



## Two new genera of small, six-eyed pholcid spiders from West Africa, and first record of *Spermophorides* for mainland Africa (Araneae: Pholcidae)

BERNHARD A. HUBER

Alexander Koenig Zoological Research Museum, Adenauerallee 160, D-53113 Bonn, Germany. E-mail: b.huber.zfmk@uni-bonn.de

### Abstract

Two new genera of West African pholcid spiders are described: *Nyikoa* n. gen., with the widely distributed *N. limbe* n. sp. (Ghana, Cameroon, Congo DR) as the single known species, and *Anansus* n. gen., with three species described herein (*A. aowin* n. sp. from Ivory Coast, *A. ewe* n. sp. from Ghana, *A. debakkeri* n. sp. from Congo DR) and a further species from Cameroon that remains undescribed. Both genera belong to the subfamily Pholcinae, and cladistic analysis of morphological characters further suggests that both represent early offshoots in pholcine spider diversification. A further species described herein (*Spermophorides africana* n. sp.) is the first African representative of this genus that is otherwise mainly known for its conspicuous radiation on the Canary Islands. Male and female genital characters, leg measurements, as well as ultrastructural data support the inclusion of this Tanzanian species in *Spermophorides*.

**Key words:** Pholcidae, West Africa, taxonomy, cladistic analysis, relict, *Nyikoa*, *Anansus*, *Spermophorides*

### Introduction

Recent studies on African pholcids have shown that in several regions the family is highly diverse at the level of species: the genera *Zatavua* and *Paramicromerys* are represented by numerous species on Madagascar (Huber 2003a), the genus *Buitinga* is speciose in Eastern Africa (Huber 2003b), and *Quamtana* is species-rich in South Africa (Huber 2003c). One high-biodiversity area that has conspicuously remained out of focus is tropical Western Africa, where many dozens of species present in collections remain undescribed, mostly representatives of the genera *Pholcus* and *Smeringopina* (B. A. Huber, unpublished data). At the level of genera, on the other hand, African pholcid diversity seems to be fairly well known, and it is remarkable that with 13 described autochthonous genera this diversity is well below that of the New World (46) or even South America alone (33). Nevertheless, a few genera remain to be described (and some more probably remain to be discovered), and these may prove to be especially interesting as some of them may represent early offshoots of pholcid diversification. The present study focuses primarily on two such genera from Western Africa, one represented only by the type species, the second by four species, three of which are described below. The fact that over the last six years I have seen more than 2000 vials with pholcids from all over Africa suggests that the low number of known species in these two genera is not just an artifact of poor sampling. Interestingly, the cladistic analysis indeed suggests that both genera represent early branches in the subfamily Pholcinae and thus possibly represent relict taxa.

The second focus of this paper is on a representative of *Spermophorides*, a genus that has gone through a conspicuous radiation on the Canary Islands (23 described species) and is also known from southwestern Europe and some Mediterranean islands (the assignment of *S. lascars* Saaristo from the Seychelles needs to be reconsidered). The presence of the genus in Africa was thus to be expected, but among the hundreds of vials

seen, only one vial contained specimens of *Spermophorides*. This first known African *Spermophorides* species is described below. Male and female genital characters, leg measurements, as well as ultrastructural data support the inclusion of the species in *Spermophorides*.

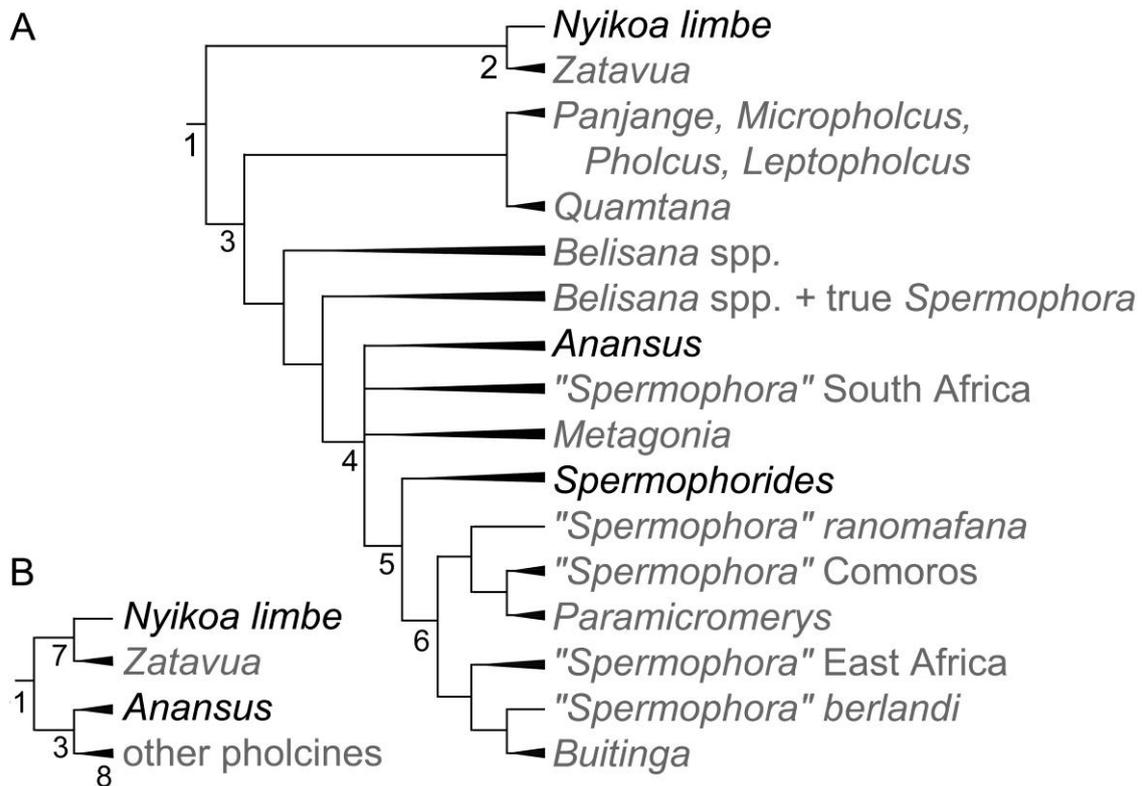
## Material and methods

Material studied herein is deposited in the following institutions: CAS (California Academy of Sciences, San Francisco), MHNG (Muséum d'Histoire Naturelle, Genève), MRAC (Musée royal de l'Afrique Centrale, Tervuren), USNM (National Museum of Natural History, Washington DC), and ZFMK (Zoologisches Forschungsmuseum Alexander Koenig, Bonn). Methods and terminology are as in Huber (2000). Measurements are in mm (+/- 0.02 mm if two decimals are given) unless otherwise noted. Eye measurements are +/- 5 µm. Drawings were done with a camera lucida on a Leitz Dialux 20 compound microscope. Photos were made with a Nikon Coolpix 995 digital camera (2048 x 1536 pixels) mounted on a Nikon SMZ 1500 dissecting microscope. For SEM photos, specimens were dried in HMDS (Brown 1993), and photographed with a Hitachi S-2460 scanning electron microscope.

The numerical cladistic analysis was done using NONA, version 2.0 (Goloboff 1993). The matrix used is a slight modification of a previous matrix (Huber 2005; the matrix with the most complete representation of pholcines), differing only by the addition of two taxa described below (*Nyikoa limbe*, *Anansus aowin*), resulting in a total of 74 taxa and 60 characters. The final matrix can be downloaded at <http://www.uni-bonn.de/~bhuber1/matrices.html>. Cladogram analysis was done with Winclada, version 1.00.08 (Nixon 2002). See Relationships for details of the analysis.

## Relationships

Using NONA with **hold/50**, **mult\*100**, and **amb-** results in six most parsimonious cladograms with a length of 160 (CI = 40; RI = 78). These cladograms are largely congruent with respect to the taxa relevant in the context of the present paper, and Figure 1A shows one of the six cladograms. Differences in other cladograms include the paraphyly versus monophyly of *Quamtana* (a problem that has been discussed in detail in Huber 2003c), and the polyphyly versus paraphyly of *Belisana* (discussed in Huber 2005). The only variation relevant here concerns the position of *Nyikoa*. It is either sister to *Zatavua* or sister to all other pholcines. The former solution is also supported by successive weighting (Fig. 1B), the latter solution implies loss and regain of epiandrous spigots. Therefore, I consider the topology shown in Fig. 1A as the preferred hypothesis. The position of *Anansus* is consistent in the cladograms based on equal character weights but differs in the cladograms using differential character weighting. Using equal weights resolves *Anansus* as representative of a large, mainly African group of genera characterized by the dorsal rather than prolateral attachment of the genital bulb to the cymbium (clade 4 in Fig. 1A). Successive weighting on the other hand puts more weight on the proximal cheliceral apophyses that point backwards in *Anansus* just as in *Nyikoa* and *Zatavua*. Accordingly, *Anansus* is in this analysis seen as a much more "basal" taxon within pholcines (Fig. 1B). Unambiguous is the position of *Spermophorides africana* n. sp. within *Spermophorides*. In all trees of both analyses (equal weights, successive weighting), *S. africana* joins the two unquestionable *Spermophorides* species (a Canary Island species and a Mediterranean species, both unidentified; collection data in Huber 2005) in a trichotomy. For further details on the characters supporting individual clades see Fig. 1 and below.



**FIGURE 1.** Cladograms of pholcines, using equal character weights (A) and successive weighting (B) in NONA. Wedge-shaped branches represent multiple taxa in a clade. Numbered clades are supported as follows: **1.** (Pholcinae) proximo-lateral apophyses on male chelicerae, six eyes, embolus tubular and membranous. **2.** Male palpal tibia-tarsus joints shifted to prolateral side. **3.** Male palpal trochanter with retrolateral apophysis. **4.** Genital bulb attached dorsally. **5.** ALS “piriform gland spigots” absent. **6.** Eye triads widely separated. **7.** Like 2 above, plus male palpal tibia spindle-shaped. **8.** Proximo-lateral apophyses on male chelicerae directed upwards, not backwards.

## Taxonomy

### Pholcidae C. L. Koch, 1851

#### *Nyikoa*, n. gen.

##### **Type species.** *Nyikoa limbe*, n. sp.

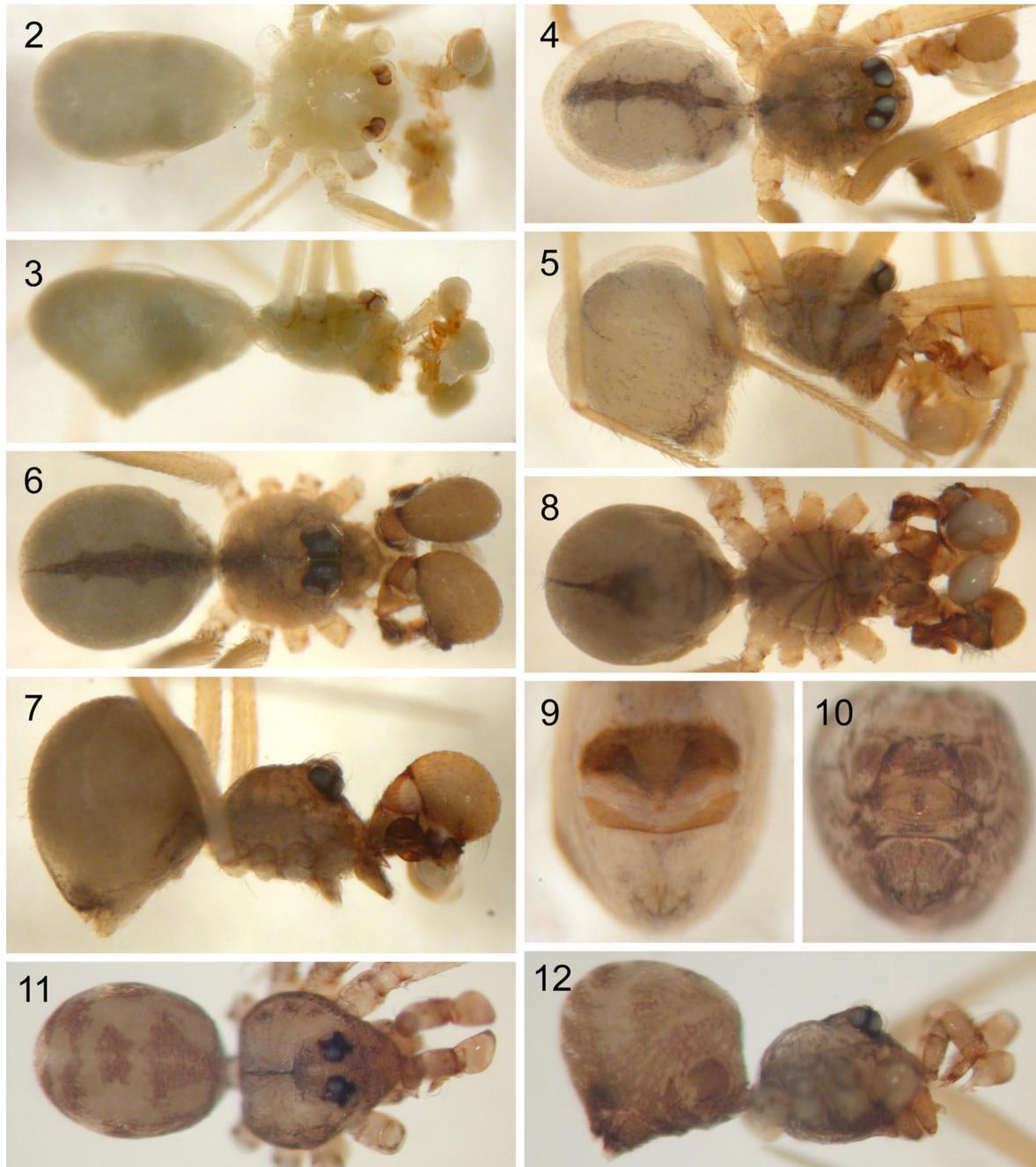
**Etymology.** Named for Nyiko, a heroic spider god in Cameroon mythology. Gender female.

**Diagnosis and description.** See single known species below.

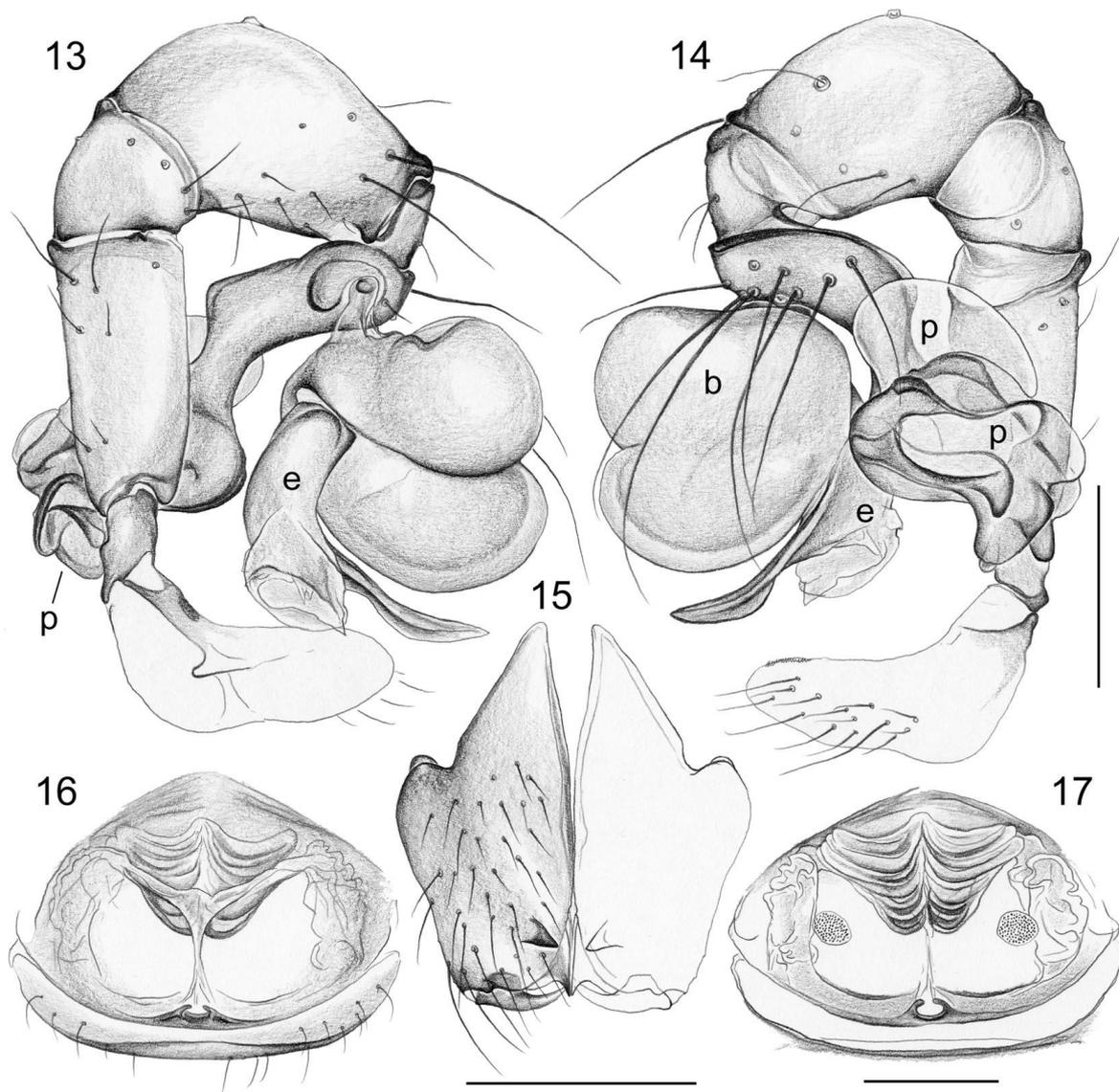
**Relationships.** As indicated above, *Nyikoa limbe* was either resolved as sister to the Malagasy genus *Zataavua* or as sister to all other pholcines. The regain of epiandrous spigots by all other pholcines implied by the latter solution is not impossible biologically, but is here seen as a solution less probable than one that only implies loss of epiandrous spigots. The sister-group relationship between *Nyikoa* and *Zataavua* is supported by one character in the analysis using equal weights (shift of male palpal tibia-tarsus joints; see Fig. 13 and discussion of this character in Huber 2003a), by two characters in the analysis using successive weighting (same as above, plus spindle-shaped male palpal tibia, a character whose coding is not unambiguous).

*Nyikoa limbe*, n. sp.  
(Figs. 2–3, 13–31)

**Type material.** Male holotype from Cameroon, Southwest Province, Fako Division, Limbe Subdivision, 1.4 km NE of Etome (04°03.0'N, 09°07.6'E), ~400 m a.s.l., January 13–19, 1992 (S. Larcher, G. Hormiga, J. Coddington, C. Griswold, C. Wanzie), in USNM.



**FIGURES 2–12.** Photographs of habitus and female abdomens. **2, 3.** *Nyikoa limbe*, male in dorsal and lateral views. **4, 5.** *Anansus aowin*, male in dorsal and lateral views. **6–8.** *Anansus ewe*, male in dorsal, lateral, and ventral views. **9.** *Anansus ewe*, female abdomen, ventral view. **10.** *Spermophorides africana*, female abdomen, ventral view. **11, 12.** *Spermophorides africana*, male in dorsal and lateral views.

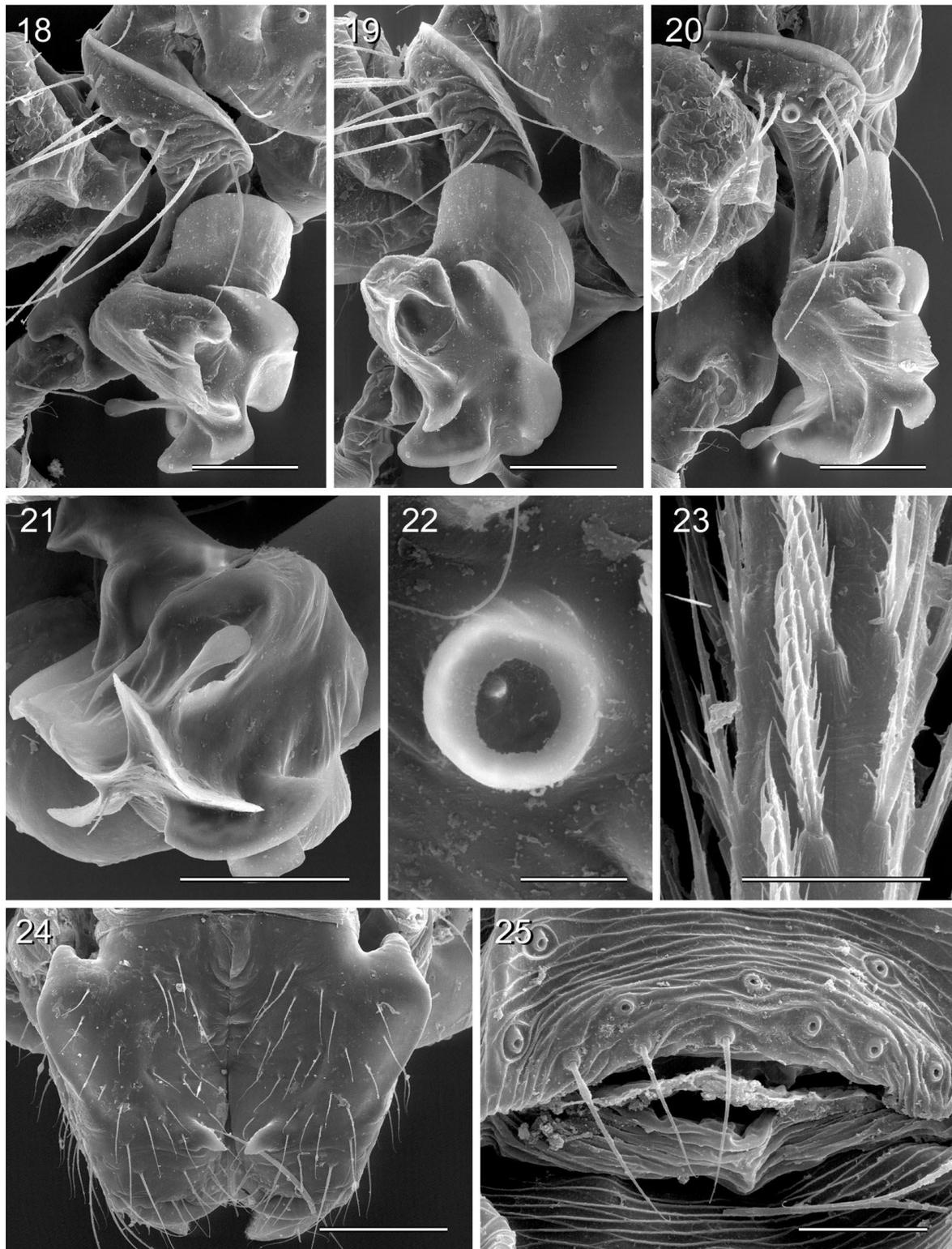


**FIGURES 13–17.** *Nyikoa limbe* n. sp. **13, 14.** Left palp, prolateral and retrolateral views. **15.** Male chelicerae, frontal view. **16, 17.** Cleared epigynum, ventral and dorsal views. b, bulb; e, putative embolus; p, procurus. Scale lines: 0.2 mm.

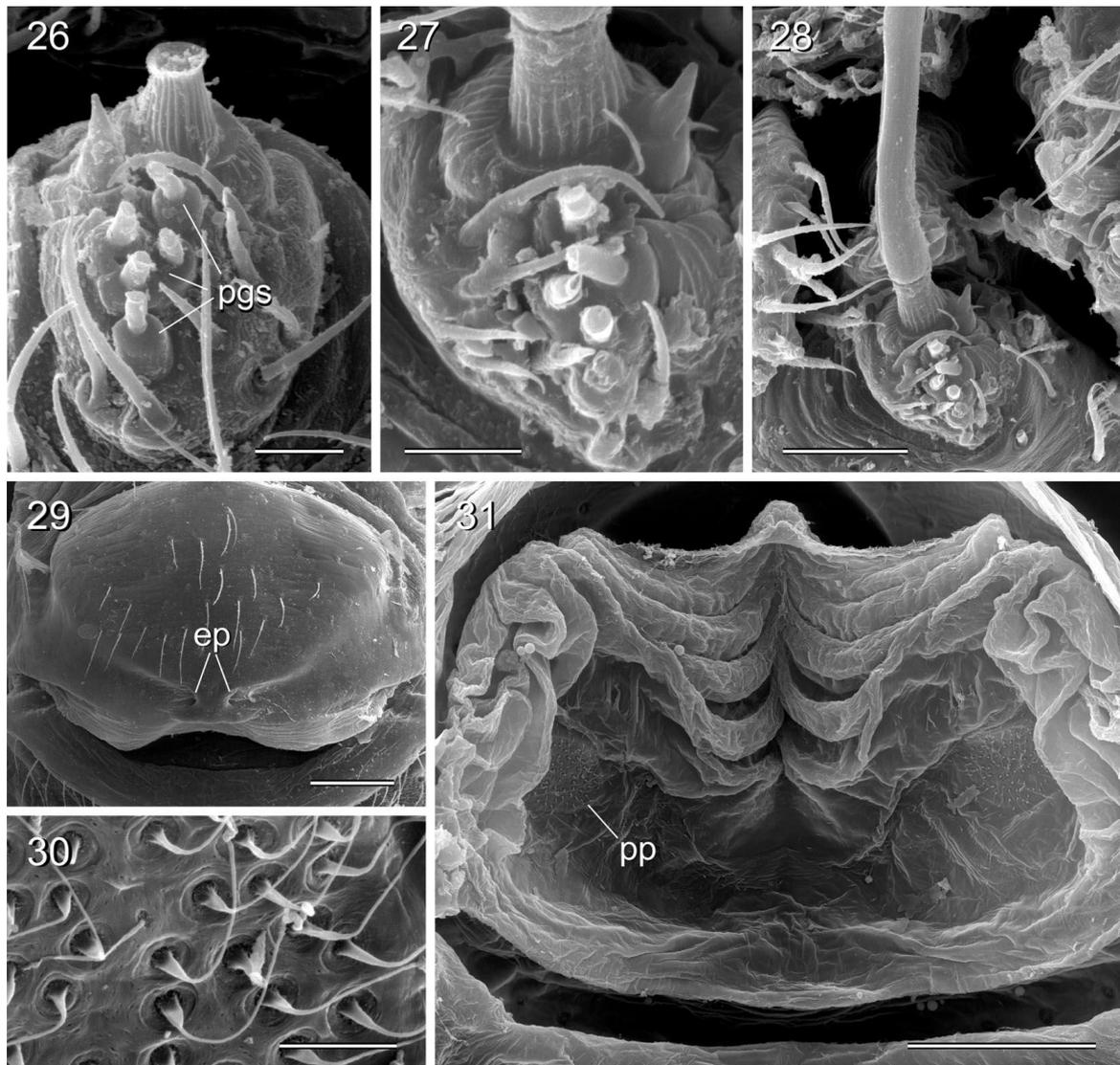
**Etymology.** The species name is derived from the type locality, and is used as a noun in apposition.

**Diagnosis.** Small but long-legged six-eyed pholcine (proximo-lateral cheliceral apophyses!), easily distinguished from other known pholcines by unique and extremely complex procurus (Fig. 14). Further distinguished from other African six-eyed pholcines by combination of following characters: male cheliceral apophyses without modified hairs (Fig. 15); epigynum without scape (Fig. 16); prolateral attachment of bulb (Fig. 13); absence of retrolateral notch proximally on cymbium (Fig. 14); widely spaced eye triads (Fig. 2); presence of several ALS spigots (versus two) (Fig. 26); shift of tibia-cymbium joints to prolateral (rather than to retrolateral) side (Fig. 13).

*Male (holotype).* Total length 1.7, carapace width 0.60. Leg 1: 14.0 (3.4 + 0.3 + 3.6 + 5.4 + 1.3), tibia 2: 2.2, tibia 3: 1.3, tibia 4: 2.4. Tibia 1 length/diameter (L/d): 50. Habitus as in Figs. 2, 3; coloration mostly pale



**FIGURES 18–25.** *Nyikoa limbe* n. sp. **18–21.** Left procurus, retrolateral (18), ventral (19), dorsal (20) and distal (21) views. **22.** Male palpal tarsal organ. **23.** Comb hairs ventrally on male tarsus 4. **24.** Male chelicerae, frontal view. **25.** Male gonopore. Scale lines: 10  $\mu$ m (22), 30  $\mu$ m (23, 25), 100  $\mu$ m (18–21, 24).



**FIGURES 26–31.** *Nyikoa limbe* n. sp. **26.** Female ALS. **27.** Male ALS. **28.** Male ALS with thick silk line emerging from widened spigot. **29.** Epigynum, ventral view. **30.** Detail of pore plate. **31.** Dorsal view of cleared female internal genitalia. ep, epigynal pockets; pgs, “piriform gland spigots”; pp, pore plate. Scale lines: 7  $\mu$ m (26, 27, 30), 20  $\mu$ m (28), 100  $\mu$ m (29, 31).

ochre-yellow, abdomen pale ochre-gray; distance PME–PME 175  $\mu$ m; diameter PME 70  $\mu$ m; distance PME–ALE 15  $\mu$ m; AME missing. Sternum wider than long (0.44/0.38), unmodified. Clypeus unmodified; chelicerae with pair of simple frontal apophyses (Figs. 15, 24), without stridulatory ridges. Palps as in Figs. 13, 14; coxa unmodified, trochanter simple, without apophysis, femur, patella and tibia widened but otherwise unmodified; procurus distinctive, highly complex (Figs. 18–21), bulb with bifid projection, one part membranous (embolus?), other part thin blade-like; palpal tarsal organ capsulate (Fig. 22). Legs without spines and curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 12%, prolateral trichobothrium apparently absent on tibia 1, present on other legs; tarsus 1 with >10 pseudosegments, but only distally a few visible in dissecting microscope; tarsus 4 with complex comb-hairs ventrally (Fig. 23). Male gonopore without epiandrous spigots (Fig. 25). ALS with one widened, one pointed, and five cylindrically shaped spigots (Fig. 27).

**Variation.** Tibia 1 in other males: Cameroon (type locality, N=9): 3.4–3.8 (mean: 3.54), Ghana (N=20): 3.0–3.7 (mean: 3.33), Congo DR (N=20): 3.2–3.7 (mean: 3.45). No variation seen in genitalia and chelicerae.

**Female.** In general similar to male. Tibia 1: Cameroon (N=6): 3.2–3.4 (mean: 3.27), Ghana (N=22): 2.9–3.3 (mean: 3.08), Congo DR (N=20): 3.0–3.4 (mean: 3.21). Epigynum very inconspicuous from outside, barely distinguishable from surrounding cuticle but somewhat protruding, with pair of pockets close together (Fig. 29); with round pore plates and complex ‘valve’ separating uterus externus from uterus internus (Figs. 17, 31).

**Distribution.** Apparently widely distributed, currently known from three localities in Ghana, Cameroon, and Congo DR (Fig. 74).

**Material examined.** CAMEROON: Southwest Province, Fako Division, Limbe Subdivision, 1.4 km NE of Etome: type above, together with 7♂4♀, in USNM. Same data, 3♂2♀ in CAS. GHANA: Kakum forest (5°20’N, 1°23’W), fogging in secondary forest, Nov. 19, 2005 (R. Jocqué, D. De Bakker, L. Baert), ~25♂29♀ in MRAC (217.690); same data but various dates (Nov. 15–24, 2005), ~8♂8♀ in MRAC (217.689, 217.721, 217.730, 217.734, 217.738); same data but primary forest, various dates (Nov. 14–25, 2005), ~22♂37♀ in MRAC (217.693, 217.702, 217.709, 217.718, 217.736). CONGO DR: Bas-Congo, Mayombe, Luki Forest Reserve, fogging in primary rainforest, Nov. 4–13, 2006 (D. De Bakker, J. P. Michiels), ~27♂54♀ in MRAC (4 vials, separated from 219.850–1, 219.853–5); same locality, beating along trail in primary rainforest, Nov. 5, 2006 (D. De Bakker, J. P. Michiels), 1♂1♀ in MRAC (219.973).

### *Anansus*, n. gen.

**Type species.** *Anansus aowin*, n. sp.

**Etymology.** Named for Anansi, one of the most important gods of west African lore, depicted as a spider, a human, or combinations thereof. Gender male.

**Diagnosis.** Small, short-legged, six-eyed pholcines (proximo-lateral cheliceral apophyses!), distinguished from other known pholcines by combination of following characters: small male palpal femur but extremely large and thick tibia (Figs. 33, 40, 58); bulb with single process (embolus) (Figs. 32, 39, 47); procurus with distinctive sclerite provided with retrolateral brush of long hairs (Figs. 33, 40, 53); unique pattern on sternum in males and females (Fig. 8); male cheliceral apophyses without modified hairs (Fig. 44); epigynum without scape (Figs. 35, 41, 60); eye triads close together (Figs. 4, 6); presence of several ALS spigots (versus two) (Fig. 49, 55).

**Description.** See species descriptions below.

**Relationships.** As indicated above, *Anansus* is either resolved as representative of a mainly African group of genera characterized by the dorsal rather than prolateral attachment of the genital bulb to the cymbium, or as a much more “basal” taxon within pholcines (Figs. 1A, B). The latter topology considers posteriorly directed cheliceral apophyses as plesiomorphic for pholcines, while upward pointing cheliceral apophyses are a synapomorphy of the sister group of *Anansus* (clade 8 in Fig. 1B). Both solutions make sense biologically, so the phylogenetic position of this genus within pholcines remains open.

**Distribution.** The three species described below are from Ivory Coast, Ghana, and Congo DR (Fig. 74). The MRAC has a further closely related species from Cameroon (Mbam near Koutoupi, MRAC 167.984). The single male specimen is very poorly preserved and therefore not described herein.

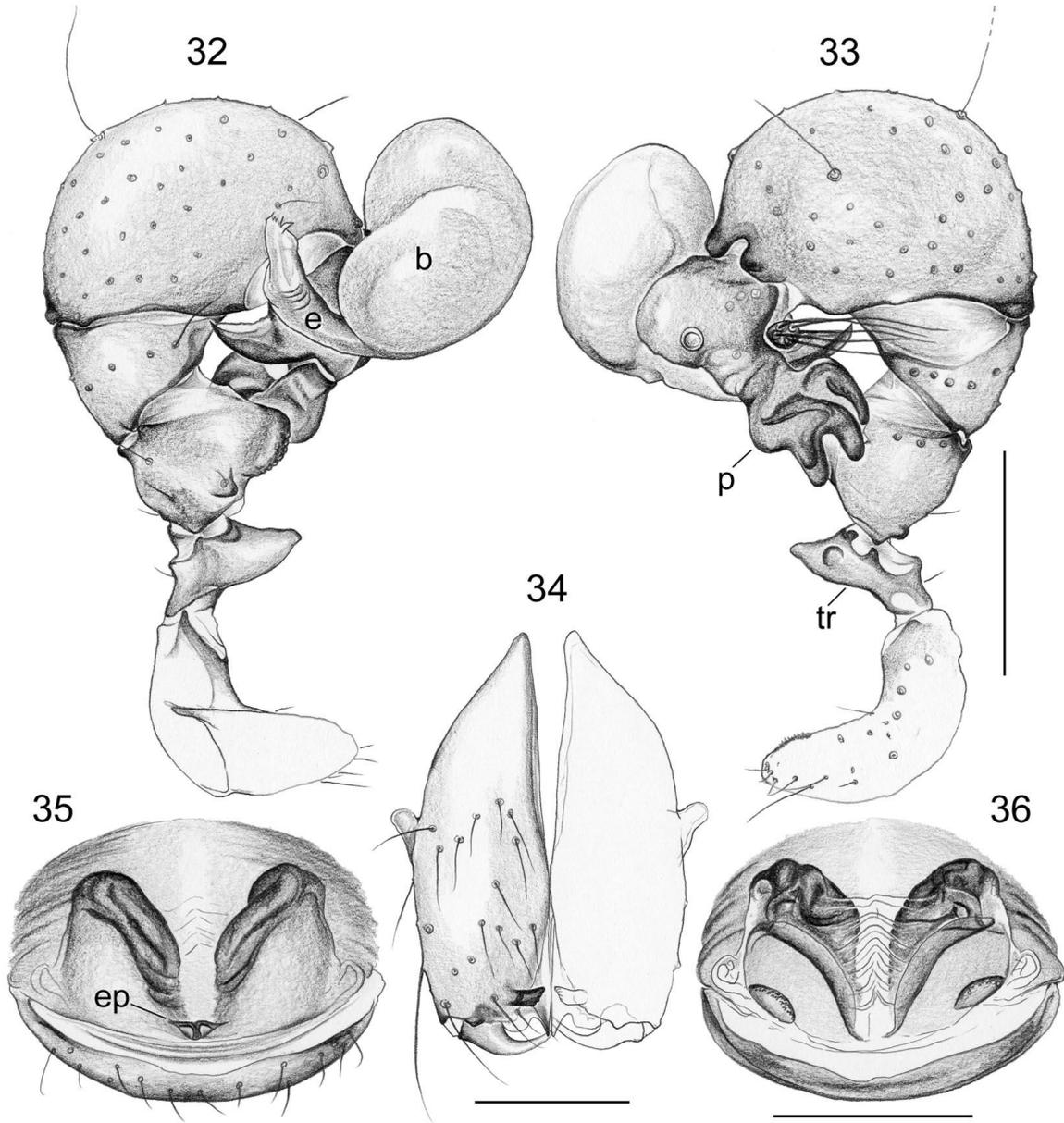
### *Anansus aowin*, n. sp.

(Figs. 4, 5, 32–37, 43–51)

**Type material.** Male holotype from Ivory Coast, Appouesso, FC Bossematie (6°35’N, 3°28’W), rain forest, Winkler extraction of sieved litter, February 13–15, 1997 (R. Jocqué, L. Baert), in MRAC (205.397).

**Etymology.** Named for the Aowin, an Akan people living in southern Côte d'Ivoire.

**Diagnosis.** Distinguished from known congeners by the morphology of the procurrus (Figs. 33, 37) and the internal female genitalia (Fig. 36). Otherwise very similar (including male chelicerae).



**FIGURES 32–36.** *Anansus aowin* n. sp. **32, 33.** Left palp, prolateral and retrolateral views. **34.** Male chelicerae, frontal view. **35, 36.** Cleared epigynum, ventral and dorsal views. b, genital bulb; e, embolus; ep, epigynal pocket; p, procurrus; tr, trochanter. Scale lines: 0.1 mm (34), 0.2 mm (32, 33, 35, 36).

*Male (holotype).* Total length 1.04, carapace width 0.48. Leg 1: 3.87 (0.97 + 0.20 + 0.97 + 1.20 + 0.53), tibia 2: 0.67, tibia 3: 0.50, tibia 4: 0.77. Tibia 1 L/d: 17. Habitus as in Figs. 4, 5; carapace brown, mottled with black, sternum with distinctive pattern of four black lines on each side (cf. Fig. 8), legs light brown to ochre-yellow, abdomen gray with distinct black line dorsally reaching the spinnerets (Fig. 4); distance PME–PME 25  $\mu$ m; diameter PME ~80  $\mu$ m (slightly oval shape); distance PME–ALE 15  $\mu$ m; AME missing. Sternum wider than long (0.38/0.30), unmodified. Clypeus with tiny median projection on ventral rim (Fig. 43); cheli-

cerae with pair of simple frontal apophyses (Figs. 34, 44), with proximo-lateral apophyses directed backwards (Fig. 46), without stridulatory ridges. Palps as in Figs. 32, 33; coxa unmodified, trochanter with distinct ventral apophysis, femur small, with prominent ventral and small prolateral projections, tibia very large, procurus (Figs. 37, 45) consisting of proximal part with ventral pointed projection and distinctive sclerite set with brush of hairs, and large distal part, the latter complex and hinged towards proximal part; bulb simple, consisting of globular part and weakly sclerotized curved embolus (Fig. 47); palpal tarsal organ capsulate. Legs without spines and curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 25%, prolateral trichobothrium apparently absent on tibia 1, present on other legs; tarsus 1 with about 12 pseudosegments, only distally fairly distinct; tarsus 4 with complex comb-hairs ventrally (Figs. 50, 51). Male gonopore with four epiandrous spigots (Fig. 48). ALS with one widened, one pointed, and five cylindrically shaped spigots (Fig. 49).

**Variation.** Tibia 1 in other males: 1.03, 1.07. No other variation seen.

**Female.** In general similar to male but clypeus unmodified. Tibia 1: 0.87 (missing in other female). Epigynum a simple dark frontal plate with pair of small pockets close together near posterior rim, and narrow posterior plate (Fig. 35; externally similar to *A. ewe*, cf. Fig. 9); internally with conspicuous dark structures of unknown significance and pair of small pore plates (Fig. 36).

**Distribution.** Known from type locality in Ivory Coast only (Fig. 74).

**Material examined.** IVORY COAST: Appouesso, FC Bossematie: type above; same data but Feb. 13, 1997, rain forest, sieved litter, 3♂2♀ in MRAC (205.452).

#### *Anansus ewe*, n. sp.

(Figs. 6–9, 38–42, 52–56)

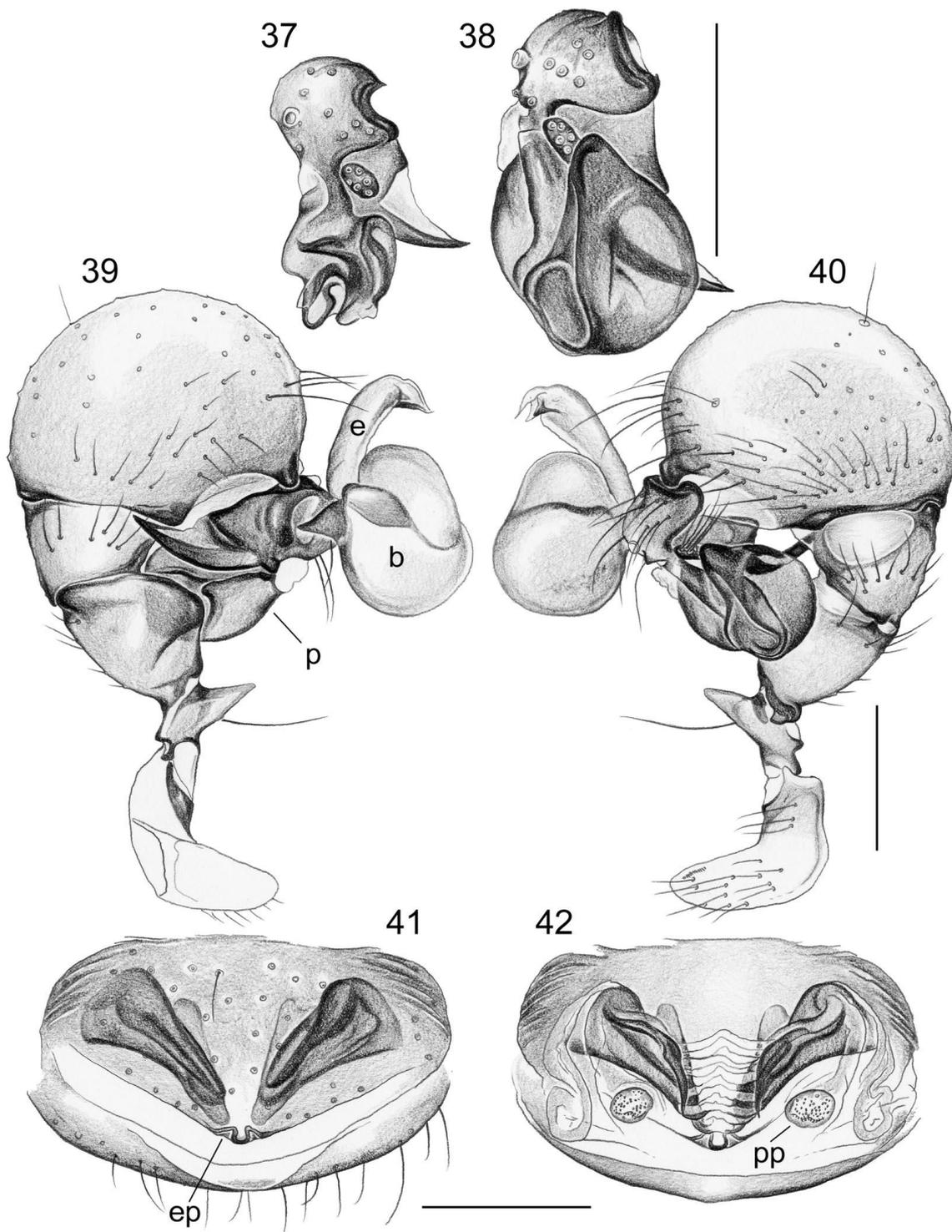
**Type material.** Male holotype from Ghana, Kakum forest (5°20'N, 1°23'W), fogging in secondary forest, November 15, 2005 (R. Jocqué, D. De Bakker, L. Baert), in MRAC (217.722).

**Etymology.** Named for the Ewé people in southeastern Ghana and the southern parts of neighboring Togo and Benin. The species name is used as a noun in apposition.

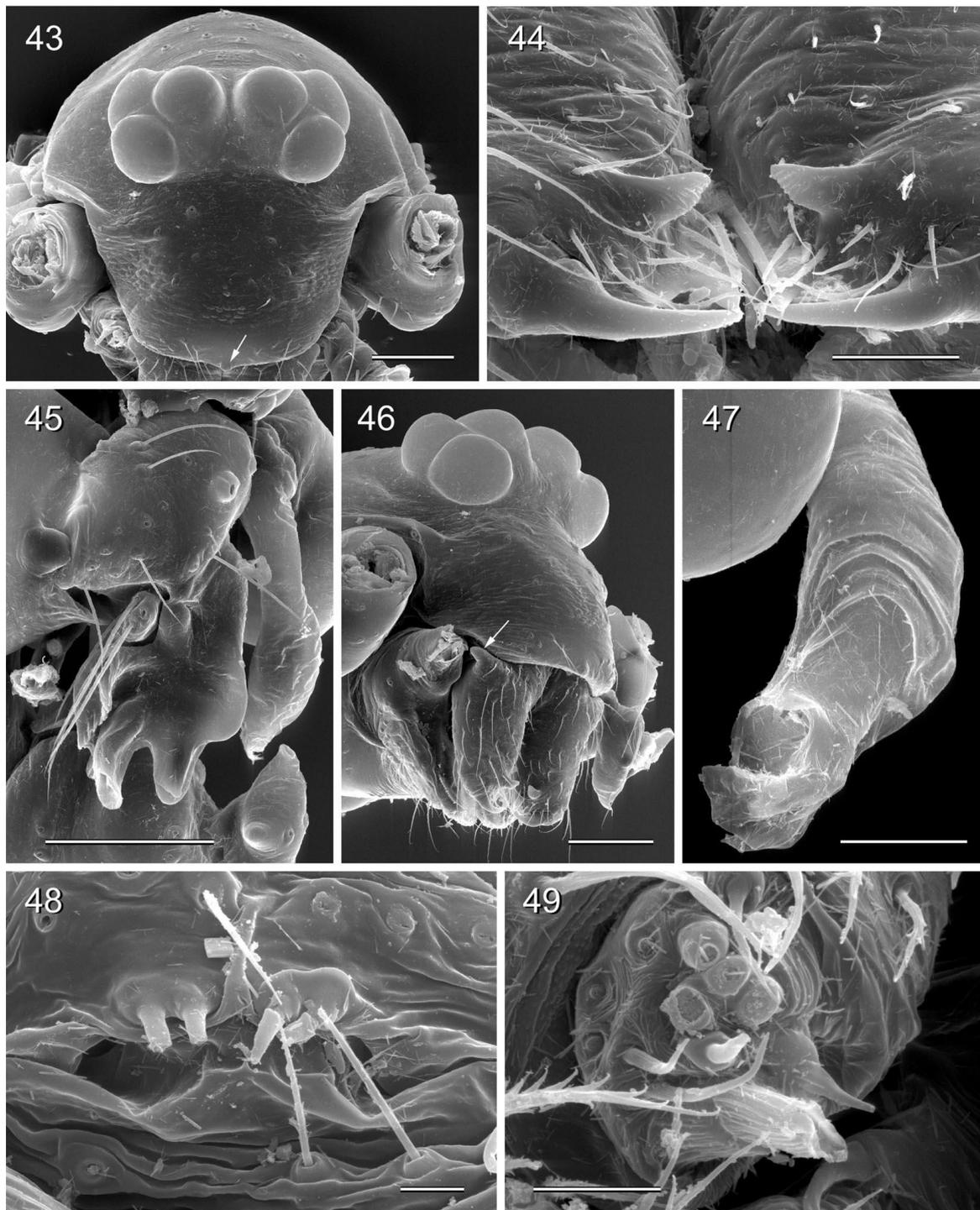
**Diagnosis.** Easily distinguished from known congeners by the morphology of the procurus (Figs. 38, 40) and the internal female genitalia (Fig. 42). Otherwise very similar (including male chelicerae).

**Male (holotype).** Total length 1.16, carapace width 0.50. Legs 1 and 2 missing (also missing in second male examined), tibia 3: 0.56, tibia 4: 0.80. Habitus as Figs. 6–8; carapace and clypeus brown, mottled with black, sternum as in Fig. 8, legs light brown to ochre-yellow, abdomen gray with distinct black line dorsally reaching spinnerets; distance PME–PME 25 µm; diameter PME ~80 µm (oval shape); distance PME–ALE 15 µm; AME missing. Sternum wider than long (0.40/0.30), unmodified. Clypeus with short median projection at ventral rim; chelicerae as in *A. aowin* (cf. Fig. 34). Palps as in Figs. 39, 40; coxa unmodified, trochanter with distinct ventral apophysis, femur small, with prominent prolatero-ventral projection, tibia very large, procurus (Figs. 38, 52) consisting of proximal part with pointed ventral projection and distinctive sclerite set with hairs (Fig. 53), and large distal part, the latter hinged towards proximal part and complex; bulb simple, consisting of globular part and weakly sclerotized curved embolus; palpal tarsal organ capsulate (Fig. 52). Male gonopore with four epiandrous spigots (Fig. 54). ALS with one widened, one pointed, and five cylindrically shaped spigots (Fig. 55).

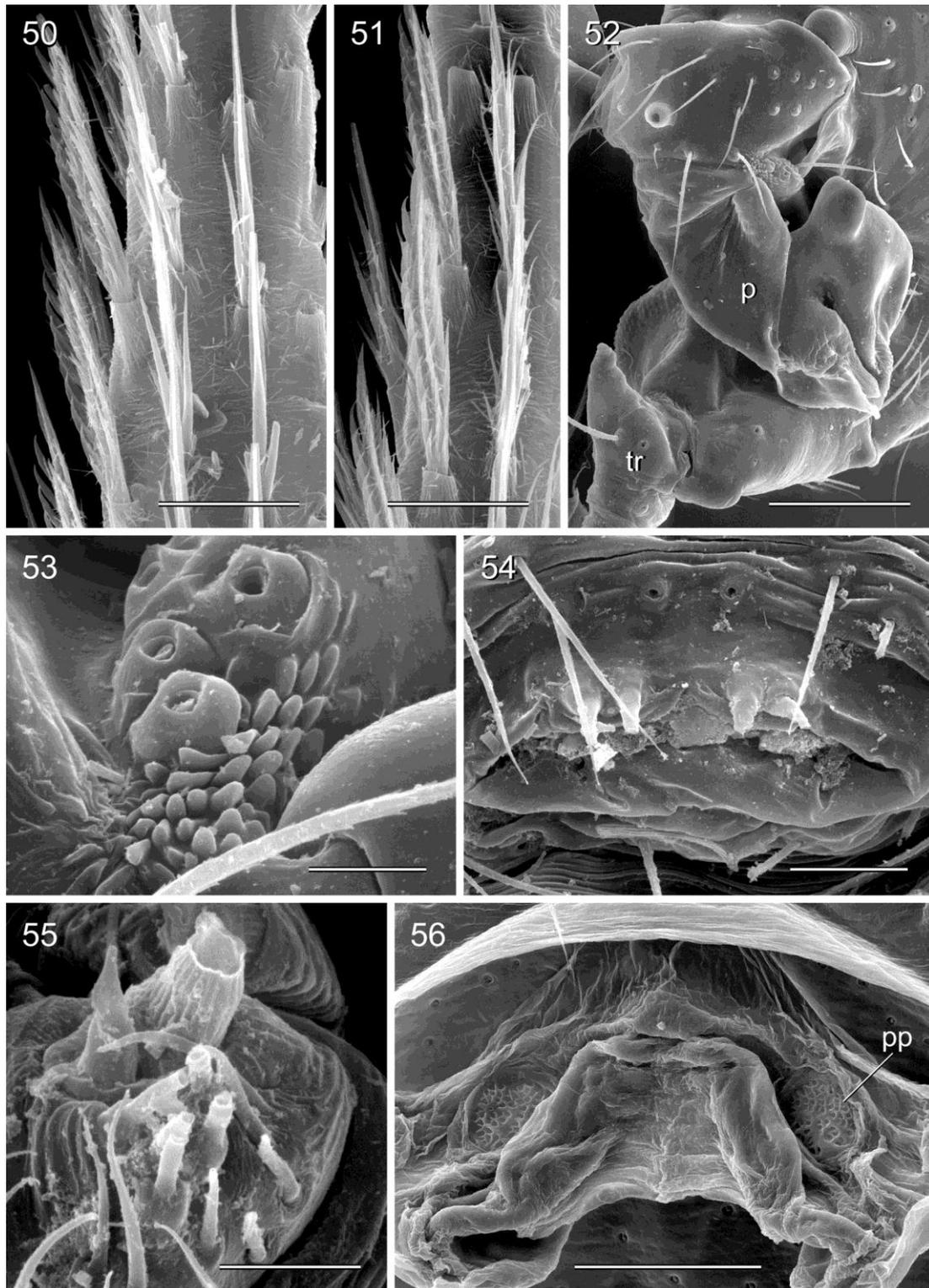
**Female.** In general similar to male but clypeus unmodified. Tibia 1 in two females: 1.20, 1.27; tibia 1 L/d: 19; retrolateral trichobothrium of tibia 1 at 23%, prolateral trichobothrium apparently absent on tibia 1, present on other legs. Epigynum a simple dark frontal plate with pair of small pockets close together near posterior rim, and narrow posterior plate (Figs. 9, 41); internally with conspicuous dark structures of unknown significance and pair of small pore plates (Figs. 42, 56).



**FIGURES 37–42.** *Anansus aowin* n. sp. (37) and *A. ewe* (38–42). **37, 38.** Left procursus, retrolateral views (same magnification). **39, 40.** Left palp, prolateral and retrolateral views. **41, 42.** Cleared female genitalia, ventral and dorsal views. b, genital bulb; e, embolus; ep, epigynal pocket; p, procursus; pp, pore plate. Scale lines: 0.2 mm.



**FIGURES 43–49.** *Anansus aowin* n. sp. **43.** Male prosoma, frontal view; arrow points to tiny clypeus projection. **44.** Male chelicerae, distal area in frontal-ventral view. **45.** Details of right male palp, retrolateral view. **46.** Male prosoma and chelicerae, oblique view; arrow points to proximo-lateral cheliceral apophysis. **47.** Embolus. **48.** Male gonopore with epiandrous spigots. **49.** Male ALS (four of the five “piriform gland spigots” damaged). Scale lines: 10  $\mu$ m (48, 49), 30  $\mu$ m (44, 47), 100  $\mu$ m (43, 45, 46).



**FIGURES 50–56.** *Anansus aowin* (50, 51) and *A. ewe* (52–56). **50, 51.** Comb hairs on male tarsus 4, lateral and ventral views. **52.** Details of left male palp, retrolateral view. **53.** Distinctive sclerite of procurus set with brush of hairs (hairs lost in this specimen). **54.** Male gonopore with four epiandrous spigots. **55.** Male ALS. **56.** Dorsal view of cleared female internal genitalia. p, procurus; pp, pore plate; tr, trochanter. Scale lines: 10  $\mu\text{m}$  (53, 55), 20  $\mu\text{m}$  (50, 51, 54), 100  $\mu\text{m}$  (52, 56).

**Distribution.** Known from type locality in Ghana only (Fig. 74).

**Material examined.** GHANA: Kakum forest, secondary forest: type above, together with 1 ♀; same data but primary forest, Nov. 16, 21, 25, 2005, 1 ♂ 2 ♀ in MRAC (217.686, 217.710, 217.739).

***Anansus debakkeri*, n. sp.**

(Figs. 57–61)

**Type material.** Male holotype from Congo Democratic Republic, Bas-Congo, Mayombe, Luki Forest Reserve, primary rain forest, “fogging 4”, November 12, 2006 (D. De Bakker, J. P. Michiels), in MRAC (separated from 219.854).

**Etymology.** Named for Domir De Bakker (Musée royal de l’Afrique Centrale, Tervuren), collector of the present material.

**Diagnosis.** Distinguished from the two known congeners by the morphology of the procurus (Figs. 58, 59) and by details of internal female genitalia (Fig. 61). Otherwise very similar (including male chelicerae).

**Male (holotype).** Total length 1.20, carapace width 0.50. Leg 1: 4.30 (1.10 + 0.20 + 1.13 + 1.30 + 0.57), tibia 2: 0.77, tibia 3: 0.57, tibia 4: 0.90. Tibia 1 L/d: 21. Habitus as in *A. ewe* (cf. Figs. 6–8); carapace ochre-gray, mottled with black, sternum with distinctive pattern of black lines on each side (cf. Fig. 8), legs ochre-yellow, abdomen gray with distinct black line dorsally reaching the spinnerets; distance PME–PME 20 µm; diameter PME ~80 µm (slightly oval shape); distance PME–ALE 15 µm; AME missing. Sternum wider than long (0.38/0.34), unmodified. Clypeus with tiny median projection on ventral rim (cf. Fig. 43); chelicerae with pair of simple frontal apophyses similar to *A. aowin* (cf. Fig. 34), with proximal apophyses directed backwards, without stridulatory ridges. Palps as in Figs. 57, 58; coxa unmodified, trochanter with distinct ventral apophysis, femur small, with prominent prolateral projection, tibia very large, procurus (Fig. 59) consisting of proximal part with ventral pointed projection and distinctive sclerite set with brush of hairs, and large distal part, the latter complex and hinged towards proximal part; bulb simple, consisting of globular part and weakly sclerotized curved embolus (Fig. 57); palpal tarsal organ capsulate. Legs without spines and curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 25%, prolateral trichobothrium absent on tibia 1, present on other legs; tarsus 1 with about 10 pseudosegments, only distally fairly distinct.

**Variation.** Tibia 1 in 7 other males: 0.93–1.13 (mean: 1.07). No other variation seen.

**Female.** In general similar to male but clypeus unmodified. Tibia 1 in 8 females: 0.93–1.10 (mean: 1.03). Epigynum a simple dark frontal plate with pair of small pockets close together near posterior rim, and narrow posterior plate (Fig. 60); externally similar to *A. ewe* (cf. Fig. 9); internally with conspicuous dark structures of unknown significance and pair of small pore plates (Fig. 61).

**Distribution.** Known from type locality in Congo DR only (Fig. 74).

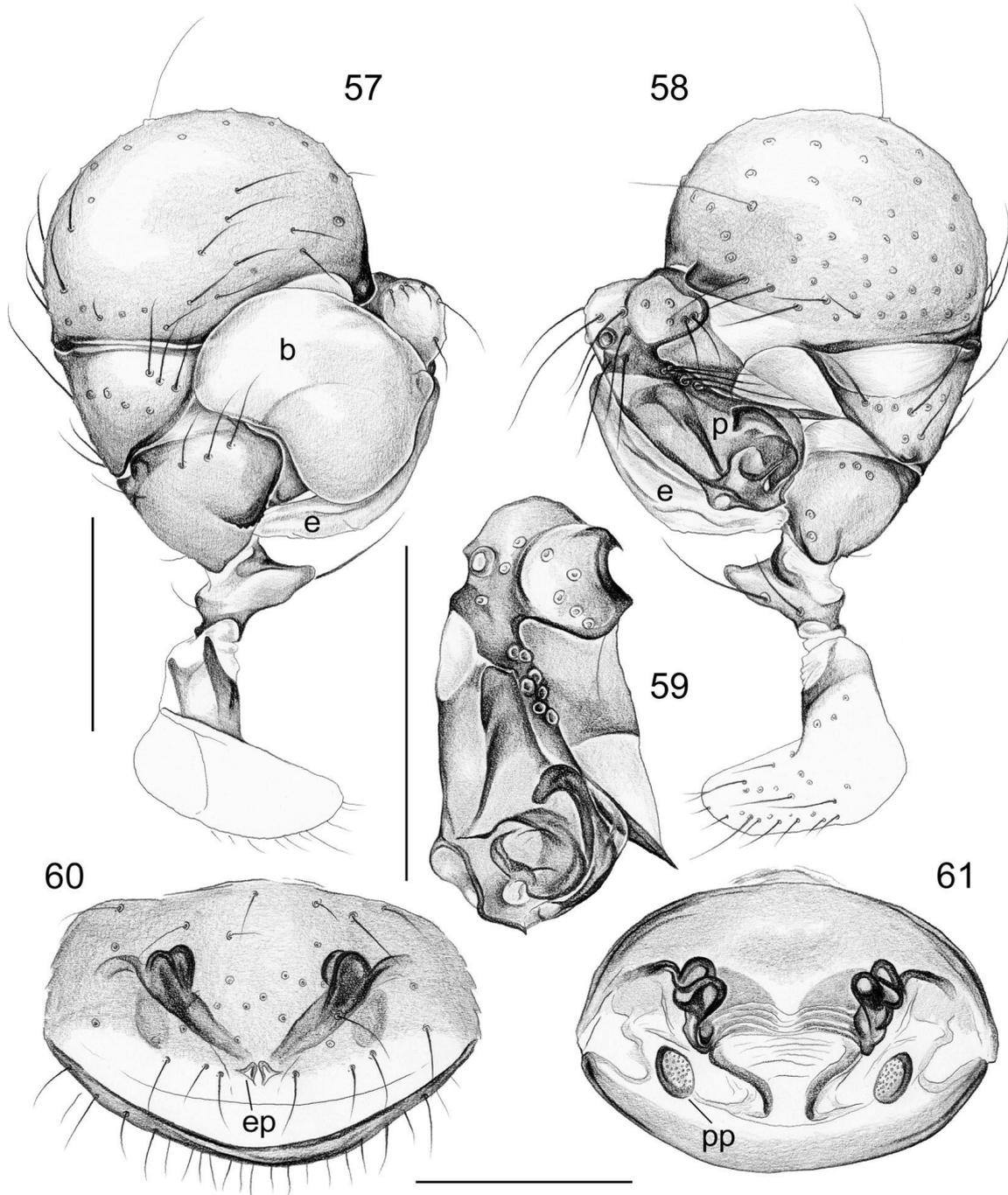
**Material examined.** CONGO DR: Bas-Congo, Mayombe, Luki Forest Reserve: type above, together with 2 ♂ 2 ♀; same data but Nov. 4–10, 2006, 6 ♂ 6 ♀ in MRAC (4 vials, separated from 219.850–3).

***Spermophorides* Wunderlich, 1992**

*Spermophorides* Wunderlich, 1992: 324–325

**Diagnosis.** A diagnosis that reliably covers all known representatives of this genus is beyond the scope of this paper and must await a revision or at least a large comparative study of the genus. The original diagnosis of the genus does not allow a distinction from several other small six-eyed pholcids, like *Spermophora*, *Buitinga*, *Quamtana* (part), *Belisana*, and others. The only character visible using untreated specimens and light micros-

copy that seems to reliably identify most *Spermophorides* species is the peculiar attachment site of the procurus to the cymbium, i.e. rather distal than proximal (see e.g., figs. 228, 243 in Wunderlich 1987; figure 229 in Wunderlich 1992; figs. 3, 11, 19, 27, 35, 41 in Senglet 1972; fig. 3 in Senglet 1973).



**FIGURES 57–61.** *Anansus debakkeri* n. sp. **57, 58.** Left palp, prolateral and retrolateral views. **59.** Left procurus, retrolateral view. **60, 61.** Cleared female genitalia, ventral and dorsal views. b, genital bulb; e, embolus; ep, epigynal pocket; p, procurus; pp, pore plate. Scale lines: 0.2 mm.

A further character that is easily accessible and that seems to separate most *Spermophorides* species from most other pholcids, is the relationship between tibia 1 length and metatarsus 1 length. Figure 75 shows that in most pholcids with comparable tibia 1 lengths (~2.5–5.5 mm) the metatarsus 1 is significantly longer than the tibia 1. In *Spermophorides*, both leg segments are approximately the same length. Only a few species of the South American genus *Chibchea* fall among the *Spermophorides* species in the scatter in Figure 75. Remarkably, the Seychelles species (*S. lascars*) does not group with the other *Spermophorides* species (measurements according to fig. 64 in Saaristo 2001: tibia 1: 1,8; metatarsus 1: 2,2).

A distinctive character that seems to unite the Mediterranean, at least some Canary Island, and the Tanzanian species below requires clearing or SEM study of the epigynum: the pockets on the posterior epigynal plates. Senglet (1972) emphasized the importance of these pockets (his “alvéoles d’ancrage de la lèvre postérieure de l’épigyne”) for the identification of Mediterranean “*Spermophora*” (now *Spermophorides*) species. They have not been described or illustrated for Canary Island species, but were found to be present in *S. mercedes* (Wunderlich) and an unidentified species from Lanzarote checked for this character (B. A. Huber, unpublished data).

Finally, the absence of male epiandrous spigots is very rare in pholcines (outside *Spermophorides* only known in *Nyikoa limbe*, see above), and has been verified in one Mediterranean species (*S. mediterranea* [Senglet]), two Canary Island species (*S. cuneata* [Wunderlich], *S. mercedes*), and the Tanzanian species below (Figs. 68–70).

**Relationships.** As in previous analyses (e.g., Huber 2005), *Spermophorides* falls in a group of African genera including *Buitinga* (East Africa) and *Paramicromerys* (Madagascar), as well as some species tentatively assigned to *Spermophora* (East Africa, Madagascar, Comoros). All these taxa (clade 5 in Fig. 1A) share the loss of the “piriform gland spigots” on the ALS (Figs. 67, 73). More important than these intergeneric relationships are, in the present context, the data that support inclusion of the Tanzanian species below in a genus that was previously known only from the Canary Islands, the Mediterranean, and one species from the Seychelles. Three characters support this assignment: pair of pockets on the posterior epigynal plate (Figs. 65, 66; unique in pholcids), loss of epiandrous spigots (Fig. 68; in pholcines otherwise only known in *Nyikoa limbe*), and the peculiar attachment site of the procurus to the cymbium (rather distal than proximal, similar only in *Spermophora sangarawe*, see fig. 235 in Huber 2003b). Whether the Seychelles species (*S. lascars* Saaristo) shares any of these characters is unknown.

**Distribution.** The genus was previously known from the Canary Islands (plus the Salvage Islands), southwestern Europe (Spain, France, Corsica, Sardinia, Italy), and one uncertain species from the Seychelles. The new species below extends the known distribution to include mainland Africa.

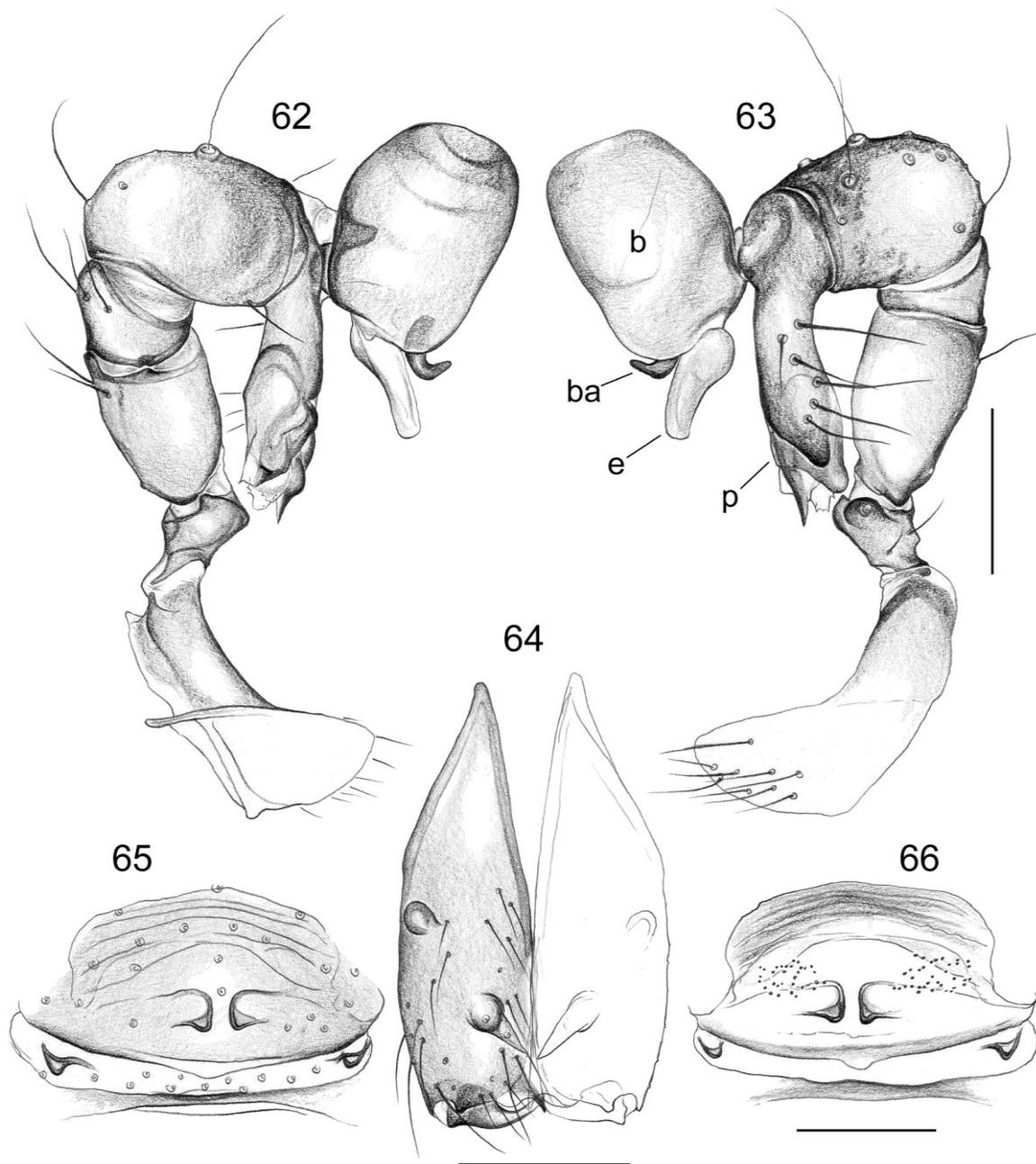
### *Spermophorides africana* n. sp.

(Figs. 10–12, 62–68)

**Type material.** Male holotype from Tanzania, Mbeya Prov., 3 km S Matema, Livingstone Mts. (9°30'S, 34°03'E), 4<sup>th</sup> canyon S with permanent water, sieved litter, November 12, 1991 (R. Jocqué), in MRAC (173.289).

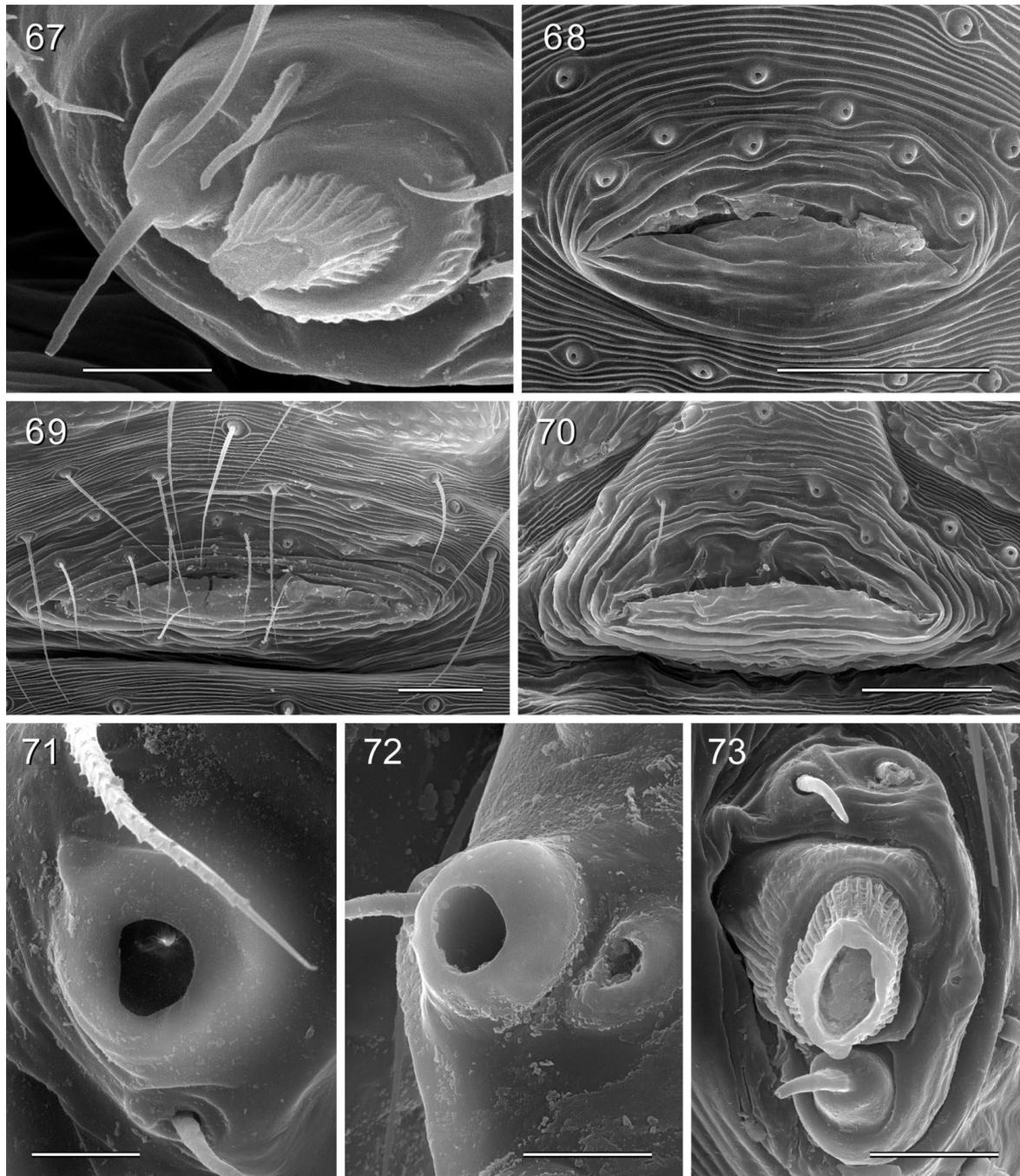
**Etymology.** The species name refers to the fact that this is the first known African representative of the genus.

**Diagnosis.** Easily distinguished from most known congeners by details of the male cheliceral apophyses (position, length, direction), the procurus (distal sclerites), and the female external genitalia (position of pockets); from other East African six-eyed pholcids by the characters mentioned in the generic diagnosis above.



**FIGURES 62–66.** *Spermophorides africana*, n. sp. **62, 63.** Left palp, prolateral and retrolateral views. **64.** Male chelicerae, frontal view. **65, 66.** Cleared epigynum, ventral and dorsal views. b, genital bulb; ba, bulbal apophysis; e, embolus; p, procursus. Scale lines: 0.1 mm.

*Male (holotype).* Total length 1.10, carapace width 0.50. Legs 1: 6.67 (1.93 + 0.20 + 1.90 + 1.77 + 0.87), tibia 2: 1.17, metatarsus 2: 1.13, tibia 3: 0.83, metatarsus 3: 0.87, leg 4 missing (also missing in other male examined); tibia 1 L/d: 43. Habitus as Figs. 11, 12; carapace pale ochre with distinct brown pattern (Fig. 11), sternum ochre, mottled with brown, legs monochromous ochre-yellow, with distinct brown marks at all trichobothria bases, abdomen ochre-gray, dorsally with some distinctive large brown marks, laterally and



**FIGURES 67–73.** *Spermophorides* spp., *S. africana* (67, 68), *S. mediterranea* (69, 71), and *S. cuneata* (70, 72, 73). **67, 73.** Male ALS. **68–70.** Male gonopore. **71, 72.** Male palpal tarsal organ. Scale lines: 5  $\mu\text{m}$  (67), 10  $\mu\text{m}$  (71–73), 50  $\mu\text{m}$  (68–70).

ventrally mottled with dark brown; distance PME–PME 55  $\mu\text{m}$ ; diameter PME 45  $\mu\text{m}$ ; distance PME–ALE 20  $\mu\text{m}$ ; AME missing. Sternum wider than long (0.38/0.30), unmodified. Clypeus unmodified; chelicerae with rounded proximo-lateral projections and very light pointed distal apophyses (Fig. 64), the latter barely visible in dissecting microscope. Palps as in Figs. 62, 63; coxa unmodified, trochanter with retrolateral apophysis

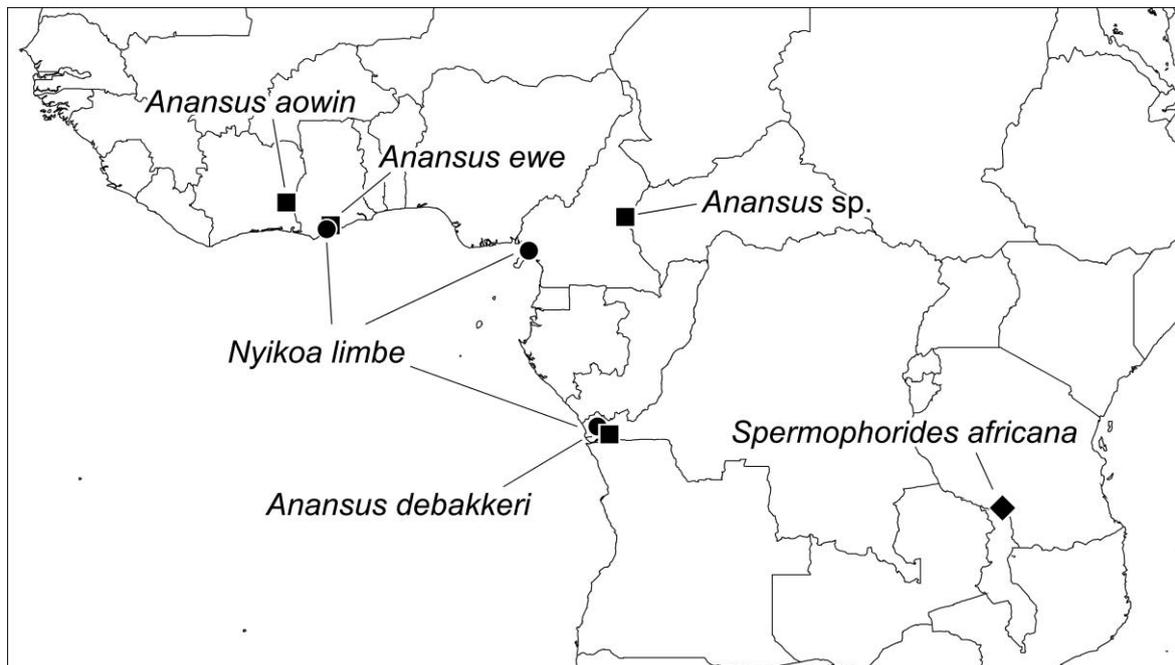
(longer than appears in Fig. 63), femur unmodified, procurus rather simple except distally, bulb with hooked apophysis and membranous embolus. Palpal tarsal organ capsulate (cf. Figs. 71, 72). Legs without spines, curved, and vertical hairs (most hairs missing); retrolateral trichobothrium of tibia 1 at 19%, prolateral trichobothrium absent on tibia 1, present on other legs; tarsus 1 with >15 pseudosegments, only distally a few fairly distinct in dissecting microscope. ALS with two spigots each (Fig. 67). Male gonopore without epiandrous spigots (Fig. 68).

**Variation.** Tibia 1/metatarsus 1 in other male: 1.73/1.57.

**Female.** In general similar to male, including pattern on carapace and abdomen; tibia 1/metatarsus 1 in 3 females: 1.43/1.33, 1.47/1.33, 1.63/1.50. Epigynum consisting of simple frontal and posterior plates, not different in color from surrounding cuticle (Fig. 10), both plates provided with pairs of pockets (Figs. 65, 66), pore plates as in Fig. 66.

**Distribution.** Known from type locality in Tanzania only (Fig. 74).

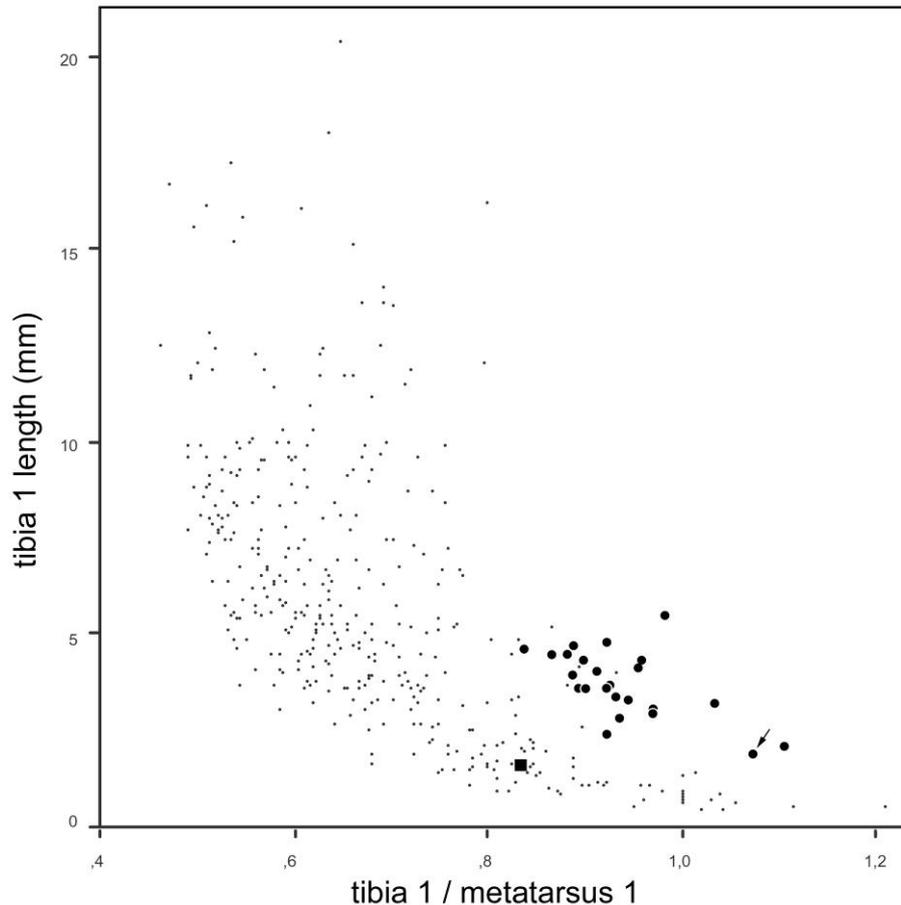
**Material examined.** TANZANIA: Mbeya Prov., 3 km S Matema: type above; same data but Nov. 15, 1991, 1♂3♀ 7 juveniles in MRAC (173.319).



**FIGURE 74.** Map showing the known distributions of *Nyikoa* n. gen. and *Anansus* n. gen., as well as the only known record of *Spermophorides* in Africa.

### Acknowledgements

I thank the following people for the loan of specimens: Jonathan Coddington (USNM), Charles Griswold (CAS), Rudy Jocqué and Domir De Bakker (MRAC), Nuria Lopez Mercader (Barcelona), and Peter Schwendinger (MHNG). An anonymous reviewer provided helpful comments that improved the manuscript.



**FIGURE 75.** Tibia 1 length and relationship between tibia 1 and metatarsus 1 lengths in 422 species of pholcids. Each species is represented by a single male specimen, usually the type specimen measured in the original description or in a redescription. Large marks indicate *Spermophorides* species (round marks: 18 Canary Island species, six Mediterranean species, and *S. africana* [arrow]; square: *S. lascars* from the Seychelles). Data are mainly from taxonomic papers by B. A. Huber (<http://www.uni-bonn.de/~bhuber1/publications.htm>); data on *Spermophorides* are from Wunderlich (1987, 1992), Saaristo (2001), and from B. A. Huber (herein and unpublished).

## References

- Brown, B.V. (1993) A further chemical alternative to critical-point-drying for preparing small (or large) flies. *Fly Times*, 11, 10.
- Goloboff, P.A. (1993) NONA, version 2.0. Program and documentation. Available from: <http://www.zmuc.dk/public/phylogeny/Nona-PeeWee/> (date of access: 31. Oct. 2006).
- Huber, B.A. (2000) New World pholcid spiders (Araneae: Pholcidae): a revision at generic level. *Bulletin of the American Museum of Natural History*, 254, 1–348.
- Huber, B.A. (2003a) Cladistic analysis of Malagasy pholcid spiders reveals generic level endemism: Revision of *Zatavua* n. gen. and *Paramicromerys* Millot (Pholcidae, Araneae). *Zoological Journal of the Linnean Society*, 137, 261–318.
- Huber, B.A. (2003b) High species diversity in one of the dominant groups of spiders in East African montane forests (Araneae: Pholcidae: *Buitinga* n. gen., *Spermophora* Hentz). *Zoological Journal of the Linnean Society*, 137, 555–619.
- Huber, B.A. (2003c) Southern African pholcid spiders: revision and cladistic analysis of *Quamtana* n. gen. and *Spermophora* Hentz (Araneae: Pholcidae), with notes on male-female covariation. *Zoological Journal of the Linnean Society*, 139, 477–527.
- Huber, B.A. (2005) High species diversity, male-female coevolution, and metapoly in Southeast Asian pholcid spiders:

- the case of *Belisana* Thorell, 1898 (Araneae, Pholcidae). *Zoologica*, 155, 1–126.
- Nixon, K.C. (2002) Winclada, version 1.00.08. Program and documentation, published by the author, Ithaca, New York. Available from: <http://www.cladistics.com/aboutWinc.htm> (date of access: 31. Oct. 2006).
- Saaristo, M.I. (2001) Pholcid spiders of the granitic Seychelles (Araneae, Pholcidae). *Phelsuma*, 9, 9–28.
- Senglet, A. (1972) Note sur les *Spermophora* (Araneae: Pholcidae) méditerranéens. *Bulletin de la Société Entomologique Suisse*, 45(4), 307–319.
- Senglet, A. (1973) Note sur *Spermophora elevata* Simon et description d'une nouvelle espèce: *Spermophora simoni* (Araneae: Pholcidae). *Bulletin du Musée d'Histoire Naturelle de Paris*, (3)125, 683–686.
- Wunderlich, J. (1987) *Die Spinnen der Kanarischen Inseln und Madeiras*. Triops Verlag, Langen, Germany, 435 pp.
- Wunderlich, J. (1992) Die Spinnen-Fauna der Makaronesischen Inseln. Taxonomie, Ökologie, Biogeographie und Evolution. *Beiträge zur Araneologie*, 1, 1–619.