcidae are most diverse in well-preserved tropical forests, but they also occur in relatively arid regions (e.g., Huber 2001; Huber & Brescovit 2003); they range from sea level to about 4000 m (Huber 2000, 2012); they include both widespread species with substantial dispersal capabilities (even though ballooning does not seem to occur in Pholcidae) and many small-scale endemics (Huber 2011b, 2013); and numerous taxa within the family include ecologically very different representatives (which is reflected in a wide range of body shapes and colors; cf. Figs 1-22), suggesting multiple independent evolutionary shifts among microhabitats (Dimitrov *et al.* 2013).

Considering the preference of Pholcidae for tropical forests, a high diversity in African rainforests was expected. Within the Guineo-Congolian center of endemism, West African forests were predicted to be less diverse than Central African forests, both for historical and current reasons (only about 12% of the original tropical moist forests remain in West Africa, as opposed to 59% in Central Africa; Naughton-Treves & Weber 2001). West Africa was also predicted to be less diverse than East Africa with its wider range of altitudes, its mosaic of different vegetation zones, and its highly diverse Eastern Arc. However, with pholcid material in existing collections it seemed impossible to even roughly estimate basic data like species numbers and distribution patterns. For this reason, a series of six expeditions was undertaken to East Africa (Kenya, Uganda), Central Africa (Cameroon, Gabon), and West Africa (Guinea, Ghana) in order to obtain comparable data across the African continent. The present paper summarizes the data on West Africa, complementing revisions of all major taxa in the area (Huber 2011b, 2012, 2013) and a previous summary on East African Pholcidae (Huber & Warui 2012). The final part of this trilogy (Central Africa) is in preparation.

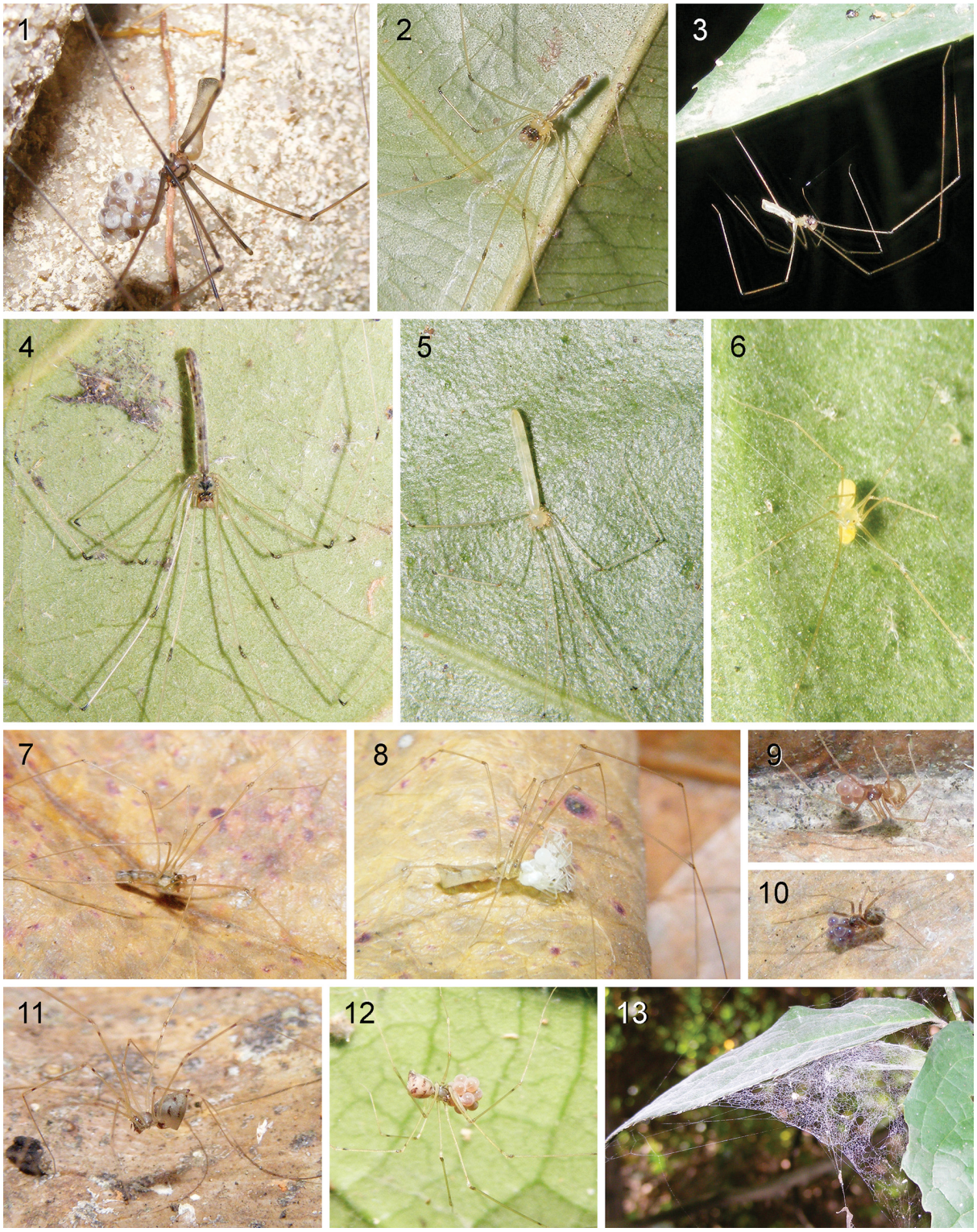
Material and methods

A large part of the material studied herein was collected during expeditions to Guinea (2008) and Ghana (2013). This material is currently deposited at Zoologisches Forschungsmuseum Alexander Koenig, Bonn (ZFMK). Further material was borrowed from the following institutions:

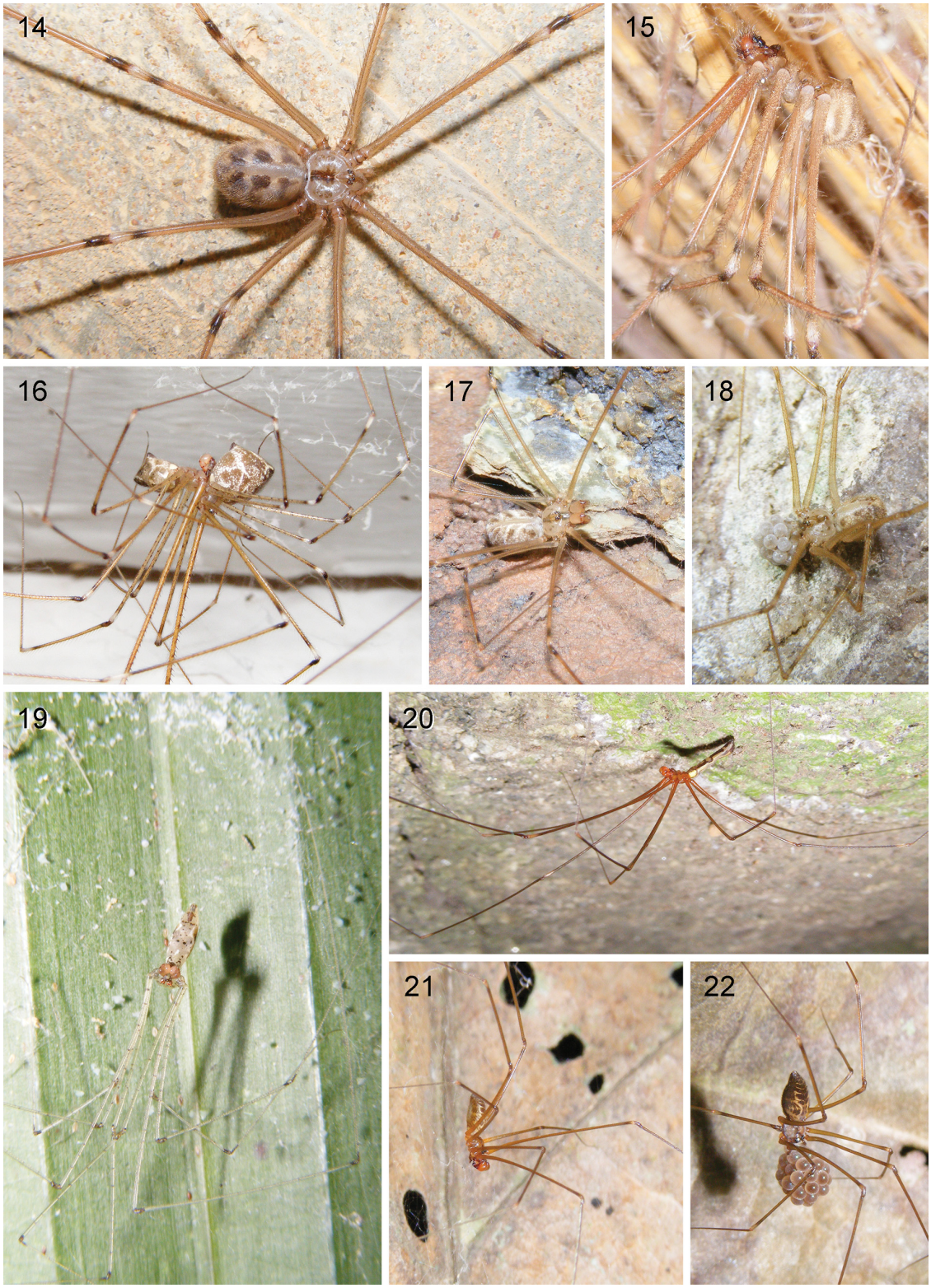
AMNH = American Museum of Natural History, New York
CAS = California Academy of Sciences, San Francisco
MCZ = Museum of Comparative Zoology, Cambridge
MNHN = Muséum national d'Histoire naturelle, Paris
MRAC = Musée royal de l'Afrique Centrale, Tervuren
SMF = Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt
USNM = National Museum of Natural History, Washington D.C.

Methods and terminology are as in recent revisions (Huber 2011b, 2012, 2013). Measurements are in mm unless otherwise noted. Eye measurements are +/- 5 µm. Epigyna were cleared in a warm NaOH solution and stained with chlorazol black. Locality coordinates are in round brackets when copied from labels and original publications or when received directly from collectors, in square brackets when originating from some other source (such as online gazetteers, Google Earth, MRAC database, etc.). The following abbreviations are used:

ALE = anterior lateral eyes
ALS = anterior lateral spinnerets
AME = anterior median eyes
a.s.l. = above sea level
L/d = length/diameter
PME = posterior median eyes.



Figs 1-13. 1. *Pholcus doucki* Huber, 2011 from Doucki, Guinea. **2-3**. *Pholcus kakum* Huber, 2009 from Forêt Classée de Ziama, Guinea (2) and Kakum N.P., Ghana (3). **4**. *Leptopholcus kintampo* sp. nov. from Kintampo, Ghana. **5**. *Leptopholcus tipula* (Simon, 1907) from Kakum N.P., Ghana. **6**. *Nyikoa limbe* Huber, 2007 from Kakum N.P., Ghana. **7-8**. *Pehrforsskalia conopyga* Deeleman-Reinhold & van Harten, 2001 from Atewa, Ghana. **9-10**. *Anansus atewa* sp. nov. from Atewa, Ghana. **11-13**. *Spermophora akwamu* sp. nov. from Kakum N.P., Ghana (13: web). Photos BAH.



Figs 14-22. 14-15. *Artema bunkpurugu* sp. nov. from near Bunkpurugu (14) and from Bunkpurugu (15), Ghana. **16**. *Crossopriza lyoni* (Blackwall, 1867) from Conakry, Guinea. **17-18**. *Physocyclus globosus* (Taczanowski, 1874) from near Mpraeso, Ghana. **19**. *Smeringopus cylindrogaster* (Simon, 1907) from Ankasa N.P., Ghana. **20**. *Smeringopina pulchra* (Millot, 1941) from Kakum N.P., Ghana. **21-22**. *Smeringopina bomfobiri* Huber, 2013 from Atewa, Ghana. Photos BAH.

The geographic area considered here (south of 17°N, west of 5°E; Fig. 23) is somewhat arbitrary, especially regarding the eastern limit of "West Africa", i.e. its border to "Central Africa". In contrast to the major textbook on African spiders (Dippenaar-Schoeman & Jocqué 1997), West Africa as defined here is largely congruent with the usage in *African Rain Forest Ecology & Conservation* (Weber *et al.* 2001; e.g., p. 31, 119, 430). Biologically it encompasses mainly the Upper Guinean subregion of the Guineo-Congolian center of endemism (White 2001). The eastern limit of this subregion is not clear since the main current gap (Dahomey Gap; ~0-3°E) is not always congruent with distribution limits of taxa, which in many cases are further east (Cross River Basin of eastern Nigeria, ~8°E) (Dowsett-Lemaire & Dowsett 2001; Lawson & Klemens 2001; Maley 2001). For the present overview, however, the exact eastern limit (western vs. eastern Nigeria) is fairly irrelevant since the pholcid fauna of Nigeria remains largely unknown.

Results

Class Arachnida Cuvier, 1812
Order Araneae Clerck, 1757
Family Pholcidae C.L. Koch, 1851

Annotated list of West African genera and species

Pholcidae described from West Africa as defined herein, with countries, references, and new records.

Anansus Huber, 2007

Anansus is widely distributed in tropical Africa (Huber 2007; Huber & Warui 2012) with at least three species endemic to West Africa (Fig. 23).

1. ***Anansus aowin*** Huber, 2007. Ivory Coast (Huber 2007).

2. ***Anansus atewa*** sp. nov. (see page 21). Ghana.

3. ***Anansus ewe*** Huber, 2007. Ghana (Huber 2007); newly recorded for Guinea and Ivory Coast (Ivory Coast records tentative, no males available).

New records

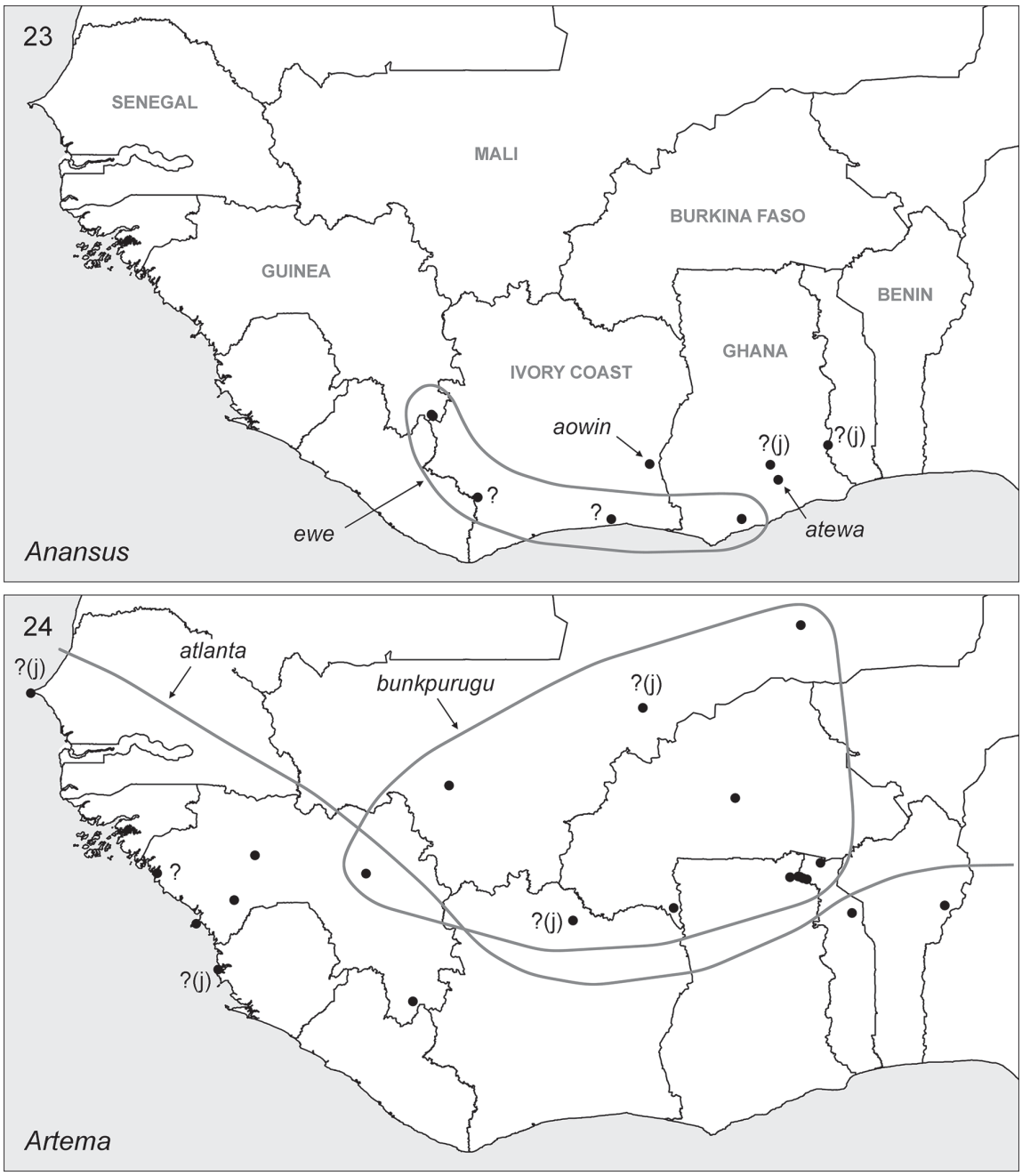
GHANA: Central Region: 20 ♂♂ 14 ♀♀ 3 juvs (3 vials) in ZFMK (Ar 10450-52), Kakum National Park (5°20.9'N, 1°23.0'W), 160 m a.s.l., forest near entrance, day collecting, 19-20 Feb. 2013 (B.A. Huber); 2 ♀ in pure ethanol, in ZFMK (Gha 150), same data.

GUINEA: 4 ♂♂ 5 ♀♀ in pure ethanol in MRAC (236926), Mt. Nimba, Zougué valley, near Gbakoré mine camp [7°42'N, 8°24'W], young secondary gallery forest, canopy fogging, 780 m a.s.l., 5 Oct. 2011 (D. Van den Spiegel, A. Henrard); 2 ♀♀ in pure ethanol in MRAC (236932), Mt. Nimba, near Gouan camp or "Station de Pompage Zié" [7°40'N, 8°22'W], sieving of litter under "matete" (high grass), open area near road, 1250 m a.s.l., 11 Oct. 2011 (D. Van den Spiegel, A. Henrard).

IVORY COAST: 1 ♀ (assigned tentatively) in MRAC (230172), Forêt de Taï, station du Centre de Recherche Ecologique (CRE) [5°50'N, 7°21'W], sieving litter, 29 Feb. 2010 (R. Jocqué, D. Van den Spiegel); 1 ♀ (assigned tentatively) in MRAC (230397), Adiopo Doumé, Centre Suisse de Recherche Scientifique (CSRS) [5°20'N, 4°20'W], winkler extraction, 15 Feb. 2010 (R. Jocqué, D. Van den Spiegel).

Artema Walckenaer, 1837

The natural distribution of *Artema* ranges from the Sudanian region of West Africa (Fig. 24) to Central Asia. Millot (1941) was the first to record the genus from West Africa, and he noted that most of his material of "*A. mauriciana* Walckenaer, 1837" (=*A. atlanta* Walckenaer, 1837) did not agree well with previous illustrations of this pantropical species. After comparing numerous West African specimens with *A. atlanta* from all over the World, we agree on these substantial morphological differences and formally describe the West African species below.



Figs 23-24. Known distributions of the genera *Anansus* Huber, 2007 and *Artema* Walckenaer, 1837 in West Africa. Question marks denote uncertain identifications (*Anansus ewe*: two localities with females only) or impossible identifications ["?(j)": juveniles only].

4. ***Artema atlanta*** Walckenaer, 1837. Guinea (Millot 1941: only the variant male from Kouroussa); newly recorded for Togo and Benin.

New records

GUINEA: 1 ♂ in pure ethanol, in ZFMK (Gui 82), Conakry, in building (9°31'N, 13°43'W), ~30 m a.s.l., 18 Nov. 2008 (B.A. Huber). Guinée Forestière: 1 ♀ in ZFMK (Ar 10453), Nzérékoré (~7°45.3'N, 8°49.2'W), 480 m a.s.l., in building, 28 Nov. 2008 (B.A. Huber). Moyenne-Guinée: 1 ♂ in pure ethanol, in ZFMK (Gui 111), Pita, at building (11°03.6'N, 12°23.7'W), 1010 m a.s.l., 25 Nov. 2008 (B.A. Huber). Kankan: 1 ♂ in MNHN, Kouroussa [10°39'N, 9°53'W], Aug. 1937 (J. Millot) [this is probably Millot's (1941) variant male of his "*Artema mauriciana*"].
TOGO: 2 ♂♂ 5 ♀♀ + juvs in MRAC (136023), Niamtougou [9°46'N, 1°07'E], 21./24. Jul. 1969 (F. Puylaert).
BENIN: 3 ♂♂ 4 ♀♀ in MRAC (215041), Nikki [9°56'N, 3°13'E], Jul. 2003 (Djaouga).

Note

Millot's (1941) specimens from Kindia, Guinea (2 juvs; ♀ missing), Ferkessedougou, Ivory Coast (1 juv.), and Gao, Mali (2 juvs) are in MNHN but juveniles of *A. atlanta* and *A. bunkpurugu* sp. nov. are indistinguishable so their identity is unclear. The same is true for juvenile specimens from Dakar, Senegal in AMNH, from Freetown, Sierra Leone in SMF, and from Bandiagara (70 km E Mopti), Mali in CAS.

5. ***Artema bunkpurugu*** sp. nov. (see page 24). Ghana, Burkina Faso, Mali, Guinea, Togo.

Crossopriza Simon, 1893

Apart from the pantropical synanthropic *C. lyoni* (Blackwall, 1867), only *C. soudanensis* Millot, 1941 is known to occur in West Africa (Fig. 25).

6. ***Crossopriza lyoni*** (Blackwall, 1867). Mali, Nigeria (Huber *et al.* 1999); newly recorded for Senegal, The Gambia, Guinea, Sierra Leone, Ivory Coast, Ghana, Burkina Faso, Benin, and Niger.

New records

SENEGAL: Kaolack Prov.: 1 ♀ 1 juv. in ZFMK (Ar 5207), Sonkoron, Kaymor Region [~13°47'N, 15°33'W], Jul. 1993 (M. Sarr.).
THE GAMBIA: 3 ♀♀ in ZFMK (Ar 5404), Banjul (13°27.6'N, 16°34.7'W), on wall, 20 Oct. 2008 (Yu.M. Marusik); 1 ♂ 2 ♀♀ in MRAC (205485), Serekunda [13°26'N, 16°41'W], in grass, 20 Aug. 1996 (G. Beyens).
GUINEA: 1 ♂ 2 ♀♀ in pure ethanol in ZFMK (Gui 103), Conakry, in building (9°34.1'N, 13°39.7'W), 40 m a.s.l., 18 Nov. 2008 (B.A. Huber). Guinée Forestière: 1 ♂ in ZFMK (Ar 10454), Nzérékoré (~7°45.3'N, 8°49.2'W), 480 m a.s.l., in building, 28 Nov. 2008 (B.A. Huber); 3 ♂♂ 4 ♀♀ in ZFMK (Ar 10455), Kissidougou, in building (9°11.2'N, 10°05.6'W), 540 m a.s.l., 26 Nov. 2008 (B.A. Huber); 2 ♀♀ 3 juvs in pure ethanol, in ZFMK (Gui 90), same data. Basse-Guinée: 1 ♂ 1 ♀ in ZFMK (Ar 10456), Kindia, in building (10°03'N, 12°51'W), 400 m a.s.l., 20 Nov. 2008 (B.A. Huber).
SIERRA LEONE: 1 ♀ in MRAC (174657), Makeni [8°53'N, 12°03'W], "maison", 19 Jan. 1993 (F. Rensonnet).
IVORY COAST: 2 ♀♀ 1 juv. in CAS, Bouaké [7°42'N, 5°02'W], 10 Jan. 1991 (W.J. Pulawski); 1 ♀ in SMF, Comoé National Park, Research Station Univ. of Würzburg [~9.1°N, 3.7°W], 23 Sep. 2002 (S. Otto); 5 ♂♂ 11 ♀♀ 9 juvs in CAS, Korhogo [9°28'N, 5°38'W], 12 Jan. 1991 (W.J. Pulawski).
MALI: 1 ♂ in CAS, 10 km E Sévaré (14°30'N, 4°00'W), 15 Jul.-1 Sep. 1977 (W.H. Settle); 1 ♀ in MRAC (136760), Kogoni, 60 km N Niono [~14°50'N, 6°00'W], Dec. 1969 (G. Pierrard); 2 ♂♂ 8 ♀♀

in MRAC (136761, 138808), M'Pesoba [Mpessoba, 12°40'N, 5°43'W], Sep.-Oct. 1969 and Sep. 1970 (G. Pierrard).
GHANA: Northern Region: 1 ♀ in ZFMK (Ar 10457), Bunkpurugu (10°31.1'N, 0°05.5'E), 230 m a.s.l., in buildings, 7 Mar. 2013 (B.A. Huber); 1 ♂ 1 ♀ in pure ethanol, in ZFMK (Gha 127), same data; 5 ♀♀ in ZFMK (Ar 10458), Bunkpurugu (10°31.3'N, 0°05.8'E), 250 m a.s.l., in building, 6 Mar. 2013 (B.A. Huber); 2 ♂♂ 2 ♀♀ in ZFMK (Ar 10459), near Bunkpurugu (10°32.0'N, 0°02.2'E), 210 m a.s.l., under concrete bridge, 8 Mar. 2013 (B.A. Huber); 1 ♀ 1 juv. in pure ethanol, in ZFMK (Gha 142), same data; 1 ♂ 3 ♀♀ in ZFMK (Ar 10460), near Bimbaga (10°34.5'N, 0°03.8'W), 330 m a.s.l., under concrete bridge, 8 Mar. 2013 (B.A. Huber); 1 ♀ 2 juvs in ZFMK (Ar 10461), near Gambaga (10°31.9'N, 0°25.3'W), 350 m a.s.l., under concrete bridge, 8 Mar. 2013 (B.A. Huber); 1 ♂ in ZFMK (Ar 10462), near Gambaga (10°29.3'N, 0°28.9'W), 300 m a.s.l., under concrete bridge, 8 Mar. 2013 (B.A. Huber); 1 ♀ in ZFMK (Ar 10463), Tamale (9°24.4'N, 0°50.4'W), 195 m a.s.l., in building, 5 Mar. 2013 (B.A. Huber). Greater Accra Region: 1 ♀ in ZFMK (Ar 10464), Accra (5°34.4'N, 0°13.1'W), 15 m a.s.l., in building, 1 Mar. 2013 (B.A. Huber). Ashanti Region: 1 ♂ 1 ♀ in ZFMK (Ar 10465), Kumasi (6°43.4'N, 1°38.1'W), 310 m a.s.l., in building, 4 Mar. 2013 (B.A. Huber). Brong-Ahafo Region: 1 ♀ in ZFMK (Ar 10466), Techiman (7°34.5'N, 1°57.5'W), 420 m a.s.l., in building, 4 Mar. 2013 (B.A. Huber). Eastern Region: 2 ♀♀ in ZFMK (Ar 10467), Suhum (6°02.4'N, 0°27.1'W), 215 m a.s.l., in building, 10 Mar. 2013 (B.A. Huber).
BURKINA FASO: ~11 ♂♂ 18 ♀♀ (3 vials) in MRAC (128066, 068-069), Ouagadougou [12°22'N, 1°31'W], Apr.-May 1965 (B. Roman); 1 ♂ in MCZ (34049), same locality, "bathroom wall", 16 Jul. 1977 (Brinckerhoff).
BENIN: 4 ♂♂ 7 ♀♀ in MRAC (215041 part), Nikki [9°56'N, 13°12'E], Jul. 2003 (Djaouga); 1 ♂ 5 ♀♀ in MRAC (212766 part), Adjohoun [6°42'N, 2°30'E], in house, 23 Dec. 2002 (S. Tchibozo).
NIGER: 4 ♂♂ 6 ♀♀ (2 vials) in MCZ (34036-37), "Aoulajouara", 20 km S Niamey [~13°21'N, 2°08'E], on wall of cement house, 17-23 Jul. 1971 (R. Dube); ~3 ♂♂ 15 ♀♀ (3 vials) in MRAC (137727, 733, 734), Niamey [13°30'N, 2°07'E], Sep.-Oct. 1970 (E. van Impe).
NIGERIA: Osun: 1 ♀ in MRAC (174602 part), Ile-Ife, Obafemi Awolowo Univ. campus [7°28'N, 4°34'E], 1991 (H. Segers).

7. *Crossopriza soudanensis* Millot, 1941. Mali, Burkina Faso (Millot 1941).

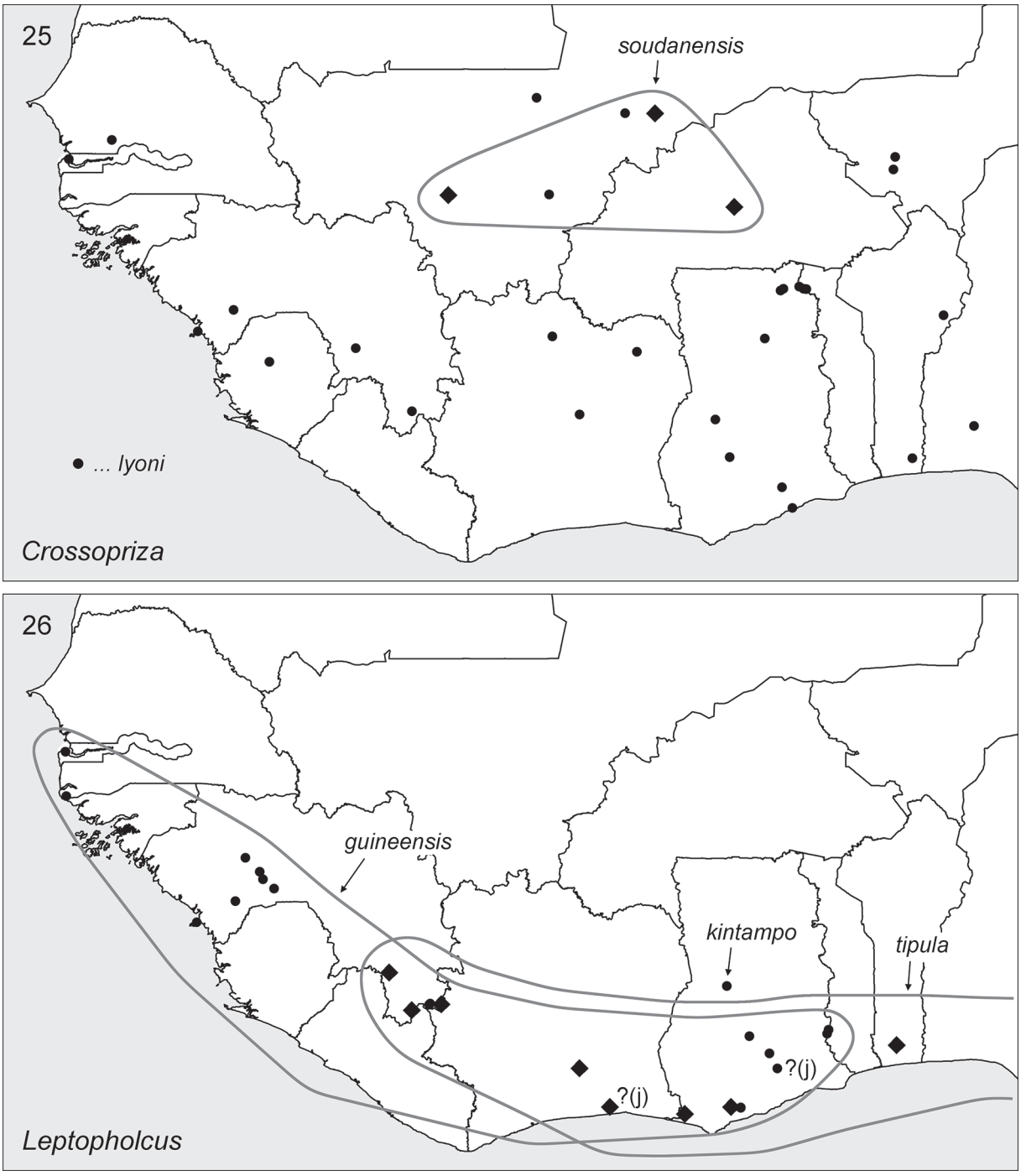
Leptopholcus Simon, 1893

Of the ten species of *Leptopholcus* currently known from mainland Africa (Huber 2011b; herein), two are endemic to West Africa (*L. guineensis* Millot, 1941; *L. kintampo* sp. nov.); the third [*L. tipula* (Simon, 1907)] occurs throughout the entire Guineo-Congolian rainforest (Huber 2011b) (Fig. 26).

8. *Leptopholcus guineensis* Millot, 1941. Senegal, The Gambia, Guinea (Millot 1941; Huber 2009); newly recorded for Ghana.

New records
GUINEA: 7 ♂♂ 5 ♀♀ in pure ethanol, in MRAC (236931), Mt. Nimba, Forêt de Zié, near Gouan camp or "Station de Pompage Zié" [7°40'N, 8°26'W], 1250 m a.s.l., 3 Oct. 2011 (D. van den Spiegel, A. Henrard); 1 ♀ in pure ethanol, in MRAC (236927 part), Mt Nimba, Zougué valley, near Gbakoré mine camp [7°42'N, 8°24'W], young secondary gallery forest, canopy fogging, 780 m a.s.l., 5 Oct. 2011 (D. Van den Spiegel, A. Henrard).
GHANA: Ashanti Region: 4 ♂♂ 1 juv. in ZFMK (Ar 10468), Bomfobiri Wildlife Sanctuary (6°57.3'N, 1°11.1'W), 160 m a.s.l., forest near river, 3 Mar. 2013 (B.A. Huber); 1 ♀ 3 juvs in pure ethanol, in ZFMK (Gha 131), same data. Eastern Region: 1 ♂ 1 juv. in ZFMK (Ar 10469), near Mpraeso (6°34.1'N, 0°43.9'W), 370 m a.s.l., degraded forest near road, 10 Mar. 2013 (B.A. Huber); 2 juvs in pure ethanol, in

ZFMK (Gha 152), same data. Volta Region: 2 ♂♂ 4 ♀♀ 7 juvs in ZFMK (Ar 10470), Agumatsa Wildlife Sanctuary, Wli waterfall (7°06.2'N, 0°36.0'E), ~300 m a.s.l., forest near waterfall, 27 Feb. 2013 (B.A. Huber); 5 juvs in pure ethanol, in ZFMK (Gha 164), same data; 1 ♂ 1 ♀ 1 juv. in ZFMK (Ar 10471), Tagbo waterfall (7°00.7'N, 0°34.4'E), ~500 m a.s.l., forest near waterfall, 28 Feb. 2013 (B.A. Huber). Central Region: 1 ♀ in MRAC (217306), Kakum Forest, primary forest, 11 Nov. 2005 (R. Jocqué, D. de Bakker, L. Baert).



Figs 25-26. Known distributions of the genera *Crossopriza* Simon, 1893 and *Leptopholcus* Simon, 1893 in West Africa. Question marks denote uncertain identifications ["?(j)": juveniles only].

9. *Leptopholcus kintampo* sp. nov. (see page 28). Ghana.

10. *Leptopholcus tipula* (Simon, 1907). Guinea, Ghana, Benin (Huber 2009, 2011b); newly recorded for Ivory Coast.

New records

IVORY COAST: 1 ♀ in MNHN, Lamto [6°13'N, 5°02'W?], 26 Aug. 1963 (collector not given); 1 juv. in MRAC (230358 part), Adiopo Doumé, Centre Suisse de Recherche Scientifique (CSRS) [5°20'N, 4°20'W], small dry forest, beating, 25 Feb. 2010 (D. van den Spiegel, R. Jocqué).

GHANA: Central Region: 1 ♀ in pure ethanol in ZFMK (Gha 143), Kakum National Park (5°20.9'N, 1°23.0'W), 160 m a.s.l., forest near entrance, day collecting, 20 Feb. 2013 (B.A. Huber). Western Region: 1 ♂ 3 ♀♀ in ZFMK (Ar 10472), Ankasa National Park (5°13.0'N, 2°39.1'W), 180 m a.s.l., forest near entrance, night collecting, 22 Feb. 2013 (B.A. Huber); 1 ♀ 3 juvs in pure ethanol, in ZFMK (Gha 156), same data.

Micropholcus Deeleman-Reinhold & Prinsen, 1987

Only the synanthropic *M. fauroti* (Simon, 1887) occurs in West Africa (Huber 2011b) (Fig. 27).

11. *Micropholcus fauroti* (Simon, 1887). Senegal, The Gambia, Sierra Leone, Guinea (Millot 1941; Huber 2011b); newly recorded for Ivory Coast and Ghana.

New records

IVORY COAST: 1 ♂ in MRAC (227392 part), Bouaké [7°41'N, 5°02'W], WARDA station, weed management experiment, upland rice, 13 Aug. 1995 (A. Russell-Smith).

GHANA: Central Region: 2 ♂♂ 2 ♀♀ in ZFMK (Ar 10473), Cape Coast (5°07.1'N, 1°17.4'W), 15 m a.s.l., in building, 19 Feb. 2013 (B.A. Huber); 1 ♀ in ZFMK (Ar 10474), Cape Coast (5°06.3'N, 1°14.8'W), 15 m a.s.l., in building, 23 Feb. 2013 (B.A. Huber). Greater Accra Region: 1 ♂ 1 ♀ in ZFMK (Ar 10475), Accra (5°34.4'N, 0°15.2'W), 45 m a.s.l., in building, 17 Feb. 2013 (B.A. Huber). Ashanti Region: 2 ♂♂ in ZFMK (Ar 10476), Kumawu (6°54.3'N, 1°15.4'W), 380 m a.s.l., in building, 3 Mar. 2013 (B.A. Huber). Eastern Region: 2 ♂♂ in ZFMK (Ar 10477), Suhum (6°02.4'N, 0°27.1'W), 215 m a.s.l., in building, 10 Mar. 2013 (B.A. Huber). Volta Region: 1 ♂ 1 ♀ in ZFMK (Ar 10478), Hohoe (7°09.3'N, 0°29.5'E), 200 m a.s.l., in building, 27 Feb. 2013 (B.A. Huber).

Modisimus Simon, 1893

The pantropical *M. culicinus* (Simon, 1893) is the only representative of this otherwise New World genus in Africa. It is probably not rare but due to its small size and cryptic lifestyle it has previously been recorded only twice from Africa (Congo DR and Kenya; Lessert 1938 – sub *Hedypsilus lawrencei* Lessert, 1938 – and Huber & Warui 2012). It is here newly recorded for West Africa (Fig. 28).

12. *Modisimus culicinus* (Simon, 1893). Newly recorded for West Africa (Sierra Leone).

New record

SIERRA LEONE: 1 ♂ in MRAC (148459 part), Freetown, Mt. Aureol [8°28.7'N, 13°13.3'W], Sep. 1976 (D. Olu-Pitt).

Nyikoa Huber, 2007

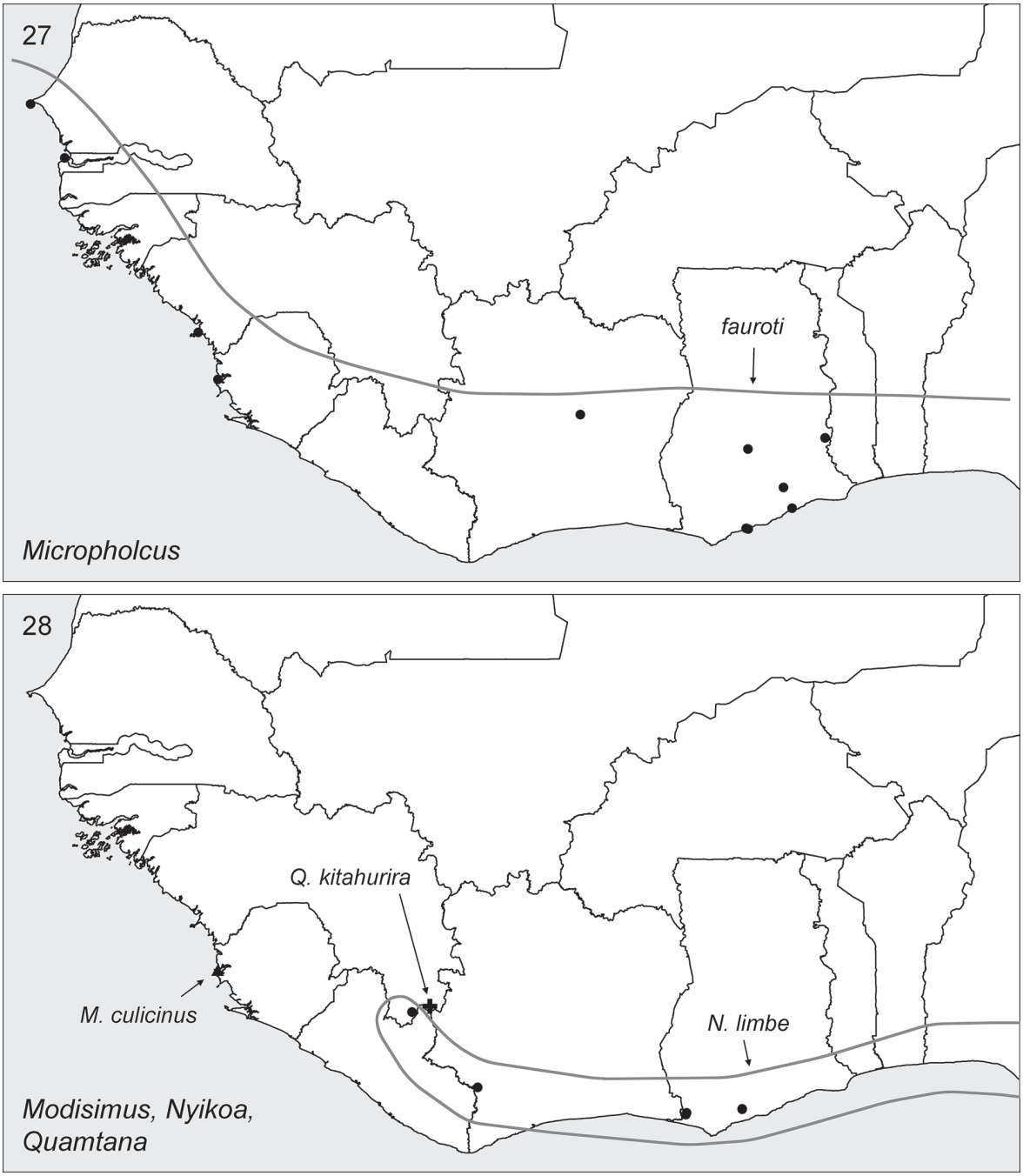
Nyikoa is a monotypic genus with the leaf-dwelling *N. limbe* Huber, 2007 covering the entire Guineo-Congolian rainforest (Huber 2007, 2009).

13. ***Nyikoa limbe*** Huber, 2007. Ghana, Guinea (Huber 2007, 2009); newly recorded for Ivory Coast.

New records

IVORY COAST: 1 ♂ in MRAC (233400), Taï Forest [5°50'N, 7°21'W], beating, 12 Oct. 2010 (D. van den Spiegel, A. Kablan).

GHANA: Western Region: 4 ♂♂ 9 ♀♀ in ZFMK (Ar 10479), Ankasa National Park (5°13.0'N, 2°39.1'W), 180 m a.s.l., forest near entrance, day collecting, 22 Feb. 2013 (B.A. Huber); 8 ♂♂ 10 ♀♀ in ZFMK (Ar 10480), same data but night collecting; 1 ♂ 1 ♀ in pure ethanol, in ZFMK (Gha 155),



Figs 27-28. Known distributions of the genera *Micropholcus* Deeleman-Reinhold & Prinsen, 1987, *Modisimus* Simon, 1893, *Nyikoa* Huber, 2007, and *Quamtana* Huber, 2003 in West Africa.

same data; 1 ♂ in ZFMK (Ar 10481), Ankasa National Park, forest along Big Tree Trail (~5°15.1'N, 2°38.4'W), ~100 m a.s.l., 23 Feb. 2013 (B.A. Huber). Central Region: 6 ♂♂ 8 ♀♀ (2 vials) in ZFMK (Ar 10482-83), Kakum National Park (5°20.9'N, 1°23.0'W), 160 m a.s.l., forest near entrance, day collecting, 19-20 Feb. 2013 (B.A. Huber); 1 ♂ 1 ♀ in ZFMK (Ar 10484), same data but night collecting; 1 ♂ 2 ♀♀ in pure ethanol, in ZFMK (Gha 146), same data.

Pehrforsskalia Deeleman-Reinhold & van Harten, 2001

Pehrforsskalia includes three described species (Huber 2011b). Only the widely distributed *P. conopyga* Deeleman-Reinhold & van Harten, 2001 occurs in West Africa (Fig. 29).

14. *Pehrforsskalia conopyga* Deeleman-Reinhold & van Harten, 2001. Guinea, Sierra Leone, Ivory Coast, Nigeria (Deeleman-Reinhold & van Harten 2001; Huber 2009); newly recorded for The Gambia and Ghana.

New records

THE GAMBIA: 2 ♀♀ in ZFMK, Banjul, Abuko Nature Reserve (13°23.5'N, 16°39.0'W), primary gallery forest, 17 Oct. 2008 (Yu.M. Marusik).

IVORY COAST: 1 ♂ 7 ♀♀ in MRAC (227392 part), Bouaké [7°41'N, 5°02'W], WARDA station, weed management experiment, upland rice, 13 Aug. 1995 (A. Russell-Smith); 5 ♂♂ 2 ♀♀ in MRAC (225855), Gagnoa [6°08'N, 5°57'W], upland rice, 10 Apr. 1995 (A. Russell-Smith); 1 ♂ 2 ♀♀ in ZFMK (Ar 5171), Bobayo near Gagnoa [6°01.6'N, 6°01.9'W], in upland rice, 26 Aug. 1992 (A. Russell-Smith); 1 ♂ 1 ♀ 2 juvs in ZFMK (Ar 5170), "Kroutla" nr. Oumé [~6°23'N, 5°25'W], 26 Aug. 1992 (A. Russell-Smith).

GHANA: Eastern Region: 1 ♂ 3 ♀♀ in ZFMK (Ar 10485), Atewa Hills, Atewa Atwirebu Reserve (6°13.8'N, 0°33.5'W), 740 m a.s.l., 25 Feb. 2013 (B.A. Huber); 2 ♀♀ 1 juv. in pure ethanol, in ZFMK (Gha 136), same data; 1 ♂ 1 ♀ in ZFMK (Ar 10486), Atewa Hills, Atewa Atwirebu Reserve (6°13.8'N, 0°32.4'W), 500 m a.s.l., degraded forest along road, 24 Feb. 2013 (B.A. Huber); 1 ♂ 7 ♀♀ in ZFMK (Ar 10487), near Mpraeso (6°34.1'N, 0°43.9'W), 370 m a.s.l., degraded forest near road, 10 Mar. 2013 (B.A. Huber). Volta Region: 3 ♂♂ 6 ♀♀ in ZFMK (Ar 10488), Agumatsa Wildlife Sanctuary, Wli waterfall (7°06.2'N, 0°36.0'E), ~300 m a.s.l., forest near waterfall, 27 Feb. 2013 (B.A. Huber); 2 ♀♀ in pure ethanol, in ZFMK (Gha 163), same data; 5 ♂♂ 4 ♀♀ in ZFMK (Ar 10489), Tagbo waterfall (7°00.7'N, 0°34.4'E), ~500 m a.s.l., forest near waterfall, 28 Feb. 2013 (B.A. Huber). Ashanti Region: 1 ♂ 4 ♀♀ in ZFMK (Ar 10490), Bomfobiri Wildlife Sanctuary (6°57.3'N, 1°11.1'W), 160 m a.s.l., forest near river, 3 Mar. 2013 (B.A. Huber); 1 ♀ 1 juv. in pure ethanol, in ZFMK (Gha 132), same data. Brong Ahafo Region: 1 ♂ 1 ♀ in ZFMK (Ar 10491), Booyem (7°39.9'N, 1°57.4'W), 450 m a.s.l., at large rocks, 4 Mar. 2013 (B.A. Huber); 1 ♂ 2 ♀♀ in ZFMK (Ar 10492), Kintampo Falls (8°05.3'N, 1°41.9'W), 280 m a.s.l., degraded forest along stream, 5 Mar. 2013 (B.A. Huber).

Pholcus Walckenaer, 1805

In the area considered here, *Pholcus* is mainly represented by the five species of the West African endemic *guineensis* group (Huber 2011b; Fig. 30). *Pholcus berlandi* Millot, 1941 from Senegal seems to belong in a species group more diverse in northern Africa (Huber 2011b); *Pholcus kakum* Huber, 2009 covers the entire Guineo-Congolian rainforest (Huber 2011b).

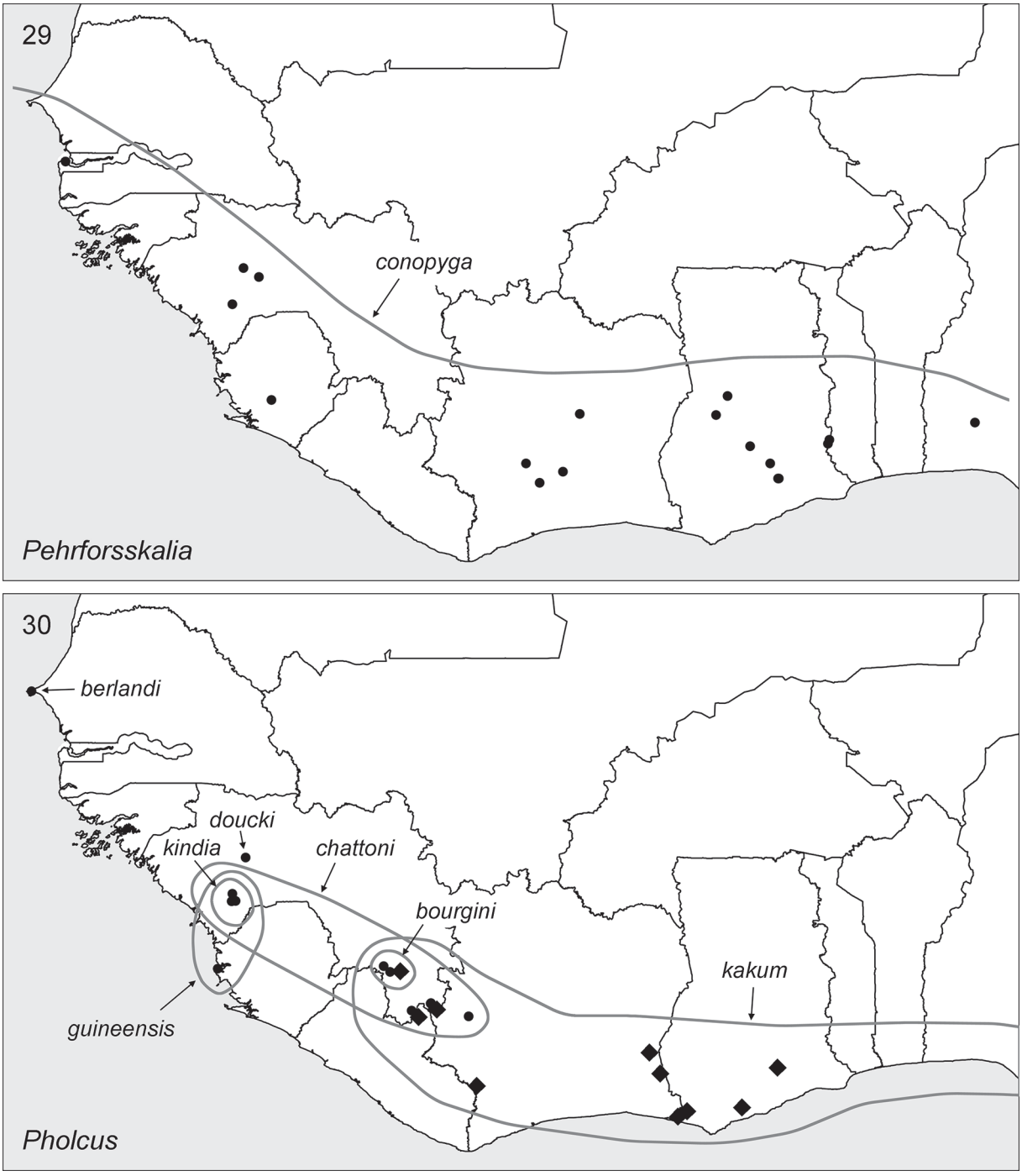
15. *Pholcus berlandi* Millot, 1941. Senegal (Millot 1941).

16. *Pholcus bourgini* Millot, 1941. Guinea (Millot 1941; Huber 2011b).

17. *Pholcus chattoni* Huber, 2011. Guinea, Ivory Coast (Millot 1941; Huber 2011b).

New records

GUINEA: 1 ♂1 ♀ in pure ethanol, in MRAC (236923), Mt. Nimba, Château [7°40'N, 8°23'W], dry mine adit, on wall, 10 Oct. 2011 (D. Van den Spiegel, A. Henrard); 3 ♀♀ in pure ethanol, in MRAC (236924), Mt. Nimba, Pierre Richaud, entrance of disaffected humid mine, adit, on beams, 7 Oct. 2011 (D. Van den Spiegel, A. Henrard).



Figs 29-30. Known distributions of the genera *Pehrforsskalia* Deeleman-Reinhold & van Harten, 2001 and *Pholcus* Walckenaer, 1805 in West Africa.

18. *Pholcus doucki* Huber, 2011. Guinea (Huber 2011b).

19. *Pholcus guineensis* Millot, 1941. Guinea, Sierra Leone (Millot 1941; Huber 2011b).

20. *Pholcus kakum* Huber, 2009. Guinea, Ivory Coast, Ghana (Huber 2009).

New records

GUINEA: 1 ♀ 1 juv. in pure ethanol, in MRAC (236927 part), Mt Nimba, Zougué valley, near Gbakoré mine camp [7°42'N, 8°24'W], young secondary gallery forest, canopy fogging, 780 m a.s.l., 5 Oct. 2011 (D. Van den Spiegel, A. Henrard).

IVORY COAST: 1 ♀ in MRAC (230510), Taï Forest, Centre de Recherche Ecologique (CRE) [5°50'N, 7°21'W], beating in forest near Chimpanzee Camp, 22 Feb. 2010 (R. Jocqué, M. Diarassouba); 4 ♀♀ in MRAC (230295), same locality but forest across river, forest on clayey soil, beating, 20 Feb. 2010; 1 ♀ in MRAC (230245), same locality but forest E of camp, "layon Gérard", inundated forest, sieved litter, 20 Feb. 2010 (R. Jocqué, L. Oulaï); 1 ♂ in MRAC (233345), Taï Forest, beating, 1 Sep. 2010 (D. Van den Spiegel, A. Kablan); 1 ♀ in MRAC (233747), Forêt des Marais-Tanoé [5°10'N, 2°50'W], Aboisso, Dohouan, beating, 25 Oct. 2010 (A. Kablan).

GHANA: Central Region: 5 ♂♂ 8 ♀♀ (2 vials) in ZFMK (Ar 10493-94), Kakum National Park (5°20.9'N, 1°23.0'W), 160 m a.s.l., forest near entrance, day collecting, 19-20 Feb. 2013 (B.A. Huber); 1 ♂ in ZFMK (Ar 10495), same data but night collecting; 2 ♀♀ in pure ethanol, in ZFMK (Gha 147), same data; 2 ♀♀ 1 juv. in MRAC (217296 part), Kakum Forest, secondary forest, beating, 23 Nov. 2005 (R. Jocqué, D. de Bakker, L. Baert); 1 ♂ 1 ♀ (2 vials) in MRAC (217260, 276), same data but beating between primary and secondary forest, 11-12 Nov. 2005. Western Region: 2 ♂♂ 1 ♀ in ZFMK (Ar 10496), Ankasa National Park (5°13.0'N, 2°39.1'W), 180 m a.s.l., forest near entrance, night collecting, 22 Feb. 2013 (B.A. Huber); 2 ♀♀ in ZFMK (Ar 10497), Ankasa National Park, forest along Big Tree Trail (~5°15.1'N, 2°38.4'W), ~100 m a.s.l., 23 Feb. 2013 (B.A. Huber). Eastern Region: 1 ♀ 2 juvs in ZFMK (Ar 10498), Atewa Hills, Atewa Atwirebu Reserve (6°13.8'N, 0°33.5'W), 740 m a.s.l., 25 Feb. 2013 (B.A. Huber); 1 ♀ in pure ethanol, in ZFMK (Gha 135), same data.

21. *Pholcus kindia* Huber, 2011. Guinea (Huber 2011b).

Physocyclus Simon, 1893

Physocyclus is a New World genus. Only the pantropical synanthropic *P. globosus* (Taczanowski, 1874) occurs in West Africa (Fig. 31).

22. *Physocyclus globosus* (Taczanowski, 1874). Guinea, Ivory Coast (Millot 1941); newly recorded for Sierra Leone, Liberia, Ghana, Togo, and Benin.

New records

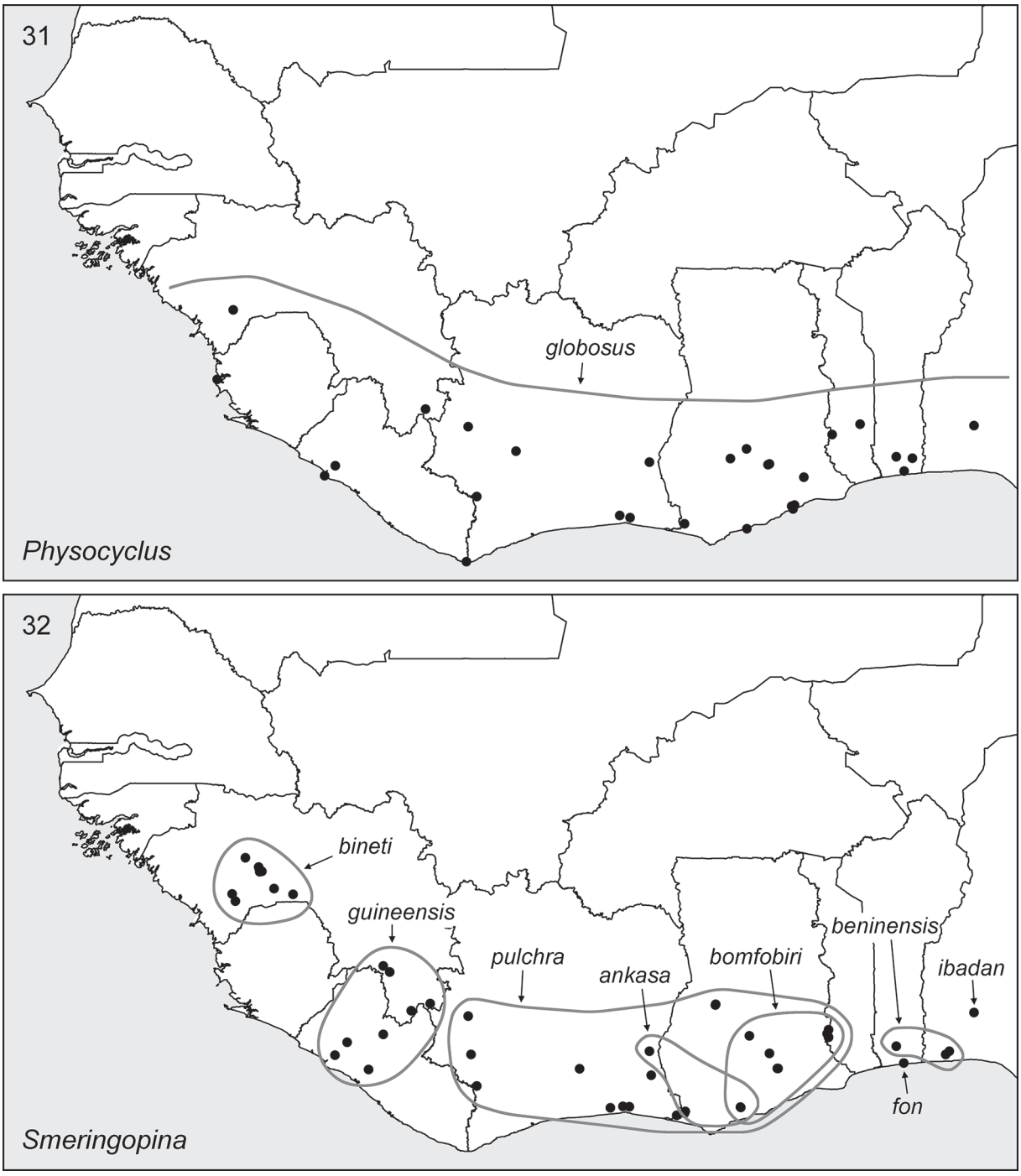
GUINEA: Guinée Forestière: 2 ♂♂ 3 ♀♀ 1 juv. in ZFMK (Ar 10499), Lola, in building (7°48.5'N, 8°30.9'W), 490 m a.s.l., 30 Nov. 2008 (B.A. Huber).

SIERRA LEONE: ~25 ♂♂ 35 ♀♀ (5 vials) in MRAC (146489, 148459, 148462, 148541, 159145), Freetown, Mount Aureol [8°28.7'N, 13°13.3'W], Sep. 1976-Nov. 1977 (D. Olu-Pitt).

LIBERIA: Montserrado Co.: 4 ♂♂ 6 ♀♀ + juvs (6 vials) in USNM, Monrovia (6°19'N, 10°48'W), Jun. 1894-Mar. 1895 (O.F. Cook); 1 ♀ 2 juvs in USNM, Mt. Coffee [6°31.7'N, 10°33.4'W], Apr. 1897 (O.F. Cook). Maryland Co.: 2 ♀♀ + juvs in USNM, Muhlenberg Mission (4°28'N, 7°35'W), Feb. 1895 (G.P. Goff); 1 ♀ 1 juv. in USNM, same locality, Jun. 1892 (O.F. Cook); 1 ♀ in USNM, unidentified locality: Liberia, "N.Y. settlement", Mar. 1895 (J.S. Sharp).

IVORY COAST: 1 ♀ in MRAC (201102), Adiopo Doumé [5°20'N, 4°20'W], Orstom, around buildings, 12 Nov. 1994 (R. Jocqué); 1 ♂ in MRAC (177559), Appouesso, Forêt classée de la Bossematié [6°35'N,

3°28'W], Nov. 1993 (R. Jocqué); 4 ♂♂ 2 ♀♀ 1 juv. in CAS, Parc National de la Maraoué [~7°05'N, 6°05'W], 8 Jan. 1991 (W.J. Pulawski); 1 ♀ in MRAC (230443), Taï Forest, Centre de Recherche Ecologique (CRE) [5°50'N, 7°21'W], no further data.
GHANA: Greater Accra Region: 2 ♀♀ 2 juvs in MRAC (131433), Accra [~5°35'N, 0°12'W], 2-8 Oct. 1966 (D. Thys van den Audenaerde); 1 ♂ in MRAC (127241), same locality, 20 Jul. 1964 (G. Marlier); 1 ♀ in MRAC (142391), Legon [5°39'N, 0°10'W], 14 Mar. 1972 (J. Edmunds); 2 ♂♂ 7 ♀♀ + juvs (6



Figs 31-32. Known distributions of the genera *Physocyclus* Simon, 1893 and *Smeringopina* Kraus, 1957 in West Africa.

vials) in MCZ (34030-35), Achimota [5°37'N, 0°14'W], in and around house, Mar. 1961-Mar. 1962 (C.P. Hinckley). Western Region: 1 ♂ 1 juv. in ZFMK (Ar 10500), Ankasa National Park (5°13.0'N, 2°39.1'W), 180 m a.s.l., buildings near entrance, 22 Feb. 2013 (B.A. Huber). Central Region: 1 ♀ in ZFMK (Ar 10501), Cape Coast (5°06.3'N, 1°14.8'W), 15 m a.s.l., in building, 23 Feb. 2013 (B.A. Huber). Eastern Region: 5 ♂♂ 3 ♀♀ 1 juv. in ZFMK (Ar 10502), near Mpraeso (6°34.1'N, 0°43.9'W), 370 m a.s.l., degraded forest near road, at rocks, 10 Mar. 2013 (B.A. Huber); 3 ♀♀ 1 juv. in pure ethanol, in ZFMK (Gha 151), same data; 1 ♀ 1 juv. in CAS, Nkawkaw [6°33'N, 0°46'W], 31 Jan. 1991 (W.J. Pulawski); 1 ♂ in MRAC (127253), Akosombo [6°16'N, 0°03'E], 12 Jul. 1964 (G. Marlier). Ashanti Region: 4 ♂♂ 3 ♀♀ in ZFMK (Ar 10503), Kumawu (6°54.3'N, 1°15.4'W), 380 m a.s.l., in building, 3 Mar. 2013 (B.A. Huber); 1 ♀ in MRAC (131424), Kumasi [6°41'N, 1°37'W], 24-25 Sep. 1966 (D. Thys van den Audenaerde).
TOGO: several ♂♂ ♀♀ (3 vials) in MRAC (136122-123, 150069), Kolokope [7°28'N, 1°19'E], 26-31 Jul. 1969 (F. Puylaert); 1 ♀ 2 juvs in MRAC (131453), "Doteleopé", 6-7 Oct. 1966 (D. Thys van den Audenaerde); 1 ♀ in MRAC (212772), Dzogbégan [7°14'N, 0°41'E], Jan. 2003 (S. Tchibozo).
BENIN: 1 ♂ in MRAC (212766 part), Adjohoun [6°42'N, 2°30'E], in house, 23 Dec. 2002 (S. Tchibozo); 2 ♀♀ 1 juv. in MRAC (212769), Godomey [6°25'N, 2°19'E], in house, Dec. 2002 (S. Tchibozo); 2 ♀♀ in ZFMK (Ar 10504), Niaouli (6°44'N, 2°08'E), 20 Feb. 2009 (S. Tchibozo).
NIGERIA: Osun: 1 ♂ 1 ♀ 1 juv. in MRAC (174602 part), Ile-Ife, Obafemi Awolowo Univ. campus [7°28'N, 4°34'E], 1991 (H. Segers).

Quamtana Huber, 2003

Quamtana is most diverse in southern Africa, but a few species occur as far north as Cameroon, Congo DR, Uganda (Huber 2003c), Rwanda ["Burundi" in Huber & Warui 2012 is a lapsus; Cyamudongo is in Rwanda, 2°33.5'S, 28°59.5'E] and Kenya (Huber & Warui 2012). The new records below include the first for West Africa, and indicate that *Q. kitahurira* Huber, 2003 (previously known from Uganda and Rwanda only) is apparently a widespread species.

23. *Quamtana kitahurira* Huber, 2003. newly recorded for West Africa (Guinea) (see page 38).

Smeringopina Kraus, 1957

The Guineo-Congolian genus *Smeringopina* is highly diverse in Central Africa but only eight species are known from West Africa (Huber 2013; Fig. 32). Most species belong to one of the two endemic West African species groups, the *guineensis* group and the *ankasa* group (Huber 2013); only *S. beninensis* Kraus, 1957 is a notable outlier of a group otherwise restricted to Central Africa.

24. *Smeringopina ankasa* Huber, 2013. Ghana, Ivory Coast (Huber 2013).

25. *Smeringopina beninensis* Kraus, 1957. Benin, Nigeria (Kraus 1957; Huber 2013).

26. *Smeringopina bineti* (Millot, 1941). Guinea (Millot 1941; Huber 2013).

27. *Smeringopina bomfobiri* Huber, 2013. Ghana (Huber 2013).

28. *Smeringopina fon* Huber, 2013. Benin (Huber 2013).

29. *Smeringopina guineensis* (Millot, 1941). Guinea, Liberia (Millot 1941; Huber 2013).

30. *Smeringopina ibadan* Huber, 2013. Nigeria (Huber 2013).

31. ***Smeringopina pulchra*** (Millot, 1941). Guinea(?), Ivory Coast, Ghana, Togo (Millot 1941; Huber 2013).

Smeringopus Simon, 1890

Smeringopus is currently the most species-rich African pholcid genus, but only two species occur in West Africa (Fig. 33): the pantropical synanthropic *S. pallidus* (Blackwall, 1858) and the widespread Guineo-Congolian *S. cylindrogaster* (Simon, 1907) which covers the entire Guineo-Congolian rainforest (Huber 2012).

32. ***Smeringopus cylindrogaster*** (Simon, 1907). Guinea Bissau, Guinea, Liberia, Ivory Coast, Ghana (Simon 1907; Huber 2009, 2012).

New records

GUINEA: 1 ♀ 1 juv. in pure ethanol, in MRAC (236933), Mt. Nimba, Gouan Forest Centre [7°42'N, 8°24'W], beating trees and shrubs with hanging litter at 1.5-3 m above ground, 1250 m a.s.l., 8 Oct. 2011 (D. Van den Spiegel, A. Henrard).

IVORY COAST: 1 ♀ in MRAC (230346 part), Taï Forest, Centre de Recherche Ecologique (CRE) [5°50'N, 7°21'W], beating in forest near Chimpanzee Camp, 22 Feb. 2010 (R. Jocqué, M. Diarassouba); 1 ♀ in MRAC (230146 part), same locality, at foot of trees, by hand, 22 Feb. 2010 (R. Jocqué); 1 ♀ 1 juv. in MRAC (230281), same data but forest near river, 22 Feb. 2010 (R. Jocqué, M. Diarassouba); 1 ♀ in MRAC (230244), same locality, forest E of camp, "layon Gérard", inundated forest, sieved litter, 20 Feb. 2010 (R. Jocqué, L. Oulaï); 2 ♀♀ in MRAC (230296), same locality, forest across river, forest on clayey soil, beating, 20 Feb. 2010 (R. Jocqué, M. Diarassouba); 1 ♀ in MRAC (233643), Taï Forest, beating, 1 Sep. 2010 (D. Van den Spiegel, A. Kablan); 2 juvs in MRAC (230360 part), Adiopo Doumé [5°20'N, 4°20'W], Centre Suisse de Recherche Scientifique (CSRS), small dry forest, sieving litter, 26 Feb. 2010 (D. van den Spiegel, R. Jocqué).

GHANA: Central Region: 1 ♀ in pure ethanol, in ZFMK (Gha 149), Kakum National Park (5°20.9'N, 1°23.0'W), 160 m a.s.l., forest near entrance, day collecting, 19 Feb. 2013 (B.A. Huber); 1 ♂ 1 ♀ 1 juv. in MRAC (217296 part), Kakum Forest, beating in secondary forest, 23 Nov. 2005 (R. Jocqué, D. de Bakker, L. Baert). Eastern Region: 3 ♀♀ in ZFMK (Ar 10505), Atewa Hills, Atewa Atwirebu Reserve (6°13.8'N, 0°33.5'W), 740 m a.s.l., 25 Feb. 2013 (B.A. Huber); 1 ♀ in ZFMK (Ar 10506), near Mpraeso (6°34.1'N, 0°43.9'W), 370 m a.s.l., degraded forest near road, 10 Mar. 2013 (B.A. Huber). Western Region: 1 ♂ in ZFMK (Ar 10507), Ankasa National Park (5°13.0'N, 2°39.1'W), 180 m a.s.l., forest near entrance, day collecting, 22 Feb. 2013 (B.A. Huber); 3 ♂♂ 5 ♀♀ 1 juv. (2 vials) in ZFMK (Ar 10508-09), same data but night collecting; 1 ♂ 1 juv. in pure ethanol, in ZFMK (Gha 157), same data.

33. ***Smeringopus pallidus*** (Blackwall, 1858). Guinea, Ivory Coast (Millot 1941); newly recorded for Senegal, The Gambia, Sierra Leone, and Ghana.

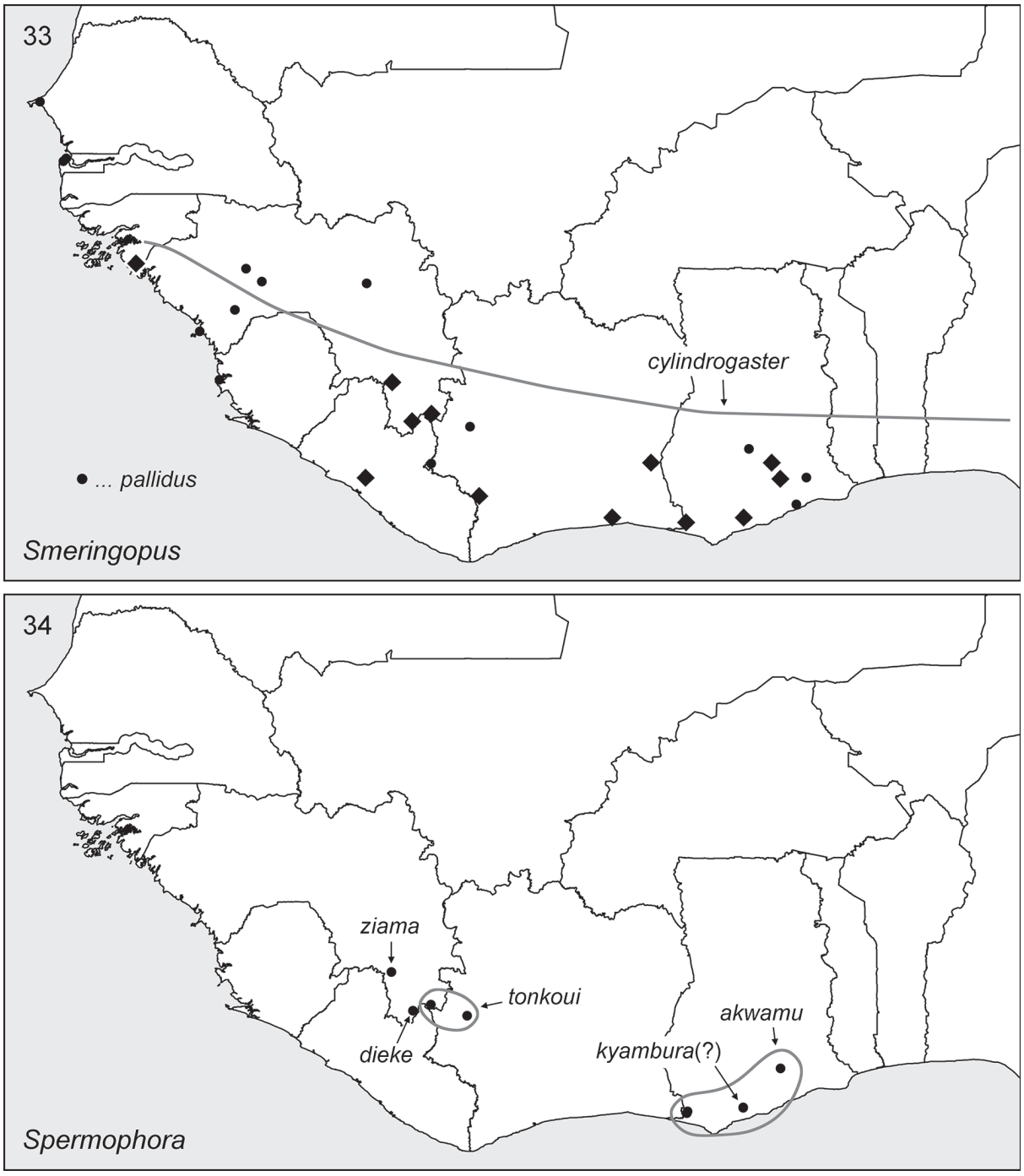
New records

SENEGAL: 1 ♂ in MRAC (161825), Dakar [14°46'N, 17°15'W], in house, 14 Nov. 1983 (E. Tybaert); 4 ♂♂ 4 ♀♀ (4 vials) in AMNH, same locality, May-Jul. 1945, no further data.

THE GAMBIA: 4 ♂♂ 15 ♀♀ in ZFMK (Ar 5242), Bijilo Forest Park (13°26.3'N, 16°43.5'W), coastal forest, 22 Oct. 2008 (Yu.M. Marusik); 1 ♂ 5 ♀♀ in ZFMK (Ar 5244), same data, litter, mostly under palms; 1 ♂ 1 juv. in CAS, Baccau [13°29'N, 16°40'W], 22 Oct. 1981 (W. Settle); 2 ♂♂ 3 ♀♀ in SMF, same locality, in building, no date (J. Wunderlich).

GUINEA: 1 ♂ 3 ♀♀ (2 vials) in pure ethanol, in ZFMK (Gui 84, 102), Conakry, in building (9°34.1'N, 13°39.7'W), 40 m a.s.l., 18 Nov. 2008 (B.A. Huber). Moyenne-Guinée: 1 ♀ in ZFMK (Ar 10510), Dalaba (10°41.4'N, 12°15.7'W), in building, 1260 m a.s.l., 22 Nov. 2008 (B.A. Huber). Moyenne-Guinée: 2 ♂♂ 6 ♀♀ in pure ethanol, in ZFMK (Gui 85), Doucki, in and at buildings (10°59.1'N,

12°36.0'W), 1050 m a.s.l., 23 Nov. 2008 (B.A. Huber). Basse-Guinée: 1 ♂ 1 juv. in ZFMK (Ar 10511), Kindia, in building (10°03'N, 12°51'W), 400 m a.s.l., 20 Nov. 2008 (B.A. Huber).
SIERRA LEONE: 10 ♂♂ 6 ♀♀ + juvs (3 vials) in MRAC (148460 part, 159113, 159145 part), Freetown, Mount Aureol [8°28.7'N, 13°13.3'W], Sep. 1976-Jun. 1977 (D. Olu-Pitt); 5 ♂♂ 9 ♀♀ (4 vials) in MRAC (146506, 148525, 530, 542), Freetown, Dec. 1974-Jan. 1977 (D. Olu-Pitt).



Figs 33-34. Known distributions of the genera *Smeringopus* Simon, 1890 and *Spermophora* Hentz, 1841 in West Africa.

IVORY COAST: 1 ♂ 3 ♀♀ 3 juvs (3 vials) in MRAC (131436-438), Toulépleu [6°35'N, 8°25'W], 28 Jul. 1966 (W. Verheyen, D. Thys van den Audenaerde).
GHANA: Ashanti Region: 1 juv. in ZFMK (Ar 10512), Kumawu (6°54.3'N, 1°15.4'W), 380 m a.s.l., in building, 3 Mar. 2013 (B.A. Huber). Greater Accra Region: 1 ♂ in MRAC (142403), Legon [5°39'N, 0°10'W], 14 Mar. 1972 (J. Edmunds). Eastern Region: 1 ♀ in MRAC (127252), Akosombo [6°16'N, 0°03'E], 12 Jul. 1964 (G. Marlier).

Spermophora Hentz, 1841

Spermophora is diverse in sub-Saharan Africa but relationships among African taxa and between African and Asian taxa remain unclear (Huber 2003b, 2003c, 2005; Dimitrov *et al.* 2013). Five species are known from West Africa (Fig. 34). Of these, *S. tonkoui* Huber, 2003 and *S. ziama* sp. nov. share several derived characters but their relationship to other conspecifics remain dubious (see under *S. ziama* sp. nov. description below). Another pair of putatively close relatives is *S. dieke* Huber, 2009 and *S. akwamu* sp. nov. (see under *S. akwamu* sp. nov. description below). A very similar undescribed species occurs in Congo DR (in MRAC). Finally, *S. kyambura* is a widespread Guineo-Congolian species but West African specimens were assigned tentatively (Huber & Warui 2012).

34. *Spermophora akwamu* sp. nov. (see page 31). Ghana.

35. *Spermophora dieke* Huber, 2009. Guinea (Huber 2009).

36. *Spermophora kyambura* Huber & Warui, 2012. Ghana (Huber & Warui 2012).

37. *Spermophora tonkoui* Huber, 2003. Ivory Coast (Huber 2003b). Newly recorded for Guinea.

New record
GUINEA: 2 ♂♂ 5 ♀♀ in pure ethanol, in MRAC (236928), Mt. Nimba, Forêt de Zié, near Gouan camp or "Station de Pompage Zié" [7°40'N, 8°26'W], 1250 m a.s.l., beating trees and shrubs with hanging litter, at 1.5-3m above ground, 11 Oct. 2011 (D. Van den Spiegel, A. Henrard); 2 ♂♂ 6 ♀♀ 2 juvs (3 vials) in SMF, Mt. Nimba, Crête de Nion, 1100-1160 m a.s.l., 11 Feb.-12 May 1957 (M. Lamotte).

38. *Spermophora ziama* sp. nov. (see page 34). Guinea.

Identification key to West African pholcid genera

References to figures in upper case ("Fig.") refer to illustrations herein; figures in lower case ("fig.") have been published previously and are freely accessible online (at http://www.uni-bonn.de/~bhuber1/).

1. Abdomen worm-shaped (>10 × longer than wide; Figs 4-5); male chelicerae with one pair of small projections in latero-distal position (Fig. 74) ..... ***Leptopholcus*** Simon, 1893
– Abdomen not worm-shaped (<10 × as long as wide); male chelicerae different 2

2. Six eyes (AME absent) 3
– Eight eyes 6

3. Sternum with characteristic pattern of radiating lines (Fig. 40); abdomen dorsally with dark heart-mark (Fig. 35) ..... ***Anansus*** Huber, 2007
– Sternum without pattern; abdomen dorsal pattern different 4

4. Carapace with 2-3 pairs of dark lateral spots; ocular area (especially in males) strongly elevated, in male with frontal hairy pocket; male chelicerae without proximal lateral projections (figs 2-4 in Huber 1996) ..... ***Modisimus culicinus*** (Simon, 1893)
– Carapace without lateral spots; ocular area not elevated; male chelicerae with proximal lateral projections 5

5. Procursus with highly complex system of transparent lamellae (fig. 14 in Huber 2007); male chelicerae narrowing distally, with pair of simple frontal apophyses close to median line (fig. 15 in Huber 2007) ..... ***Nyikoa limbe*** Huber, 2007
– Procursus and male chelicerae different ..... ***Spermophora*** Hentz, 1841

6. Carapace with median indentation (furrow or pit) 7
– Carapace evenly domed, without median indentation 11

7. Abdomen globular, oval, or higher than long 8
– Abdomen elongated 9

8. Procursus with prominent distal spine; female carapace with posterior median cone acting against frontal plate on abdomen; epigynum with median anterior process ..... ***Physocyclus globosus*** (Taczanowski, 1874)
– Procursus short, without distal spine (Figs 57-58); female carapace without posterior cone; epigynum without median anterior process (Fig. 54) ..... ***Artema*** Walckenaer, 1837

9. Legs with many small black marks; abdomen angular in lateral view (posteriorly high; Fig. 16) ..... ***Crossopriza*** Simon, 1893
– Legs without small black marks, abdomen not angular in lateral view (posteriorly tapering) 10

10. Male chelicerae with proximal lateral projections, either without or with several modified hairs on each side ..... ***Smeringopina*** Kraus, 1957
– Male chelicerae without proximal lateral projections, with single modified hair on each distal apophysis (fig. 47 in Huber 2009) ..... ***Smeringopus*** Simon, 1890

11. Abdomen globular or oval 12
– Abdomen elongated 13

12. Procursus with long hinged dorsal process, epigynum weakly sclerotized, internal U-shaped structure visible through cuticle anteriorly (figs 83-89 in Huber 2011b) ..... ***Micropholcus fauroti*** (Simon, 1887)
– Procursus widely curved, without long dorsal process (figs 204-205 in Huber 2003c); epigynum weakly sclerotized, no internal structure visible through cuticle (Fig. 107) ..... ***Quamtana kitahurira*** Huber, 2003

13. Abdomen drawn into cone dorso-posteriorly (Fig. 8; fig. 29 in Huber 2011b); male chelicerae with pair of lateral unsclerotized projections in distal position (fig. 130 in Huber 2009); epigynum weakly sclerotized ..... ***Pehrforsskalia conopyga*** Deeleman-Reinhold & van Harten, 2001
– Abdomen rounded posteriorly; male chelicerae with pair of lateral unsclerotized projections in proximal position; epigynum strongly sclerotized ..... ***Pholcus*** Walckenaer, 1805

Taxonomy

Anansus atewa sp. nov.

urn:lsid:zoobank.org:act:9EC8FF7E-F56B-4FAD-9B48-730CE2795474

Figs 9-10, 23, 35-47

Diagnosis

Easily distinguished from known congeners by distinct pair of projections on male clypeus (Figs 35, 39; other known species with single tiny median process); also by male cheliceral apophyses (more proximal, wider apart, and more pointed than in other known species; Figs 39, 45), by shape of procursus (large ventral curved sclerite; without retrolateral sclerite provided with brush of long hairs; without ventral pointed projection; Figs 38, 44), and by more anterior position of epigynal pockets (Figs 41, 46).

Etymology

The species name is a noun in apposition, derived from the type locality.

Type material

Holotype ♂, in ZFMK (Ar 10513).

Type data

GHANA: Eastern Region: Atewa Hills, Atewa Atwirebu Reserve (6°13.8'N, 0°33.5'W), 740 m a.s.l., 25 Feb. 2013 (B.A. Huber).

Other material examined

GHANA: Eastern Region: 4 ♀♀ together with holotype; 2 ♂♂ 2 ♀♀ in ZFMK (Ar 10514), same data, specimens taken alive and died from heat; 2 ♀♀ 5 juvs in pure ethanol in ZFMK (Gha 137), same data.

Description

Male (holotype)

Measurements. Total body length 1.5, carapace width 0.6. Leg 1: 5.2 (1.3 + 0.2 + 1.4 + 1.6 + 0.7), tibia 2: 0.9, tibia 3: 0.7, tibia 4: 1.1; tibia 1 L/d: 22. Distance PME-PME 25 µm, diameter PME 80 µm, distance PME-ALE 20 µm, no AME.

Color. Carapace ochre-grey, slightly darker medially, sternum with four pairs of dark lines extending from behind labium to bases of leg coxae, legs pale ochre-yellow, without rings, abdomen ochre-gray with distinct dark median dorsal mark.

Body. Habitus as in Figs 35-36; ocular area barely elevated; carapace without median furrow; clypeus with distinct pair of projections at rim (Fig. 35); sternum wider than long (0.40/0.35), unmodified. Chelicerae as in Fig. 45, with pair of lateral processes proximally and pointed frontal apophyses, without stridulatory ridges.

Palps. As in Figs 37-38 and 43-44, coxa unmodified, trochanter with indistinct ventral projection, femur small relative to tibia, with small retrolatero-ventral process and larger prolatero-ventral process set with tubercles, procursus complex, entire distal part apparently hinged against basis, without elements distinctive for other known species (retrolateral sclerite provided with brush of long hairs; ventral pointed projection), bulb with single weakly sclerotized process (embolus).

LEGS. Without spines and curved hairs, few vertical hairs; retrolateral trichobothrium on tibia 1 at 25%; prolateral trichobothrium absent on tibia 1, present on other tibiae; tarsus 1 with about ten indistinct pseudosegments.

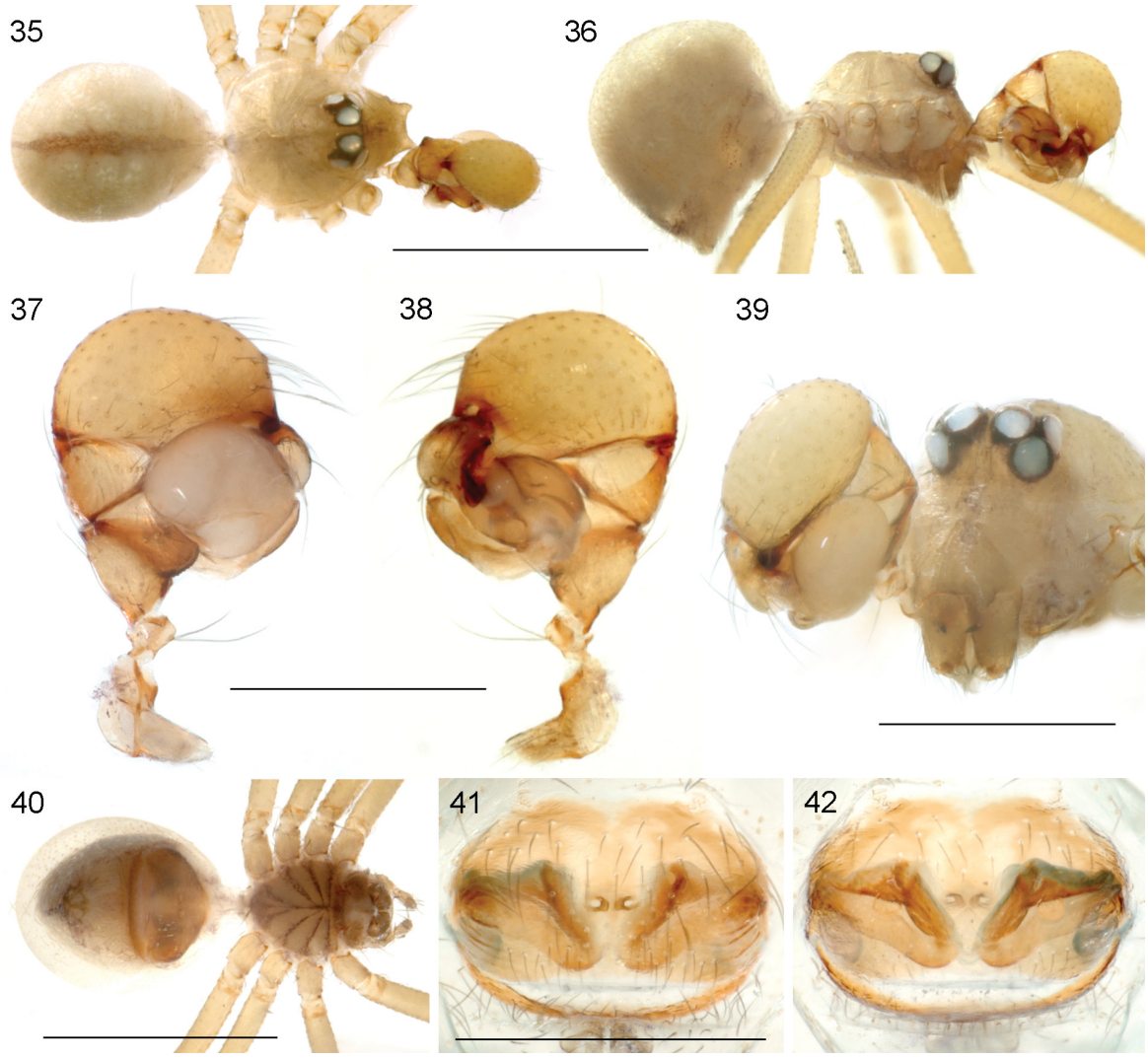
VARIATION. Tibia 1 in 2 other males: 1.3, 1.4.

Female

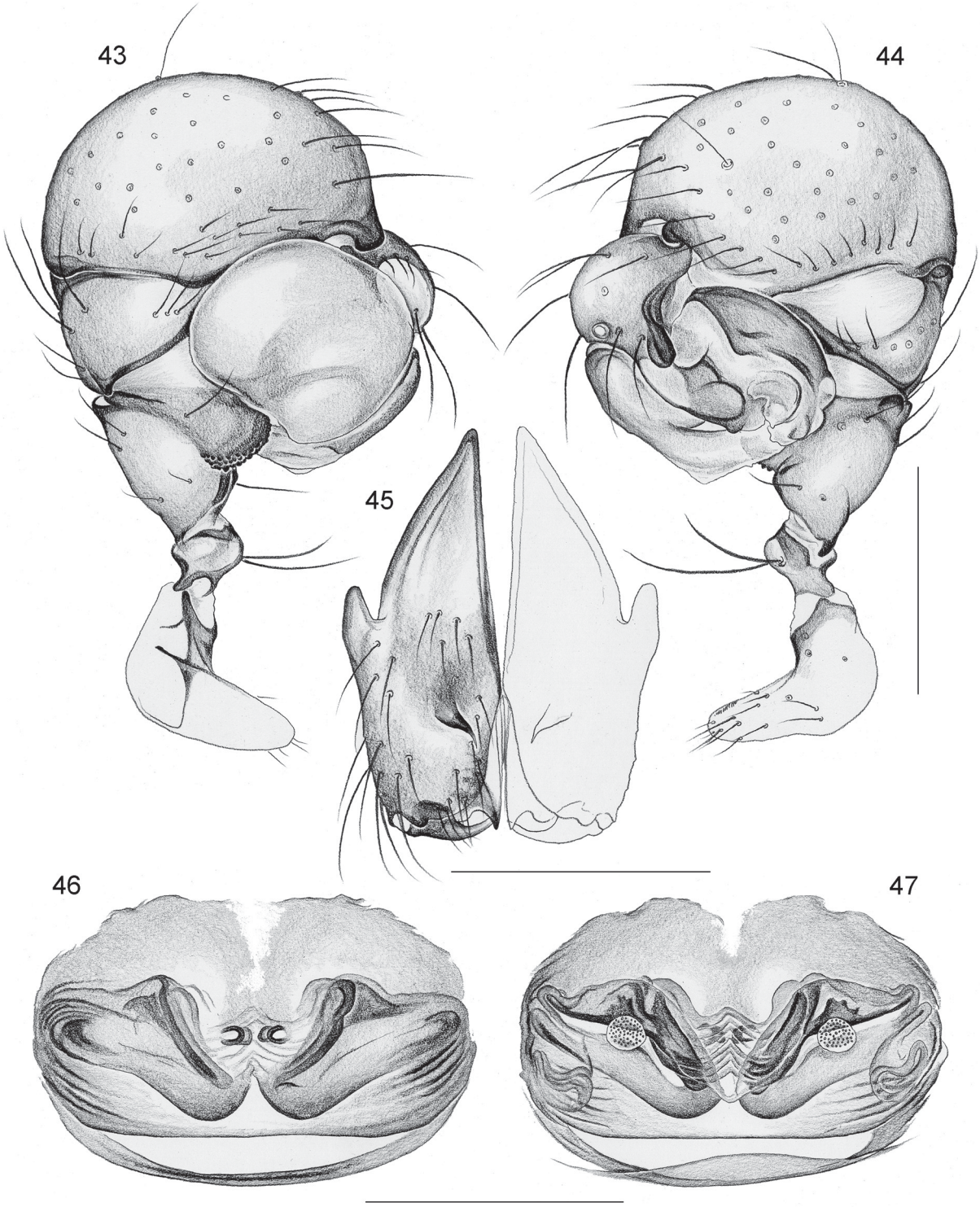
In general similar to male; tibia 1 in 6 females: 1.2-1.4 (mean 1.3). Epigynum consisting of large anterior plate provided with pair of pockets and narrow posterior plate (Figs 40, 41, 46); internal genitalia as in Figs 42 and 47.

Natural history

The spiders were found in the leaf-litter under leaves that are curved in a way to produce protected space on the underside. Two eggsacs contained 13 and 15 eggs respectively.



Figs 35-42. *Anansus atewa* sp. nov. **35-36**. ♂, dorsal and lateral views. **37-38**. Left ♂ palp, prolateral and retrolateral views. **39**. ♂ prosoma and right palp, oblique frontal view. **40**. ♀, ventral view. **41-42**. Cleared ♀ genitalia, ventral and dorsal views. Scale lines: 35-36, 40 = 1 mm; 37-39, 41-42 = 0.5 mm.



Figs 43-47. *Anansus atewa* sp. nov. **43-44**. Left ♂ palp, prolateral and retrolateral views. **45**. ♂ chelicerae, frontal view. **46-47**. Cleared ♀ genitalia, ventral and dorsal views. Scale lines: 43-44, 46-47 = 0.3 mm; 45 = 0.2 mm.

Distribution

Known from type locality only (Fig. 23). Further juvenile specimens from near Mpraeso and from Tagbo Falls (Ghana; in ZFMK) might also belong to this species.

Artema bunkpurugu sp. nov.
urn:lsid:zoobank.org:act:05986623-C648-495E-AA88-C708FEF1A926
Figs 14-15, 24, 48-62

"*Artema mauriciana*" (misidentification) – Millot 1941: 3-5, figs 1A-E, G-I (fig. 1F is the true *A. mauriciana* = *A. atlanta*).

Diagnosis

Distinguished from the widespread *A. atlanta* by shape of procursus (arrows in Figs 57-58), bulbal processes (arrow in Fig. 58), relatively longer male palpal tibia, less prominent male cheliceral projections, more straight posterior epigynal margin (Figs 54, 61), and more prominent anterior epigynal projections (Fig. 49). Middle East and Central Asian species have a very different epigynum (cf. fig. 10 in Spassky 1934).

Etymology

The species name is a noun in apposition, derived from the type locality.

Type material

Holotype ♂, in ZFMK (Ar 10515).

Type data

GHANA: Northern Region: Bunkpurugu (10°31.1'N, 0°05.5'E), 230 m a.s.l., in building, 7 Mar. 2013 (B.A. Huber).

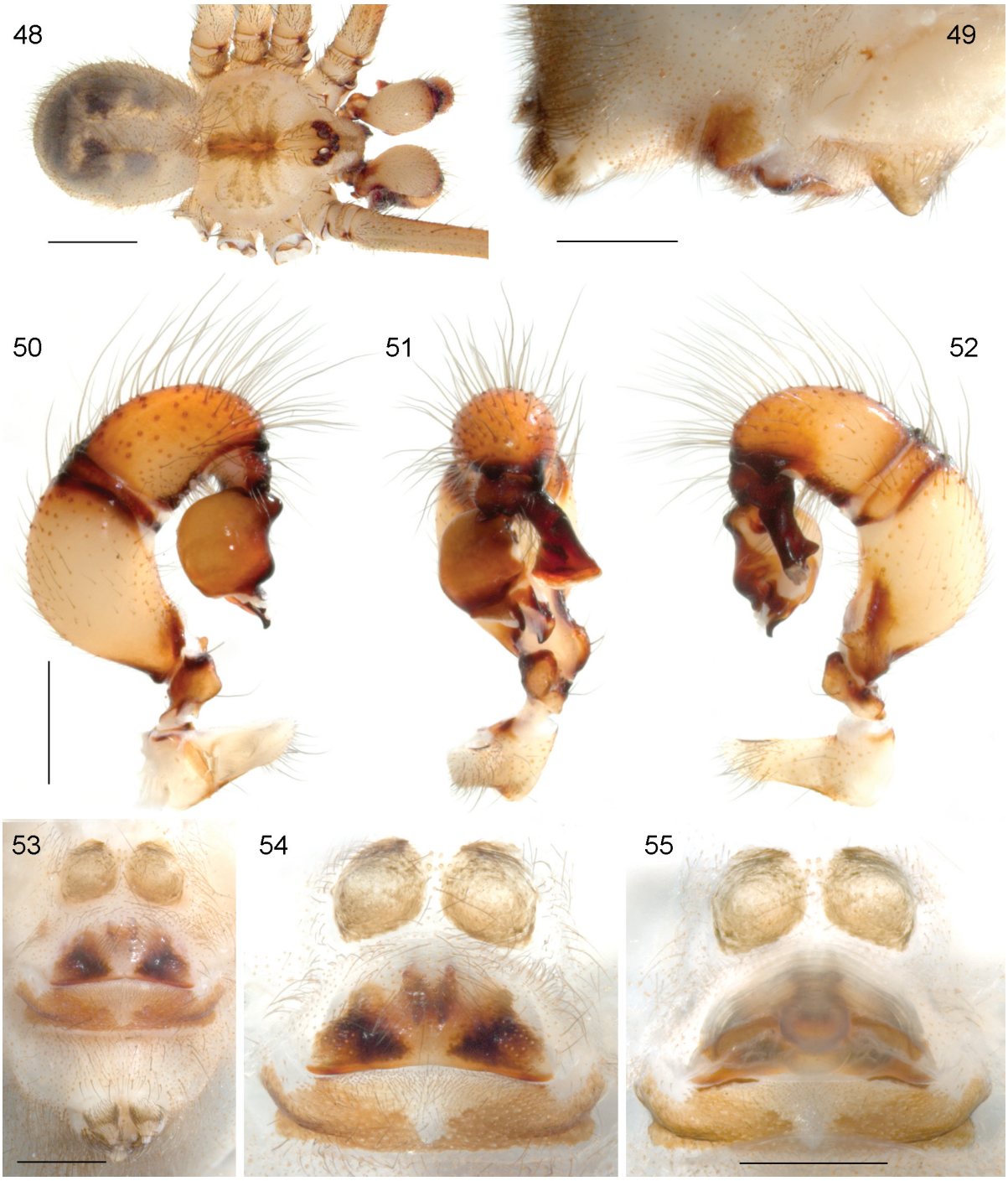
Other material examined

GHANA: Northern Region: 1 ♀ together with holotype; 2 ♀♀ 1 juv. in pure ethanol in ZFMK (Gha 126), same data; 1 ♂ 2 ♀♀ in ZFMK (Ar 10516), between Bunkpurugu and Nakpanduri (10°32.9'N, 0°00.2'E), 270 m a.s.l., under concrete bridge, 8 Mar. 2013 (B.A. Huber); 1 ♀ in pure ethanol in ZFMK (Gha 128), same data; 1 ♀ in ZFMK (Ar 10517), near Bimbaga (10°34.5'N, 0°03.8'W), 330 m a.s.l., under concrete bridge, 8 Mar. 2013 (B.A. Huber); 2 ♀♀ in ZFMK (Ar 10518), near Nakpanduri (10°35.0'N, 0°06.4'W), 345 m a.s.l., under concrete bridge, 8 Mar. 2013 (B.A. Huber); 1 ♀ 2 juvs in pure ethanol in ZFMK (Gha 140), between Gambaga and Nakpanduri (10°34.0'N, 0°17.5'W), 400 m a.s.l., under large rocks, 8 Mar. 2013 (B.A. Huber).
TOGO: 3 ♂♂ 2 ♀♀ 6 juvs in MRAC (136024), Namoundjoga [10°53.4'N, 0°23.4'E], 27/29 Jul. 1969 (F. Puylaert).
BURKINA FASO: Sud-Ouest: 1 ♂ in MRAC (128076), Ouagadougou [12°22'N, 1°32'W], Apr.-May 1965 (B. Roman); 1 ♀ in MNHN, same locality, Sep. 1937 (J. Millot); 3 ♂♂ 9 ♀♀ 13 juvs (2 vials) in MNHN, Batié [9°52'N, 2°55'W], Sep. 1937 (J. Millot).
MALI: 1 ♀ 3 juvs (?, abdomens missing in two specimens) in MNHN, Bamako [12°38'N, 8°00'W], Oct. 1937 (J. Millot); 1 ♀ in AMNH, Gao [16°16'N, 0°03'W], 23-25 Nov. 1948 (B. Malkin).
GUINEA: 1 ♂ (1 palp and chelicerae missing), 2 ♀♀ (1 epigynum missing), 2 juvs in MNHN, Kouroussa [10°39'N, 9°53'W], Oct. 1937 (J. Millot).

Description

Male (holotype)

MEASUREMENTS. Total body length 9.0, carapace width 4.2. Leg 1: 77.1 (20.3 + 1.9 + 21.1 + 29.1 + 4.7), tibia 2: 16.3, tibia 3: 12.7, tibia 4: 16.1; tibia 1 L/d: 54. Distance PME-PME 230 µm, diameter PME 220 µm, distance PME-ALE 115 µm, distance AME-AME 60 µm, diameter AME 210 µm.



Figs 48-55. *Artema bunkpurugu* sp. nov. **48**. ♂, dorsal view. **49**. Female genitalia and spinnerets, lateral view. **50-52**. Left ♂ palp, prolateral, dorsal, and retrolateral views. **53**. ♀ abdomen, ventral view. **54-55**. Cleared ♀ genitalia, ventral and dorsal views. Scale lines: 48 = 2 mm; 49-55 = 1 mm.

Color. Carapace pale ochre-grey with light brown median band and small brown spots laterally, clypeus with pair of narrow light brown bands below AME, legs pale ochre-gray to light brown, with dark rings on femora subdistally, patellae + tibiae proximally, and tibiae subdistally, tips of femora and tibiae whitish, sternum pale gray with narrow dark brown margins, abdomen pale gray with large dark marks dorsally.

Body. Habitus as in Fig. 48; ocular area slightly elevated; carapace with large median pit and distinct median furrow posteriorly; clypeus unmodified; sternum wider than long (2.5/2.0), unmodified. Chelicerae as in Figs 59-60, with heavily sclerotized frontal projections provided with about ten modified (cone-shaped) hairs each, without stridulatory ridges. Gonopore with five epiandrous spigots.

Palps. As in Figs 50-52 and 56-58, coxa unmodified, trochanter with short ventral projection, femur with distinct retrolateral process proximally, large ventral membranous area proximally bordered on both sides by heavily sclerotized ridges, and small dorsal projection proximally; femur-patella hinges close together dorsally; patella very short; procursus with proximal dorsal apophysis and weakly developed ventral pocket, with distinctive ventral projection distally (arrow in Fig. 57), bulb with two apophyses flanking membranous process (putative embolus).

Legs. Without spines, with some very weakly curved hairs on tibiae and metatarsi, few vertical hairs mainly on distal leg segments; retrolateral trichobothrium on tibia 1 at 5.5%; prolateral trichobothrium present on all tibiae (also tibia 1); pseudosegmentation not visible.

Variation. Tibia 1 in 8 other males: 15.5-23.1 (mean 19.8). Lateral spots on carapace sometimes fused to three pairs of large marks. Sternum posteriorly with variably distinct pattern of light brown marks. Gonopore with variable number of epiandrous spigots (4-6).

Female

In general similar to male but chelicerae with distinct sclerotized patches laterally provided with stidulatory files (cf. fig. 1G in Millot 1941); tibia 1 in 20 females: 12.0-18.9 (mean 16.1). Epigynum consisting of trapezoidal anterior plate and simple posterior plate, with pair of large distinctive projections in front of epigynum (Figs 49, 53-54, 61); internal genitalia as in Figs 55, 62.

Natural history

The spiders were found both in natural habitats (among large rocks) and in human-made habitats (under low concrete bridges, in buildings; see also Millot 1941). When disturbed, the spiders try to hide in crevices, running short distances and then vibrating at low amplitude but high frequency.

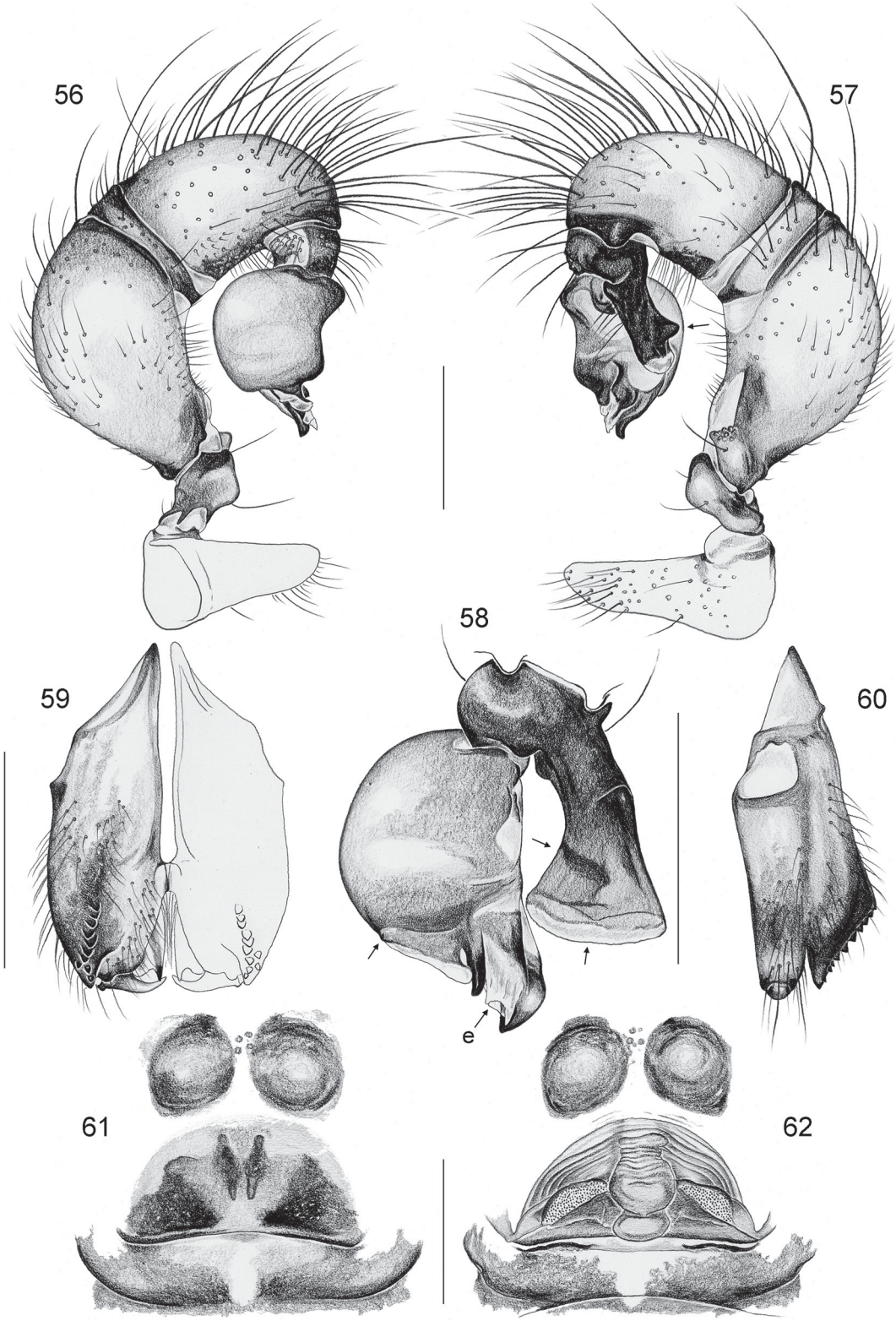
Distribution

Widely distributed in Sudanian West Africa (Fig. 24).

Note

Millot (1941) was aware of the fact that most of his specimens from West Africa did not agree well with published figures of *A. mauriciana* (=*A. atlanta*). He tentatively interpreted this as intraspecific variation. However, comparison of numerous specimens of this new species with specimens of *A. atlanta* from all over the World shows that the two species differ in several characters (see above) and that no intermediate specimens seem to occur.

Millot's (1941) specimens from Kindia, Guinea (2 juvs; ♀ missing), Ferkessedougou, Ivory Coast (1 juv.), and Gao, Mali (2 juvs) are in MNHN but juveniles of *A. atlanta* and *A. bunkpurugu* sp. nov. are indistinguishable so their identity is unclear.



Figs 56-62. *Artema bunkpurugu* sp. nov. **56-57**. Left ♂ palp, prolateral and retrolateral views. **58**. Left procursus and genital bulb, dorsal view (e: embolus). **59-60**. ♂ chelicerae, frontal and lateral views. **61-62**. Cleared ♀ genitalia, ventral and dorsal views. Arrows point at distinctive structures (as compared with *A. atlanta*). Scale lines: 1 mm.

Leptopholcus kintampo sp. nov.
urn:lsid:zoobank.org:act:AB6C8FC0-A0FB-4EFA-82A5-A622435F19CF
Figs 4, 26, 63-76

Diagnosis

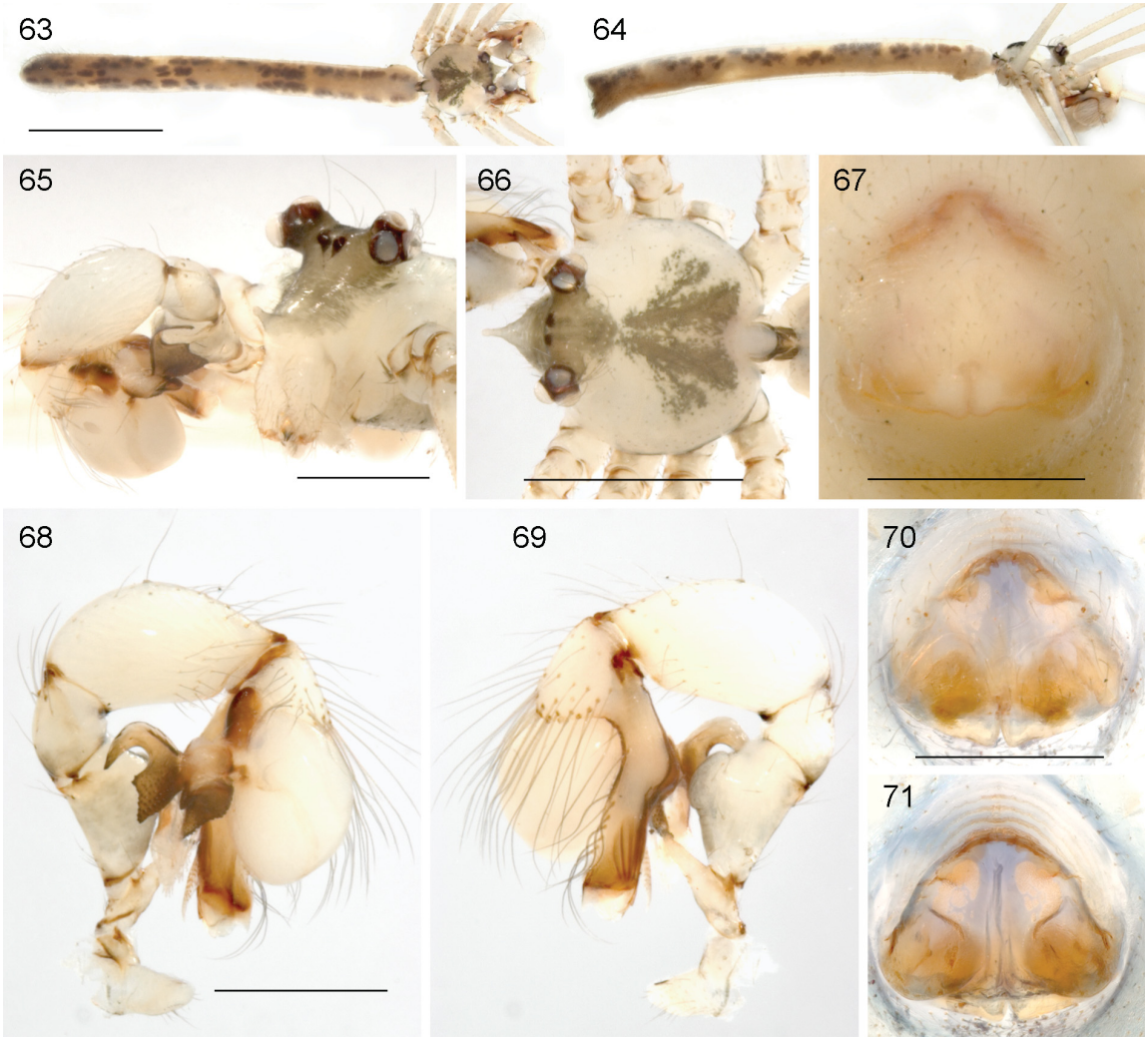
Distinguished from similar close relatives (species with median process on male clypeus: *L. signifer* Simon, 1893; *L. debakkeri* Huber, 2011; *L. guineensis*; *L. dschang* Huber 2011; *L. gracilis* Berland, 1920; *L. budongo* Huber, 2011) by shapes of bulbal processes (Figs 68, 72).

Etymology

The species name is a noun in apposition, derived from the type locality.

Type material

Holotype ♂, in ZFMK (Ar 10519).



Figs 63-71. *Leptopholcus kintampo* sp. nov. **63-64**. ♂, dorsal and lateral views. **65-66**. ♂ prosoma, oblique frontal and dorsal views. **67**. Epigynum, ventral view. **68-69**. Left ♂ palp, prolateral and retrolateral views. **70-71**. Cleared ♀ genitalia, ventral and dorsal views. Scale lines: 63-64 = 2 mm; 66 = 1 mm; 65, 67-71 = 0.5 mm.

Type data

GHANA: Brong-Ahafo Region: Kintampo Falls (8°05.3'N, 1°41.9'W), 280 m a.s.l., degraded forest along stream, 5 Mar. 2013 (B.A. Huber).

Other material examined

GHANA: Brong-Ahafo Region: 1 ♂ 3 ♀♀ 2 juvs in ZFMK (Ar 10520), same data as holotype; 2 ♂♂ 2 ♀♀ 2 juvs in ZFMK (Ar 10521), same data but 9 Mar. 2013; 2 ♀♀ 2 juvs in pure ethanol in ZFMK (Gha 161), same data as holotype.

Description

Male (holotype)

Measurements. Total body length 7.5, carapace width 1.1. Leg 1: 33.0 (8.3 + 0.5 + 7.9 + 13.0 + 3.3), tibia 2: 5.9, tibia 3: 3.8, tibia 4: 6.0; tibia 1 L/d: 89. Distance PME-PME 345 µm, diameter PME 95 µm, distance PME-ALE 25 µm, diameter AME 25 µm, distance AME-AME 25 µm.

Color. Carapace pale ochre-yellow with large triangular brown mark (Fig. 66), ocular area and clypeus also dark, sternum pale gray with dark margins and small dark spots, legs pale ochre-yellow with dark rings in patella area and at tibia-metatarsus joints, abdomen ochre-yellow with numerous black dorsal marks.

Body. Habitus as in Figs 63-64; ocular area slightly elevated, each triad on short stalk directed laterally (Fig. 65); carapace without median furrow; clypeus with distinct median process about 160 µm long; sternum wider than long (0.65/0.55), unmodified. Chelicerae as in Fig. 74, with pair of tiny lateral processes in rather distal position, without stridulatory ridges.

Palps. As in Figs 68-69 and 72-73, coxa unmodified, trochanter with long ventral apophysis and short projection at retrolateral trochanter-femur joint, femur with finger-shaped retrolateral process and large ventral bulge distally, procursus with two membranous ventral processes, one arising from ventral 'knee', the other more distally, bulb with large uncus with flat curved process and bifid appendix, embolus membranous with many fringes distally.

Legs. Without spines and curved hairs, few vertical hairs; retrolateral trichobothrium on tibia 1 at 3.5%; prolateral trichobothrium absent on tibia 1, present on other tibiae; tarsus 1 with >30 indistinct pseudosegments.

Variation. Tibia 1 in 3 other males: 7.5, 7.8, 8.0. Sternum variably dark.

Female

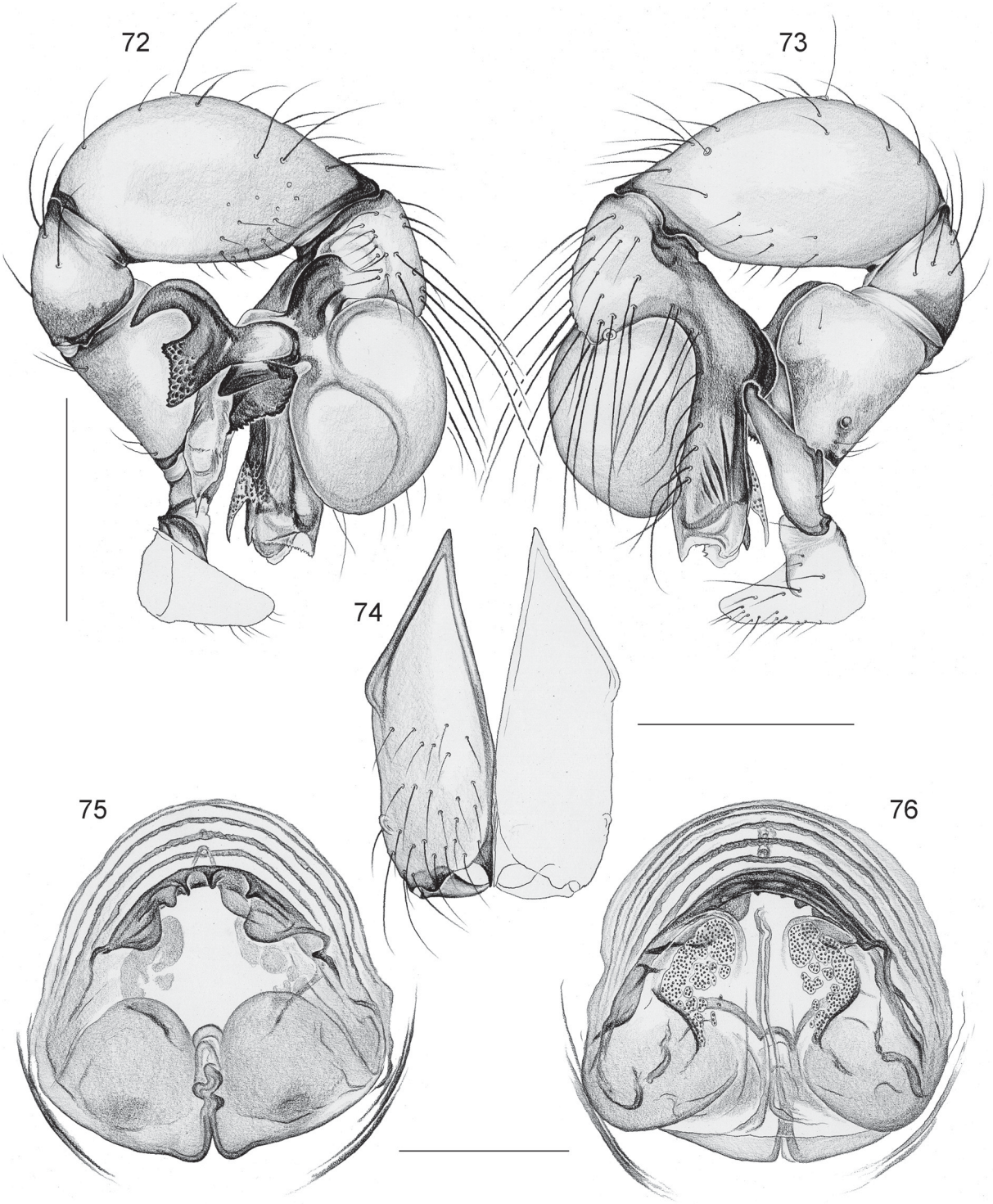
In general similar to male but only weak V-mark on carapace, ocular area and clypeus not darkened, triads not on stalks and closer together (distance PME-PME 240 µm), clypeus unmodified, abdominal marks indistinct. Tibia 1 in 5 females: 6.2-7.1 (mean 6.8). Epigynum weakly sclerotized, anterior plate simple with median incision posteriorly (Figs 67, 70, 75); internal genitalia as in Figs 71, 76.

Natural history

The spiders were found on the undersides of large leaves, with their bodies flat against the leaf.

Distribution

Known from type locality only (Fig. 26).



Figs 72-76. *Leptopholcus kintampo* sp. nov. **72-73**. Left ♂ palp, prolateral and retrolateral views. **74**. ♂ chelicerae, frontal view. **75-76**. Cleared ♀ genitalia, ventral and dorsal views. Scale lines: 72-73 = 0.5 mm; 74-76 = 0.3 mm.

Spermophora akwamu sp. nov.
urn:lsid:zoobank.org:act:D0DB384E-4A3F-4EB1-80D6-48278C31EB82
Figs 11-13, 34, 77-91

Diagnosis

Distinguished from the very similar *S. dieke* and from a similar undescribed species from Congo DR (in MRAC) by pair of processes on male clypeus (Fig. 80; only one median process in *S. dieke*; bifid process in species from Congo DR); from other congeners by armature of male chelicerae (only one pair of weakly sclerotized proximal processes; Fig. 89), by shapes of procursus (ventral sclerotized flap, distal flagellum; Figs 87-88) and bulb (shape of hooked apophysis; Fig. 87), and by shape of epigynum (rectangular plate without pockets; Figs 85, 90).

Etymology

The name is a noun in apposition, derived from the Akwamu (or Akuambo), an Akan kingdom in the 17th and 18th centuries whose founders settled in the area of modern-day Kakum National Park.

Type material

Holotype ♂, in ZFMK (Ar 10522).

Type data

GHANA: Central Region: Kakum National Park (5°20.9'N, 1°23.0'W), 160 m a.s.l., forest near entrance, day collecting, 19 Feb. 2013 (B.A. Huber).

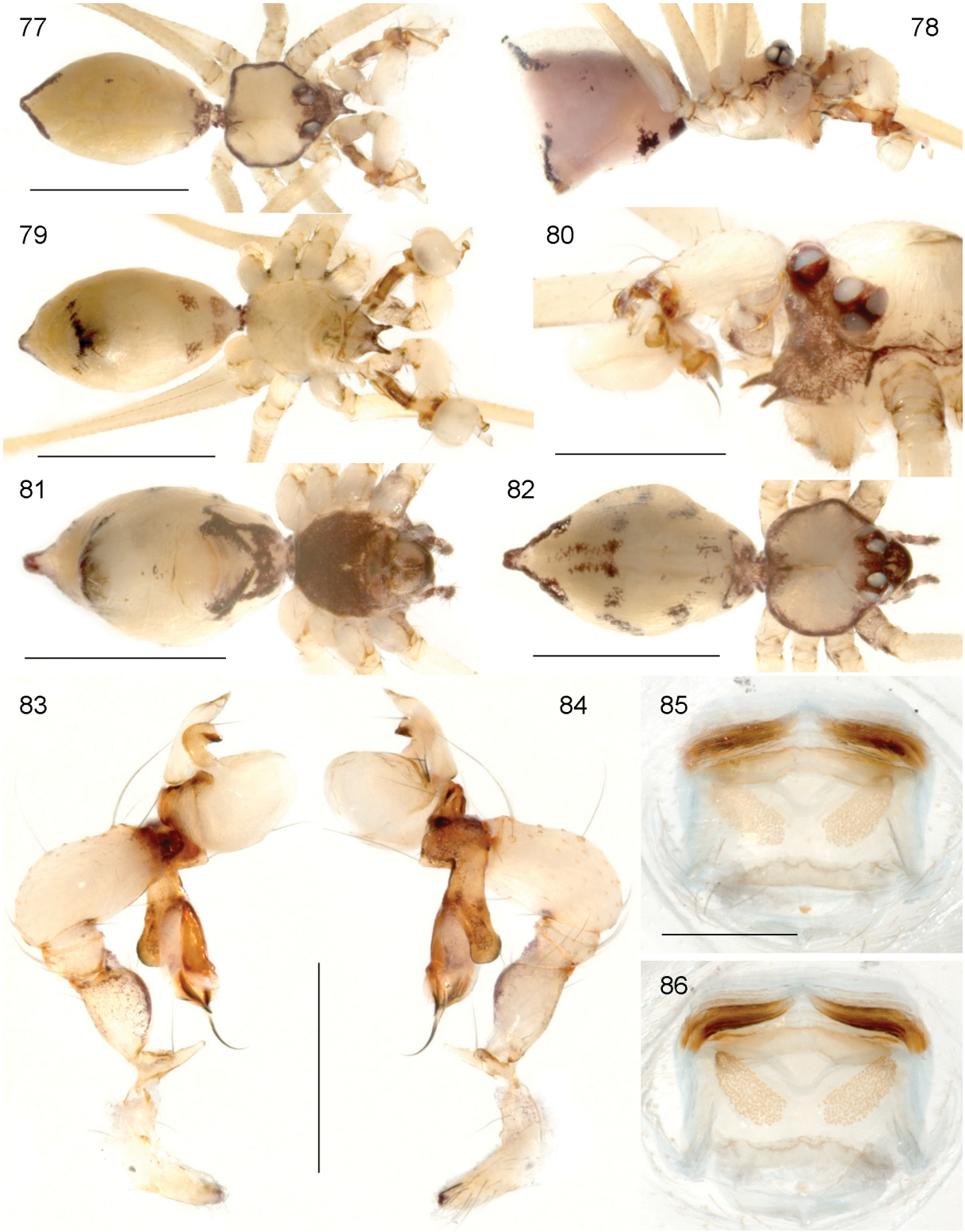
Other material examined

GHANA: Central Region: 15 ♂♂ 25 ♀♀ 8 juvs in ZFMK (Ar 10523-24), Kakum National Park, same data as holotype; 7 ♂♂ 7 ♀♀ 2 juvs in ZFMK (Ar 10525), same data but 20 Feb. 2013; 1 ♂ 8 ♀♀ 2 juvs in pure ethanol in ZFMK (Gha 145), same data; 6 ♂♂ 6 ♀♀ in ZFMK (Ar 10526-27), same data but night collecting, 20 Feb. 2013; 11 ♂♂ 28 ♀♀ in MRAC (217694, 698, 712, 725, 737), Kakum Forest, fogging in primary forest, 16-25 Nov. 2005 (R. Jocqué, D. De Bakker, L. Baert); 8 ♂♂ 20 ♀♀ in MRAC (217687, 701, 703, 708), same data but secondary forest, 12-19 Nov. 2005; 1 juv. in MRAC (217292), same data but beating in secondary forest, 23 Nov. 2005; 3 ♂♂ 2 ♀♀ in MRAC (217261, 277), same data but beating between primary and secondary forest, 11-12 Nov. 2005; 1 ♂ 2 ♀♀ 1 juv. in MRAC (217173), same data but sieving of forest litter, 10 Nov. 2005. Eastern Region: 2 ♂♂ 1 ♀ 1 juv. in ZFMK (Ar 10528), Atewa Hills, Atewa Atwirebu Reserve at 500 m a.s.l. (6°13.8'N, 0°32.4'W), degraded forest along road, 24 Feb. 2013 (B.A. Huber); 1 ♀ 5 juvs in ZFMK (Ar 10529), Atewa Atwirebu Reserve at 740 m a.s.l. (6°13.8'N, 0°33.5'W), 25 Feb. 2013 (B.A. Huber); 1 juv. in pure ethanol in ZFMK (Gha 139), same data. Western Region: 5 ♂♂ 4 ♀♀ 2 juvs in ZFMK (Ar 10530), Ankasa National Park (5°13.0'N, 2°39.1'W), 180 m a.s.l., forest near entrance, day collecting, 22 Feb. 2013 (B.A. Huber); 2 ♂♂ 2 juvs in pure ethanol in ZFMK (Gha 159), same data; 1 ♂ 2 ♀♀ in ZFMK (Ar 10531), Ankasa National Park, forest along Big Tree Trail (~5°15.1'N, 2°38.4'W), ~100 m a.s.l., 23 Feb. 2013 (B.A. Huber).

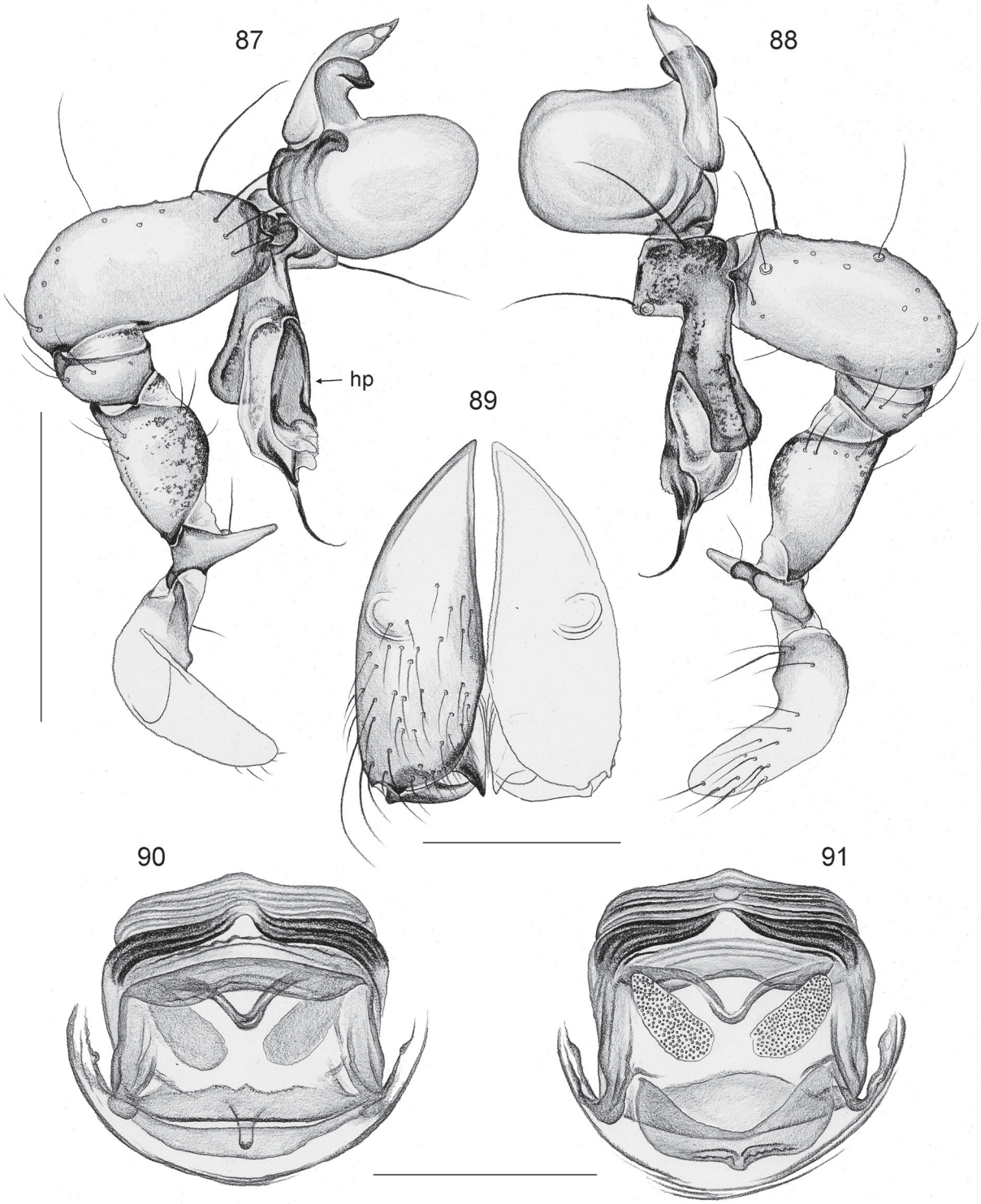
Description

Male (holotype)

Measurements. Total body length 2.1, carapace width 0.7. Leg 1: 22.3 (5.3 + 0.4 + 5.4 + 9.2 + 2.0), tibia 2: 3.1, tibia 3: 2.0, tibia 4: 3.0; tibia 1 L/d: 76. Distance PME-PME 115 µm, diameter PME 95 µm, distance PME-ALE 35 µm, no AME.



Figs 77-86. *Spermophora akwamu* sp. nov. **77-79**. ♂, dorsal, lateral, and ventral views. **80**. ♂ prosoma, oblique frontal view. **81-82**. ♀, ventral and dorsal views. **83-84**. Left ♂ palp, prolateral and retrolateral views. **85-86**. Cleared ♀ genitalia, ventral and dorsal views. Scale lines: 77-79, 81-82 = 1 mm; 80, 83-84 = 0.5 mm; 85-86 = 0.2 mm.



Figs 87-91. *Spermophora akwamu* sp. nov. **87-88**. Left ♂ palp, prolateral and retrolateral views (hp: hinged process). **89**. ♂ chelicerae, frontal view. **90-91**. Cleared ♀ genitalia, ventral and dorsal views. Scale lines: 87-88 = 0.5 mm; 90-91 = 0.3 mm; 89 = 0.2 mm.

Color. Carapace pale gray with narrow black margins and indistinct median line (Fig. 77), ocular area and clypeus dark brown to black, sternum pale gray (Fig. 79), legs ochre-yellow, with indistinct dark rings subdistally on femora and tibiae, abdomen mostly pale gray, with black transversal mark at posterior tip, further black marks posteriorly above spinnerets and near gonopore.

Body. Habitus as in Figs 77-79; ocular area slightly elevated, each triad on low hump; carapace without median furrow (only dark line); clypeus with distinctive pair of dark processes, about 100 µm long (Fig. 80); sternum wider than long (0.55/0.45), unmodified. Chelicerae as in Fig. 89, with pair of weakly sclerotized processes proximally, distally without modification, without stridulatory ridges.

Palps. As in Figs 83-84 and 87-88, coxa with indistinct ventral process, trochanter with long ventral and shorter retrolateral apophyses, procursus with ventral sclerotized flap, prolatero-dorsal hinged process and thin distal flagellum; bulb with hooked apophysis and long weakly sclerotized embolus.

Legs. Without spines and curved hairs, few vertical hairs; retrolateral trichobothrium on tibia 1 at 8.5%; prolateral trichobothrium absent on tibia 1, present on other tibiae; tarsus 1 with >20 indistinct pseudosegments.

Variation. Tibia 1 in 35 other males: 4.3-5.6 (mean 4.8). Some males from type locality with additional small black marks dorsally on abdomen; in both males from Atewa Hills, these marks are present and larger; in males from Ankasa N.P. the abdomen is almost monochromous, without ventral marks, without marks above spinnerets, only mark at posterior tip.

Female

In general similar to male but sternum in most females dark brown or black (Fig. 81), abdomen dorsally with more and larger black marks (Fig. 82), clypeus unmodified, carapace with small median process acting against indistinct sclerotized plate above pedicel. Tibia 1 in 42 females: 3.5-4.4 (mean 3.9). Epigynum simple rectangular plate, anteriorly with dark transversal internal structure, without pockets (Figs 85, 90); internal genitalia as in Figs 86, 91.

Relationships

Judging from the very similar morphology, this species is probably closely related to *S. dieke* from Guinea (cf. figures in Huber 2009) as well as to a further very similar (undescribed) species from Congo DR (in MRAC).

Natural history

The spiders were found both under green leaves where they built slightly domed sheets that extended beyond the leaves (Fig. 13; with the spider resting under a leaf), and in the leaf litter, under curved dead leaves, in small webs apparently not extending beyond the leaf.

Distribution

Known from several localities in southern Ghana (Fig. 34).

Spermophora ziama sp. nov.

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Figs 34, 92-105

Spermophora cf. *tonkoui* – Dimitrov *et al.* 2013 (DNA data).

Diagnosis

Distinguished from *S. tonkoui* (the only similar species and probably closest known relative; see below) by relatively shorter palpal elements (femur, tibia, bulb; Figs 100-101), by large hooked apophysis on bulb (Fig. 100; in *S. tonkoui* pair of small apophyses distally on long bulb), by shorter proximal frontal apophyses on male chelicerae (Fig. 103), and by pair of small pockets in posterior epigynal plate (Fig. 104).

Etymology

The species name is a noun in apposition, derived from the type locality.

Type material

Holotype ♂, in ZFMK (Ar 10532).

Type data

GUINEA: Guinée Forestière: Forêt Classée de Ziama (8°24.2'N, 9°19.3'W), 640 m a.s.l., 2 Dec. 2008 (B.A. Huber).

Other material examined

GUINEA: Guinée Forestière: 1 ♂ 3 ♀♀ in ZFMK (Ar 10533), same data as holotype; 1 ♂ 1 ♀ in ZFMK (Ar 10534), same data, taken alive and died from heat; 4 ♀♀ 1 juv. in pure ethanol in ZFMK (Gui 67), same data.

Description

Male (holotype)

Measurements. Total body length 2.0, carapace width 0.9. Leg 1: 19.3 (4.6 + 0.4 + 5.0 + 7.1 + 2.2), tibia 2: 3.0, tibia 3: 2.1, tibia 4: 2.8; tibia 1 L/d: 57. Distance PME-PME 345 µm, diameter PME 70 µm, distance PME-ALE 35 µm, no AME.

Color. Carapace and clypeus mostly light brown except lighter median band, sternum dark brown, legs ochre-yellow, abdomen mostly dark except dorsal median mark and book-lung covers pale gray.

Body. Habitus as in Figs 92-93; ocular area barely elevated, each triad on short stalk directed laterally, with pair of elongate furrows behind each stalk; carapace without median furrow; clypeus unmodified; sternum wider than long (0.65/0.50), unmodified. Chelicerae as in Figs 102-103, with pair of lateral processes proximally, pair of frontal apophyses proximally close together, and pair of frontal apophyses distally provided with five tiny modified (conical) hairs each; without stridulatory ridges.

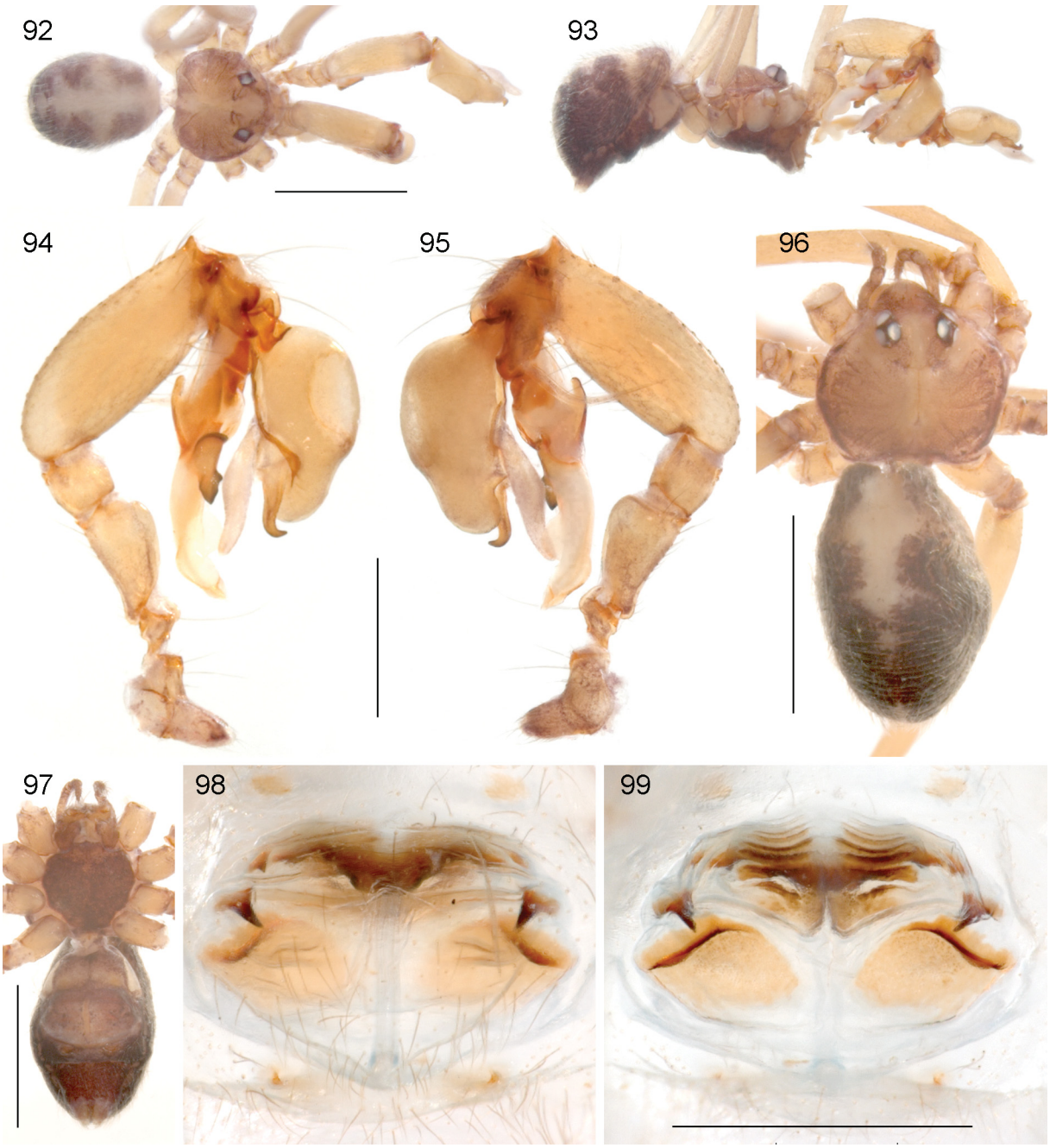
Palps. As in Figs 94-95 and 100-101, coxa unmodified, trochanter with retrolateral apophysis curved towards dorsally, femur with retrolatero-dorsal process proximally, widened distally, tibia very long, dorso-distal rim slightly projecting, procursus complex, apparently with two hinges in proximal part, with long membranous process arising from hinge retrolaterally, distal whitish part provided with many short pseudotrichia ventrally; bulb elongated, with hooked apophysis and long weakly sclerotized embolus.

Legs. Without spines and curved hairs, few vertical hairs (most hairs missing); retrolateral trichobothrium on tibia 1 at 14%; prolateral trichobothrium absent on tibia 1, present on other tibiae; tarsus 1 with >30 very indistinct pseudosegments.

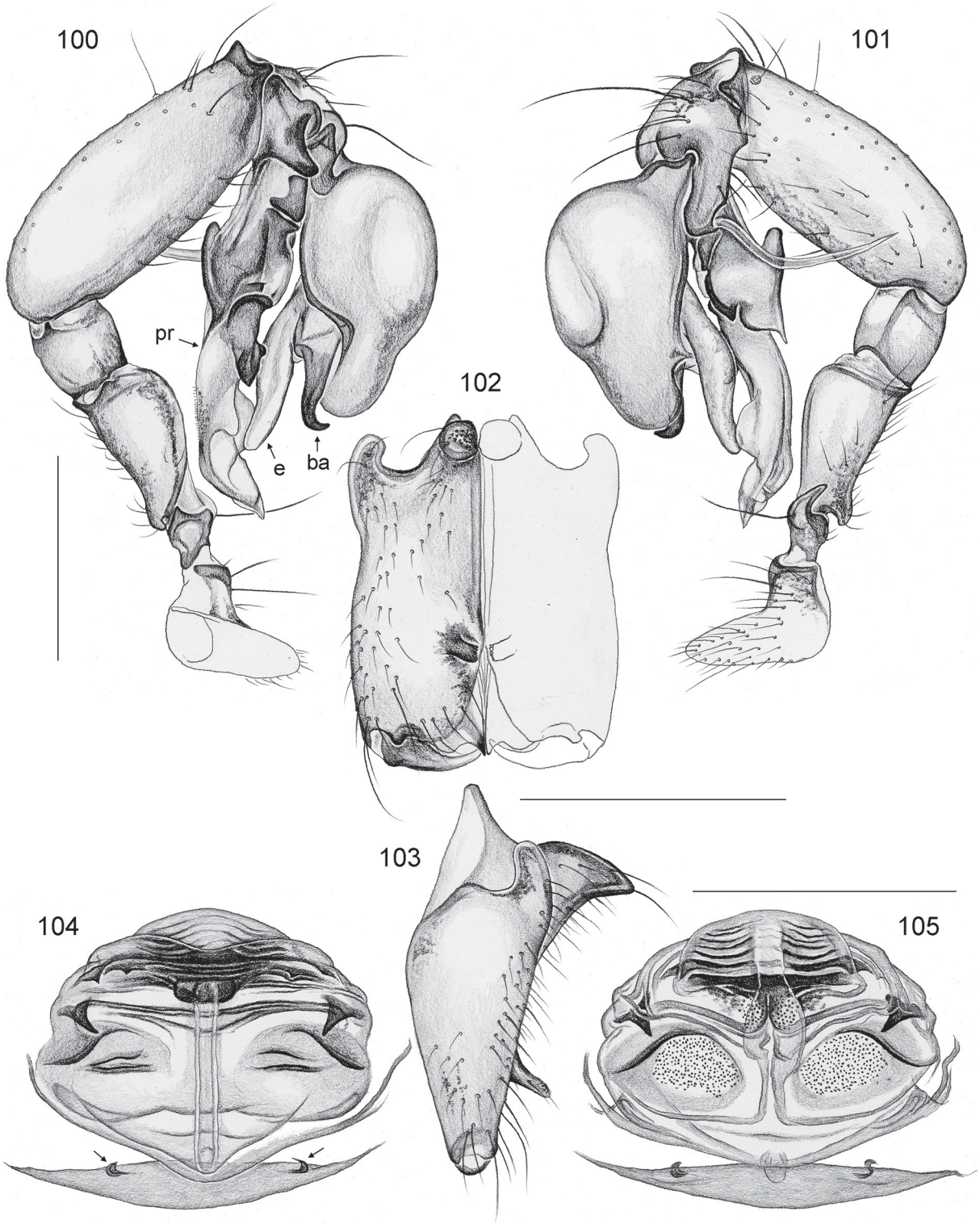
Variation. Tibia 1 in 2 other males: 4.8, 5.4.

Female

In general similar to male but triads closer together (distance PME-PME 185 µm), furrows behind ocular area less distinct (Fig. 96). Tibia 1 in 2 females: 4.6 (both). Epigynum large bulging area with median internal tube-like structure, posterior narrow plate with pair of small pockets (Figs 97, 98, 104); internal genitalia as in Figs 99, 105.



Figs 92-99. *Spermophora ziama* sp. nov. **92-93**. ♂, dorsal and lateral views. **94-95**. Left ♂ palp, prolateral and retrolateral views. **96-97**. ♀, dorsal and ventral views. **98-99**. Cleared ♀ genitalia, ventral and dorsal views. Scale lines: 92-93, 96-97 = 1 mm; 94-95, 98-99 = 0.5 mm.



Figs 100-105. *Spermophora ziama* sp. nov. **100-101**. Left ♂ palp, prolateral and retrolateral views (ba = bulbal apophysis; e = embolus; pr = procursus). **102-103**. ♂ chelicerae, frontal and lateral views. **104-105**. Cleared ♀ genitalia, ventral and dorsal views. Arrows point at pockets in posterior epigynal plate. Scale lines: 100-101, 104-105 = 0.5 mm; 102-103 = 0.3 mm.

Relationships

Several unique characters indicate that *S. ziama* sp. nov. is closely related to *S. tonkoui*: curved retrolateral apophysis on male palpal trochanter; procursus with long transparent retrolateral process and distinctive prolateral sclerite between two putative hinges; distal whitish part of procursus with many short pseudotrichia ventrally; male cheliceral armature (proximal frontal apophyses close together); and tube-like internal structure in female genitalia.

The relationships of these two species to other taxa remain obscure. *Spermophora tonkoui* was explicitly assigned tentatively to the genus (Huber 2003b), and recent analyses of molecular data of *S. ziama* sp. nov. (Dimitrov *et al.* 2013: 12S, 18S, h3) provided contradicting results, mostly poorly supported but suggesting an affinity to a group consisting of African *Spermophora* and the genera *Buitinga* Huber, 2003, *Paramicromerys* Millot, 1946, *Spermophorides* Wunderlich, 1992, and *Belisana* Thorell, 1898 (Dimitrov *et al.* 2013: supplement fig. S2).

Natural history

The spiders were found in crevices in the ground, between soil and roots or between soil and rocks.

Distribution

Known from type locality only (Fig. 34).

Quamtana kitahurira Huber, 2003
Figs 106-113

Quamtana kitahurira Huber, 2003c: 513, figs 24, 204-208 (♂, Uganda).

Quamtana kitahurira – Huber & Warui 2012: 12 (♂, Rwanda).

New records

GUINEA: 8 ♂♂ 4 ♀♀ 1 juv. in pure ethanol, in MRAC (236930), Mt. Nimba, Forêt de Zié, near Gouan camp or "Station de Pompage Zié" [7°40'N, 8°26'W], 1250 m a.s.l., canopy fogging of trees and understory shrub layer, 3 Oct. 2011 (D. Van den Spiegel, A. Henrard); 1 ♂ in pure ethanol, in MRAC (236929), same data but beating trees and shrubs with hanging litter at 1.5-3 m above ground.
ANGOLA: 1 ♂ in SMF (Ang 59.1), near Dundo [~7°23'S, 20°51'E], gallery forest of Chilanda river, in bushes, 4 Oct. 1946 (A. de Barros Machado).

Description

Female

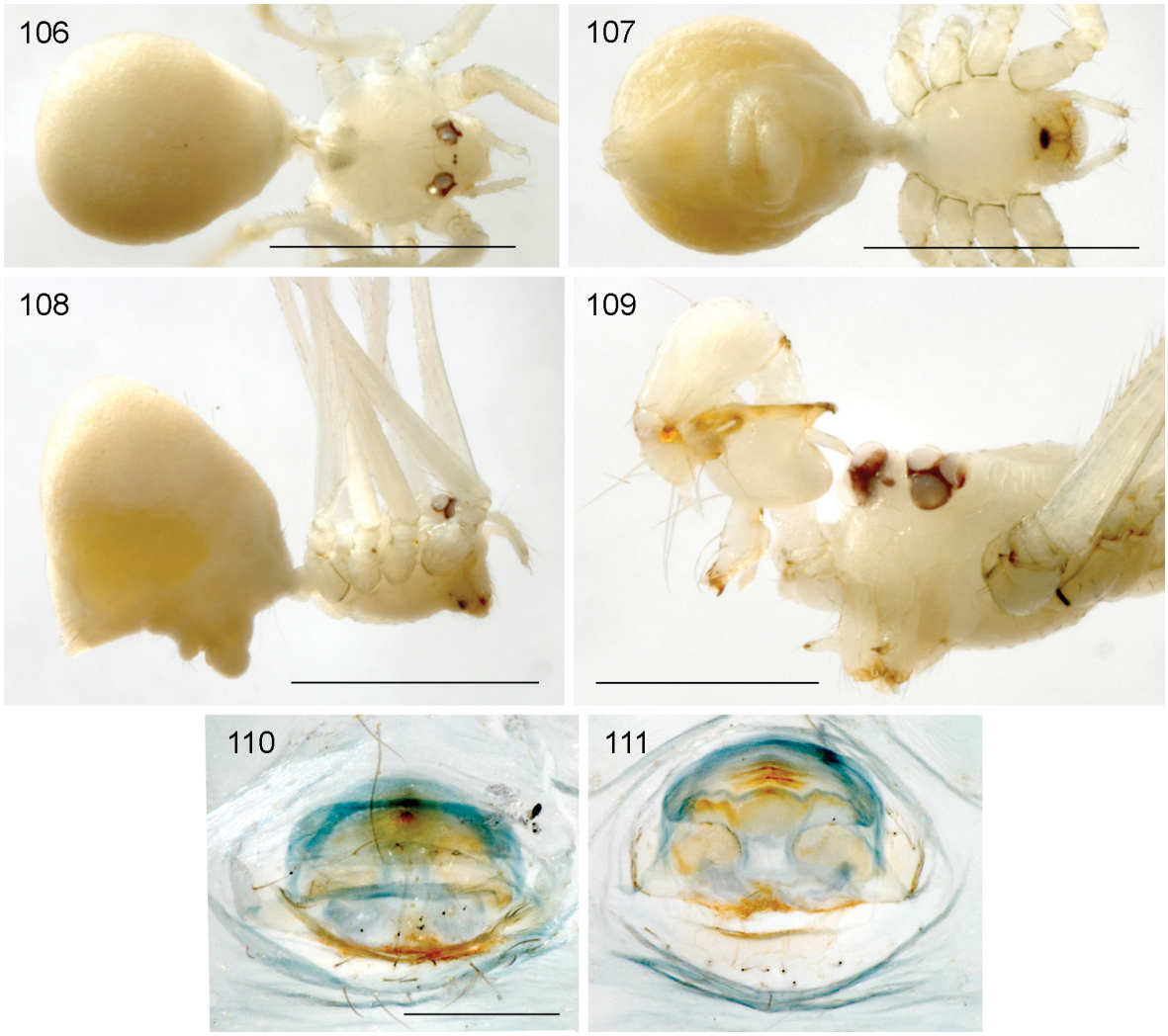
In general similar to male, habitus as in Figs 106-108; entire animal pale ochre-gray, abdomen light yellow-greenish; tibia 1: 3.4, 3.5, 3.8. Epigynum very simple externally, strongly protruding but weakly sclerotized, with pair of pockets not visible in dissecting microscope (Fig. 110; arrows in Fig. 112); internal genitalia as in Figs 111, 113.

Distribution

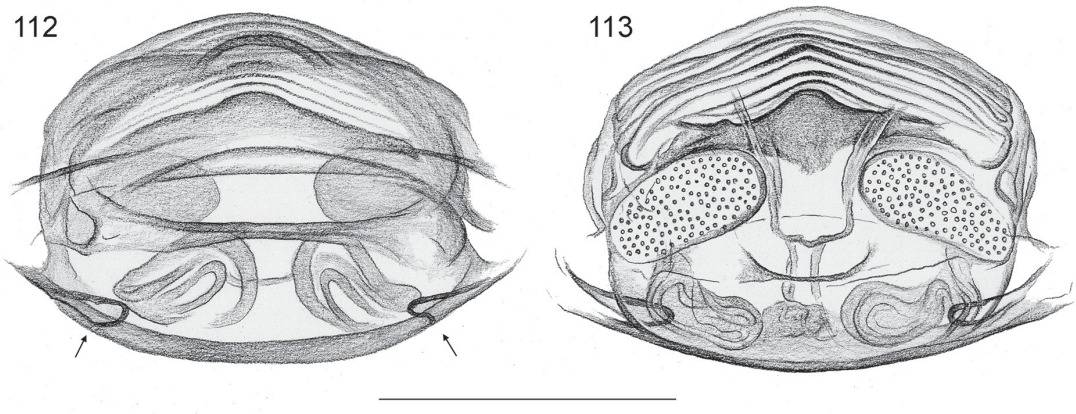
Apparently widely distributed in tropical Africa, but so far only recorded from Uganda, Rwanda, Guinea, and Angola.

Note

The male from Angola has a slightly more slender procursus but it otherwise identical to specimens from Guinea and East Africa; tibia 1: 4.0.



Figs 106-111. *Quamtana kitahurira* Huber, 2003. **106-108**. ♀, dorsal, ventral, and lateral views. **109**. ♂ prosoma, oblique frontal view. **110-111**. Cleared ♀ genitalia, ventral and dorsal views. Scale lines: 106-108 = 1 mm; 109 = 0.5 mm; 110-111 = 0.2 mm.



Figs 112-113. *Quamtana kitahurira* Huber, 2003. Cleared ♀ genitalia, ventral and dorsal views. Arrows point at epigynal pockets. Scale line: 0.2 mm.

Discussion

Distribution patterns

West African pholcids can be divided into five groups (not monophyla) according to their distribution patterns:

West African endemics

Most species listed above (23, i.e. 61%; or 72% if introduced species are not counted) are endemics of the Upper Guinean subregion of the Guineo-Congolian center of endemism. About half of these species belong to species groups that are endemic to the Upper Guinean subregion: the *Pholcus guineensis* group (five species; Huber 2011b); the *Smeringopina guineensis* and *ankasa* groups (three species each; Huber 2013); and *Spermophora tonkoui* + *S. ziama* sp. nov. *Pholcus berlandi* from Senegal seems to belong in a species group more diverse in northern Africa (Huber 2011b). All other species belong in tropical African genera and species groups: *Anansus* is widespread in tropical Africa (Huber 2007; Huber & Warui 2012), with undescribed species in Ethiopia and Angola (interspecific relationships have not been studied; B.A. Huber unpubl. data); *Leptopholcus guineensis* and *L. kintampo* sp. nov. belong in a species group ranging all across tropical Africa (Huber 2011b); *Spermophora dieke* and *S. akwamu* sp. nov. belong in a species group that includes an undescribed species from Congo D.R. (B.A. Huber unpubl. data); *Smeringopina beninensis* is a notable outlier of a group otherwise restricted to Lower Guinea (Huber 2013); finally, *Smeringopina fon* is a species with unclear relationships (closest relatives in Upper or Lower Guinea; Huber 2013).

Sudanian species

Artema bunkpurugu sp. nov. and *Crossopriza soudanensis* are restricted to the northern part of West Africa as defined herein. Both constitute the western limits of genera that are not tropical but range from Sudanian West Africa to Central Asia and northern India (B.A. Huber unpubl. data).

Guineo-Congolian species

Six species are not restricted to the Upper Guinean subregion but cross the Dahomey Gap (and the Cross River Basin) into Lower Guinea or even into Congolia: *Nyikoa limbe* (Upper and Lower Guinea; Huber 2007, 2009); *Leptopholcus tipula* (entire Guineo-Gongolian region from Guinea to Albertine Rift; Huber 2011b); *Pholcus kakum* which has not yet been found in Lower Guinea but ranges deeply into Congolia (Huber 2011b); *Smeringopus cylindrogaster* (entire Guineo-Congolian region at least up to Congo River; closest relatives in Lower Guinea and Congolia; Huber 2012); *Spermophora kyambura* (entire Guineo-Gongolian region from Ghana to Albertine Rift, but note that specimens from Ghana differ slightly from eastern populations; Huber & Warui 2012); finally, *Quamtana kitahurira*, which has been collected in montane forests of the Albertine Rift (Uganda, Rwanda) and is here newly recorded from Mt. Nimba in Guinea and northeastern Angola.

Widespread African species

A single West African species is widespread across several African forest blocks and transition zones: *Pehrforsskalia conopyga*, which ranges from Cape Verde to southern Africa and the Arabian Peninsula (Huber 2011b), possibly as a result of its tolerance of severely degraded forests. The two congeners known are both East African (Huber 2011b).

Synanthropic species

Six widespread synanthropic species originated outside West Africa or even outside Africa and have attained pantropical distributions by human transport: *Physocyclus globosus* (all congeners in Mexico and Central America; Valdez-Mondragón 2010); *Modisimus culicinus* (all congeners around the Caribbean; Huber *et al.* 2010); *Micropholcus fauroti* (origin unclear, possibly Middle East; Huber 2011b); *Smeringopus pallidus* (African genus; closest relatives apparently in eastern Africa; Huber

2012); *Crossopriza lyoni* (closest relatives apparently in Middle East; B.A. Huber unpubl. data); and *Artema atlanta* (origin unclear, possibly Middle East or Central Asia; B.A. Huber unpubl. data).

Diversity and conservation

Until recently it was unclear if the relatively low pholcid diversity in West Africa as compared to East and Central Africa was an artifact resulting from taxonomic neglect or a true phenomenon (Huber 2003b). In the meantime, data have accumulated that strongly suggest that the species diversity in West Africa is indeed significantly lower than in areas of comparable size in Central and East Africa. A recent overview of East African pholcids resulted in a total of 87 species (Huber & Warui 2012), and an upcoming summary paper on Central African pholcids will comprise about 80 species (B.A. Huber unpubl. data). This is in each case more than twice the number reported here for West Africa (38). Six expeditions of comparable duration and collecting effort, two to each region, have resulted in very similar differences among regions: only 28 species in Guinea + Ghana versus 60 species in Gabon + Cameroon and 40 species in Kenya + Uganda. Percentages of undescribed species (as of 2008) collected at these expeditions suggest that the undiscovered diversity is much larger in Central Africa (83%) than in East Africa (53%) and West Africa (43%).

A range of ideas have been proposed to explain why Africa in general appears to be less diverse than South America and tropical Asia (White 2001; Livingstone 2001; Lawson & Klemens 2001; Antonelli & Sanmartín 2011), and some of these explanations may also apply to the low pholcid diversity of West Africa compared to Central and East Africa.

1. Central Africa has a much larger area that is wet enough to support rain forest (about 3.1×10^6 km^2 vs. 1.2×10^6 km^2 in West Africa; Naughton-Treves & Weber 2001).
2. Geologically, West Africa is and has been more homogeneous and stable (especially compared to East Africa), resulting in limited opportunities for speciation (Lawson & Klemens 2001).
3. Pleistocene dry periods have probably affected West Africa more severely than Central Africa, resulting in fewer and smaller refuges of tropical moist forest (Maley 2001).

Human impact in prehistoric times has also been invoked to explain low African diversity in general (White 2001), but whether this was more severe in West than in Central and East Africa is not known.

Another aspect of West African pholcid distribution is pertinent to conservation issues. There seems to be a tendency for West African endemic species to have on average wider distributions than Central African species. Relatively few species in West Africa seem to be local endemics (e.g., *Leptopholcus kintampo* sp. nov.; *Pholcus doucki*; *Spermophora ziama* sp. nov., *S. dieke*), while this is common both in Central Africa (e.g., in *Smeringopina*; Huber 2013) and East Africa (e.g., in *Buitinga* and *Spermophora*; Huber 2003b; Huber & Warui 2012). This certainly requires denser sampling but if it turns out to be true it means that most West African species are not immediately threatened with extinction.

Outlook

After almost a decade of taxonomic work on African pholcids, a fairly realistic framework is emerging about African pholcid diversity and distribution. All major and most small genera represented in Africa have been revised (Huber 2003a, 2003b, 2003c, 2007, 2009, 2011b, 2012, 2013; Huber & El Hennawy 2007; Huber & Warui 2012), and the total number of species has more than tripled from 88 in 2002 to 287. At the level of genera, African pholcids can now be considered relatively well known.

However, the fact that the six expeditions mentioned above resulted in 74% undescribed species (87 of 117 species) clearly demonstrates that much taxonomic work remains to be done. The undiscovered species diversity is still tremendous. Material deposited in major museums has largely been incorporated in the above revisions. This means that if any significant progress is to be made, new collecting is inevitable. In West Africa, the major gaps of knowledge are probably in Liberia and Nigeria. The western

fauna of the Western Guinean forest zone (west of the Sassandra River, i.e. western Ivory Coast and Liberia) is richer than the eastern fauna (e.g., for mammals; Grubb 2001), but Liberia has essentially seen no arachnologists interested in pholcid spiders. Much the same is true for Nigeria, a country almost four times the size of Ghana but with only four pholcid species recorded for the country (versus 18 for Ghana). Nigeria is particularly interesting for its position between Upper and Lower Guinea and with respect to the border between these subregions of the Guineo-Congolian forests (Maley 2001; Grubb 2001; Dowsett-Lemaire & Dowsett 2001).

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