

High species diversity in one of the dominant groups of spiders in East African montane forests (Araneae: Pholcidae: *Buitinga* n. gen., *Spermophora* Hentz)

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The six-eyed pholcid spiders of East Africa are revised. A new genus is recognized, *Buitinga* n. gen., with 17 new species and three species transferred from *Spermophora* Hentz. The new genus is characterized by the presence of a scape on the epigynum. This scape may be straight or tightly curled up at rest, and is usually highly expandable. Seven additional African and Comoran species are newly described and tentatively assigned to *Spermophora*. A data matrix with 60 characters and 77 taxa (including 20 East African species and 25 additional *Spermophora* and 'Spermophora-like' species) is analysed cladistically. *Buitinga* is closer to the genera *Paramicromerys* Millot (endemic in Madagascar) and *Spermophorides* Wunderlich (Mediterranean and Canary Islands) as well as to several African and Comoran species tentatively assigned to *Spermophora* than to the type species of *Spermophora*. It is argued that current estimates of species numbers may be inaccurate and that pholcids may turn out to be one of the most diverse spider families. © 2003 The Linnean Society of London. *Zoological Journal of the Linnean Society*, 2003, 137, 555–619

ADDITIONAL KEYWORDS: cladistic analysis – Eastern Arc – phylogeny – Tanzania – taxonomy.

INTRODUCTION

Pholcids are not usually considered a highly diverse or dominant family of spiders, and in terms of species described this seems to hold true: according to Platnick (2002) the family ranks as eleventh out of 109 families. However, species numbers may be biased for several reasons. First, pholcids are mainly tropical and as such may not have attracted the same attention as families strongly represented in Europe and North America, like araneids, linyphiids, lycosids, salticids, and theridiids; the numbers may partly be a function of the number of taxonomists working on the group. Second, and again in contrast to some of the most diverse families, pholcids are often cryptic, prefer shady habitats, and are not easily spotted by generalist collectors. Finally, the extremely long legs of most species make pholcids a group not eagerly collected by many generalist collectors as the legs easily end up in unresolvable knots as soon as several specimens are inserted into a single vial.

Considering these potential biases, it is revealing to examine quantitative collections that employ a variety of collecting methods and are not influenced by collectors' preferences. The most elaborate such inventory following the collecting protocol outlined by Coddington *et al.* (1991) has recently been made in the East African Uzungwa Mountain forests by a group of Danish, Tanzanian, and American zoologists (Sørensen, Coddington & Scharff, 2002; Sørensen, 2003). Surprisingly, pholcids were the most abundant spider family, including the first and second most abundant species in the area sampled: in a sample of 14 329 adult specimens, there were 4319 pholcids, followed by linyphiids (2025) and theridiids (1338) (L. Sørensen, Copenhagen, pers. comm.). Preliminary estimates of species richness in this forest ranked pholcids in sixth place. It might be argued that extrapolating a more generalized picture of pholcid diversity is premature because only forests were investigated in the survey. However, several studies have shown that pholcids are also highly diverse in areas where forests are rather rare (e.g. *Anopsicus* in subtropical Mexico: Gertsch, 1982; *Trichocyclus* in western Australia: Huber, 2001; a new genus in southern Africa: unpublished data).

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The present paper treats the six-eyed pholcids from the above-mentioned quantitative collections taxonomically, with the result that all species collected are new (a fact that was already recognized by the collectors). This may not seem surprising as the area under consideration (and the entire Eastern Arc) is well known for its high degree of endemism (Lovett & Wasser, 1993; Myers *et al.*, 2000). However, including collections from a larger area (Tanzania and neighbouring countries) does not change the picture dramatically, even though these collections may not be comparably unbiased: 37 of 42 six-eyed species seen (including species that are not described below) were new.

Historically, the study of East African pholcids follows a widespread pattern in invertebrate taxonomy: an early surge of exploration followed by a long phase of neglect. Only three papers can be cited on East African six-eyed pholcids, all published over 60 years ago (Tullgren, 1910; Berland, 1920; Fage & Simon, 1936). Since then, no single new species has been described, nor is any publication of a new record known to me. It is hoped that the present paper, which describes the abundance and diversity of pholcids, goes some way towards remedying this oversight.

MATERIAL AND METHODS

Most of the material treated herein comes from only four museums (CAS, MRAC, USNM, and ZMUC). However, pholcids resembling *Spermophora* and potential relatives (*Belisana*, *Spermophorides*, *Paramicromerys*) were borrowed from more than 40 institutions and individuals worldwide, and the list below covers only those with material actually used in the present paper.

AMNH	American Museum of Natural History, New York
BMNH	Natural History Museum, London
CAS	California Academy of Sciences, San Francisco
CLD	Collection C. L. Deeleman-Reinhold, deposited in the National Museum of Natural History, Leiden
IES	Instituto de Ecología y Sistemática, La Habana
MCN	Museu de Ciências Naturais, Porto Alegre, Rio Grande do Sul
MCZ	Museum of Comparative Zoology, Cambridge
MHNG	Muséum d'Histoire Naturelle, Genève
MNHN	Muséum National d'Histoire Naturelle, Paris
MRAC	Musée royale de l'Afrique Centrale, Tervuren
NCP	National Collection, Pretoria
QMB	Queensland Museum, Brisbane
UCR	Universidad de Costa Rica, San José

USNM National Museum of Natural History, Washington, D.C.

WAM Western Australian Museum, Perth

ZFMK Zoological Research Institute and Museum Alexander Koenig, Bonn

ZMUC Zoological Museum, University of Copenhagen

Methods and terminology are as in Huber (2000). Measurements are in mm (± 0.02 mm if two decimals are given) unless otherwise indicated. Eye measurements are ± 5 μ m. Drawings were done with a camera lucida on a Nikon Labophot-2 compound microscope. Photos were made with a Nikon Coolpix 950 digital camera (1600 \times 1200 pixels) mounted on a Nikon SMZ-U dissecting scope. For SEM photos, specimens were cleaned ultrasonically, dried in HMDS (Brown, 1993), and photographed with a Hitachi S-2460 scanning electron microscope. The numerical cladistic analysis was done using NONA, version 1.8 (Goloboff, 1993), Pee-Wee, version 2.8 (Goloboff, 1997), and Hennig86, version 1.5 (Farris, 1988). Cladogram analysis was done with Winclada, version 0.9.9+ (Nixon, 1999). See Relationships for details of the analysis.

RELATIONSHIPS

Relationships were analysed by cladistic analysis, based on the data matrix in Appendix 3. The 77 taxa and 60 characters used for this matrix are listed in Appendices 1 and 2. The matrix is modified from Huber (2000, 2001) as follows:

- (1) Several taxa were added, with an emphasis on East African and Malagasy taxa and following the maximal diversity approach *sensu* Prendini (2001) with respect to other '*Spermophora*-like' species.
- (2) Some taxa were deleted, especially New World taxa and ninetines which were heavily represented in the previous analyses but would not have contributed to the resolution of *Spermophora* and its relatives.
- (3) Several characters were added according to the new taxa included.
- (4) Several characters were deleted, either because (a) they were uninformative resulting from the deletion of taxa (characters 5, 7, 18, 19, 25, 26, 30, 39, 42, 43, 48, 49, 58, 59 from Huber, 2000), or (b) it became obvious that unambiguous coding is impossible (characters 4, 17, 45, 51, 61 from Huber, 2000), or (c) they are obviously uninformative at the present level of analysis (characters 41, 50 from Huber, 2000).

Binary character coding was used as far as possible. Multistate characters were only used when coding as binary characters would not have represented independent evidence in support of a group (characters 4,

18, 39, 44, 46 in Appendix 2). All multistate characters were treated as unordered.

Using NONA with **hold/50**, **mult*100**, and **amb-** resulted in 12 cladograms. Collapsing unsupported nodes and eliminating all resulting consensus-like cladograms longer than minimum length left only six cladograms of length 145 (CI = 46; RI = 83). These cladograms all supported the four subfamilies provisionally named pholcines, holocnemines, ninetines, and New World clade (see Huber, 2000, for arguments against using formal names before a stable and convincing cladogram is found). However, the relationships among these subfamilies varied considerably, allowing no new conclusion as to the basic topology of pholcid phylogeny. Therefore, the cladogram presented in Appendix 4 is the strict consensus (length 147) of the six most parsimonious cladograms found by NONA. Differences between the most parsimonious and the consensus cladograms only affected clades not directly relevant within the context of this paper. The basal tetrachotomy of Pholcidae was either unresolved or resolved in one of two ways (New World clade as sister of holocnemines; ninetines as sister of pholcines). The New World clade was partly fully resolved (with *Ciboneya* as sister to the rest), while *Micromerys* was partly sister to clade 2 and *Spermophora* was partly sister to clade 1.

Using **amb=** as a less strict way to collapse nodes (nodes are not collapsed if at least one optimization results in node support, while with **amb-** nodes must be supported by all possible optimizations to remain intact), resulted in 126 cladograms, 68 of which had a length of 145 after collapsing unsupported nodes; the strict consensus of these was identical to the cladogram shown in Appendix 4. Using Hennig86 with the commands **mh*** and **bb*** resulted in 750 cladograms. I did not explore these in detail, but the strict consensus was identical again to the cladogram shown in Appendix 4.

Clade stability was estimated using the Bremer support function in NONA which calculates the number of extra steps required before a clade is lost from the strict consensus of near-minimum length cladograms. Within pholcines, only two clades had a Bremer support of 3 (*Spermophorides*; *Metagonia*); five clades had a support of 2 (*Micropholcus* + *Pholcus* + *Leptopholcus*; *Metagonia a.* + *M. r.*; *Spermophora peninsulae* + *Spermophora* sp. 3; the two Comoran '*Spermophora*'; and clade 14 within *Buitinga*); all other clades had a Bremer support of 1. The only higher values in the cladogram were for Pholcidae (4) and Ninetinae (5). The main conclusions from this cladogram are as follows:

- (1) Some East African pholcids previously assigned to *Spermophora* are more closely related to the gen-

era *Spermophorides* Wunderlich, 1992 (Mediterranean and Canary Islands) and *Paramicromerys* Millot, 1946 (Madagascar) than to the type species of *Spermophora* [*S. senoculata* (Dugès)] and its closest known relatives from Asia and Australia.

- (2) One large monophyletic species group in East Africa (the new genus *Buitinga*) is characterized by the presence of a scape on the epigynum.

These conclusions also hold when the data are analysed using successive weighting. Successive weighting in NONA (with the consistency index as weighting function) resulted in the same cladograms that were obtained using equally weighted characters. Stable results were obtained at iteration 1. Implied weighting in Pee-Wee (which resolves character conflict in favour of the characters that have less homoplasy) with all possible settings of the constant of concavity K (1–6) resulted in some interesting differences. First, even though all cladograms obtained resolved *Buitinga* as a monophyletic group, the sequence of taxa was reversed at K = 1 (Appendix 4), implying exactly reversed transformations in some characters (scape morphology and position, armature of male chelicerae proximally). At K = 6, the topology within *Buitinga* was identical to the one obtained by NONA, while the only difference at K = 2–5 was that *B. buhoma* was in a basal trichotomy together with *B. ruwenzori*. Second, at K = 1 and 2, some East African taxa treated tentatively as *Spermophora* in the present paper (node 3 in Appendix 4) were indeed seen as closely related to *S. senoculata* in the strict consensus cladogram. At K = 3–5, many cladograms were obtained (600 and more), with large polytomies in the strict consensus cladograms. Third, Pee-Wee neither supported nor clearly contradicted a sister-group relationship of *Buitinga* and *Spermophora*.

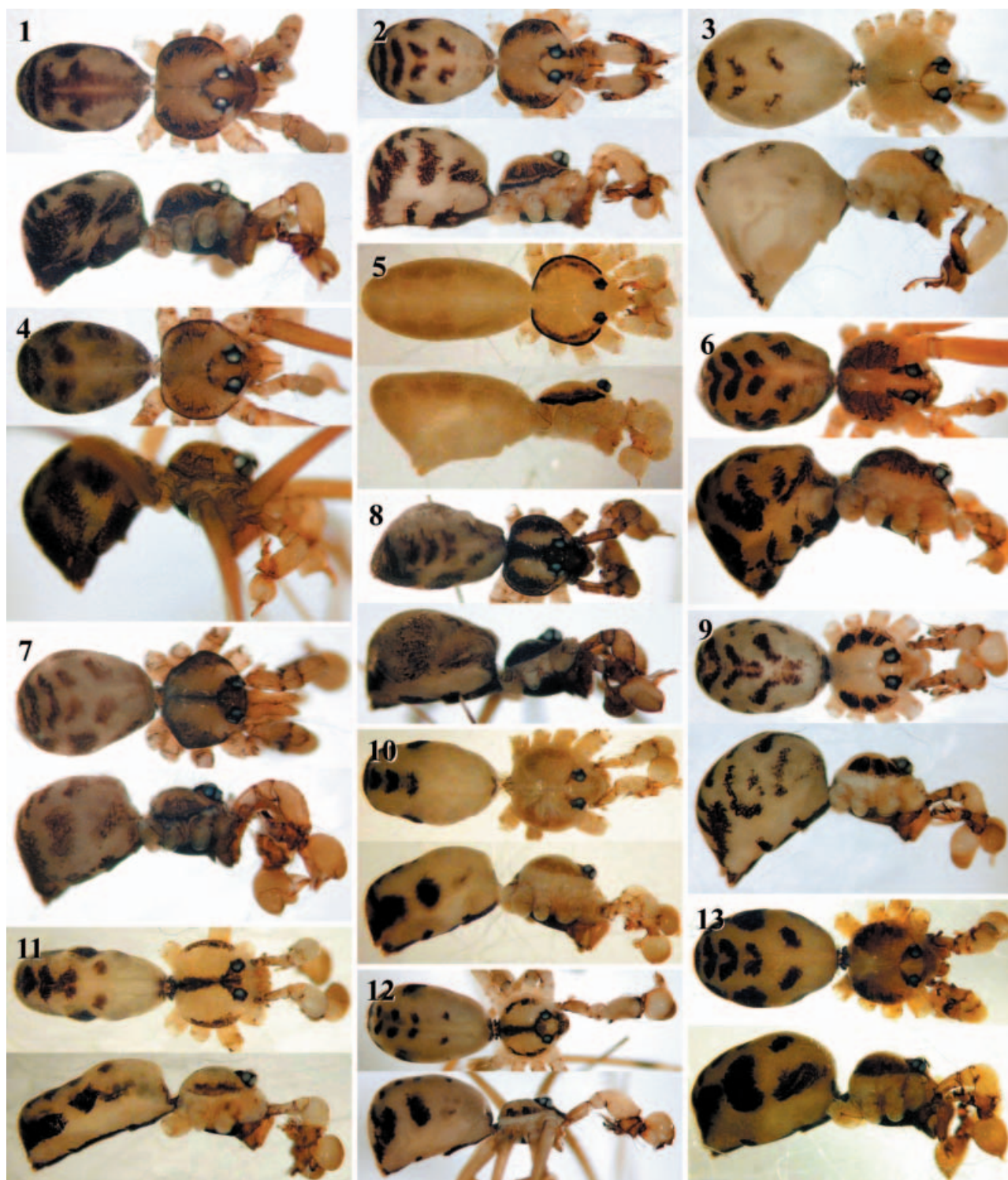
In conclusion, the only positive evidence for the relationships of *Buitinga* to other genera points to African, Mediterranean, and Malagasy taxa (*Spermophorides*, *Paramicromerys*) rather than to *Spermophora*. It should be noted, however, that the node relating *Buitinga* closer to *Spermophorides* than to *Paramicromerys* (node 6 in Appendix 4) rests on the character with the lowest consistency index in the entire matrix (character 2 in Appendix 2).

TAXONOMY

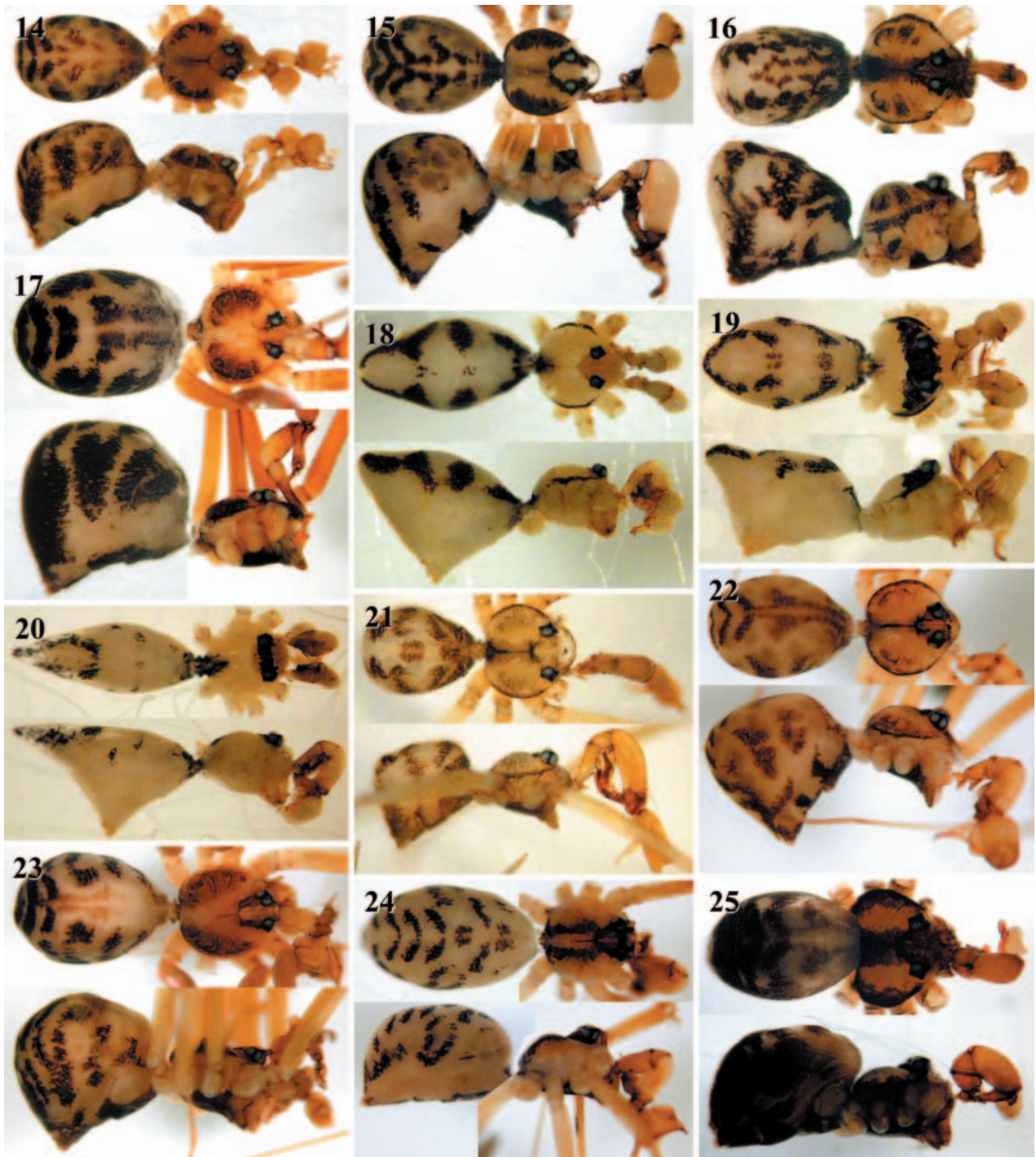
BUITINGA N. GEN.

Type species. Buitinga kadogo n. sp.

Etymology. Derived from the Swahili for 'large spider' (*bui*) and 'vibrate' (*tinga*). It refers to the vibrating and whirling movements that many long-legged pholcids make when disturbed. Gender feminine.



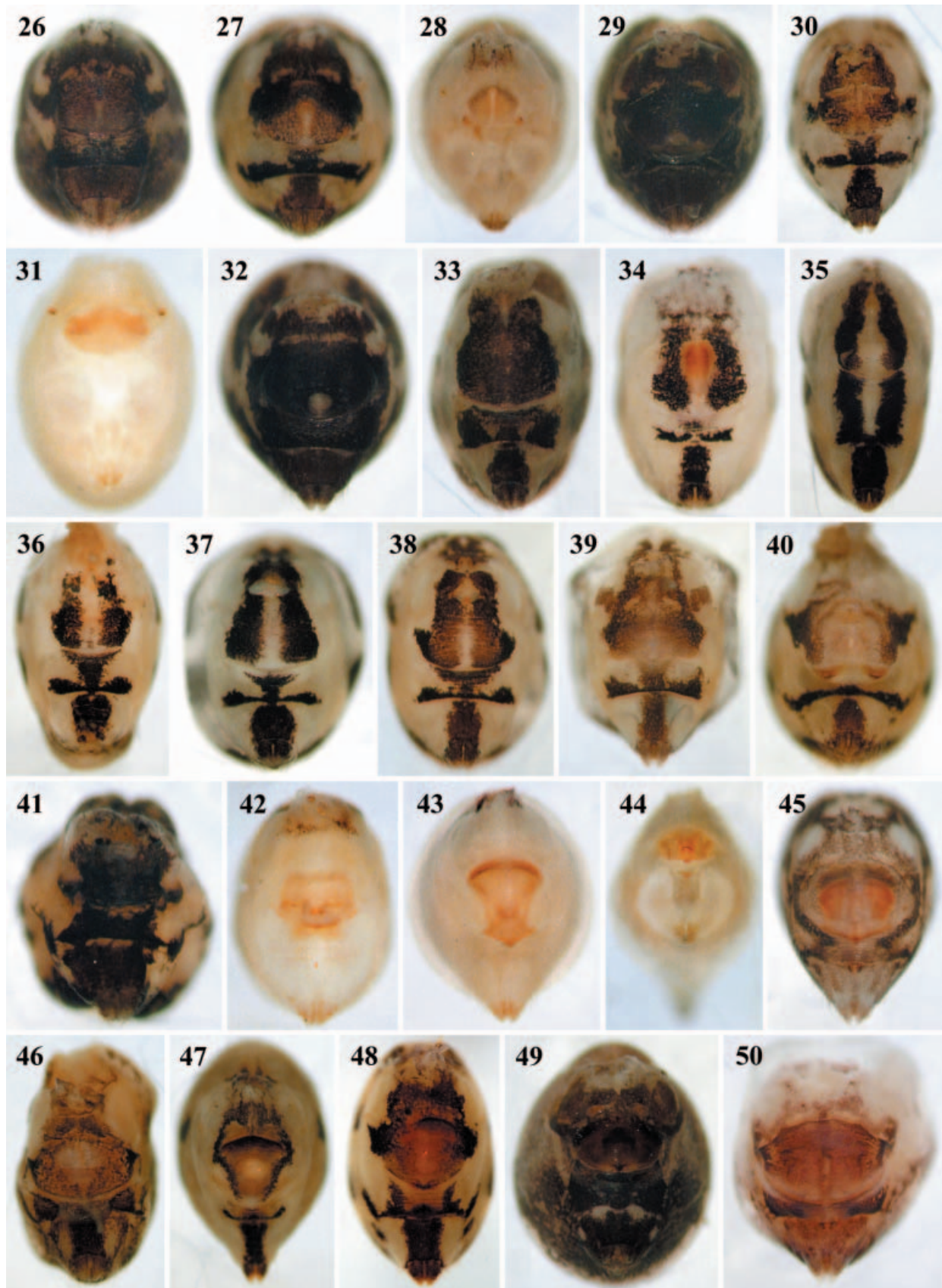
Figures 1–13. *Buitinga* habitus, males in dorsal and lateral views. 1. *B. kadogo*, 2. *B. mazumbai*, 3. *B. lakilingo*, 4. *B. amani*, 5. *B. safura*, 6. *B. nigrescens*, 7. *B. griswoldi*, 8. *B. buhoma*, 9. *B. kihanga*, 10. *B. asax*, 11. *B. mbomole*, 12. *B. ruhiza*, 13. *B. uzungwa*.



Figures 14–25. *Buitinga* and ‘*Spermophora*’ habitus, males in dorsal and lateral views. 14. *B. ruwenzori*. 15. *B. tingatingai*. 16. *B. mulanje*. 17. *B. kanzuiri*. 18. ‘*S.*’ *morogoro*. 19. ‘*S.*’ *sangarawe*. 20. ‘*S.*’ *usambara*. 21. ‘*S.*’ *masisiwe*. 22. ‘*S.*’ *kivu*. 23. ‘*S.*’ *berlandi*. 24. ‘*S.*’ *minotaura*. 25. ‘*S.*’ *lambilloni*.

Diagnosis. Long-legged, 6-eyed pholcids with globular or elongate opisthosoma and variable size (total length ~1.5–3). Easily distinguished from other genera by the scape on the epigynum (e.g. Figs 56, 62, 69); only

‘*Spermophora*’ *berlandi* has a similar scape (Fig. 266) that is here considered a convergence. Also distinguished by the very distal position of the dorsal palpal trichobothrium (e.g. Figs 59, 86, 219). The males of



Figures 26–50. *Buitinga* and '*Spermophora*', female opisthosomata, ventral views with epigynum. 26. *B. kadogo*. 27. *B. mazumbai*. 28. *B. lakilingo*. 29. *B. amani*. 30. *B. nigrescens*. 31. *B. safura*. 32. *B. griswoldi*. 33. *B. buhoma*. 34. *B. ruhiza*. 35. *B. mbomole*. 36. *B. asax*. 37. *B. uzungwa*. 38. *B. kihanga*. 39. *B. ruwenzori*. 40. *B. tingatingai*. 41. *B. mulanje*. 42. '*S.*' morogoro. 43. '*S.*' sangarawe. 44. '*S.*' usambara. 45. '*S.*' masisiwe. 46. '*S.*' berlandi. 47–48. '*S.*' minotaura, female morphs a and b. 49. '*S.*' lambilloni. 50. '*S.*' tonkouli.

most species have on their chelicerae frontally and proximally either macrosetae (e.g. Figs 102, 144, 167) or a pair of teeth (e.g. Figs 54, 71).

Description. Total length in males usually ~1.5–3. Carapace oval or round, thoracic groove very shallow and often restricted to frontal part; often with dark pattern that may be distinctive (Figs 1–17) despite of some intraspecific variation. Six eyes in two triads, on slightly elevated ocular area; no trace of AME. Distance PME–ALE small (~30–55% of PME diameter), distance PME–PME large (~140–340% of PME diameter). Clypeus never modified. Male chelicerae with lateral apophyses proximally, usually with pair of frontal apophyses set with 4–6 modified hairs; in some species these hairs are not embedded in an apophysis (*B. ruwenzori*, *kikura*) or absent (*B. kanzuiri*); proximally, the male chelicerae are often provided with a projection that is either set with strong hairs or with one pair of teeth (both missing in *B. tingatingai*, *mulanje*, *kanzuiri*); chelicerae never with stridulatory ridges. Male palps small to moderately large in relation to overall size (compare Figs 15 and 16); coxa often with distinct projection ventrally (e.g. Figs 58, 64); trochanter with retrolateral apophysis; femur cylindrical or slightly widened, sometimes with projection proximo-dorsally; patella often almost globular (e.g. Figs 114, 165, 188); tibia moderately to highly expanded (compare Figs 65 and 142), with two trichobothria in often extremely distal position (e.g. Figs 59, 86, 219); procurus usually complex, with or without hinged process; with capsulate tarsal organ (Figs 82, 123, 153, 196; except in *kadogo*: Fig. 77); bulb consisting of proximal globular part, embolus that may be partly sclerotized, and sclerotized projection that is often hooked (but reduced to a thin lamella in *B. ruwenzori* and absent in *B. kikura*). Legs usually long (leg 1 about 6–10 × body length), medium-thin (tibia 1 L/d ~35–68), leg 1 always longest, legs 2 and 4 about same length, leg 3 shortest. Legs with or without spines (spines may be present in single rows ventrally distally on femora 1 and sometimes also femora 2), with few vertical hairs, usually without curved hairs; retrolateral trichobothrium of tibia 1 usually at 5–23%. Prolateral trichobothrium missing on tibiae 1, present in all others. Tarsus 1 with over 20 pseudosegments, but only ~10–20 distal pseudosegments easily visible in dissecting microscope. Opisthosoma either globular or elongate, rarely with posterior elon-

gation over spinnerets (Fig. 5) or elevated (Fig. 3). Male gonopore with four epiandrous spigots in all species examined (*B. kadogo*, *safura*, *mbomole*, *asax*, *uzungwa*, *kihanga*, *ruwenzori*; Figs 74, 124, 156); ALS with only basic set of two spigots (Figs 79, 81, 128, 132); other spinnerets typical for family (e.g. Fig. 73; cf. Huber, 2000).

Sexual dimorphism slight. Epigynum shape very variable (Figs 26–41), with scape that points either straight back (Figs 118, 134, 139), or to the front with the tip turning back (Figs 56, 62, 76, 80), or is tightly curled up at rest (e.g. Figs 129, 131, 158, 162); internally with usual pair of pore plates and complex system of sclerites and membranes of unknown function.

Monophyly. The monophyly of *Buitinga* is supported by the following three synapomorphies: a scape on the epigynum (shared by all species included); the presence of macrosetae proximally on the male chelicerae (these are missing in some species and replaced by a pair of teeth in others); the very distal position of the male palpal tibial trichobothrium (this character actually unites *Buitinga* with '*Spermophora*' *vyvato* in the cladogram shown in Appendix 4, but this may be artificial).

Generic relationships. As discussed above, *Buitinga* is here considered more closely related to the genera *Spermophorides* and *Paramicromerys* (and to some African and Malagasy species provisionally kept in *Spermophora*) than to the type species of *Spermophora* or to other genera of the *Pholcus*-group *sensu* Huber (1995). The characters supporting this association (node 2 in Appendix 4) are the presence of a thoracic groove and the reduction of ALS spigots (characters 4 and 12 in Appendix 2).

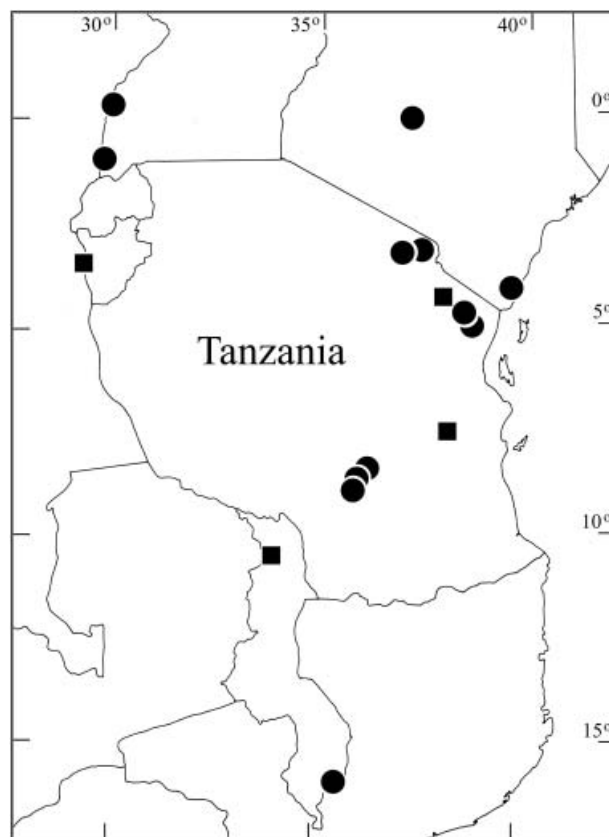
Specific relationships. Several synapomorphies support species groups within *Buitinga*. A core group of species is characterized by the presence of a tooth on each of the two proximal elevations of the male chelicerae [node 14 in Appendix 4: *B. kadogo*, *mazumbai*, *lakilingo*, *amani*, *nigrescens*, *globosa*]. The first three of these species share the morphology of the scape (at rest pointing forward and then turning back; Figs 76, 80), the last two may be synonyms (see redescription of *B. nigrescens* below). This core group shares with five further species (*B. safura*, *griswoldi*, *buhoma*, *ruhiza*, *ensifera*) the proximal projection on the male chelicerae. Of these five species, *B. buhoma* and

ruhiza (and maybe also *B. ensifera*) share the morphology of the scape (straight backwards; Figs 118, 139). A further group of species (node 10 in Appendix 4: *B. mbomole*, *asax*, *uzungwa*, *kihanga*) share the process on the procurus that winds ventrally around the procurus (Figs 142, 148, 165, 183). *Buitinga ruwenzori* and *kikura* have identical chelicerae and very similar palps and are probably closely related. Finally, three further species are assigned to the genus, but their exact position is open: (1) *B. tingatingai* has a small scape (Fig. 210), a quite distal dorsal trichobothrium (Fig. 207) and distal cheliceral apophyses typical for the genus. (2) *B. mulanje* has a well developed scape and the same morphology of the distal cheliceral apophyses, but the dorsal trichobothrium is not very distal, the chelicerae have no macrosetae proximally, and the curved procurus (Fig. 213) is reminiscent of some species that are here tentatively assigned to *Spermophora* rather than to *Buitinga*. (3) *B. kanzuiri* has a very distal trichobothrium (Fig. 219) and a globular patella, but the chelicerae are almost unmodified. The bulb is similar to that of *B. ensifera* and '*S. masisiwe*', but the similarity to the latter is here interpreted to be convergent.

Natural history. No species has ever been studied in any detail, and little can be inferred from notes on the collection labels. All species seem to be restricted to pristine forests. Several species have been collected by sieving litter, others were collected by a variety of methods from searching litter and logs to canopy fogging (e.g. *B. safura*, *asax*, *uzungwa*). So far, no cave-dwelling species is known.

Distribution. The genus seems restricted to eastern Africa, defined here as the humid area delimited by the Somali and Sudanese deserts to the north, the Madagascan rain shadow to the south, and the central African plateau to the west (Lovett & Wasser, 1993) (Map 1). Large collections of South African and Malagasy pholcids have not provided a single species (Huber, 2003, and unpublished data), and extensive collections by experienced arachnologists on Mt. Cameroon, in parts of Ivory Coast and Guinea, indicate that *Buitinga* does not occur in western Africa. The Ethiopian mountains have apparently been collected inadequately, resulting in too little material to decide on the absence of the genus there.

Composition. The genus includes a total of 20 described species. Of these, two species described by Tullgren (1910) under *Spermophora* [*B. globosa* (Tullgren, 1910) comb. nov., and *B. ensifera* (Tullgren, 1910) comb. nov.] are not treated below (the original material could not be found, and no new material was available to me). The remaining 18 species [17 new and *B. nigrescens* (Berland, 1920)], are (re)described



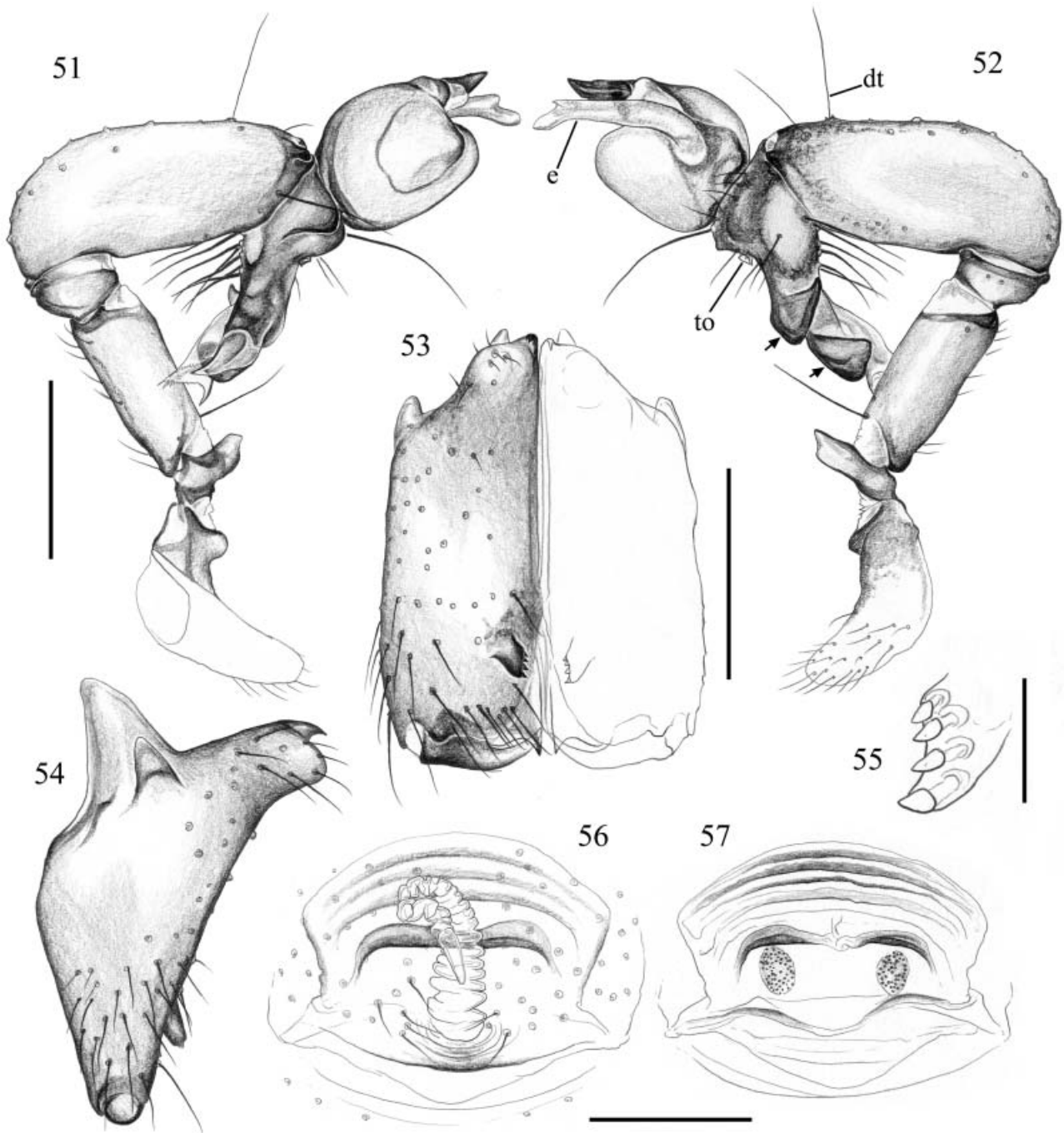
Map 1. Known geographical distribution of *Buitinga*. Squares show localities that are represented only by taxa not yet described. Note that some marks represent several species (see Maps 2 and 3).

below. Note that the two other East African species originally described as *Spermophora* (*S. minotaura*, *S. berlandi*) are redescribed below but not transferred to another genus. The collections studied contain several additional new species of *Buitinga* that are not described because they do either not seem to offer additional insight into the phylogeny of the group, or are poorly preserved. In view of the fact that the three main collection areas [(1) Ruwenzori, including the volcanoes of Virunga and Impenetrable Forest; (2) Uzungwa, and (3) Usambara Mountains] yielded between six and nine species each (including species not described herein), and that only a single species is shared by two of these localities (*B. safura* in Uzungwa and Usambara Mountains), it seems reasonable to assume that several dozen additional species remain to be discovered.

***BUITINGA KADOGO* N. SP.**

(FIGS 1, 26, 51–57, 71–79)

Type. Male holotype from Mazumbai (4°49'S,

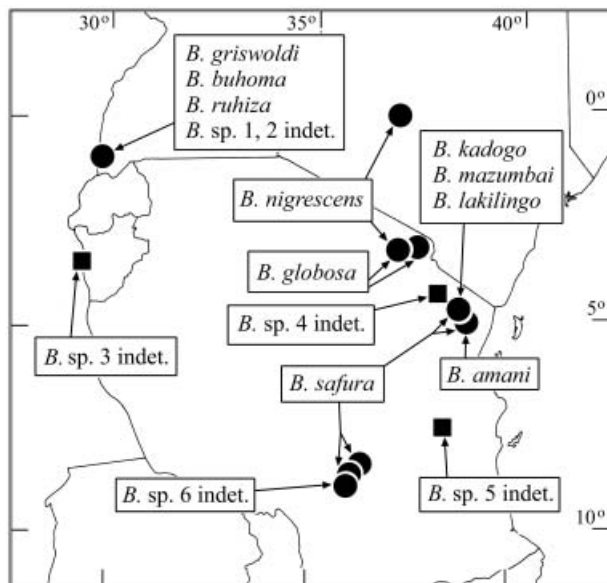


Figures 51–57. *Buitinga kadogo*. Left male palp in prolateral (51) and retrolateral (52) views, male chelicerae in frontal (53) and lateral (54) views, modified hairs on male cheliceral apophysis (55), and cleared epigynum in ventral (56) and dorsal (57) views. 'e': embolus; 'dt': dorsal trichobothrium; 'to': tarsal organ; arrows point to distinctive structures of procursus. Scale bars = 0.3 mm (51, 52), 0.2 mm (53, 54, 56, 57), 30 μ m (55).

38°29.5'E), forest at 1800–1900 m elev., sifting litter, W Usambara Mountains, Tanga District, Tanzania; November 10–20, 1995 (C. E. Griswold, N. Scharff, D. Ubick); in CAS.

Etymology. Derived from a Swahili term for small; it refers to the small size of this species.

Diagnosis. Distinguished from known congeners by



Map 2. Known distribution of *Buitinga* species, part 1.

the shape of the procurus (pair of distinctive distal sclerotized elements; arrows in Fig. 52); from the closest known relatives also by the short proximal apophyses on the male chelicerae (Fig. 54).

Male (holotype). Total length 1.65, carapace width 0.76. Leg 1: 9.2 (2.2 + 0.3 + 2.3 + 3.1 + 1.3), tibia 2: 1.3, tibia 3: 1.0, tibia 4: 1.3; tibia 1 L/d: 36. Habitus as in Figure 1. Carapace ochre-yellow with brown and blackish marks; sternum dark brown to black with many small light spots. Legs ochre-yellow, without dark rings. Opisthosoma grey with brown pattern as in Figure 1; ventrally similar to female (cf. Fig. 26). Ocular area slightly elevated; distance PME–PME 150 µm; diameter PME 60 µm; distance PME–ALE 20 µm. Thoracic furrow reduced to very shallow line. Sternum wider than long (0.52/0.44). Chelicerae as in Figures 53 and 54, with short proximal apophyses set with pair of teeth (Fig. 71) and four teeth on each distal apophysis (Figs 55, 72). Palps as in Figures 51 and 52; coxa with ventral hump, trochanter with retrolateral apophysis, femur with indistinct hump proximodorsally, procurus with distinctive sclerotized structures, but apparently without hinged process (Figs 51, 75); bulb with membranous embolus ('e' in Fig. 52) and hooked apophysis (does not appear hooked in the views shown in Figs 51 and 52); palpal tarsal organ exposed (Fig. 77). Legs with spines on femora 2 only (3 spines distally), without curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 23%; tarsus 1 with ~20 pseudosegments, distally fairly distinct. Spinnerets and epiandrous spigots as in Figures 73 and 74.

Variation. Tibia 1 in 6 other males: 2.0–2.5 (\bar{x} = 2.31).

Female. In general similar to male, but without spines on femora 2, and palpal tarsal organ capsulate (Fig. 78). Tibia 1 in 14 females: 1.8–2.2 (\bar{x} = 1.96). Epigynum as in Figures 26 and 56, with long scape originating close to posterior border of epigynum (Fig. 76). Dorsal view as in Figure 57. ALS as in Figure 79.

Distribution. Known only from type locality (Map 2).

Material examined. TANZANIA: TANGA: W Usambara Mountains: Mazumbai: type above, together with 5♂12♀, in CAS. Same collection data, 2♂3♀ in separate vial, in CAS.

***BUITINGA MAZUMBAI* N. SP.**

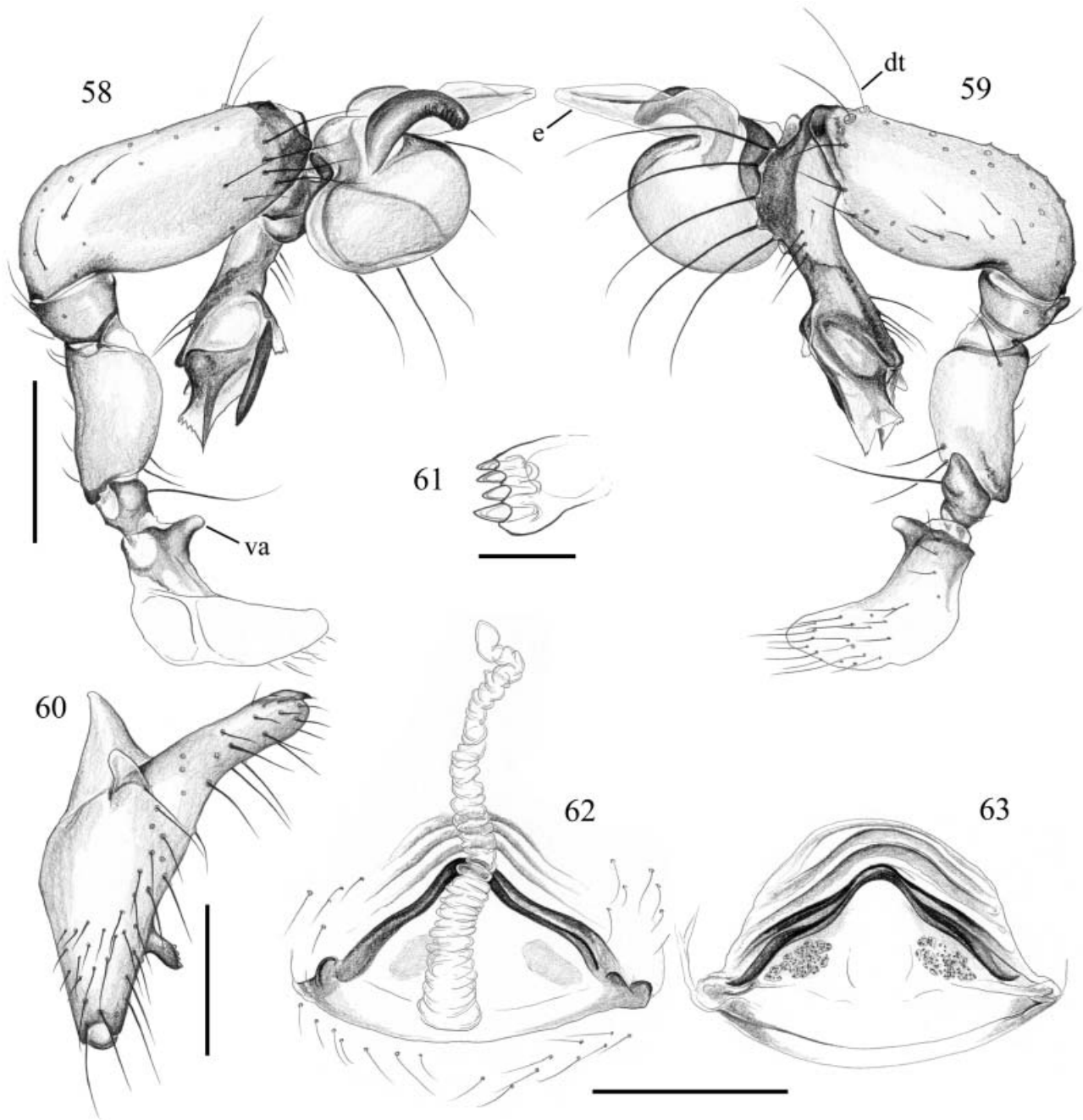
(FIGS 2, 27, 58–63, 80–83)

Type. Male holotype from Mazumbai (4°49'S, 38°29.5'E), forest at 1800–1900 m elev., pitfall traps, W Usambara Mountains, Tanga District, Tanzania; November 12–20, 1995 (C. E. Griswold, N. Scharff, D. Ubick); in CAS.

Etymology. Refers to the type locality.

Diagnosis. Easily distinguished from most known congeners by the long apophyses proximally on the male chelicerae (Fig. 60); from species with similar chelicerae (*B. amani*, *lakilingo*) by the shape of the bulbal apophysis and the distal elements of the procurus (Figs 58, 59).

Male (holotype). Total length 2.2, carapace width 0.95. Leg 1: 15.3 (3.6 + 0.4 + 3.9 + 5.5 + 1.9), tibia 2: 2.3, tibia 3: 1.7, tibia 4: 2.3; tibia 1 L/d: 43. Habitus as in Figure 2. Carapace ochre-orange with brownish lateral bands and V mark behind ocular area; sternum dark brown. Legs ochre-orange, with dark rings on femora and tibiae (subdistally), and on patellae. Opisthosoma ochre-grey with brown spots dorsally; ventral dark pattern similar to female (cf. Fig. 27). Ocular area slightly elevated; distance PME–PME 170 µm; diameter PME 90 µm; distance PME–ALE 35 µm. Thoracic furrow shallow frontally, absent posteriorly. Sternum wider than long (0.70/0.58). Chelicerae as in Figure 60, with four modified hairs on each distal apophysis (Fig. 61). Palps as in Figs 58 and 59; coxa with strong ventral apophysis ('va' in Fig. 58), trochanter with retrolateral apophysis, dorsal trichobothrium on tibia very distal ('dt' in Fig. 59), procurus apparently without hinged process, bulb with simple membranous embolus ('e' in Fig. 59) and short curved apophysis; palpal tarsal organ capsulate (Fig. 82). Legs with spines on femora 1 (about 8) and femora 2 (about 5) in single rows prolatero-ventrally, without curved hairs, few vertical hairs; retrolateral



Figures 58–63. *Buitinga mazumbai*. Left male palp in prolateral (58) and retrolateral (59) views, male chelicerae in lateral (60) view, modified hairs on male cheliceral apophysis (61), and cleared epigynum in ventral (62) and dorsal (63) views. 'e': embolus; 'dt': dorsal trichobothrium; 'va': ventral apophysis on palpal coxa. Scale bars = 0.3 mm (58, 59, 62, 63), 0.2 mm (60), 30 μ m (61).

trichobothrium of tibia 1 at 14%; tarsus 1 with >20 pseudosegments.

Variation. Tibia 1 in 4 other males 3.7–4.1. The ZMUC has a male from (or near) the type locality that differs by having absolutely and relatively longer

palps and a much stronger bulbal apophysis; tibia 1 in this male: 2.9.

Female. In general similar to male, but without spines on femora. Tibia 1 in 20 females: 2.7–3.1 (\bar{x} = 2.88). Epigynum as in Figures 27, 62, and 80, with

extremely expandable scape (compare Figs 62 and 80) originating from close to posterior border of epigynum. Dorsal view as in Figure 63. ALS and palpal tarsal organ as in Figures 81 and 83.

Distribution. Known only from type locality (Map 2).

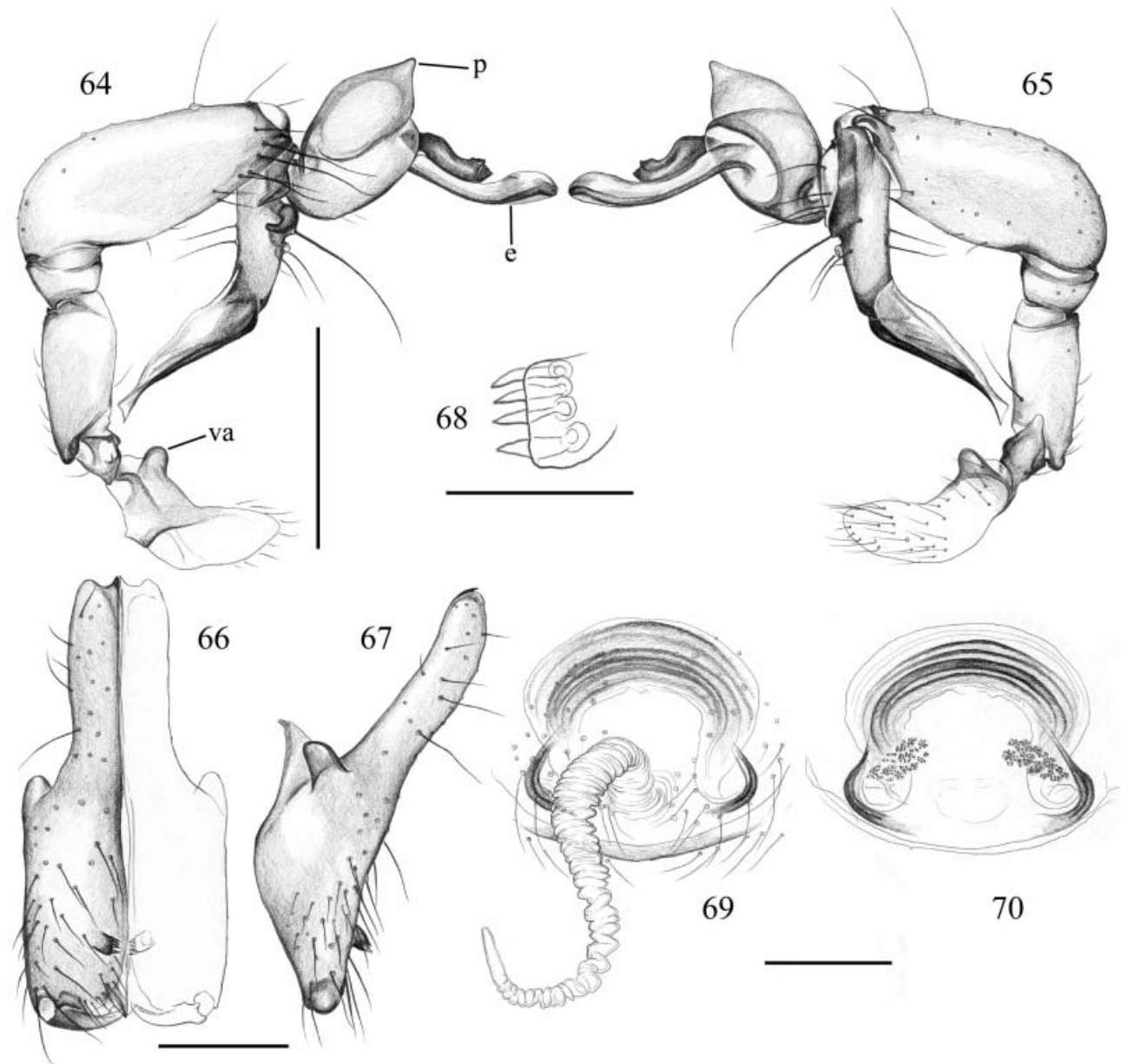
Material examined. TANZANIA: TANGA: W Usambara Mountains: Mazumbai: type above, together with 1♂2♀. Same collection data, sifting litter, 3♂15♀ in

CAS. Same collection data but November 11–20, 1995, sifting litter, 1♂3♀ in CAS. Mazumbai, 1900 m elev., August 1, 1980 (M. Stoltze, N. Scharff), 1♂ in ZMUC (assigned tentatively, see Variation above).

***BUITINGA LAKILINGO* N. SP.**

(FIGS 3, 28, 64–70, 84)

Type. Male holotype from Mazumbai (4°49'S,



Figures 64–70. *Buitinga lakilingo*. Left male palp in prolateral (64) and retrolateral (65) views, male chelicerae in frontal (66) and lateral (67) views, modified hairs on male cheliceral apophysis (68), and cleared epigynum in ventral (69) and dorsal (70) views. 'e': embolus; 'p': distinctive papilla on bulb; 'va': ventral apophysis on palpal coxa. Scale bars = 0.5 mm (64, 65), 0.2 mm (66, 67, 69, 70), 50 µm (68).

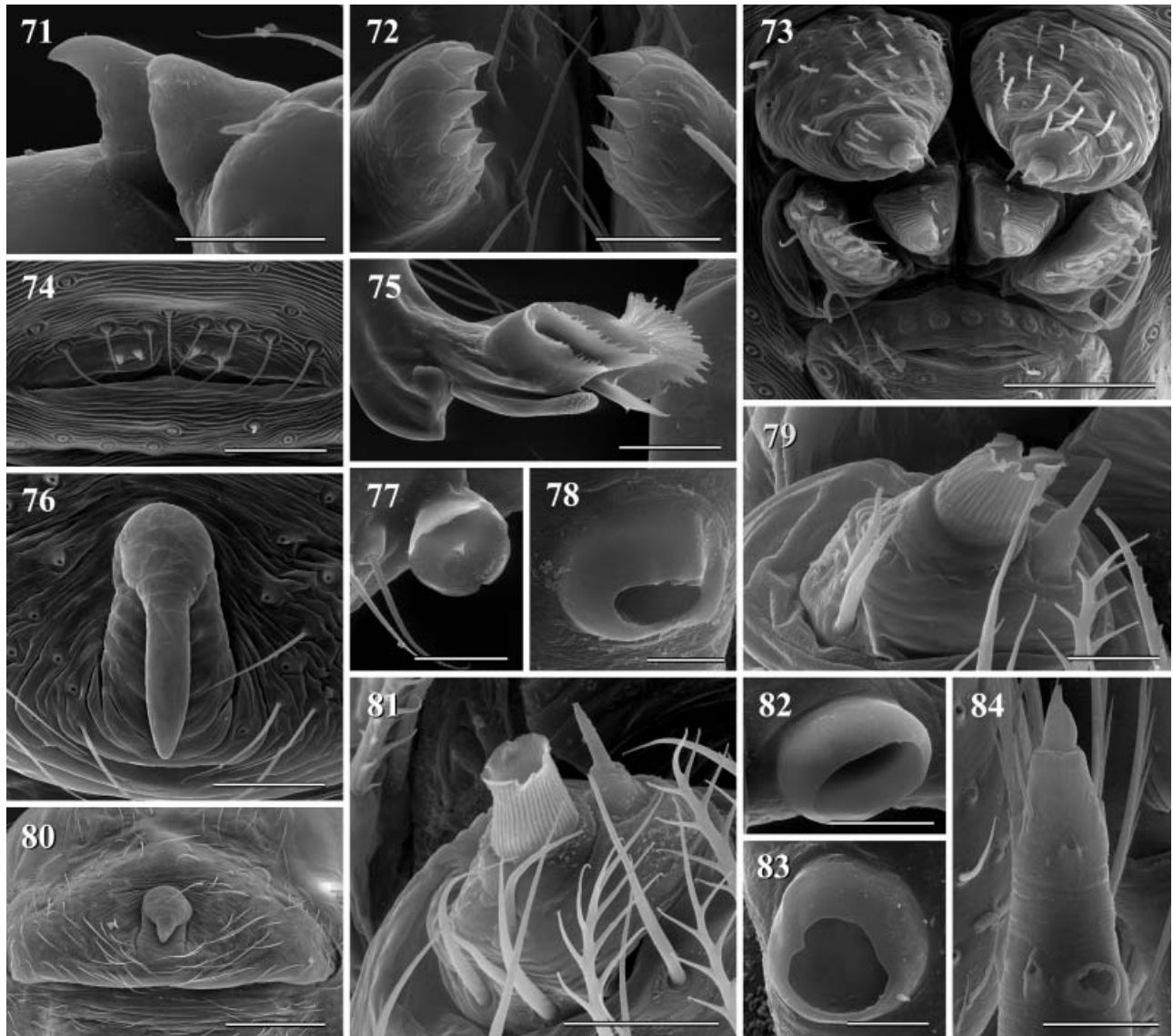
38°30'E), forest at 1400–1800 m elev., W Usambara Mountains, Tanga District, Tanzania; November 10–20, 1995 (C. E. Griswold, N. Scharff, D. Ubick); in CAS.

Etymology. Derived from the Swahili for 'no' (*la*) and 'pattern' (*kilingo*); it refers to the monochrome carapace in most specimens of this species.

Diagnosis. Distinguished from known congeners by the long apophyses proximally on the male chelicerae (Figs 66, 67); from species with similar chelicerae

(*B. mazumbai*, *amani*, *kadogo*) by the papilla on the bulb ('p' in Fig. 64), and the shape of the procurus (Figs 64, 65).

Male (holotype). Total length 2.3, carapace width 0.93. Leg 1: 20.9 (5.1 + 0.4 + 5.1 + 7.8 + 2.5), tibia 2: 3.2, tibia 3: 2.3, tibia 4: 3.1; tibia 1 L/d: 51. Habitus as in Fig. 3. Carapace pale ochre-yellow with brown Y-mark behind ocular area; sternum almost black. Legs pale ochre-yellow, without dark rings. Opisthosoma



Figures 71–84. *Buitinga kadogo* (71–79), *mazumbai* (80–83), and *lakilingo* (84). 71. Sclerotized teeth on proximal projections of male chelicerae. 72. Distal male chelical apophyses with modified hairs. 73. Male spinnerets. 74. Male gonopore with epiandrous spigots. 75. Right procurus, prolateral view. 76, 80. Scapes on epigyna. 77, 82. Male palpal tarsal organs. 78, 83. Female palpal tarsal organs. 79, 81. Female ALS. 84. Tip of female pedipalp with tarsal organ. Scale bars = 6 μ m (78), 8 μ m (83), 10 μ m (79), 20 μ m (71, 72, 77, 81, 82), 30 μ m (84), 40 μ m (74), 60 μ m (73, 76), 80 μ m (75), 200 μ m (80).

ochre-grey with few brown spots dorsally and V-mark above spinnerets; ventrally no marks. Ocular area slightly elevated; distance PME–PME 140 µm; diameter PME 100 µm; distance PME–ALE 35 µm. Thoracic furrow distinct but shallow. Sternum wider than long (0.65/0.58). Chelicerae as in Figures 66 and 67, with very long proximal apophyses and distal apophyses with four modified hairs each (Fig. 68). Palps as in Figures 64 and 65; coxa with strong ventral apophysis ('va' in Fig. 64), trochanter with retrolateral apophysis, femur with proximo-dorsal hump, procursus with proximal and distal division, but apparently without hinged process; bulb with papilla, partly sclerotized embolus ('e' in Fig. 64) and short curved apophysis. Legs apparently with spines on femora 1 (maybe also 2; almost all hairs missing), without curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 12%; tarsus 1 with >20 pseudosegments, only ~10 distally distinguishable.

Variation. Tibia 1 in 3 other males: 5.0–5.1. One male with brown marks laterally on carapace.

Female. In general similar to male, but without spines on femora. Tibia 1 in 5 females: 3.7–4.5 (\bar{x} = 4.18); two females with brown marks laterally on carapace. Epigynum as in Figures 28 and 69, with long scape originating from close to posterior border of epigynum. Dorsal view as in Figure 70. Palpal tarsal organ capulate (Fig. 84).

Distribution. Known only from type locality (Map 2).

Material examined. TANZANIA: TANGA: W Usambara Mountains: Mazumbai: type above, together with 3♂6♀, in CAS.

***BUITINGA AMANI* N. SP.**

(FIGS 4, 29, 85–91)

Type. Male holotype from Amani (5°05.7'S, 38°38'E), forest at 950 m elev., sifting litter, E Usambara Mountains, Tanga District, Tanzania; October 27–November 9, 1995 (C. E. Griswold, N. Scharff, D. Ubick); in CAS.

Etymology. Refers to the type locality.

Diagnosis. Distinguished from known congeners by the shapes of procursus and bulbal apophysis (Figs 85, 86), and by the length of the proximal apophyses on the male chelicerae (Fig. 88).

Male (holotype). Total length 1.44, carapace width 0.68. Leg 1: 10.9 (2.5 + 0.3 + 2.7 + 3.9 + 1.5), tibia 2: 1.5, tibia 3: 1.2, tibia 4: 1.5; tibia 1 L/d: 46. Habitus as in Figure 4. Carapace ochre to light brown, with darker brown pattern; sternum dark brown. Legs ochre, without dark rings. Opisthosoma grey with

dark pattern as in Figure 4. Ocular area slightly elevated; distance PME–PME 195 µm; diameter PME 90 µm; distance PME–ALE 25 µm. Thoracic furrow reduced to short line behind ocular area, barely indented. Sternum wider than long (0.48/0.40). Chelicerae as in Figures 87 and 88, with four modified hairs on each distal apophysis (Fig. 89). Palps as in Figures 85 and 86; coxa with ventral apophysis ('va' in Fig. 85), trochanter with large retrolateral apophysis, femur with small dorsal hump proximally, dorsal trichobothrium on tibia extremely distal ('dt' in Fig. 86), procursus with structure that winds around it ventrally (arrow in Fig. 85), apparently without hinged process, bulb with distinctive apophysis provided with some teeth and simple membranous embolus ('e' in Fig. 86). Legs without spines and curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 18%; tarsus 1 with ~20 pseudosegments, hardly visible in dissecting microscope.

Female. In general similar to male; tibia 1 in 3 females: 2.2–2.3. Epigynum as in Figures 29 and 90, with long scape curled up at rest near posterior rim of epigynum; dorsal view as in Figure 91. The second vial listed below contains a female with longer legs (tibia 1: 3.0) which is probably not conspecific.

Distribution. Known only from type locality (Map 2).

Material examined. TANZANIA: TANGA: E Usambara Mountains: Amani: type above, together with 2♀ and 4 juveniles. Same collection data, but without 'sifting litter', 1♂1♀ in CAS.

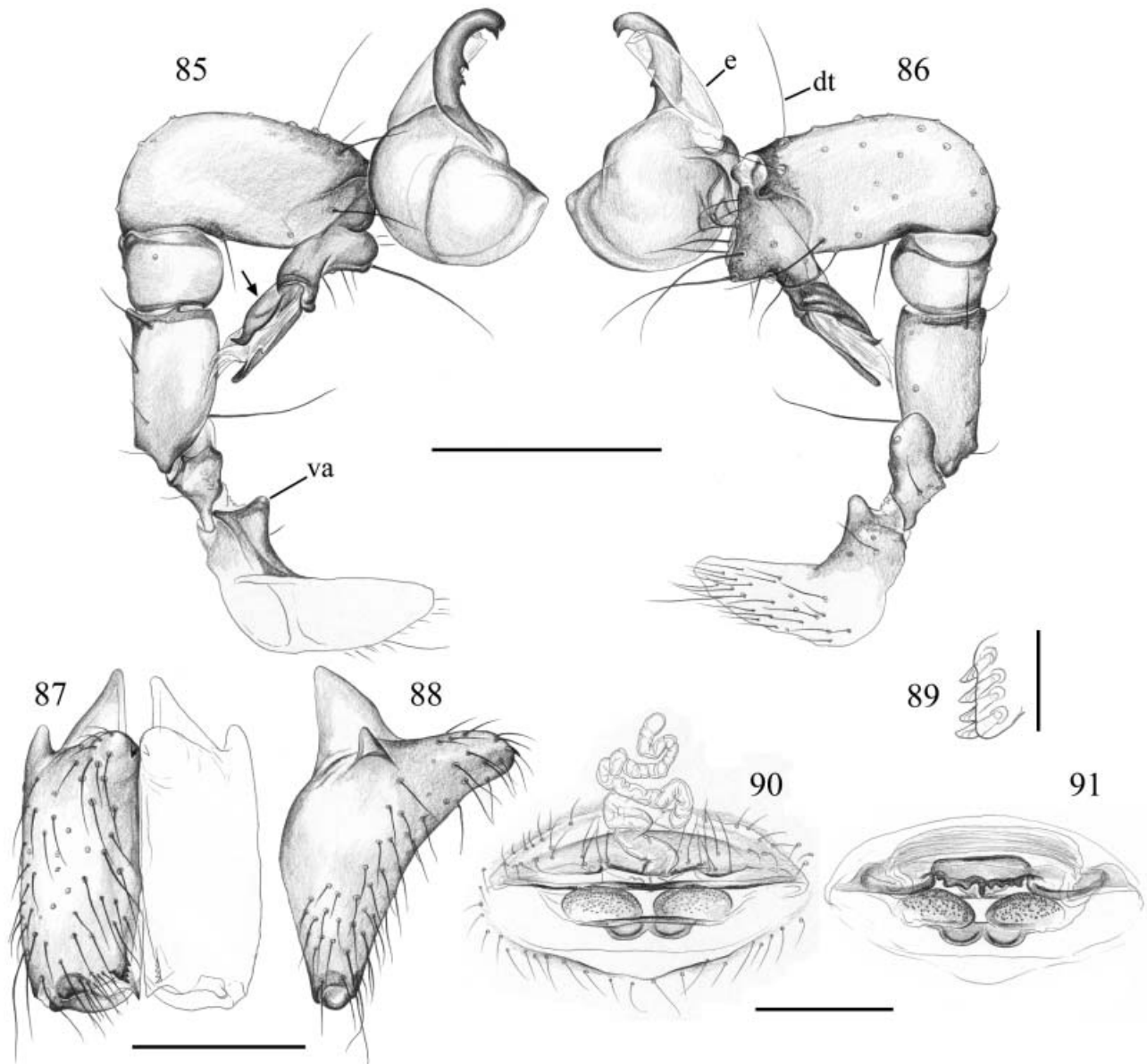
***BUITINGA NIGRESCENS* (BERLAND, 1920) N. COMB.**
(FIGS 6, 30, 92–98)

Spermophora nigrescens Berland, 1920: 137–138, figures 162–164.

Type. Female holotype from 'st. n°39' on Mt. Kenya, Kenya; January–February 1912 (C. Alluaud, R. Jeanne), in MNHN (AR 10373), examined.

Diagnosis. Distinguished from known congeners by the shapes of procursus (distal elements) and bulbal apophysis (Figs 92, 93), and by the armature of the male chelicerae (Figs 94–96).

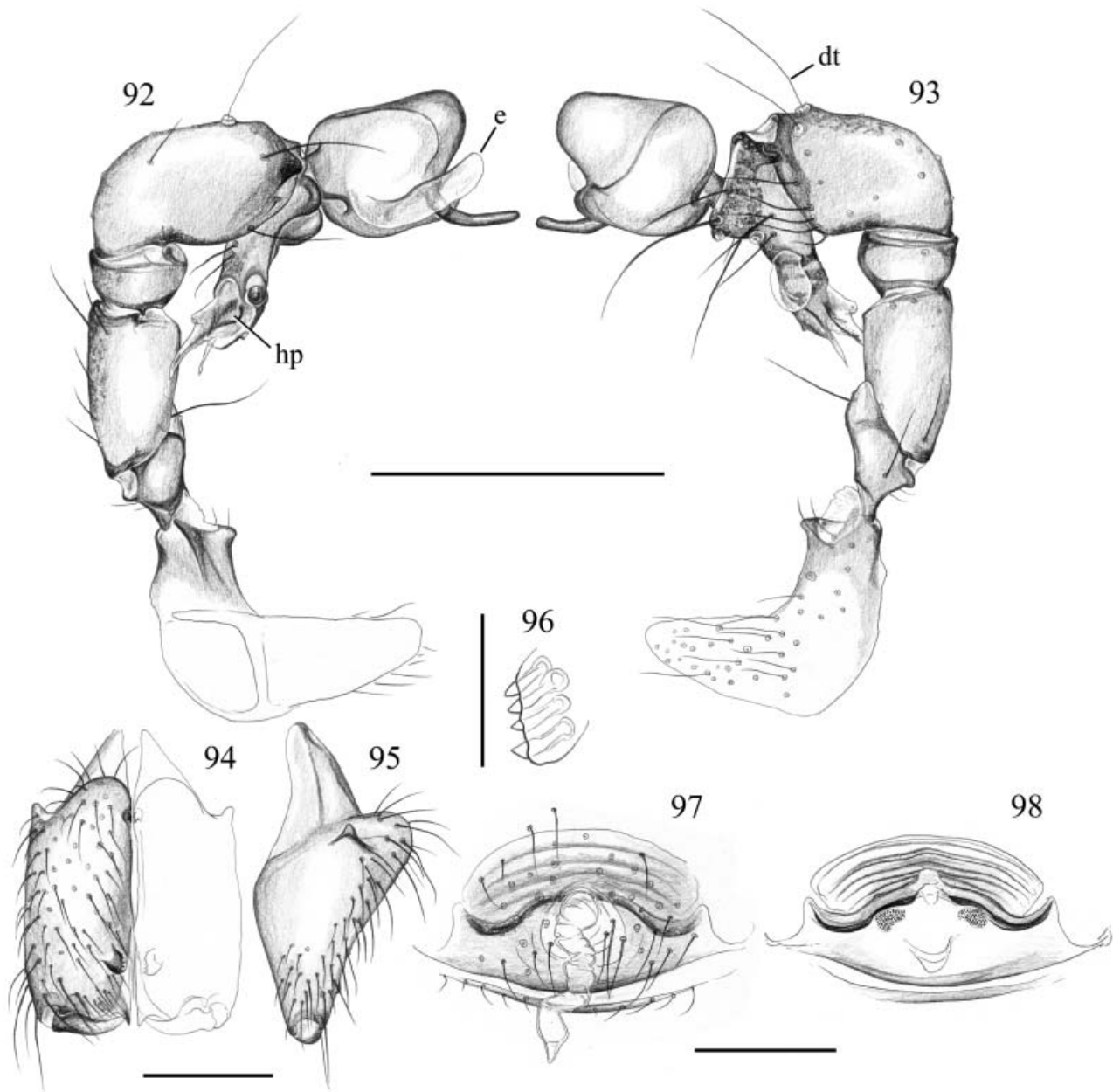
Notes. *Buitinga globosa* (Tullgren, 1910) was described from the Kilimanjaro and Meru area, and might actually be a senior synonym of *B. nigrescens*. More material needs to be collected (or the types of *B. globosa* need to be found) to decide this matter. Whether the Tanzanian material described below is indeed conspecific with the type also requires further study. The females appeared indistinguishable both in epigynum shape and colour pattern.



Figures 85–91. *Buitinga amani*. Left male palp in prolateral (85) and retrolateral (86) views, male chelicerae in frontal (87) and lateral (88) views, modified hairs on male cheliceral apophysis (89), and cleared epigynum in ventral (90) and dorsal (91) views. 'e': embolus; 'dt': dorsal trichobothrium; 'va': ventral apophysis on palpal coxa; arrow points to structure that winds around procursus ventrally. Scale bars = 0.3 mm (85, 86), 0.2 mm (87, 88, 90, 91), 30 μ m (89).

Male (Arusha N. P). Total length 2.15, carapace width 0.95. Leg 1: 15.7 (3.9 + 0.4 + 3.9 + 5.5 + 2.0), tibia 2: 2.5, tibia 3 missing, tibia 4: 2.6; tibia 1 L/d: 35. Habitus as in Figure 6. Carapace ochre-yellow with large brown marks laterally; sternum dark brown with light spot frontally. Legs ochre-yellow, with barely visible darker rings as in female (see below). Opisthosoma ochre-grey with dark brown pattern. Ocular area elevated and clearly separated from carapace; distance PME–PME 135 μ m; diameter PME 80 μ m; distance PME–ALE 35 μ m. Thoracic furrow

distinct frontally, absent posteriorly. Sternum wider than long (0.68/0.54). Chelicerae as in Figures 94 and 95, with large proximal projections with single tooth each, and pair of distal apophyses associated with four modified hairs each (Fig. 96). Palps as in Figures 92 and 93; coxa with ventral hump, trochanter with large retrolateral apophysis, procursus with membranous flap retrolaterally and putative hinged process ventrally ('hp' in Fig. 92); bulb with simple membranous embolus ('e' in Fig. 92), slightly curved apophysis and hump (Fig. 93). Legs without spines, without curved



Figures 92–98. *Buitinga nigrescens*. Left male palp in prolateral (92) and retrolateral (93) views, male chelicerae in frontal (94) and lateral (95) views, modified hairs on male chelical apophysis (96), and cleared epigynum in ventral (97) and dorsal (98) views. 'e': embolus; 'dt': dorsal trichobothrium; 'hp': putative hinged process. Scale bars = 0.4 mm (92, 93), 0.2 mm (94, 95, 97, 98), 50 μ m (96).

hairs, few vertical hairs (most hairs missing); retrolateral trichobothrium of tibia 1 at 14%; tarsus 1 with >20 pseudosegments, distally quite distinct.

Female. In general similar to male, but rings on legs more distinct: femora subdistally, tibiae proximally, medially and subdistally. In holotype additional incomplete ring on femora at about 60%. Tibia 2 in holotype: 2.0. Female from Arusha: tibia 1: 3.4, tibia 2:

2.1. Epigynum as in Figures 30 and 97; scape in holotype coiled up and difficult to see. Dorsal view as in Figure 98.

Distribution. Known from Mt. Kenya in Kenya and from Arusha N. P. in Tanzania (Map 2).

Material examined. KENYA: Mt. Kenya, type above. TANZANIA: ARUSHA: Arusha National Park, E side

Mt. Meru (~3°S, 37°E), 5500 ft elev., June–July 1974 (B. D. Valentine), in AMNH.

BUITINGA SAFURA N. SP.

(FIGS 5, 31, 99–105, 120–129)

Type. Male holotype from 11 km SE Masisiwe, Kihanga Stream (8°22'05.7"S, 35°58'41.6"E), 1800 m elev., canopy, Uzungwa Scarp Forest Reserve, Iringa District, Tanzania; May 17–27, 1997 (ZMUC-SI Expedition); in USNM ('TA 076').

Etymology. From the Swahili for 'pale'; it refers to the relatively pale coloration of this species.

Diagnosis. Pale species, distinguished from known congeners by the long proximal apophyses on the male chelicerae set with modified hairs (Figs 102, 103), and by the shapes of bulbal apophysis and procurus (Figs 99, 100).

Male (holotype). Total length 2.7, carapace width 1.00. Leg 1: 24.6 (5.8 + 0.5 + 5.9 + 9.3 + 3.1), tibia 2: 3.8, tibia 3: 2.5, tibia 4: 3.6; tibia 1 L/d: 57. Habitus as in Figure 5. Carapace pale ochre-yellow with brown and blackish marginal pattern; sternum whitish. Legs pale ochre-yellow, patella area and tibia-metatarsus joint dark brown. Opisthosoma pale ochre-grey, without marks. Ocular area not elevated, triads on low elevations; distance PME–PME 240 µm; diameter PME 70 µm; distance PME–ALE 35 µm. Thoracic furrow reduced to barely indented line. Sternum wider than long (0.66/0.60). Chelicerae as in Figures 102 and 103, with long proximal apophyses set with modified hairs (Figs 120, 121) and distal apophyses set with 4–6 modified hairs each (Figs 101, 122). Palps as in Figures 99 and 100; coxa with distinct ventral hump, trochanter with retrolateral apophysis, femur with distinct hump proximo-dorsally, procurus with distinctive transparent flap retrolaterally ('f' in Figs 100, 123; difficult to see in dissecting microscope), apparently without hinged process; bulb with membranous nontubular embolus ('e' in Fig. 100), papilla ('p' in Fig. 99), and distinctive curved apophysis. Legs without spines, without curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 9%; tarsus 1 with >30 pseudosegments, distally ~20 fairly distinct. Four epia-androus spigots as in Figure 124.

Variation. Tibia 1 in 8 other males: 5.6–6.0 (\bar{x} = 5.86). Some males with pair of large black spots and pair of smaller spots dorso-posteriorly on opisthosoma; some males with light brown spots parallel to marginal line on carapace.

Female. In general similar to male, with same variation in colour pattern. Tibia 1 in 8 females: 4.6–5.0 (\bar{x} = 4.81). Epigynum simple light brown plate

(Fig. 31), with long scape (Fig. 104) coiled up at rest (Figs 126, 129). Dorsal view as in Figure 105. Palpal tarsal organ capsulate (Fig. 127). ALS as in Figure 128.

Distribution. Known from Tanga and Iringa Districts in Tanzania (Map 2).

Material examined. TANZANIA: IRINGA: Uzungwa Scarp Forest Reserve: type above, together with 9♂9♀, in USNM. Same collection data, 14 vials with many specimens, in USNM. Same collection data, understory, 60 vials with many specimens, in USNM. Same collection data, litter and logs, 2 vials, in USNM. Same collection data, sweeping, 2 vials, in USNM. Same collection data, low vegetation, 1 vial in USNM. Uzungwa Scarp Forest Reserve at 8°32'S, 35°52'E, 1370 m elev., March 21, 1996 (McKamey *et al.*), canopy fogging, 1♂1♀ (2 vials), in ZMUC. Same collection data but March 19, 1996, 7♂7♀ (13 vials), in ZMUC. Uzungwa Mountains, Kiranzi Kitunguru Catchment Forest Reserve (8°07'S, 36°04'E), March–April, 1996 (L. L. Sørensen), 1♂1♀, in ZMUC. TANGA: E Usambara Mountains: Amani, Mbomole Hill (5°05.7'S, 38°37'E), 1000 m elev., November 5–8, 1995 (C. E. Griswold, N. Scharff, D. Ubick), 1♂3♀, in ZMUC. Same collection data, 1♀–8♀, in CAS. W Usambara Mtns. Mazumbai forest (4°49'S, 38°30'E), 1400–1800 m elev., November 10–20, 1995 (C. E. Griswold, N. Scharff, D. Ubick), 3♂3♀, in ZMUC. Same collection data, 5♂8♀, in CAS. Same locality and collectors at 4°49'S, 38°29'E, 1800–1900 m elev., 2♂2♀, in ZMUC. Same locality at 4°49'S, 38°29.5'E, November 12–20, 1995 (same collectors), 4♂3♀, in CAS. Mazumbai, 1600 m elev., August 1, 1980 (M. Stoltze, N. Scharff), 1♂, in ZMUC. Morogoro: Uluguru Mts., Lukwangule, West (~7°S, 37.5°E), 2100 m elev., July 22, 1981 (M. Stoltze, N. Scharff), 1♂, in ZMUC.

BUITINGA GRISWOLDI N. SP.

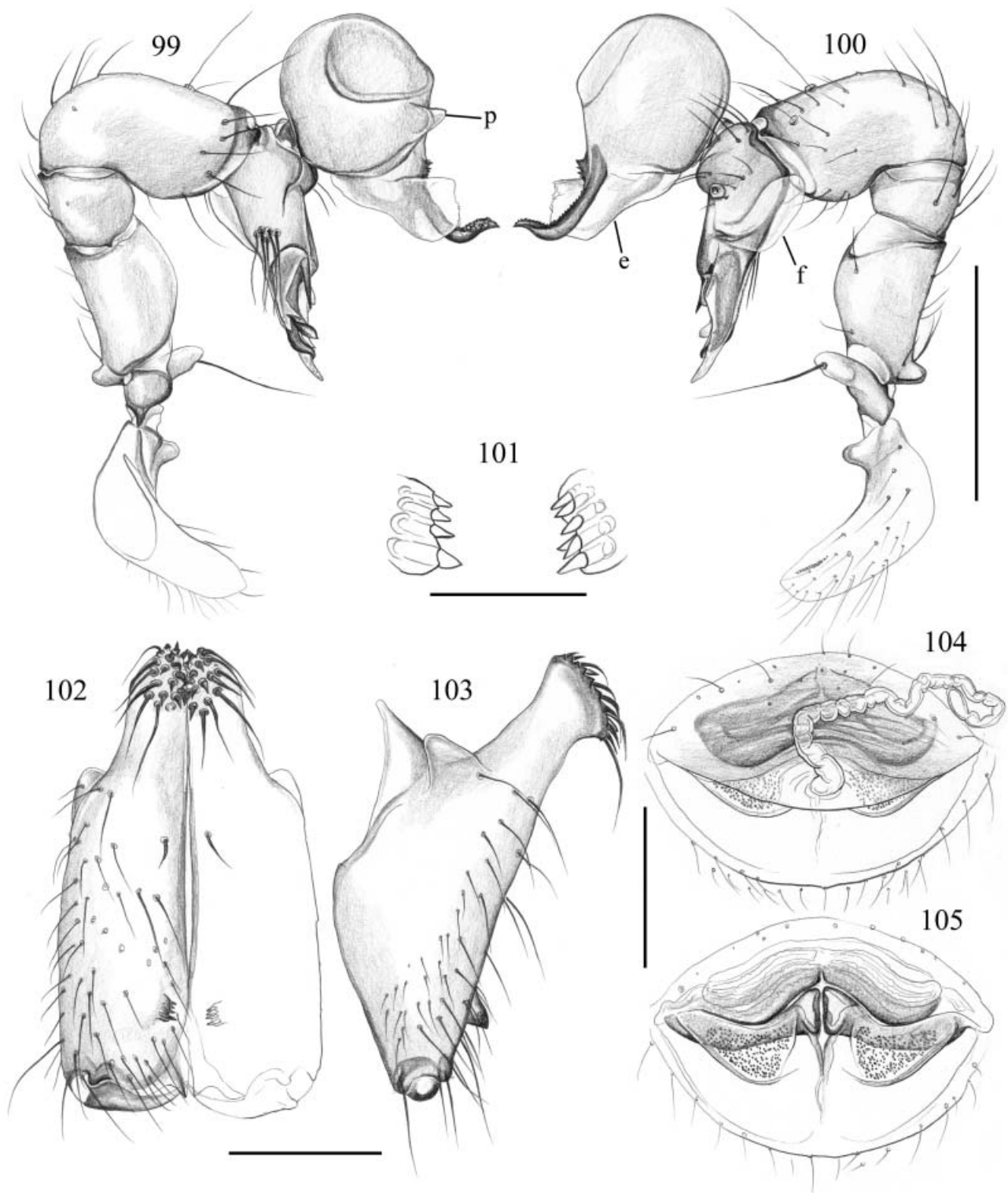
(FIGS 7, 32, 106–112, 130–132)

Type. Male holotype from Impenetrable Forest National Park (0°59'S, 29°36'E), Buhoma, Bwindi, Rukungiri District, Uganda; forest at about 1400 m elev., September 20–24, 1996 (C. E. Griswold), in CAS.

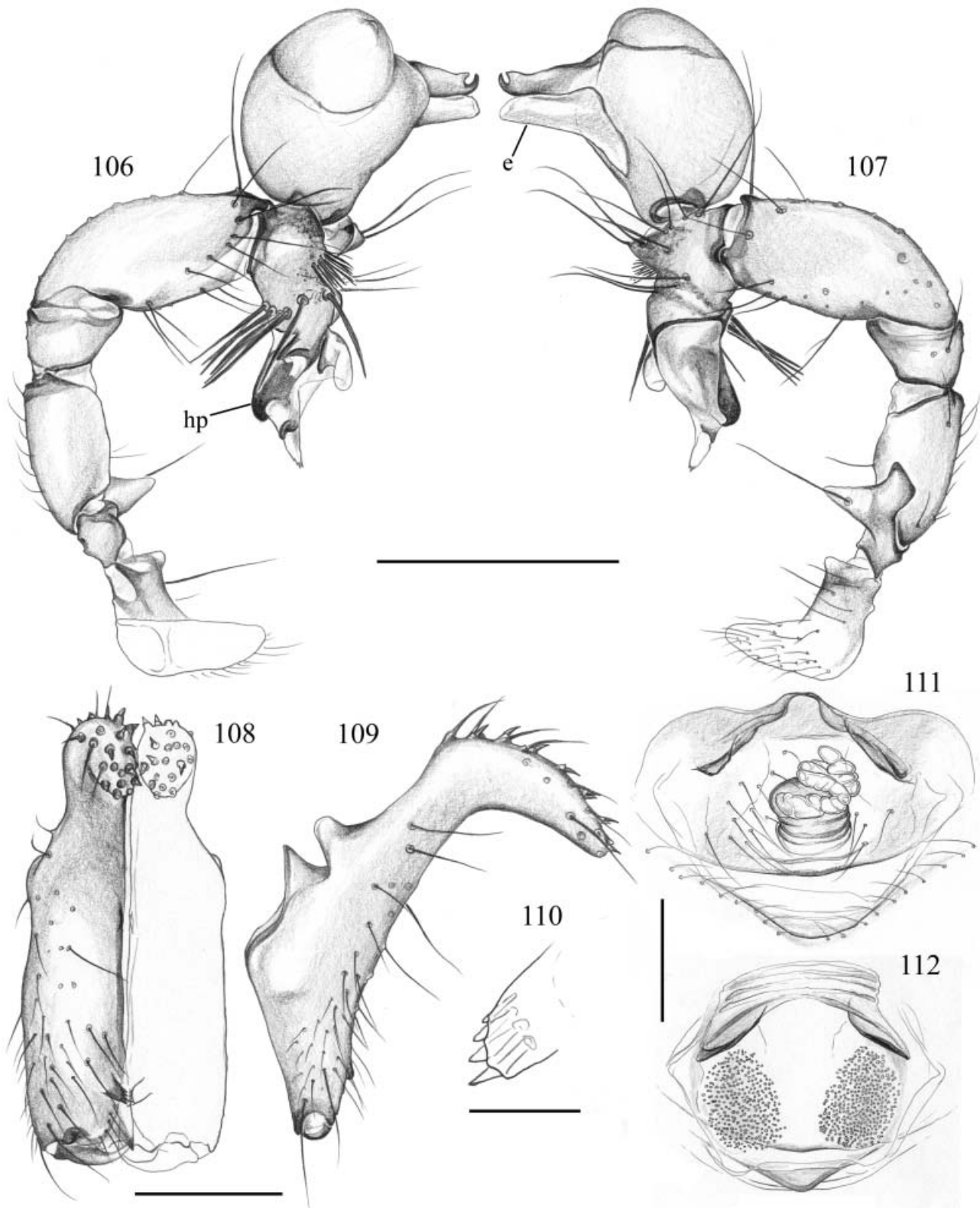
Etymology. Named after the collector, Charles Griswold (California Academy of Sciences).

Diagnosis. Easily distinguished from known congeners by the long curved projections proximally on the male chelicerae (Fig. 109); also by the shapes of procurus and bulbal apophysis (Figs 106, 107), and by the bifid palpal trochanter apophysis (Fig. 107).

Male (holotype). Total length 1.85, carapace width 0.78. Leg 1: 13.2 (3.2 + 0.3 + 3.4 + 4.7 + 1.6), tibia 2:



Figures 99–105. *Buitinga safura*. Left male palp in prolateral (99) and retrolateral (100) views, modified hairs on male cheliceral apophyses (101), male chelicerae in frontal (102) and lateral (103) views, and cleared epigynum in ventral (104) and dorsal (105) views. 'e': embolus; 'f': transparent flap on procursus; 'p': bulbal papilla. Scale bars = 0.5 mm (99, 100), 0.2 mm (102, 103), 0.3 mm (104, 105), 50 μ m (101).



Figures 106–112. *Buitinga griswoldi*. Left male palp in prolateral (106) and retrolateral (107) views, male chelicerae in frontal (108) and lateral (109) views, modified hairs on male cheliceral apophysis (110), and cleared epigynum in ventral (111) and dorsal (112) views. 'e': embolus; 'hp': putative hinged process. Scale bars = 0.5 mm (106, 107), 0.2 mm (108, 109, 111, 112), 30 μ m (110).

2.0, tibia 3: 1.5, tibia 4: 2.1; tibia 1 L/d: 48. Habitus as in Figure 7. Carapace ochre with brown pattern as in Figure 7; sternum dark brown. Legs ochre, with indistinct rings on femora and tibiae (subdistally). Opisthosoma grey with brown spots. Ocular area slightly elevated; distance PME–PME 170 µm; diameter PME 80 µm; distance PME–ALE 25 µm. Thoracic furrow shallow but distinct. Sternum wider than long (0.58/0.44). Chelicerae as in Figures 108 and 109, with strong modified hairs on long proximal apophyses, and four modified hairs embedded in each distal apophyses (Fig. 110). Palps as in Figures 106 and 107; coxa with unsclerotized ventral hump, trochanter with distinctive retrolateral apophyses, procurus with putative hinged process ('hp' in Fig. 106) and two distinctive brushes of strong hairs; bulb with simple membranous embolus ('e' in Fig. 107) and sclerotized apophysis with distal hook. Legs with spines ventrally in single rows on femora 1 (distally about 6 spines), without curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 14%; tarsus 1 with ~25 pseudosegments, distally quite distinct.

Variation. Tibia 1 in 11 other males: 2.9–3.6 (\bar{x} = 3.27).

Female. In general similar to male, but without spines on femora. Tibia 1 in 21 females: 2.7–3.3 (\bar{x} = 2.92). Epigynum as in Figures 32, 111, and 130, with long scape tightly coiled up at rest (Fig. 131) close to posterior rim of epigynum. Dorsal view as in Figure 112. Spinnerets as in Figure 132.

Distribution. Known only from Impenetrable Forest National Park, Uganda (Map 2).

Material examined. UGANDA: RUKUNGIRI DISTRICT: Buhoma Bwindi: Impenetrable Forest N. P.: type above, together with 7♀, in CAS. Same collection data, 5♂11♀, in CAS. Kitahurira Bwindi, Impenetrable Forest N. P. (0°58'S, 29°41'E), about 1740 m elev., September 17–19, 1996 (C. E. Griswold), 3♂3♀, in CAS. Same collection data, sifting forest litter, 1♂1♀, in CAS. Same locality, pitfall traps in forest, September 14–24, 1996 (C. E. Griswold, G. Mayooba, J. Vindum), 1♂1♀, in CAS. Same locality, September 18–20, 1996 (C. E. Griswold), 2♂1♀, in CAS.

BUITINGA BUHOMA N. SP.

(FIGS 8, 33, 113–119, 133–134)

Type. Male holotype from Impenetrable Forest National Park (0°59'S, 29°36'E), Buhoma Bwindi, Rukungiri District, Uganda; forest at about 1400 m elev., September 20–24, 1996 (C. E. Griswold), in CAS.

Etymology. Refers to the type locality.

Diagnosis. Distinguished from known congeners by

the shapes of procurus (retrolateral membranous cushion-like structure and distal elements), and bulbal apophysis (long and straight with distal hook; Figs 113, 114), and by the armature of the male chelicerae (Figs 116, 117).

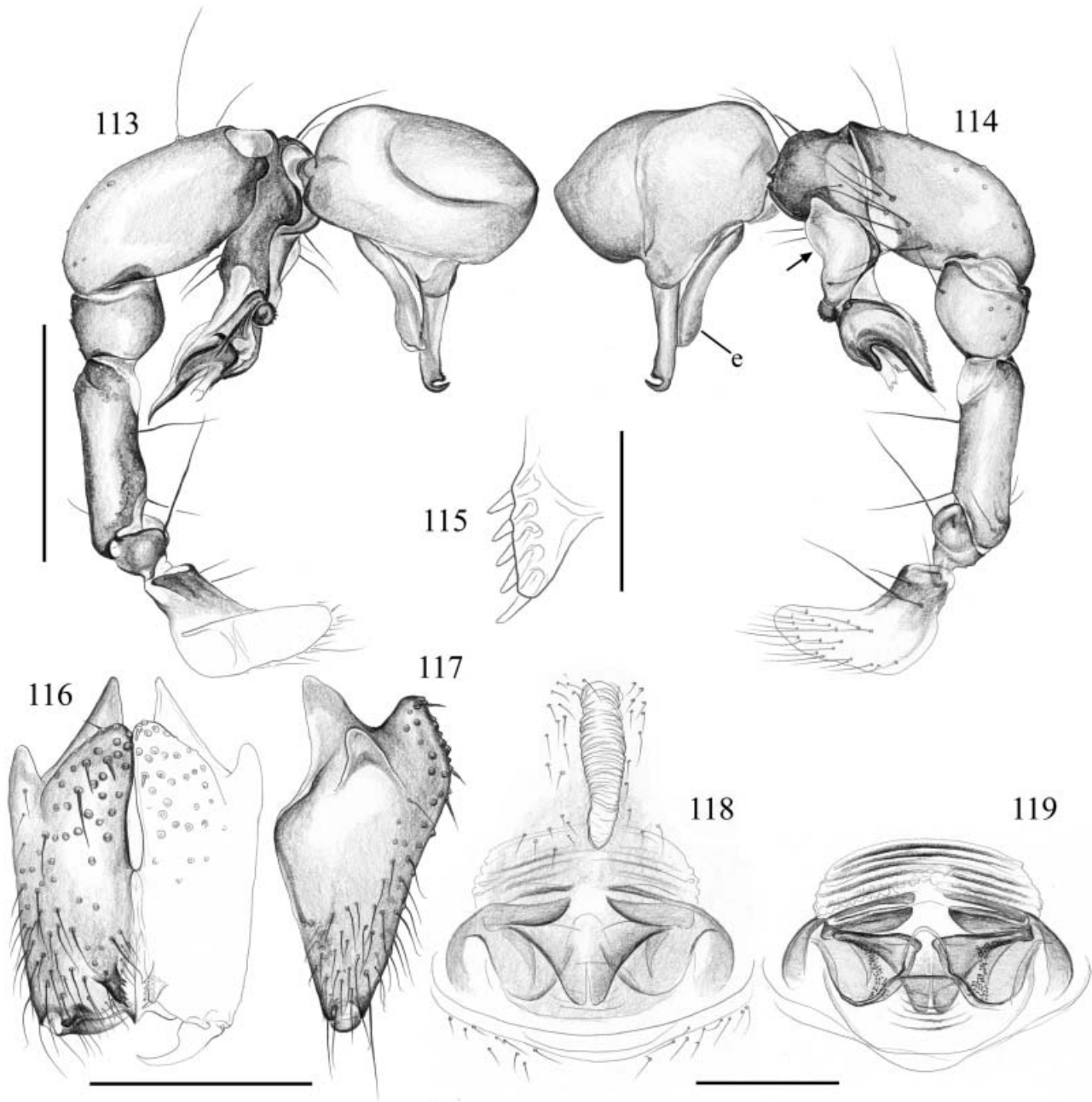
Male (holotype). Total length 2.6, carapace width 0.97. Leg 1: 22.1 (5.3 + 0.3 + 5.5 + 8.6 + 2.4), tibia 2: 3.3, tibia 3: 2.5, tibia 4: 3.2; tibia 1 L/d: 59. Habitus as in Figure 8. Carapace mostly dark brown to black, with pair of ochre spots; sternum dark brown to black, medially with lighter longitudinal spot. Legs ochre-yellow, with darker rings on femora (subdistally) and tibiae (proximally, including patella). Opisthosoma grey with dark brown spots, ventrally mostly blackish. Ocular area slightly elevated; distance PME–PME 180 µm; diameter PME 90 µm; distance PME–ALE 25 µm. Thoracic furrow shallow frontally, absent posteriorly. Sternum wider than long (0.70/0.53). Chelicerae as in Figures 116 and 117, with strong modified hairs on proximal projections (most hairs missing) and five modified hairs embedded in each distal apophysis (Fig. 115). Palps as in Figures 113 and 114; trochanter with short but wide retrolateral apophysis, patella globular, procurus with distinctive membranous cushion-like structure retrolaterally (arrow in Fig. 114) and complex set of structures distally; bulb with simple membranous embolus ('e' in Fig. 114) and straight sclerotized apophysis with distal hook. Legs without spines, without curved hairs, few vertical hairs (most hairs missing); retrolateral trichobothrium of tibia 1 at 10%; tarsus 1 with ~25 pseudosegments distally fairly distinct.

Variation. Tibia 1 in 2 other males examined: 4.5, 5.2. Tibiae sometimes also with subdistal dark ring.

Female. In general similar to male. Tibia 1 in 18 females: 4.3–4.7 (\bar{x} = 4.43). Epigynum as in Figures 33 and 118, with straight scape (Fig. 134) in very frontal position. Dorsal view as in Figure 119. ALS as in Figure 133.

Distribution. Known only from Impenetrable Forest National Park, Uganda (Map 2).

Material examined. UGANDA: RUKUNGIRI DISTRICT: Buhoma Bwindi: Impenetrable Forest N. P.: type above, together with 2♂10♀, in CAS. Same collection data, 1♂5♀, in CAS. Kitahurira Bwindi, Impenetrable Forest N. P. (0°58'S, 29°41'E), about 1740 m elev., September 17–19, 1996 (C. E. Griswold), 3♀, in CAS. KABALE DISTRICT: Ruhiza Bwindi: Impenetrable Forest N. P. (1°03'S, 29°47'E), forest at about 2300 m elev., September 13–16, 1996 (C. E. Griswold), 1♂4♀, in CAS.



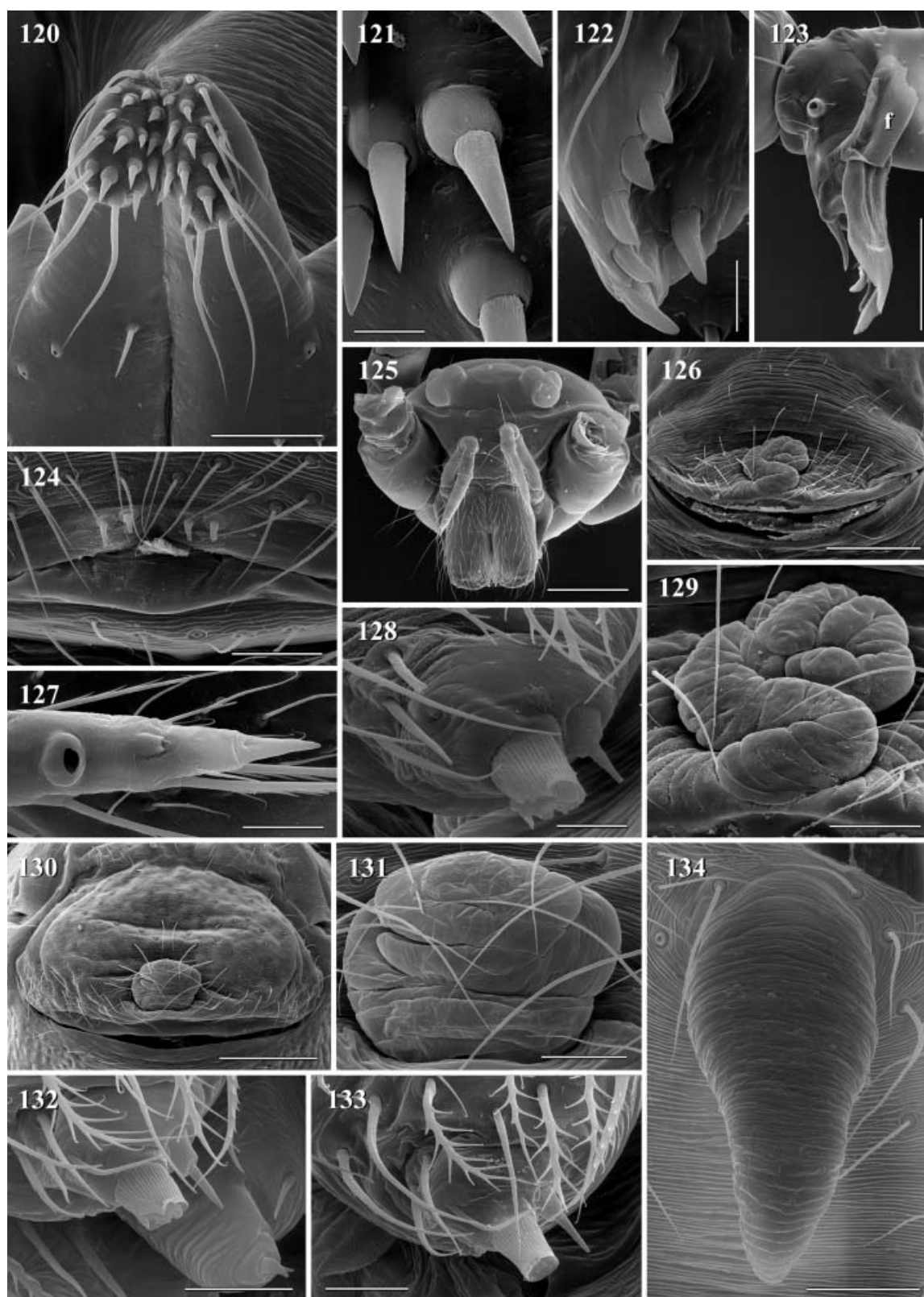
Figures 113–119. *Buitinga buhoma*. Left male palp in prolateral (113) and retrolateral (114) views, modified hairs on male cheliceral apophysis (115), male chelicerae in frontal (116) and lateral (117) views, and cleared epigynum in ventral (118) and dorsal (119) views. 'e': embolus; arrow points to cushion-like structure on procurus. Scale bars = 0.5 mm (113, 114), 0.3 mm (116–119), 50 μ m (115).

***BUITINGA RUHIZA* N. SP.**
(FIGS 12, 34, 135–140)

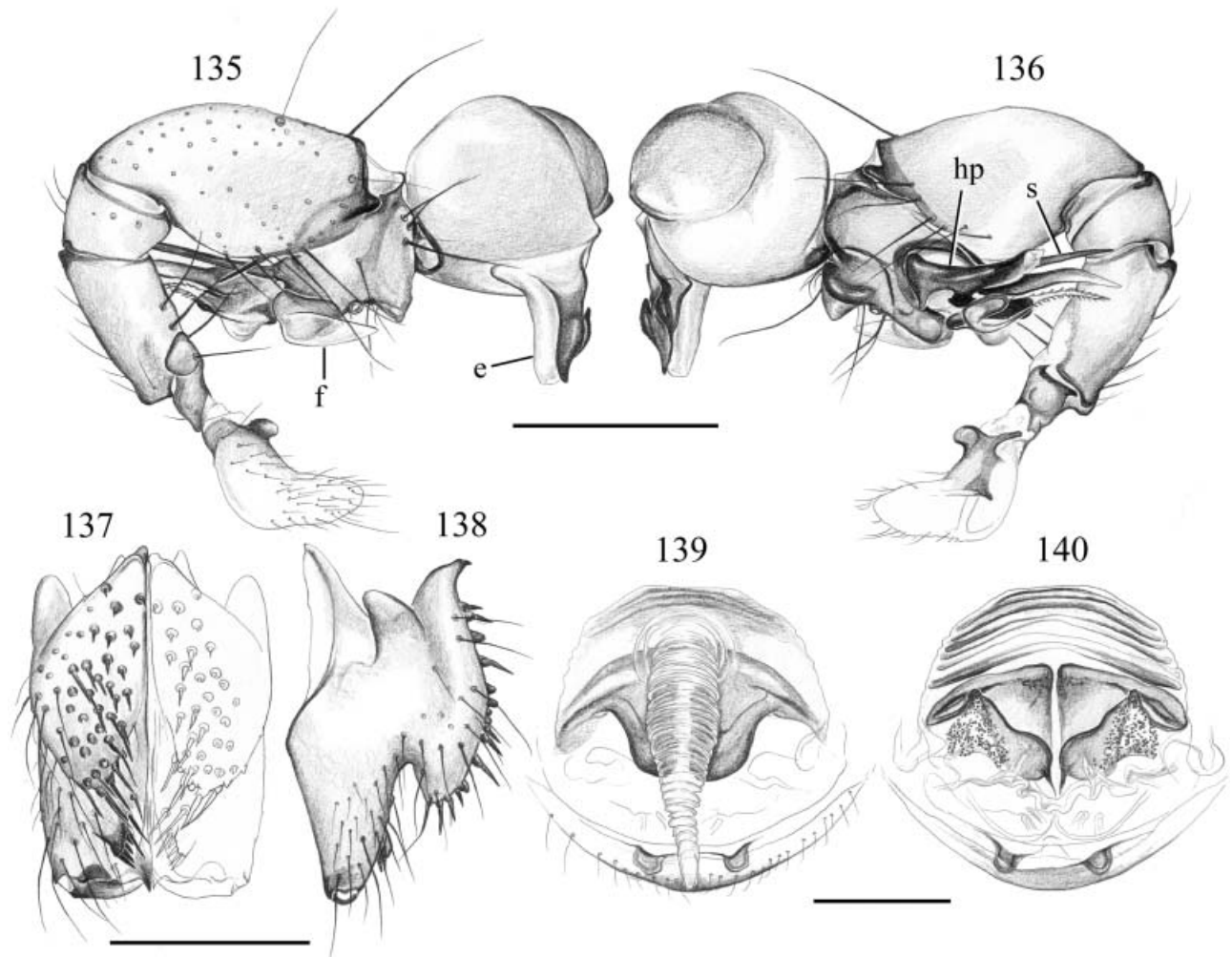
Type. Male holotype from Impenetrable Forest National Park (1°03'S, 29°47'E), Ruhiza Bwindi, Kabale District, Uganda; forest at about 2300 m elev., September 13–16, 1996 (C. E. Griswold), in CAS.

Etymology. The specific name is a noun in apposition, referring to the type locality.

Diagnosis. Easily distinguished from known congeners by the armature on the male chelicerae (Figs 137, 138); also by the shapes of procurus and bulbal apo-



Figures 120–134. *Buitinga safura* (120–129), *griswoldi* (130–132), and *buhoma* (133, 134). 120. Proximal projections on male chelicerae with modified hairs. 121. Detail of Fig. 120. 122. Distal male chelical apophysis with modified hairs. 123. Procursus with transparent flap ('f'). 124. Male gonopore with epiandrous spigots. 125. Female prosoma, frontal view. 126, 130. Epigynum with scape. 127. Tip of female palp with tarsal organ. 128, 132, 133. Female ALS spigots. 129, 131. Epigynal scapes (details of Figs 126 and 130). 134. Scape on epigynum. Scale bars = 10 μ m (121, 122, 128), 20 μ m (132, 133), 30 μ m (127), 40 μ m (124, 131), 50 μ m (129), 60 μ m (134), 80 μ m (120), 200 μ m (123, 126, 130), 300 μ m (125).



Figures 135–140. *Buitinga ruhiza*. Right male palp in retrolateral (135) and prolateral (136) views, male chelicerae in frontal (137) and lateral (138) views, and cleared epigynum in ventral (139) and dorsal (140) views. 'e': embolus; 'f': transparent flap on procurus; 'hp': hinged process; 's': spine (modified hair?) on procurus. Scale bars = 0.5 mm (135, 136), 0.3 mm (137–140).

physis (Figs 135, 136), and by the proximally orange scape (Fig. 34). The CAS has three males of a very close relative from close to the type locality (1°02'S, 29°46'E), labelled 'pholcid 9', that differs by having the frontal chelical projections smaller, by the shapes of procurus (distal elements) and bulbal apophysis, and also by being much lighter (sternum pale, opisthosoma with only a few spots dorsally, no marks ventrally).

Male (holotype). Total length 2.8, carapace width 1.03. Leg 1: 25.3 (6.1 + 0.4 + 6.3 + 10.0 + 2.5), tibia 2: 3.6, tibia 3: 2.6, tibia 4: 3.5; tibia 1 L/d: 68. Habitus as in Figure 12. Carapace ochre-yellow with blackish lateral spots and median band, posterior half of ocular area and clypeus also dark; sternum brown with marginal black bands and longitudinal darker spot. Legs ochre-yellow, with dark bands on femora (subdistally)

patella area and tibiae (subdistally). Opisthosoma grey with black spots, ventrally similar to female (cf. Fig. 34), but with longitudinal black spot between transversal band and gonopore. Ocular area barely elevated; distance PME–PME 265 µm; diameter PME 80 µm; distance PME–ALE 40 µm. Thoracic furrow very shallow frontally, absent posteriorly. Sternum wider than long (0.66/0.58). Chelicerae as in Figures 137 and 138, with strong modified hairs on massive frontal projections and about five strong hairs associated with distal apophysis. Palps as in Figures 135 and 136; coxa with distinct weakly sclerotized projection ventrally, trochanter with large retrolateral apophysis, procurus very complex, with extremely strong spine ventrally ('s' in Fig. 136), transparent flap retrolaterally ('f' in Fig. 135), several apparently hinged structures distally (putative hinged process marked as 'hp' in Fig. 136); bulb with simple membranous embolus ('e' in Fig. 135) and distinctive sclerotized apophysis. Legs with spines ventrally in single rows on femora 1 (distally about 10 spines, most missing), without curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 11%; tarsus 1 with only ~15 pseudosegments visible distally.

Variation. Tibia 1 in other male examined: 5.8.

Female. In general similar to male, but without spines on femora. Tibia 1 in 7 females: 4.6–5.2 (\bar{x} = 4.88). Epigynum as in Figures 34 and 139, with distinctive scape (orange proximally; not coiled up). Dorsal view as in Figure 140.

Distribution. Known only from Impenetrable Forest National Park, Uganda (Map 2).

Material examined. UGANDA: KABALE DISTRICT: Ruhiza Bwindi: Impenetrable Forest N. P.: type above, together with 1♂8♀, in CAS. Same locality at 29°46'E, sweeping forest, September 16, 1996 (C. E. Griswold), 1♀, in CAS. Same locality, on buildings and roadcut, September 12–16, 1996 (C. E. Griswold), 1♀, in CAS. RUKUNGIRI DISTRICT: Buhoma Bwindi: Impenetrable Forest N. P. (0°59'S, 29°36'E), about 1400 m elev., sweeping and beating forest understory, September 20–24, 1996 (C. E. Griswold), 1♀, in CAS.

BUITINGA MBOMOLE N. SP.

(FIGS 11, 35, 141–146, 151–159)

Type. Male holotype from Mbomole Hill (5°05.7'S, 38°37'E), 1000 m elev., Amani, E Usambara Mountains, Tanga District, Tanzania; November 5–8, 1995 (C. E. Griswold, N. Scharff, D. Ubick); in CAS.

Etymology. Refers to the type locality.

Diagnosis. Easily distinguished from most known congeners by the long cylindrical opisthosoma and the

colour pattern on the carapace (Fig. 11); also by the male palp (shapes of bulbal apophysis and procurus; Figs 141, 142), and by the two parallel dark stripes ventrally on the opisthosoma (Fig. 35). The ZMUC has a very close relative from Kwangumi Forest Reserve in Tanga that differs only by the larger bulbal apophysis ('h' in Fig. 154) and the more proximal position of the male cheliceral apophyses. The CAS and ZMUC have a further close relative from Mazumbai in the W Usambara Mountains that differs by the absence of the dark median line on the carapace, a stronger bulbal apophysis ('h' in Fig. 154) and minimally by the shape of the distal procurus elements.

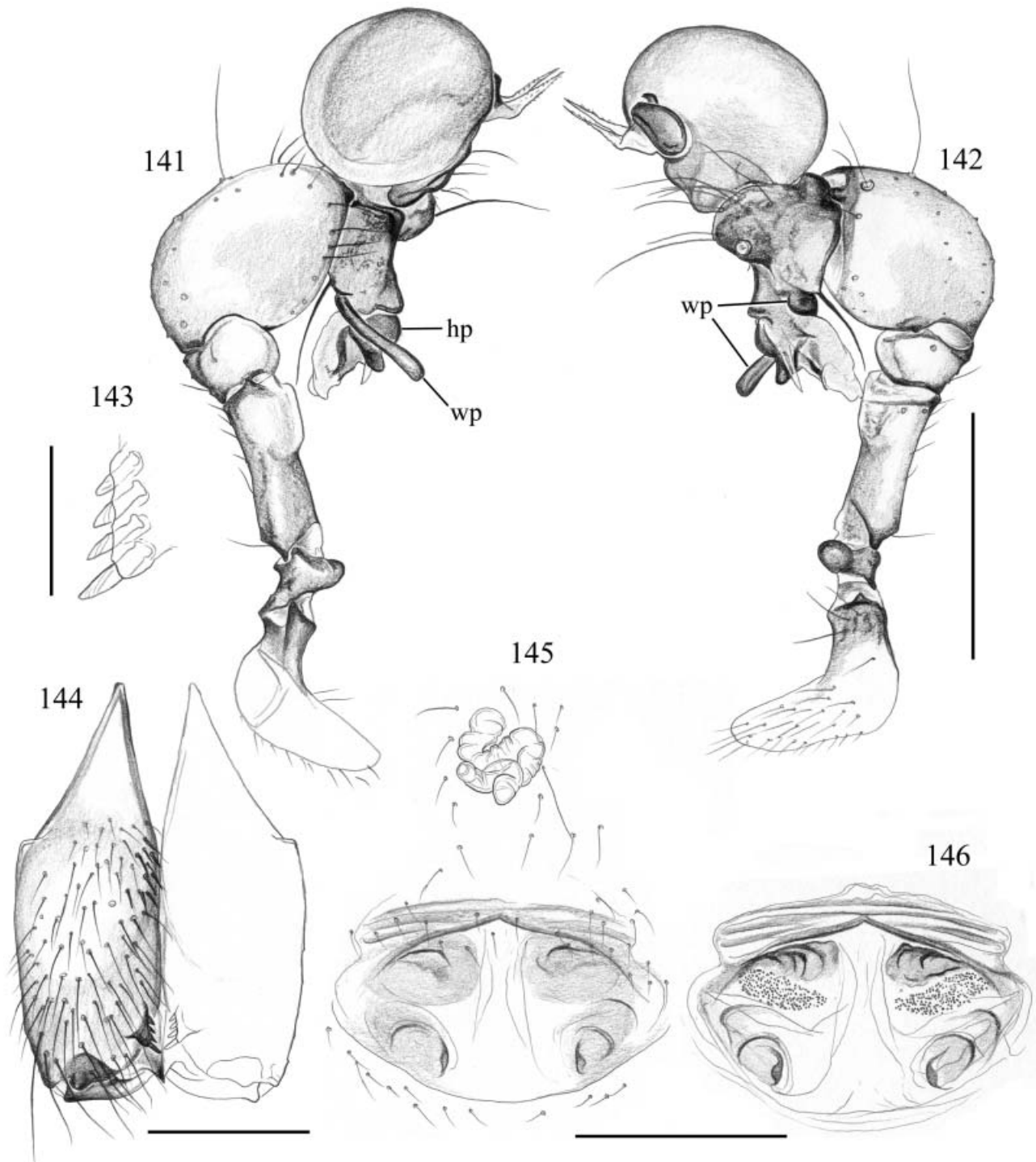
Male (holotype). Total length 2.6, carapace width 0.95. Leg 1: 25.0 (5.9 + 0.4 + 5.7 + 10.2 + 2.8), tibia 2: 3.5, tibia 3: 2.5, tibia 4: 3.3; tibia 1 L/d: 57. Habitus as in Figure 11. Carapace ochre-yellow with dark brown median and lateral bands and ocular area; sternum dark brown with lighter central area, laterally whitish. Legs ochre, tips of femora and tibiae whitish. Opisthosoma grey with black spots dorsally and long parallel stripes ventrally (as in female; cf. Fig. 35). Ocular area slightly elevated; distance PME–PME 195 µm; diameter PME 90 µm; distance PME–ALE 25 µm. Thoracic furrow shallow frontally, absent posteriorly. Sternum wider than long (0.70/0.55). Chelicerae as in Figure 144, with slightly stronger hairs proximally (Fig. 151) and four modified hairs embedded in each distal apophysis (Figs 143, 152). Palps as in Figures 141 and 142; trochanter with short retrolateral apophysis, procurus with long process winding around it ventrally ('wp' in Figs 141, 142, 153) and apparently with hinged process ('hp' in Fig. 141), bulb with small sclerotized hook and two membranous projections arising from sclerotized base (Figs 142, 154). Legs without spines and curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 5%; tarsus 1 with >20 pseudosegments, quite distinct distally. Four epiandrous spigots as in Figure 156.

Variation. Tibia 1 in 29 other males 5.3–6.6 (\bar{x} = 5.94).

Female. In general similar to male, but most females with many small black spots on legs. Tibia 1 in 15 females: 4.5–5.1 (\bar{x} = 4.89). Epigynum as in Figures 35, 145, and 157, with scape coiled up at rest (Fig. 158) in very frontal position. Dorsal view as in Figure 146. Spinnerets as in Figure 159.

Distribution. Known from E Usambara Mountains in Tanzania and Shimba Hills in Kenya (Map 3).

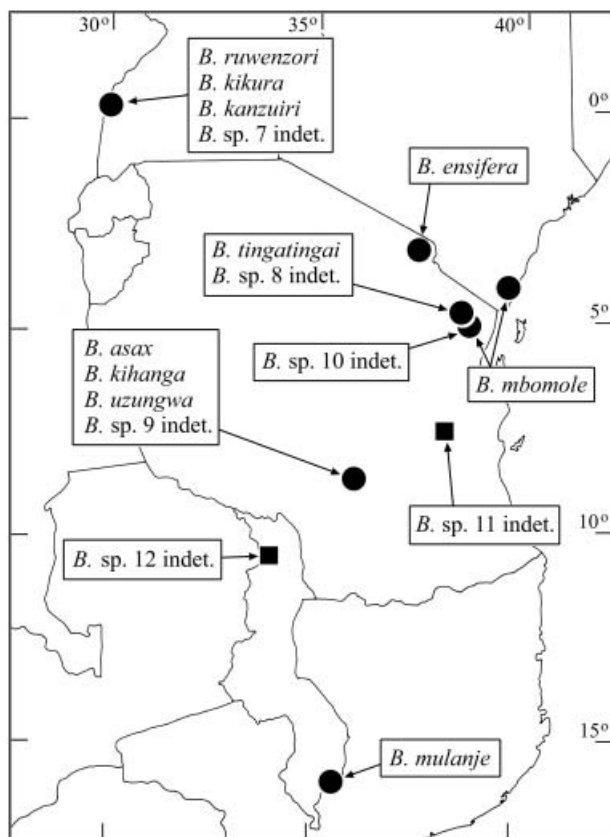
Material examined. TANZANIA: TANGA: E Usambara Mountains: Amani: type above, together with 6♂ > 40♀. Amani, forest (5°05.7'S, 38°38'E), 950 m elev., October 27–November 9, 1995 (C. E. Griswold, N. Scharff, D. Ubick), > 25♂ > 80♀ in CAS. Same col-



Figures 141–146. *Buitinga mbomole*. Left male palp in prolateral (141) and retrolateral (142) views, modified hairs on male cheliceral apophysis (143), male chelicerae in frontal view (144), and cleared epigynum in ventral (145) and dorsal (146) views. 'hp': putative hinged process; 'wp': distinctive process winding around procursus. Scale bars = 0.5 mm (141, 142), 0.2 mm (144), 0.3 mm (145, 146), 50 μ m (143).

lection data, > 20♂ > 20♀ in ZMUC. Same collection data, sifting litter, 1♂ in CAS. Sangarawe Forest (5°06.5'S, 38°35.7'E), 990 m elev., November 5–6, 1995

(same collectors), 7♂–20♀ in CAS. Same collection data, sifting litter, 3♂15♀ in CAS. Same collection data but November 11–20, 1995, sifting litter, 1♂3♀ in



Map 3. Known distribution of Buitinga species, part 2.

CAS. 12 km SE Amani, Kihuhwi-Zigi Forest Reserve (5°06.3'S, 38°40.6'E), 400–450 m elev., November 2–4, 1995 (same collectors), 3♂–20♀ in CAS. Same collection data, 4♂–8♀ in ZMUC. Amani, 1000 m elev., July 10–20, 1980 (M. Stoltze, N. Scharff), 1♂7♀ in ZMUC. Dowde Stream, 900–1000 m elev., July 10, 1980 (M. Stoltze, N. Scharff), 2♂5♀ (1♂1♀ from cave) in ZMUC. KENYA: COAST PROVINCE: Shimba Hills (~4°15'S, 39°30'E), February 14, 1982 (R. R. Jackson), 'species that cohabits', 1♂1♀ in BMNH.

BUITINGA ASAX N. SP.

(FIGS 10, 36, 147–150, 160–163)

Type. Male holotype from 11 km SE Masisiwe, Kihanga Stream (8°22'05.7"S, 35°58'41.6"E), 1800 m elev., sweeping, Uzungwa Scarp Forest Reserve, Iringa District, Tanzania; May 17–27, 1997 (ZMUC-SI Expedition); in ZMUC ('TA 075').

Etymology. In commemoration of the Asax (or Asak, Aasák), Tanzanian hunter-gatherers who became extinct in 1976.

Diagnosis. Distinguished from known congeners by the shapes of bulbal apophysis and procurus (Figs 147, 148, 160); from the very similar *B. mbomole* also by the simple embolus; from *B. uzungwa* (which has similar palps) by the absence of a papilla on the bulb (cf. Fig. 165) and apparently also by the pattern on the opisthosoma (frontal pair of dark spots missing; compare Figs 10 and 13).

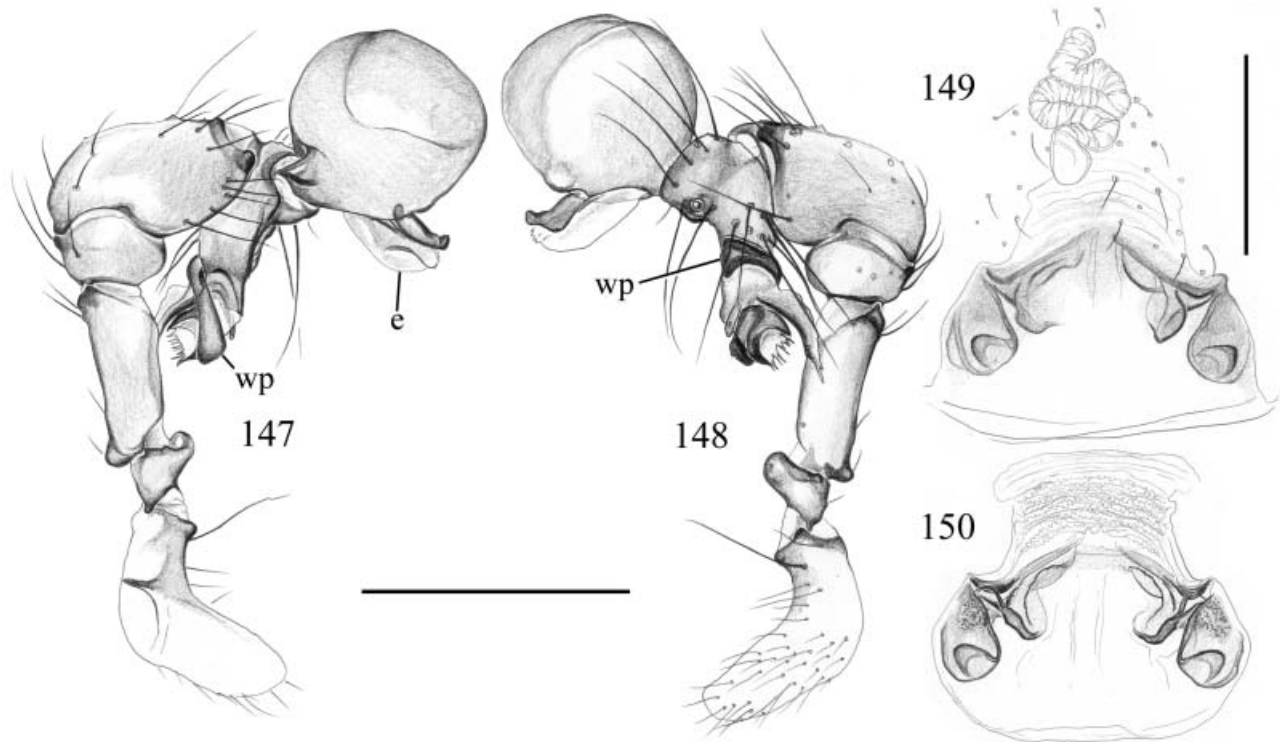
Male (holotype). Total length 2.6, carapace width 1.0. Leg 1: 23.8 (5.8 + 0.5 + 5.7 + 9.3 + 2.5), tibia 2: 3.5, tibia 3: 2.5, tibia 4: 3.2; tibia 1 L/d: 55. Habitus as in Figure 10. Carapace ochre-yellow, laterally slightly darker; sternum light brown with dark margin and dark median band. Legs ochre to light brown, slightly darker subdistally on femora and on tibiae proximally and subdistally. Opisthosoma grey with black spots, ventrally similar to female (cf. Fig. 36). Ocular area barely elevated; distance PME–PME 205 µm; diameter PME 70 µm; distance PME–ALE 35 µm. Thoracic furrow very shallow frontally, absent posteriorly. Sternum wider than long (0.70/0.60). Chelicerae as in *B. mbomole* (cf. Fig. 144), with distal apophyses as in Figure 161. Palps as in Figures 147 and 148; coxa with low hump ventrally, trochanter with wide retrolateral apophysis, femur with proximo-dorsal hump; procurus very complex, with long sclerite winding around it ventrally ('wp' in Figs 147, 148, 160) and several additional distal structures; bulb with short apophysis and simple membranous embolus ('e' in Fig. 147). Legs without spines, without curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 7%; tarsus 1 with >20 pseudosegments, very indistinct.

Variation. Tibia 1 in 23 other males: 5.2–6.2 (\bar{x} = 5.76).

Female. In general similar to male; some females with fairly distinct spots laterally on carapace; some females with many little spots on legs. Tibia 1 in 22 females: 4.1–5.0 (\bar{x} = 4.55). Epigynum simple externally (Fig. 36), with scape coiled up at rest (Fig. 162) in frontal position (Fig. 149). Dorsal view as in Figure 150.

Distribution. Known only from type locality (Map 3).

Material examined. TANZANIA: IRINGA: Uzungwa Scarp Forest Reserve: type above, together with 5♂4♀, in ZMUC; same collection data, ~49♂37♀ (8 vials), in ZMUC, and 19 vials with many specimens, in USNM. Same collection data, understory, 10♂–29♀ (4 vials), in ZMUC, and 36 vials with many specimens, in USNM. Same collection data, canopy, 4♀–9♀ (2 vials), in ZMUC, and 3♂8♀, in USNM. Same collection data, low vegetation, 7 vials with many specimens, in USNM. Same collection data, litter and logs, 3♂3♀, in USNM.



Figures 147–150. *Buitinga asax*. Left male palp in prolateral (147) and retrolateral (148) views, and cleared epigynum in ventral (149) and dorsal (150) views. 'e': embolus; 'wp': distinctive process winding around procursus. Scale bars = 0.5 mm (147, 148), 0.3 mm (149, 150).

***BUITINGA UZUNGWA* N. SP.**

(FIGS 13, 37, 164–181)

Type. Male holotype from 11 km SE Masisiwe, Kihanga Stream (8°22'05.7"S, 35°58'41.6"E), 1800 m elev., litter and logs, Uzungwa Scarp Forest Reserve, Iringa District, Tanzania; May 17–27, 1997 (ZMUC-SI Expedition), in ZMUC ('TA 080').

Etymology. Refers to the type locality.

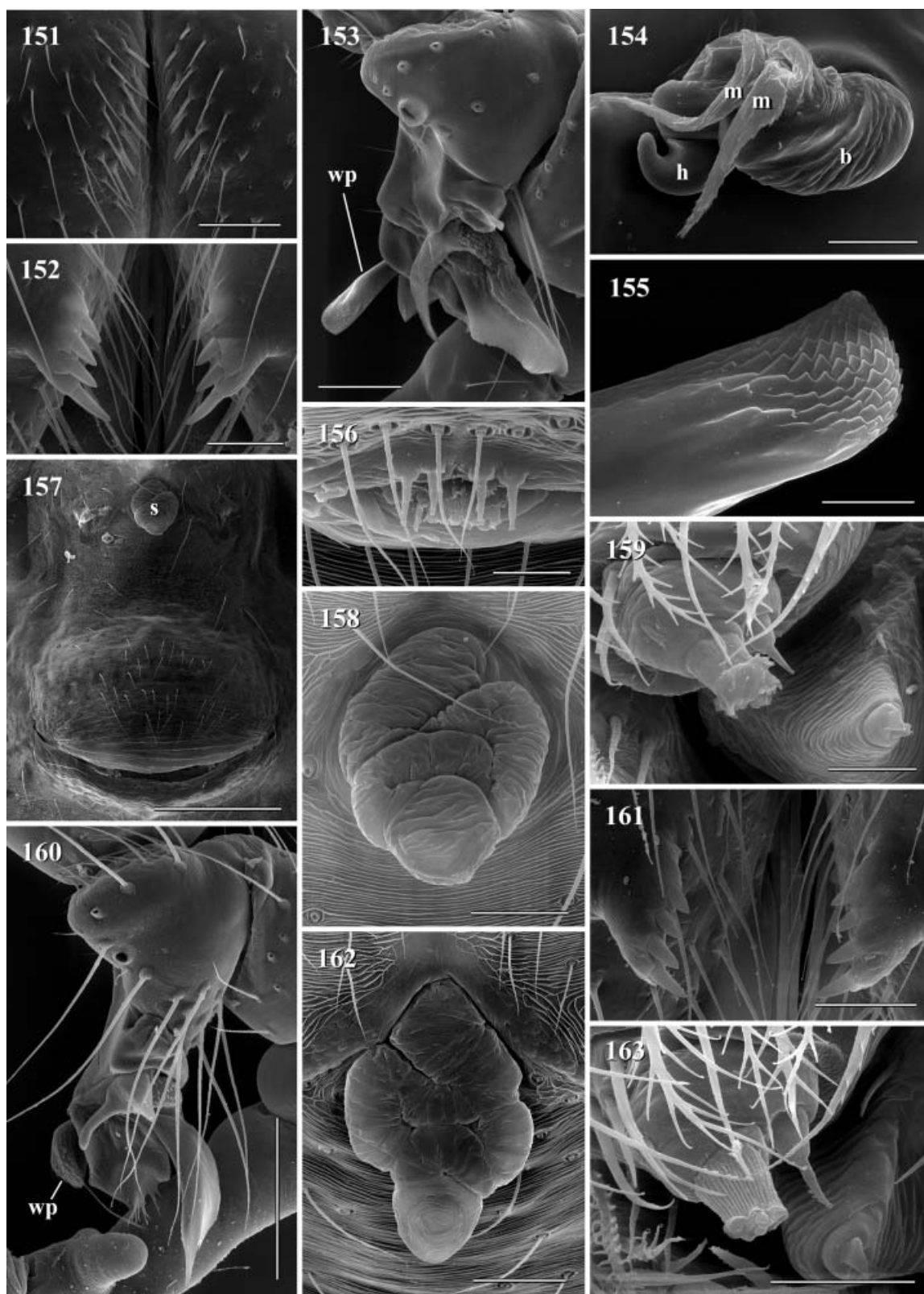
Diagnosis. Distinguished from known congeners by the shapes of procursus and bulbal apophysis (Figs 164, 165), and by the papilla on the bulb ('pa' in Fig. 165).

Male (holotype). Total length 2.4, carapace width 1.04. Leg 1: 22.3 (5.4 + 0.4 + 5.3 + 8.5 + 2.7), tibia 2: 3.1, tibia 3: 2.3, tibia 4: 3.1; tibia 1 L/d: 56. Habitus as in Figure 13. Carapace ochre-yellow with darker brown smudges laterally and on clypeus; sternum dark brown, blackish at margin, light in middle frontally. Legs ochre to light brown, darker on femora (sub-distally) and patella area. Opisthosoma ochre-grey with black spots, ventral pattern as in female (cf. Fig. 37). Ocular area barely elevated; distance PME–PME 220 µm; diameter PME 80 µm; distance PME–ALE 40 µm. Thoracic furrow reduced to barely

indented line. Sternum barely wider than long (0.68/0.64). Chelicerae as in Figures 167 and 170, with strong modified hairs proximally (Fig. 171), and 4 or 5 modified hairs embedded in each distal apophysis (Figs 166, 172). Palps as in Figures 164 and 165; coxa with low sclerotized hump ventrally, trochanter with retrolateral apophyses (longer than appears in retrolateral view!), femur with apophysis dorso-proximally, patella globular, procursus complex, with three processes: ventral hinged process ('hp' in Fig. 164), long structure winding around procursus ventrally (Figs 173, 180; 'wp' in Figs 165, 175), and ventral structure with transparent lamella ('l' in Fig. 164); bulb with distinctive papilla, simple membranous embolus ('e' in Figs 164, 181), and strong curved apophysis (Fig. 181). Legs without spines, without curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 8%; tarsus 1 with >20 pseudosegments, but only distally ~15 fairly distinct. Four epiandrous spigots as in Figure 174.

Variation. Some males without or with very indistinct dark marks on carapace. Tibia 1 in 24 other males: 5.0–6.3 (\bar{x} = 5.54).

Female. In general similar to male; tibia 1 in 24 females: 3.7–5.0 (\bar{x} = 4.28). Epigynum as in



Figures 151–163. *Buitinga mbomole* (151–159) and *asax* (160–163). 151. Macrosetae proximally on male chelicerae. 152, 161. Distal male cheliceral apophyses with modified hairs. 153, 160. Left cymbia and procursi, retrolateral views ('wp': process winding around procursus ventrally). 154. Projections on bulb: sclerotized base ('b'), sclerotized hook ('h'), and pair of membranous projections ('m'). 156. Male gonopore with epiandrous spigots. 157. Epigynum and frontal scape ('s'). 158, 162. Epigynal scapes. 159, 163. Female ALS and PMS. Scale bars = 20 µm (155, 159, 163), 30 µm (152, 156, 161), 50 µm (151, 158), 60 µm (154, 162), 100 µm (153), 200 µm (160), 300 µm (157).

Figure 37, with long scape folded up at rest (Fig. 177) in frontal position (Fig. 168). Dorsal view as in Figure 169. Palpal tarsal organ capsulate (Fig. 178). Spinnerets as in Figure 179.

Distribution. Known only from the Uzungwa Mountains (Map 3).

Material examined. TANZANIA: IRINGA DISTRICT: Uzungwa Scarp Forest Reserve: 11 km SE Masisiwe, Kihanga Stream: type above, together with 5♂10♀, in ZMUC. Same collection data, low vegetation, 22♂35♀ (4 vials), in ZMUC, and 2 vials with several specimens, in USNM. Same collection data, understory, 17♂28♀ (4 vials), in ZMUC, and 4 vials with several specimens, in USNM. Same collection data, sweeping, 18♂8♀ (2 vials), in ZMUC, and 4 vials with several specimens, in USNM. Same data, canopy, 4♀ (2 vials), in USNM. Uzungwa Mountains, Kiranzi Kitunguru Catchment Forest Reserve (8°07'S, 36°04'E), March–April 1996 (L. L. Sørensen), 8♂1♀ (2 vials), in ZMUC.

BUITINGA KIHANGA N. SP.

(FIGS 9, 38, 182–186, 193–199)

Type. Male holotype from 11 km SE Masisiwe, Kihanga Stream (8°22'05.7"S, 35°58'41.6"E), 1800 m elev., canopy, Uzungwa Scarp Forest Reserve, Iringa District, Tanzania; May 17–27, 1997 (ZMUC-SI Expedition); in ZMUC ('TA 077').

Etymology. Refers to the type locality.

Diagnosis. Distinguished from known congeners by the shapes of bulbal apophysis and procursus (Figs 182, 183).

Male (holotype). Total length 2.3, carapace width 0.95. Leg 1: 19.0 (4.6 + 0.4 + 4.6 + 7.1 + 2.3), tibia 2: 2.7, tibia 3 missing, tibia 4: 2.6; tibia 1 L/d: 47. Habitus as in Figure 9. Carapace ochre-yellow with wide dark brown lateral bands (not separated into distinct spots as in photographed male!); sternum dark brown with pair of longitudinal ochre-yellow spots. Legs ochre-orange with dark rings on femora (at ~60% and subdistally), in patella area, on tibiae (medially and subdistally), and faint on metatarsi (proximally). Opisthosoma ochre-grey with black spots also ventrally (similar to female, but with large round spot behind gonopore). Ocular area slightly elevated; dis-

tance PME–PME 170 µm; diameter PME 90 µm; distance PME–ALE 40 µm. Thoracic furrow distinct but very shallow frontally, absent posteriorly. Sternum wider than long (0.66/0.54). Chelicerae as in *B. mbomole* (cf. Fig. 144), with four modified hairs embedded in each distal apophysis (Figs 184, 194). Palps as in Figures 182 and 183; coxa with low hump ventrally, trochanter with wide retrolateral apophysis, femur with large hump proximo-dorsally; procursus very complex, with long process winding around it ventrally ('wp' in Figs 182, 183, 193), prolateral hinged process ('hp' in Fig. 182), and two further processes that appear to be flexibly connected to base of procursus; bulb very large, with short hooked apophysis and simple membranous embolus ('e' in Fig. 182); palpal tarsal organ capsulate (Fig. 196). Legs without spines, without curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 9%; tarsus 1 with >20 pseudosegments, distally quite distinct. Four epiandrous spigots as in Figure 195. ALS as in Figure 199.

Variation. Tibia 1 in 10 other males: 3.9–4.4. Lateral bands on carapace in some specimens divided into several spots (as in male shown in Fig. 9). Pattern on opisthosoma variably 'complete'.

Female. In general similar to male, with similar variation in pattern on carapace and opisthosoma. Tibia 1 in 7 females: 3.3–3.8 (\bar{x} = 3.56). Epigynum very simple externally (Fig. 38), with whitish scape curled up at rest (Fig. 198) in frontal position (Figs 185, 197). Dorsal view as in Fig. 186.

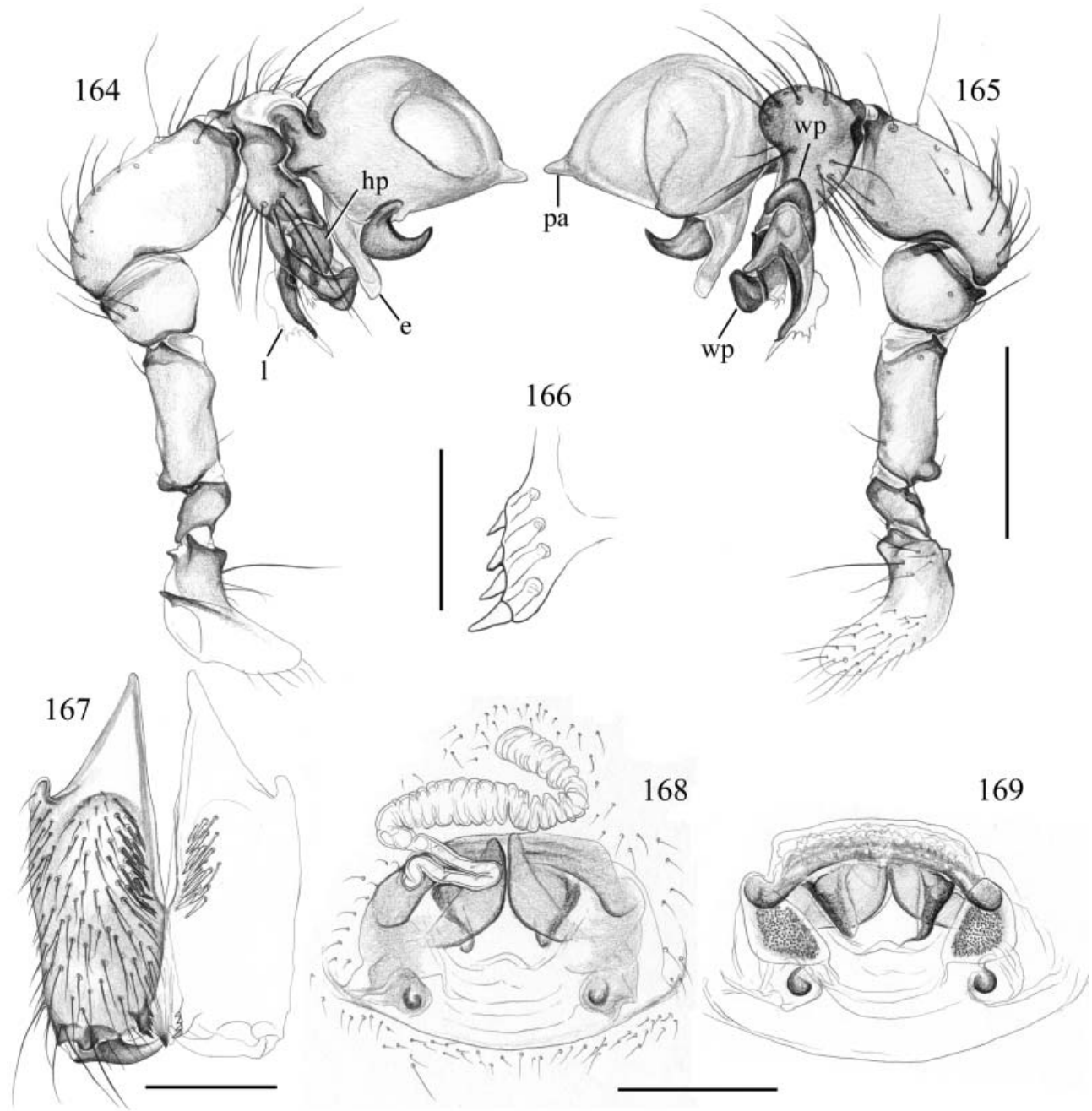
Distribution. Known only from type locality (Map 3).

Material examined. TANZANIA: IRINGA: Uzungwa Scarp Forest Reserve: type above, together with 3♂6♀, in ZMUC; 1♀ in separate vial, in ZMUC. Same collection data, 7♂6♀, in USNM. Same collection data, low vegetation, 1♀, in ZMUC. Same collection data, understory, 2♀, in USNM.

BUITINGA RUWENZORI N. SP.

(FIGS 14, 39, 187–192, 200–203)

Type. Male holotype from Ruwenzori (~0.5°N, 30°E), Uganda, 1952 (G. O. Evans), in BMNH, 'Pholcidae 187'.



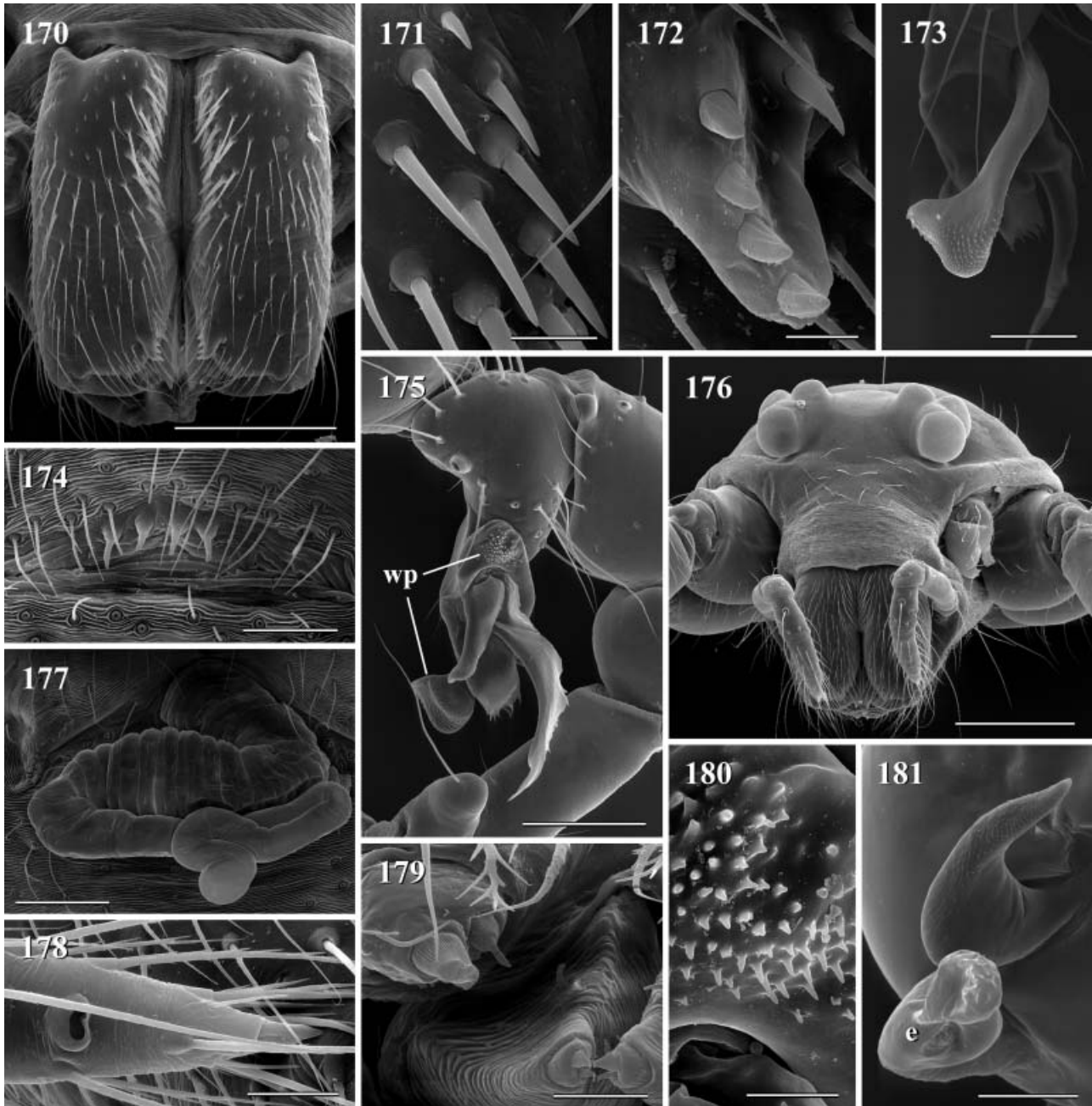
Figures 164–169. *Buitinga uzungwa*. Left male palp in prolateral (164) and retrolateral (165) views, modified hairs on male cheliceral apophysis (166), male chelicerae in frontal view (167), and cleared epigynum in ventral (168) and dorsal (169) views. 'e': embolus; 'hp': putative hinged process; 'l': transparent lamina; 'pa': distinctive bulbal papilla; 'wp': process winding around procursus. Scale bars = 0.5 mm (164, 165), 0.2 mm (167), 0.3 mm (168, 169), 50 μ m (166).

Etymology. Refers to the type locality.

Diagnosis. Distinguished from known congeners by the shapes of procursus and bulbal apophysis (Figs 187, 188), from most congeners (except *B. kikura*) also by the male chelicerae with modified hairs proximally and distally (Figs 190, 201). The

BMNH has a species from the same locality that differs mainly by the bulbal apophysis (not widened distally).

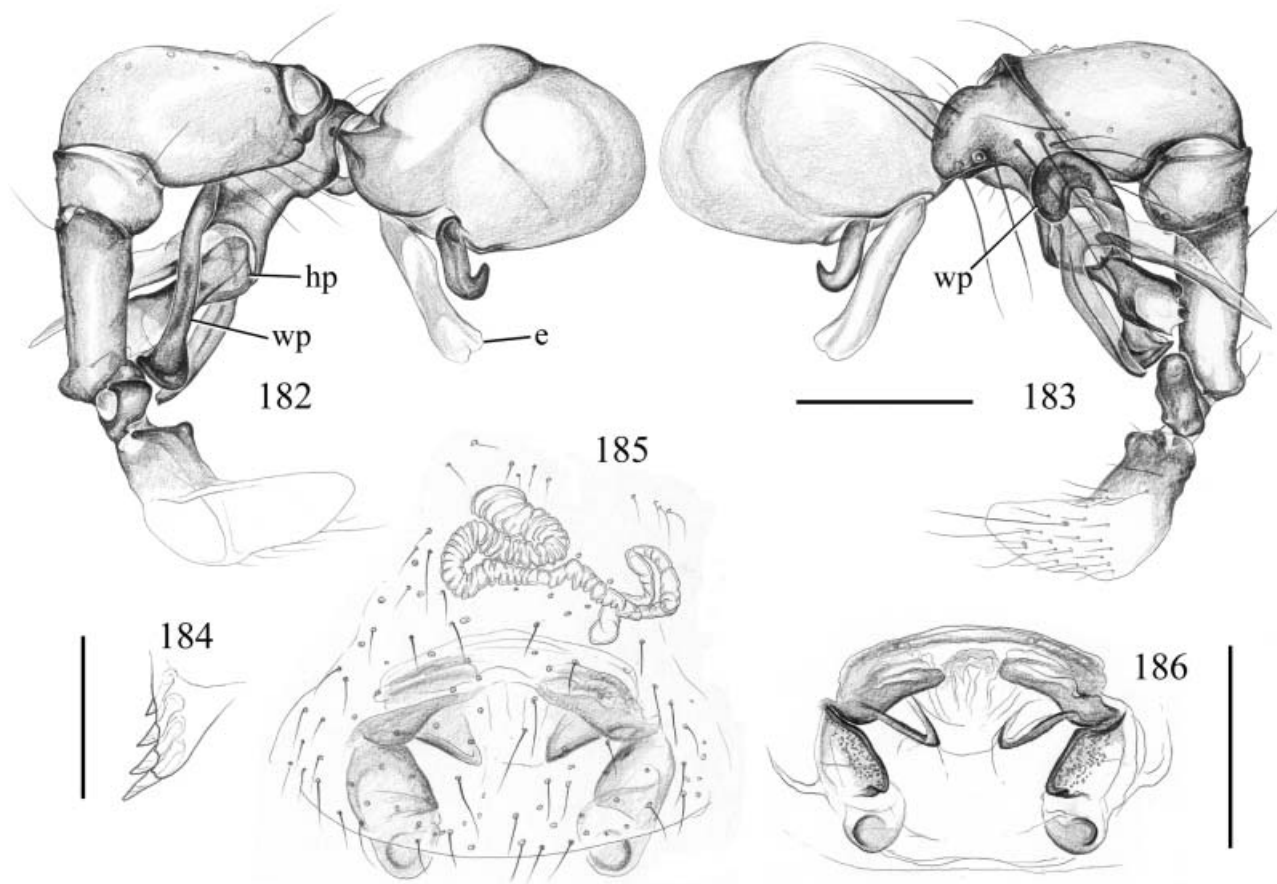
Male (holotype). Total length 2.7, carapace width 1.13. Leg 1: 21.7 (5.1 + 0.5 + 5.3 + 8.1 + 2.7), tibia 2: 3.5, tibia 3: 2.7, tibia 4: 3.5; tibia 1 L/d: 52. Habitus as



Figures 170–181. *Buitinga uzungwa*. 170. Male chelicerae. 171. Spines proximally on male chelicerae. 172. Distal cheliceral apophysis with modified hairs. 173. Process winding around procursus ventrally. 174. Male gonopore with epianorous spigots. 175. Left procursus, retrolateral view ('wp': process winding around procursus ventrally). 176. Female prosoma, frontal view. 177. Scape coiled up at rest. 178. Tip of female palp with tarsal organ. 179. Male ALS and PMS. 180. Proximal part of process winding around procursus. 181. Bulbal apophysis and embolus ('e'). Scale bars = 10 μ m (172), 20 μ m (171, 179, 180), 30 μ m (178), 40 μ m (174), 80 μ m (177, 181), 100 μ m (173), 200 μ m (170, 175), 300 μ m (176).

in Figure 14. Carapace ochre-yellow with dark brown pattern as in Figure 14, clypeus also dark; sternum very dark brown. Legs ochre-yellow, slightly darker rings on femora (subdistally) and tibiae (proximally, subdistally). Opisthosoma ochre-grey with black spots,

ventral pattern as in female (cf. Fig. 39). Ocular area slightly elevated; distance PME–PME 150 μ m; diameter PME 95 μ m; distance PME–ALE 25 μ m. Thoracic furrow shallow frontally, absent posteriorly. Sternum wider than long (0.85/0.70). Chelicerae as in



Figures 182–186. *Buitinga kihanga*. Left male palp in prolateral (182) and retrolateral (183) views, modified hairs on male cheliceral apophysis (184), and cleared epigynum in ventral (185) and dorsal (186) views. 'e': embolus; 'hp': hinged process; 'wp': process winding around procurus. Scale bars = 0.3 mm (182, 183, 185, 186), 50 μ m (184).

Figure 190, distally with strong modified hairs not associated with apophysis (Figs 189, 201). Palps as in Figures 187 and 188; trochanter with short but wide retrolateral apophysis, femur cylindrical, patella globular, procurus with two processes, both of which appear hinged (putative hinged process marked with 'hp' in Fig. 187); bulb with distinctive semitransparent process ('bp' in Fig. 188) and embolus with apophysis ('e' in Fig. 187). Legs with spines ventrally in single rows on femora 1 (distally about 9 spines) and 2 (about 4 spines), without curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 10%; tarsus 1 with ~30 pseudosegments, distally quite distinct. Four epiandrous spigots as in Figure 200. ALS as in Figure 203.

Variation. Tibia 1 in 8 other males: 4.5–5.9 (\bar{x} = 5.19).

Female. In general similar to male, but without spines on femora; rings on legs often more distinct than in males. Tibia 1 in 17 females: 4.0–4.4 (\bar{x} = 4.26). Epigynum as in Figure 39, with long scape coiled up at

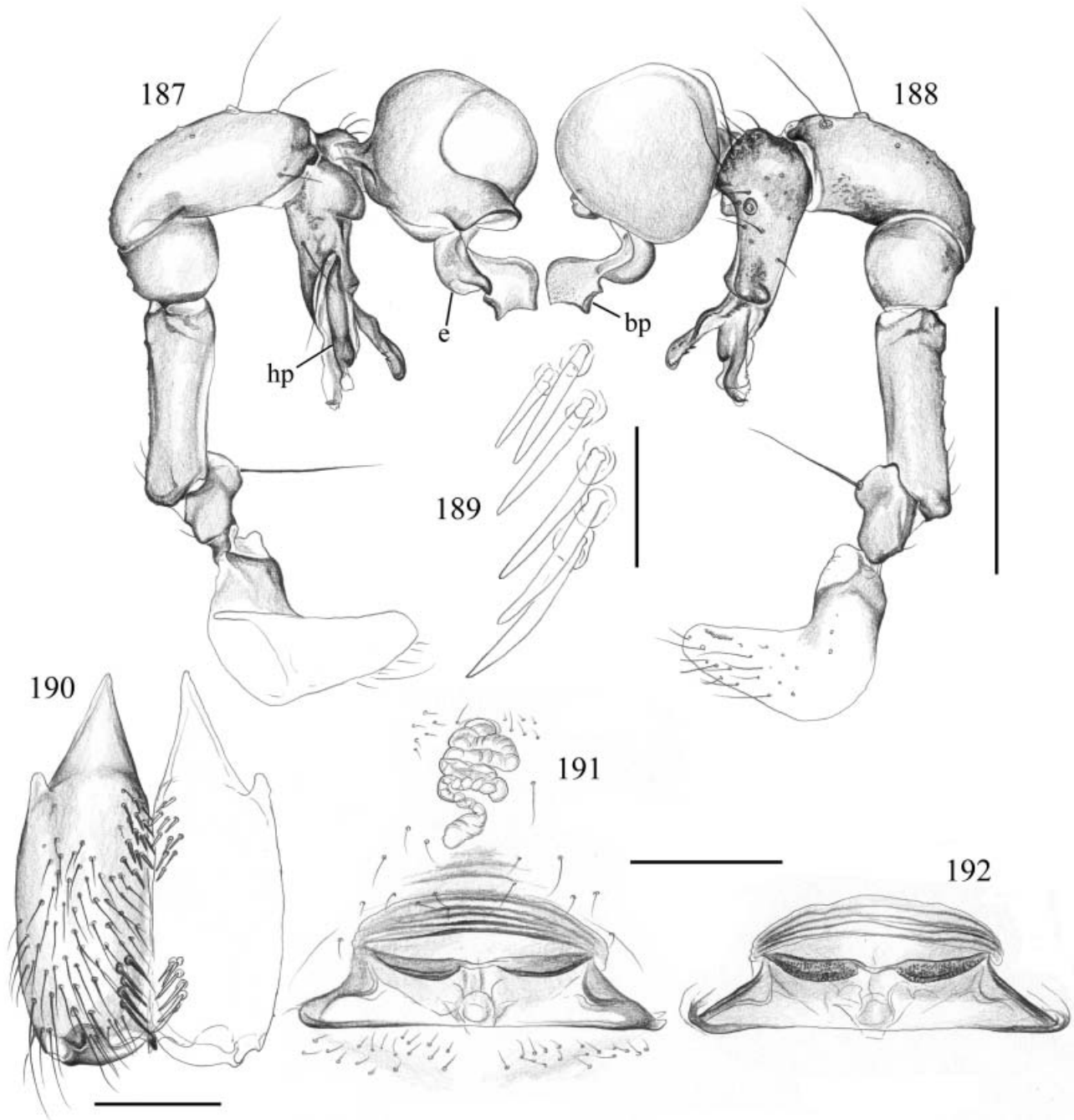
rest (Fig. 202) in frontal position (Fig. 191). Dorsal view as in Figure 192.

Distribution. Known from the Ruwenzori area in Uganda and Congo (Map 3).

Material examined. UGANDA: RUWENZORI: type above, together with 1♂7♀, in BMNH; same collection data, 'Pholcidae 186', 7♂12♀, in BMNH; same collection data, 'Pholcidae 165', 3♂1♀, in BMNH; same collection data, 1♂, in BMNH. CONGO: NORD-KIVU: Northern face of Ruwenzori, camp de Kikura (0°35'N, 29°57'E), 2000 m elev., July–August 1974 (M. Lejeune), 1♀, in MRAC (154.134). Northern face of Ruwenzori, camp de Kilindera (0°23'N, 29°55'E), Kilindera, 2750 m elev., July–August 1974 (M. Lejeune), 1♂, in MRAC (158.550).

***BUITINGA KIKURA* N. SP. (FIGS 204–205)**

Type. Male holotype from camp de Kikura (0°35'N, 29°57'E), 2000 m elev., northern face of Ruwenzori,



Figures 187–192. *Buitinga ruwenzori*. Left male palp in prolateral (187) and retrolateral (188) views, modified hairs distally on male chelicerae (189), male chelicerae in frontal view (190), and cleared epigynum in ventral (191) and dorsal (192) views. 'bp': distinctive semitransparent bulbal projection; 'e': embolus; 'hp': hinged process. Scale bars = 0.5 mm (187, 188), 0.3 mm (191, 192), 0.2 mm (190), 50 μ m (189).

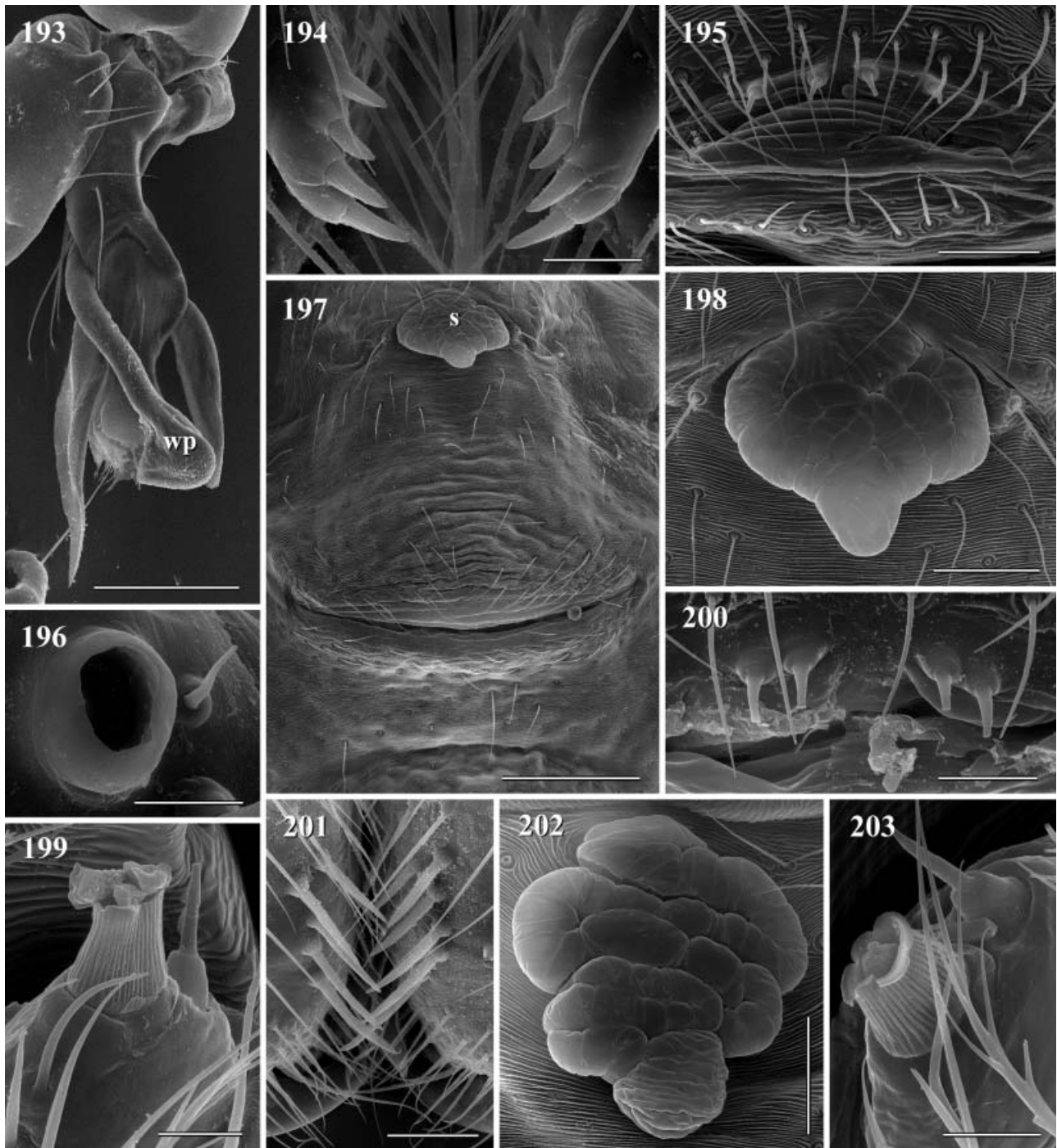
Nord-Kivu District, Congo; July–August 1974 (M. Lejeune); in MRAC (154.067).

Etymology. Refers to the type locality.

Diagnosis. Distinguished from known congeners by the shapes of bulb (with embolus as single projection;

Figs 204, 205) and procursus; from most species (except *B. ruwenzori*) also by the male chelicerae with strong modified hairs proximally and distally, but without distal apophyses (cf. Fig. 190).

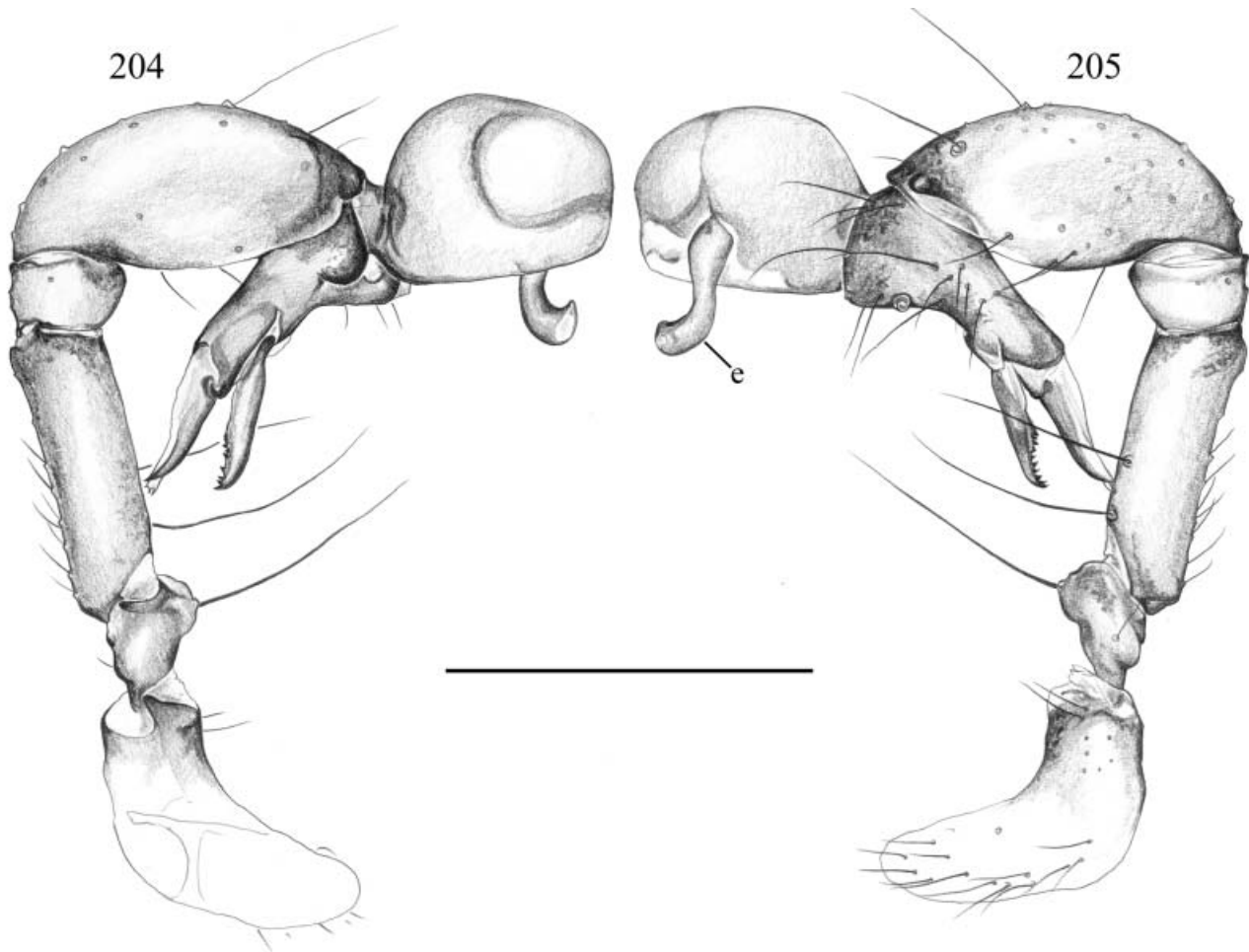
Male (holotype). Total length ~2.3 (opisthosoma damaged), carapace width 0.98. Leg 1: 21.1



Figures 193–203. *Buitinga kihanga* (193–199), and *ruwenzori* (200–203). 193. Left procursus, prolateral view, with process winding around procursus ('wp'). 194. Distal cheliceral apophyses with modified hairs. 195, 200. Male gonopores with epiandrous spigots. 196. Male palpal tarsal organ. 197. Epigynum with frontal scape ('s'). 198, 202. Epigynal scapes, coiled up at rest. 199, 203. Male ALS spigots. 201. Spines distally on male chelicerae. Scale bars = 10 μ m (199, 203), 20 μ m (194, 196, 200), 40 μ m (195), 50 μ m (201), 60 μ m (198, 202), 200 μ m (193, 197).

(5.1 + 0.4 + 5.3 + 7.8 + 2.5), tibia 2: 3.3, tibia 3: 2.4, tibia 4: 3.3; tibia 1 L/d: 60. Habitus as in *B. ruwenzori* (cf. Fig. 14). Carapace ochre-yellow with large brown

marks and marginal black line; sternum dark brown. Legs ochre-orange, with short dark rings on femora (subdistally) and tibiae (proximally and subdistally).



Figures 204, 205. *Buitinga kikura*. Left male palp in prolateral (204) and retrolateral (205) views. 'e': embolus. Scale bar = 0.5 mm.

Opisthosoma ochre-grey with brown to black marks, also ventrally. Ocular area slightly elevated; distance PME–PME 140 µm; diameter PME 80 µm; distance PME–ALE 45 µm. Thoracic furrow shallow frontally, absent posteriorly. Sternum wider than long (0.78/0.60). Chelicerae as in *B. ruwenzori* (cf. Fig. 190), without distal apophyses but with strong modified hairs proximally and distally. Palps as in Figures 204 and 205, trochanter with short but wide retrolateral apophysis, procursus apparently with two hinged processes distally; bulb with embolus as single process ('e' in Fig. 205). Legs apparently with spines on femora (only bases left), without curved hairs, few vertical hairs (most hairs missing); retrolateral trichobothrium of tibia 1 at 10%; tarsus 1 with >20 pseudosegments, distally quite distinct.

Female. Unknown.

Distribution. Known only from type locality (Map 3).

Material examined. CONGO: NORD-KIVU: Northern face of Ruwenzori: type above.

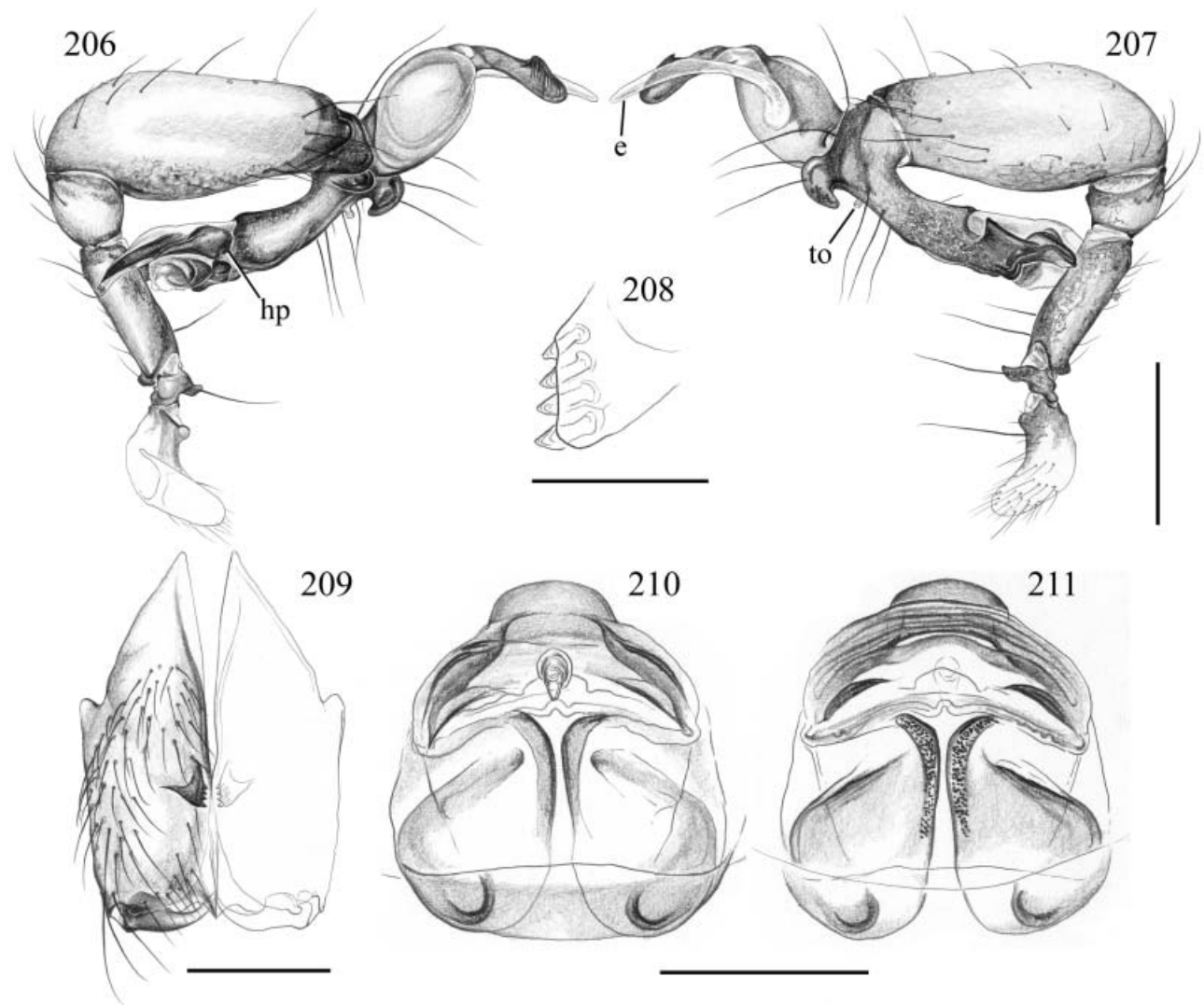
***BUITINGA TINGATINGAI* N. SP.**

(FIGS 15, 40, 206–211)

Type. Male holotype from Mazumbai (4°49'S, 38°29.5'E), forest at 1800–1900 m elev., W Usambara Mountains, Tanga District, Tanzania; November 12–20, 1995 (C. E. Griswold, N. Scharff, D. Ubick); in CAS.

Etymology. In honour of Edward Saidi Tingatinga (1932–72), a self-taught painter who established Tanzanian Tingatinga, a style of art which involves painting on masonite using bicycle paint.

Diagnosis. Easily distinguished from known congeners by the male procursus (dorsal protrusion proximally and shapes of distal structures; Figs 206, 207), by the proximal position of the



Figures 206–211. *Buitinga tingatingai*. Left male palp in prolateral (206) and retrolateral (207) views, modified hairs distally on male chelicerae (208), male chelicerae in frontal view (209), and cleared epigynum in ventral (210) and dorsal (211) views. 'e': embolus; 'hp': hinged process; 'to': tarsal organ. Scale bars = 0.5 mm (206, 207), 0.4 mm (210, 211), 0.2 mm (209), 50 μ m (208).

male cheliceral apophyses (Fig. 209), and by the shape of the epigynum with small frontal scape (Figs 40, 210).

Male (holotype). Total length 2.2, carapace width 0.95. Leg 1: 18.4 (4.3 + 0.4 + 4.5 + 7.0 + 2.2), tibia 2: 2.9, tibia 3: 2.1, tibia 4: 2.7; tibia 1 L/d: 56. Habitus as in Figure 15. Carapace ochre-yellow with dark brown pattern as in Figure 15; clypeus with pair of dark stripes; sternum almost black. Legs ochre-yellow, with dark rings on femora (subdistally), tibiae (proximally and subdistally), and metatarsi (indistinct, proximally). Opisthosoma grey with dark brown pattern dorsally and ventrally. Ocular area slightly elevated; distance PME–PME 220 μ m; diameter PME 100 μ m;

distance PME–ALE 30 μ m. Thoracic furrow shallow frontally, absent posteriorly. Sternum wider than long (0.70/0.60). Chelicerae as in Figure 209, with four modified hairs embedded in each distal apophysis (Fig. 208). Palps as in Figures 206 and 207; coxa with small hump ventrally, trochanter with ventral apophysis, femur with hump proximo-dorsally, procurus with large protrusion proximally, very complex distally, apparently with hinged process ('hp' in Fig. 206), tarsal organ elevated ('to' in Fig. 207), bulb with simple membranous embolus ('e' in Fig. 207) and strong apophysis. Legs without spines and curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 13%; tarsus 1 with >20 pseudosegments, quite distinct distally.

Female. In general similar to male; tibia 1: 4.2. Epigynum as in Figure 40, with short scape in frontal position (Fig. 210). Dorsal view as in Figure 211.

Distribution. Known only from type locality (Map 3).

Material examined. TANZANIA: TANGA: W Usambara Mountains: Mazumbai: type above, together with 1♀, in CAS.

BUITINGA MULANJE N. SP.

(FIGS 16, 41, 212–217)

Type. Male holotype from Mt. Mulanje (16°00'S, 35°30'E), Lichenya Plateau, Linje river, Southern District, Malawi 2000 m elev., shoulder of river bank, November 7, 1981 (R. Jocqué), in MRAC.

Etymology. Refers to the type locality.

Diagnosis. Distinguished from known congeners by the shapes of procurus and bulbal apophysis (Figs 212, 213). The MRAC has a very close relative from Nyika Plateau (Northern Malawi) that differs by the absence of lateral spots on the carapace, relatively larger palps, more pointed trochanter apophysis on male palp, additional dark rings on femora (medially) and tibiae (subproximally), very different bulbal apophysis, and larger size (tibia 1 in male: 4.8, in females: 3.6, 4.0) (MRAC 156.104, 156.773).

Male (holotype). Total length 1.8, carapace width 0.93. Leg 1: 14.2 (3.6 + 0.4 + 3.5 + 4.8 + 1.9), tibia 2: 2.2, tibia 3: 1.7, tibia 4: 2.3; tibia 1 L/d: 36. Habitus as in Figure 16. Carapace ochre-orange with dark brown to black pattern as in Figure 16; sternum dark brown to black. Legs ochre-yellow, patellae darker. Opisthosoma grey with dark pattern as in Figure 16. Ocular area slightly elevated; distance PME–PME 150 µm; diameter PME 80 µm; distance PME–ALE 35 µm. Thoracic furrow deep. Sternum wider than long (0.66/0.50). Chelicerae as in Figure 215, with four modified hairs embedded in each distal apophysis (Fig. 214). Palps as in Figures 212 and 213; trochanter with short retrolateral apophyses, femur with hump dorso-proximally, procurus with prolateral hinged process ('hp' in Fig. 212); bulb with simple membranous embolus ('e' in Fig. 212), and strong hooked apophysis. Legs with spines in single row ventrally distally on femora 1 (about 12 spines), without curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 16%; tarsus 1 with >20 pseudosegments, distally quite distinct.

Variation. Tibia 1 in 8 other males: 3.1–4.0 (\bar{x} = 3.58).

Female. In general similar to male; tibia 1 in 13 females: 2.7–3.3 (\bar{x} = 3.02); one female from MRAC (156.785) with shorter legs (tibia 1: 2.4). Epigynum as

in Figure 41, with long scape in frontal position (Fig. 216). Dorsal view as in Figure 217.

Distribution. Known from several close localities at Mt. Mulanje (Map 3).

Material examined. MALAWI (all collected by R. Jocqué, deposited in MRAC): SOUTHERN DISTRICT: Mt. Mulanje: Lichenya plateau: type above. Lichenya plateau, Linje Pools, under bark of isolated tree, November 9, 1981, 2♀ (156.233). Lichenya plateau, CCAP hut, 2000 m elev., November 25, 1981, 1♂1♀ (155.640). Same locality, firebreak-path, November 19, 1981, 1♀ (156.785). Same locality, around CCAP hut, under *Helichrysum*, November 9, 1981, 3♀ (156.612). Same locality, near CCAP hut, moist grassland, November 15, 1981, 2♀ (156.798). Lichenya plateau, litter in isolated small woodland, 2000 m elev., November 17, 1981, 1♂ (156.750). Lichenya plateau, under rosettes of *Helichrysum nitidum*, 2000 m elev., November 5, 1981, 1♂1♀ (156.593). Same locality, in *Helichrysum* clump, November 16, 1981, 2♂1♀ (155.963). Same locality, *Widdringtonia* evergreen forest, November 7, 1981, 1♀ (156.141). Mt. Mulanje, Thuchila hut, Nambiti Stream, 2000 m elev., November 11, 1981, 1♂3♀ (156.321, 156.433). Mt. Mulanje, Thuchila, November 11, 1981, 1♂2♀ (156.640). Same collection data, 1♂1♀ (156.697). Mt. Mulanje, Chisepo shelter, 2150 m elev., November 12, 1981, 1♂ (156.443). Mt. Mulanje, Chilemba hill, 2300–2350 m elev., under stones, November 20, 1981, 1♀ (156.685).

BUITINGA KANZUIRI N. SP.

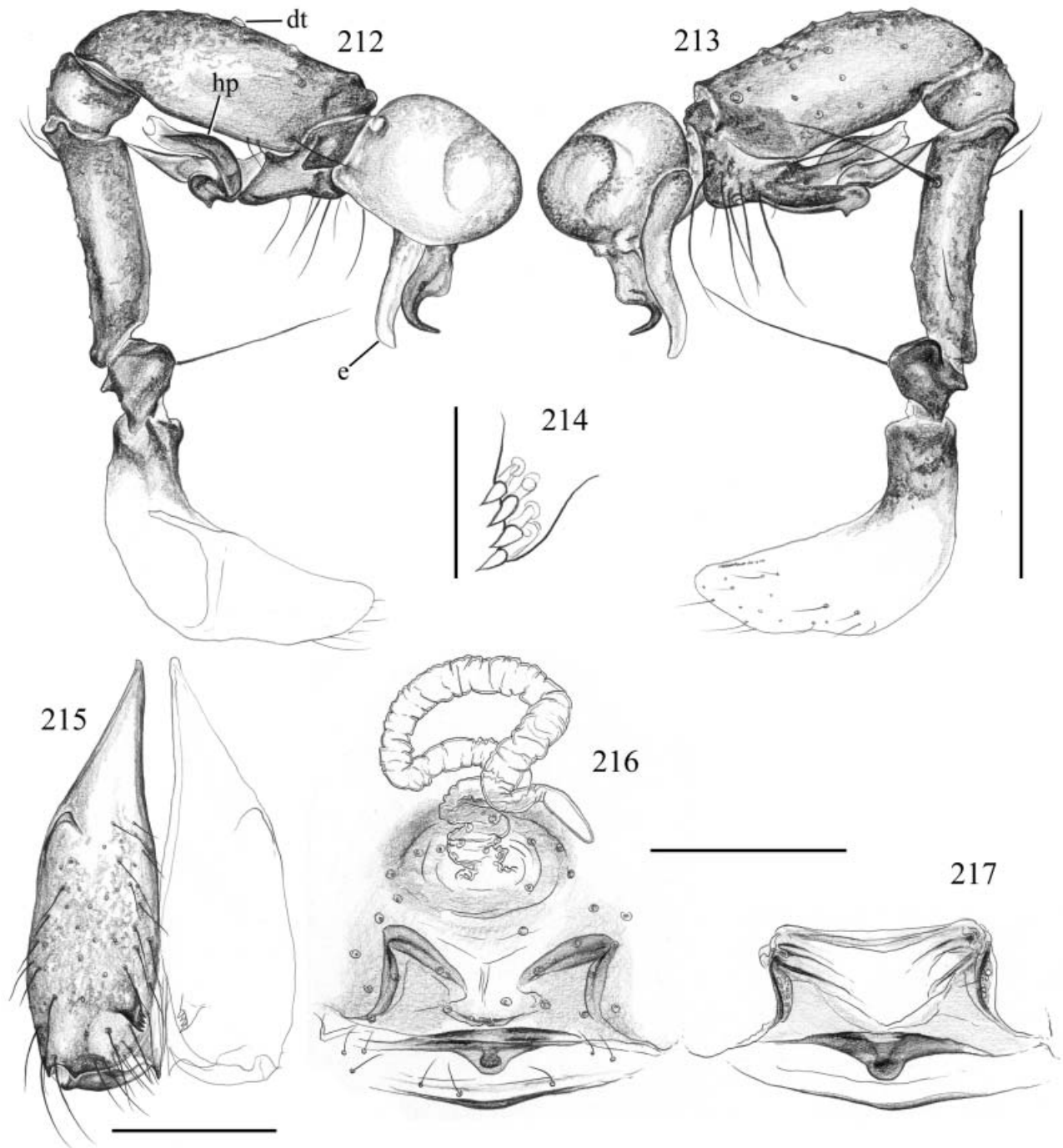
(FIGS 17, 218–220)

Type. Male holotype from Crête du Kanzuiri, Camp de Kanzuiri (0°25'N, 29°54'E), 3500 m elev., northern face of Ruwenzori, Nord-Kivu District, Congo; July–August 1974 (M. Lejeune); in MRAC (154.976).

Etymology. Refers to the type locality.

Diagnosis. Easily distinguished from most congeners by the shape of the bulb (Figs 218, 219); from species with similar bulbs (*B. ensifera*, '*S.*' *masisiwe*, '*S.*' *tonkouli*) by the male chelicerae without distal apophyses (Fig. 220).

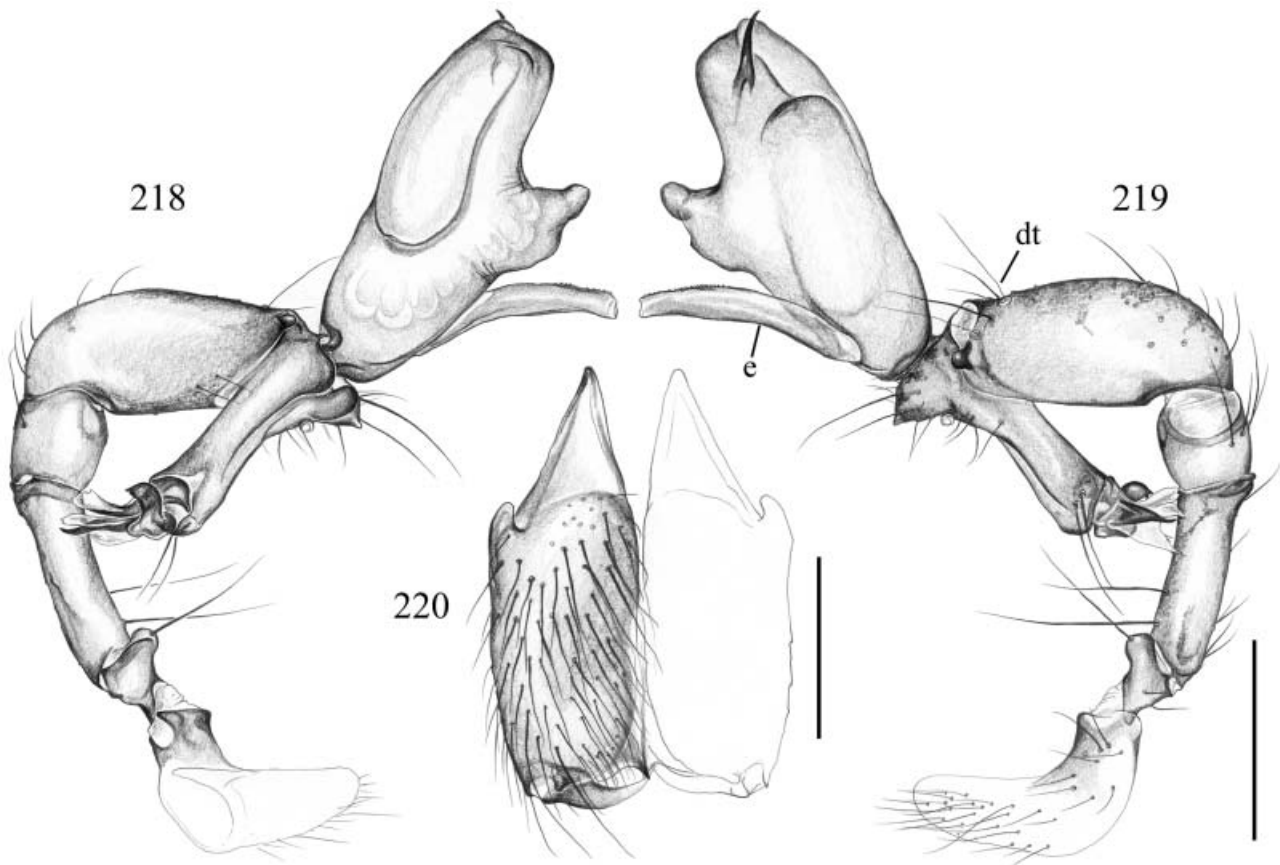
Male (holotype). Total length 2.9, carapace width 1.3. Leg 1: 26.9 (6.5 + 0.5 + 6.7 + 9.9 + 3.3), tibia 2: 4.4, tibia 3: 3.3, tibia 4: 4.5; tibia 1 L/d: 56. Habitus as in Figure 17. Carapace ochre-yellow with large brown marks laterally; sternum dark brown to black. Legs ochre-orange, with dark rings on femora (subdistally) and tibiae (proximally and subdistally). Opisthosoma ochre-grey with large black marks, also ventrally. Ocular area barely elevated, with distinctive brushes of strong curved hairs behind PME; distance PME–PME



Figures 212–217. *Buitinga mulanje*. Left male palp in prolateral (212) and retrolateral (213) views, modified hairs distally on male chelicerae (214), male chelicerae in frontal view (215), and cleared epigynum in ventral (216) and dorsal (217) views. 'e': embolus; 'dt': base of dorsal trichobothrium; 'hp': hinged process. Scale bars = 0.5 mm (212, 213), 0.2 mm (215–217), 50 μ m (214).

275 μ m; diameter PME 105 μ m; distance PME–ALE 35 μ m. Thoracic furrow shallow frontally, absent posteriorly. Sternum slightly wider than long (0.90/0.83). Chelicerae as in Figure 220, without distal apophyses.

Palps as in Figures 218 and 219; coxa with small ventral hump, trochanter with short apophysis retrolatero-ventrally, dorsal trichobothrium on tibia very distal ('dt' in Fig. 219), procursus with two hinged pro-



Figures 218–220. *Buitinga kanzuiri*. Left male palp in prolateral (218) and retrolateral (219) views, and male chelicerae in frontal view (220). 'e': embolus; 'dt': dorsal trichobothrium. Scale bars = 0.5 mm (218, 219), 0.3 mm (220).

cesses distally; bulb very large, with membranous embolus ('e' in Fig. 219) and several modifications distally (Figs 218, 219). Legs without spines, without curved hairs, few vertical hairs (many hairs missing); retrolateral trichobothrium of tibia 1 at 10%; tarsus 1 with ~25 pseudosegments, distally quite distinct.

Female. Unknown.

Distribution. Known only from type locality (Map 3).

Material examined. CONGO: NORD-KIVU: northern face of Ruwenzori: type above.

'SPERMOPHORA' INCERTAE SEDIS

Several new East African species are tentatively assigned to *Spermophora*, even though this assignment is poorly supported. The first four species treated ('*S. morogoro*', *sangarawe*, *usambara*, *masisiwe*) are probably a monophyletic group (node 5 in Appendix 4), supported by the strong ventral bend of the procursus (Figs 222, 235, 239, 245); a similar morphology in *Buitinga mulanje* is tentatively considered conver-

gent. All these species lack a scape, have no modified hairs or sclerotized teeth proximally on the male chelicerae, and the dorsal palpal trichobothria are not extremely distal. Therefore, even tentative assignment to *Buitinga* seems unjustified, while the pocket between epigynum and spinnerets may be a synapomorphy of *Spermophora*.

The two Kenyan species treated below ('*S. minotaura*' and *berlandi*) are even more problematic. Details of the procursus suggest they are close relatives, but the scape of *berlandi* reminds of *Buitinga* while the ventral flap on the procursus ('f' in Figs 262, 269) as well as the pocket behind the epigynum in *minotaura* (Fig. 272) are strongly reminiscent of *Spermophora*.

The two Comoran species ('*S. lambilloni*', *jocquei*) are close relatives (compare distal cheliceral apophyses: Figs 277, 291; dorsal sclerotized structure on procursus: arrows in Figs 275, 289) but their relationships are obscure too. They share more characters with *Paramicromerys* than with *Buitinga* (e.g. pair of pockets on epigynum: Fig. 278; widely expanded male

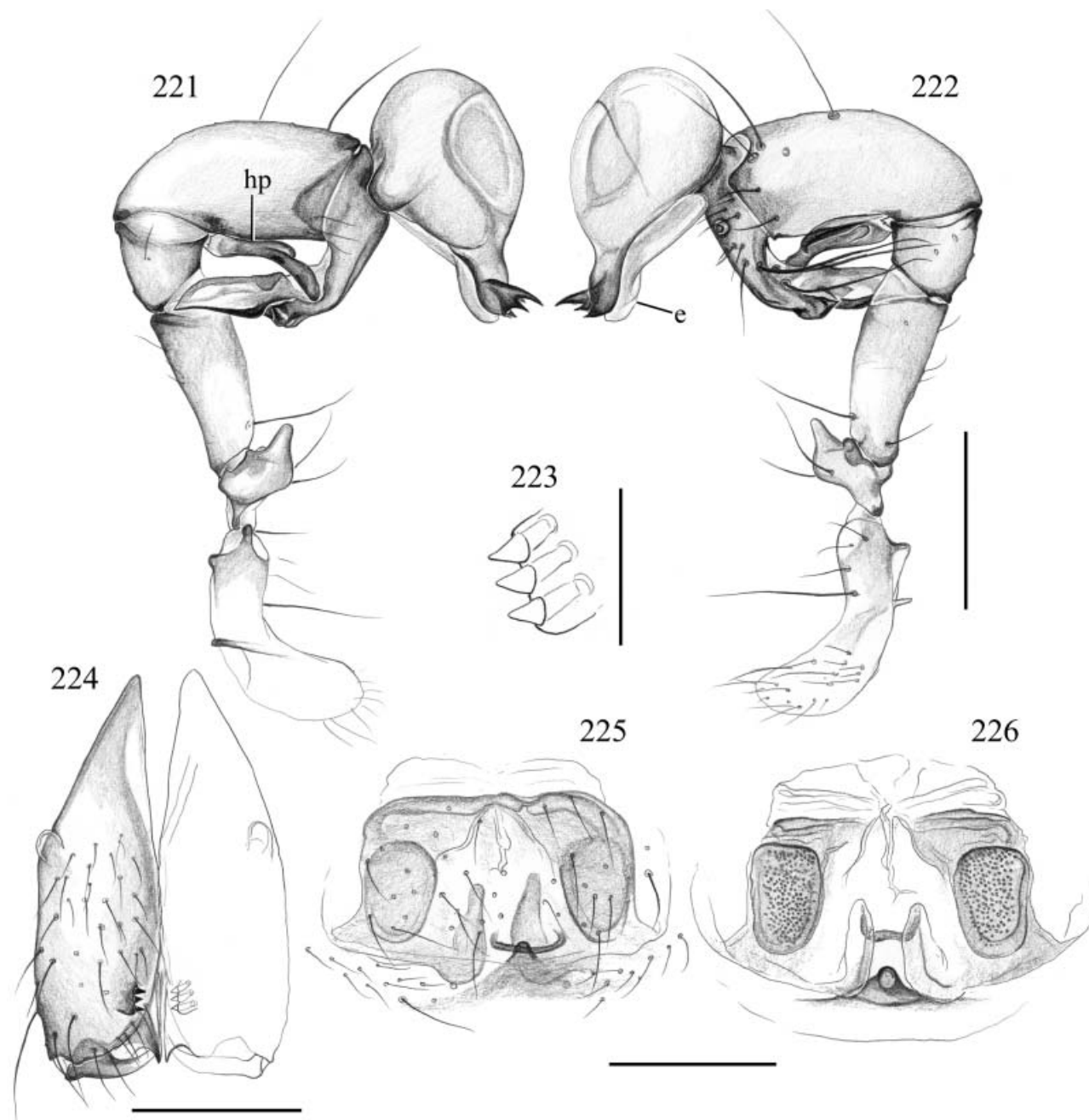
palpal femur; embolus as single bulbal projection), but the relevance of these characters is ambiguous.

Finally, '*S. kivu*' (from Congo) and '*S. tonkoui*' (from Ivory Coast) merely suggest that Central and Western Africa harbour a wealth of unknown taxa that cannot be properly assigned without further material at hand.

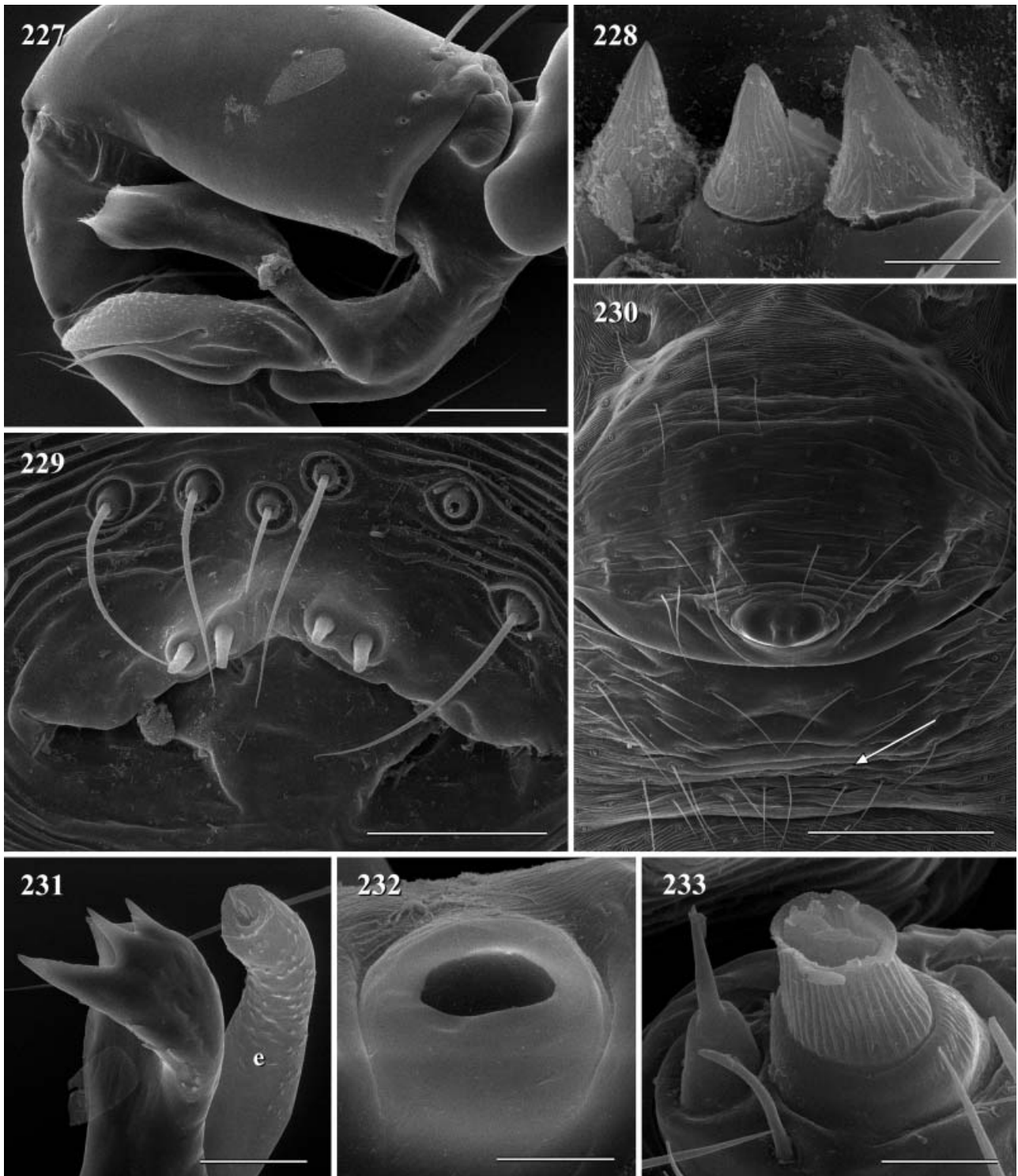
'*SPERMOPHORA*' MOROGORO N. SP.

(FIGS 18, 42, 221–233)

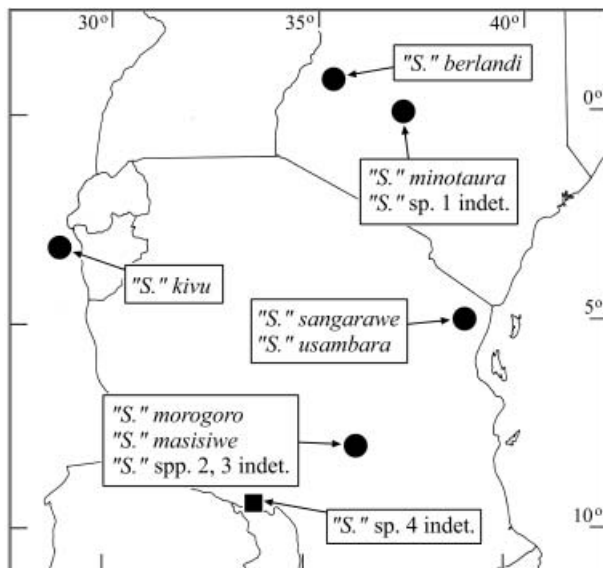
Type. Male holotype from Kihansi Forest Reserve, Lower Kihansi hydropower project (8°24'S, 36°21'E), forest, Uzungwa Mountains, Morogoro District, Tan-



Figures 221–226. '*Spermophora*' *morogoro*. Left male palp in prolateral (221) and retrolateral (222) views, modified hairs distally on male chelicerae (223), male chelicerae in frontal view (224), and cleared epigynum in ventral (225) and dorsal (226) views. 'e': embolus; 'hp': hinged process. Scale bars = 0.3 mm (221, 222), 0.2 mm (224–226), 50 µm (223).



Figures 227–233. *'Spermophora' morogoro*. 227. Left procurrus, prolateral view. 228. Modified hairs on distal male cheliceral apophysis. 229. Male gonopore with epiandrous spigots. 230. Epigynum, and folded cuticle between epigynum and spinnerets (arrow). 231. Embolus ('e') and bulbal apophysis. 232. Male palpal tarsal organ. 233. Male ALS spigots. Scale bars = 8 μ m (228, 232, 233), 30 μ m (229), 50 μ m (231), 100 μ m (227), 200 μ m (230).



Map 4. Known distribution of East African species tentatively assigned to *Spermorphora* Hentz (excluding Comoran species).

zania; June–July 1997 (J. Heionen, I. Zilihona); in ZMUC.

Etymology. Refers to the type locality.

Diagnosis. Distinguished from known congeners by the shapes of procurus and bulbal apophysis (Figs 221, 222), and by the shape of the epigynum (Fig. 42).

Male (holotype). Total length 2.4, carapace width 0.88. Leg 1: 20.4 (5.0 + 0.4 + 4.9 + 7.6 + 2.5), tibia 2: 3.2, tibia 3: 2.3, tibia 4 missing; tibia 1 L/d: 61. Habitus as in Figure 18. Carapace ochre-yellow with black lateral margins and posterior spot, with light brown median band (not in photographed male!); sternum whitish. Legs ochre-yellow, without dark rings. Opisthosoma ochre-grey with black spots (holotype with less developed dark pattern than photographed male; spots at middle even missing!). Ocular area slightly elevated; distance PME–PME 250 µm; diameter PME 80 µm; distance PME–ALE 35 µm. Thoracic furrow very shallow frontally, absent posteriorly. Sternum wider than long (0.60/0.52). Chelicerae as in Figure 224, with three modified hairs embedded in each distal apophysis (Figs 223, 228). Palps as in Figures 221 and 222; trochanter with ventral and retrolateral apophyses, procurus with ventral hinged process ('hp' in Fig. 221) and additional hinged structure distally (Fig. 227), bulb with distinctive apophysis and simple membra-

nous embolus ('e' in Figs 222, 231). Palpal tarsal organ capsulate (Fig. 232). Legs with spines in single row on femora 1 (maybe also 2, but most hairs missing), without curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 13%; tarsus 1 with ~20 fairly distinct pseudosegments. Four epiandrous spigots as in Figure 229. ALS as in Figure 233.

Variation. Median brown band on carapace missing in some males; pattern on opisthosoma variably 'complete'. Tibia 1 in 4 other males: 4.6, 4.9, 5.0, 5.1.

Female. In general similar to male, but ocular area not brown; some females with black pigment on femora proximally (dorso-frontally); one female with much more black pigment on opisthosoma and with black sternum; one female without lateral dark lines on carapace. Tibia 1 in 3 females: 3.8–4.0. Epigynum as in Figures 42 and 225, without scape, with unsclerotized median conical projection (not visible in ventral view). Without pocket between epigynum and spinnerets, but with folded cuticle in area where close relatives have pockets (arrow in Fig. 230). Dorsal view as in Figure 226.

Distribution. Known only from type locality (Map 4).

Material examined. TANZANIA: MOROGORO: Uzungwa Mountains: Kihansi Forest Reserve: type above, together with 12♂10♀, in ZMUC. Same collection data, 1♂1♀ in ZMUC. Same collection data, 'open sprayzone', 1♀ in ZMUC.

'SPERMOPHORA' SANGARAWA N. SP.

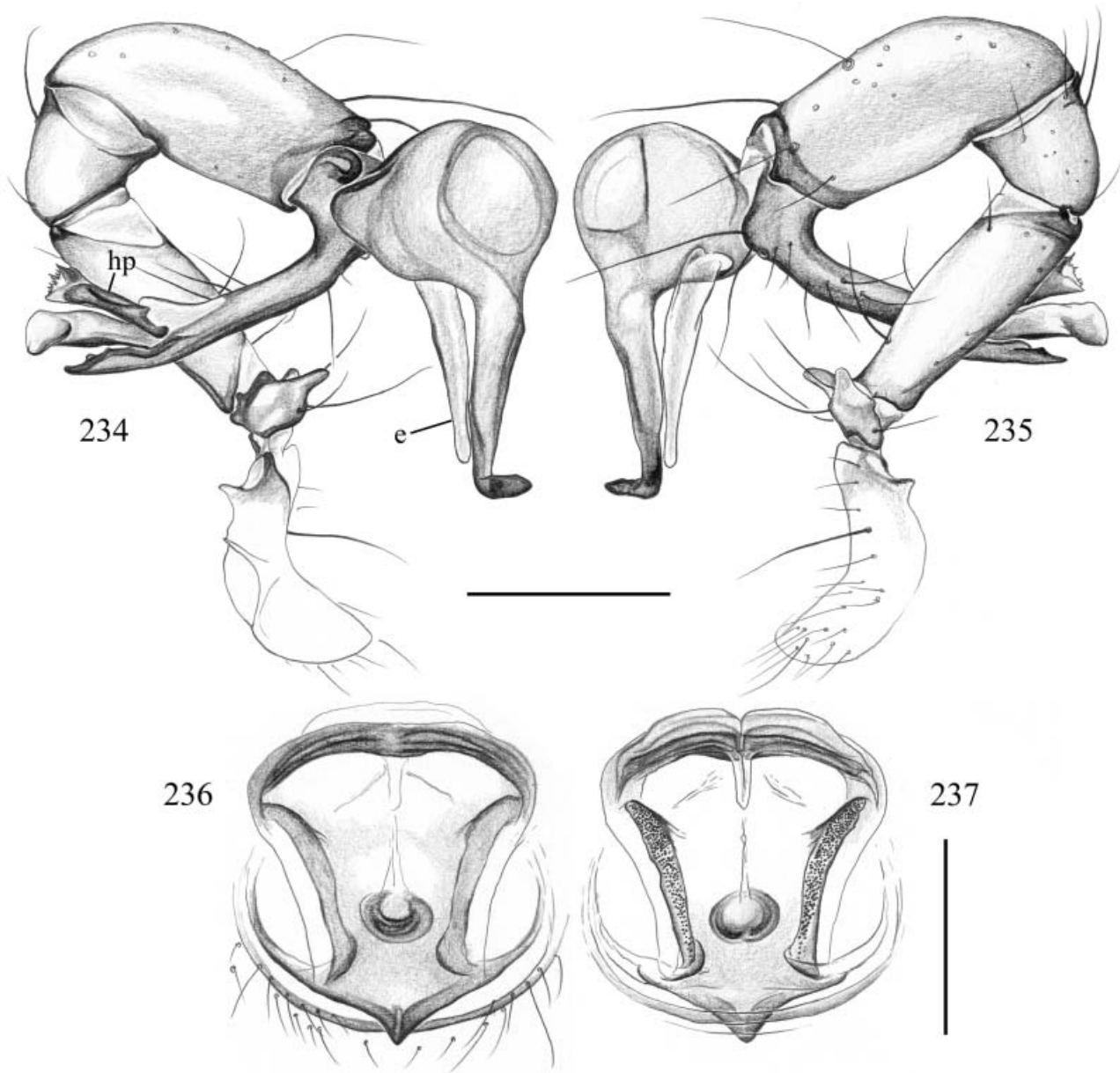
(FIGS 19, 43, 234–237)

Type. Male holotype from Sangarawe Forest (5°06.5'S, 38°35.7'E), 990 m elev., E Usambara Mountains, Tanga District, Tanzania; November 5–6, 1995 (C. E. Griswold, N. Scharff, D. Ubick); in ZMUC.

Etymology. Refers to the type locality.

Diagnosis. Easily distinguished from known congeners by the black transversal band on the carapace (Fig. 19); also by the male pedipalp (shape of bulbal apophysis and distal procurus elements; Figs 234, 235) and by the shape of the long epigynum (Figs 43, 236).

Male (holotype). Total length 2.1, carapace width 0.73. Leg 1: 21.6 (5.2 + 0.4 + 5.1 + 8.2 + 2.7), tibia 2: 3.2, tibia 3: 2.2, tibia 4: 3.1; tibia 1 L/d: 64. Habitus as in Figure 19. Carapace ochre-yellow with distinctive black band across ocular area; sternum pale ochre-yellow. Legs ochre-yellow, only patellae and tips of tibiae black. Opisthosoma ochre-grey with blackish spots



Figures 234–237. *'Spermophora' sangarawe*. Left male palp in prolateral (234) and retrolateral (235) views, and cleared epigynum in ventral (236) and dorsal (237) views. 'e': embolus; 'hp': hinged process. Scale bars = 0.3 mm.

dorsally; ventrally without marks. Ocular area distinctly separated from carapace; distance PME–PME 250 µm; diameter PME 70 µm; distance PME–ALE 35 µm. Thoracic furrow very shallow frontally, absent posteriorly. Sternum wider than long (0.56/0.40). Chelicerae as in *'S. morogoro* (cf. Fig. 224). Palps as in Figures 234 and 235; trochanter with two apophyses, one prolateral, one retrolateral; procursus with distinct hinged process ventrally ('hp' in Fig. 234). Bulb with simple membranous embolus ('e' in Fig. 234) and long apophysis. Legs with a row of stiffer hairs ven-

trally on femora 1, without curved hairs, few vertical hairs (most hairs missing in holotype); retrolateral trichobothrium of tibia 1 at 11%; tarsus 1 with >25 pseudosegments (distally about 20 quite distinct).

Variation. Tibia 1 in 7 other males 4.6–5.6 (\bar{x} = 5.19). Some males with black marks proximally on femora 2 and 3 (dorso-frontally).

Female. In general similar to male, but femora proximally with dorso-frontal blackish pigment on legs 1–3. Tibia 1 in 5 females: 4.1–4.5 (\bar{x} = 4.27). Epigynum as

in Figures 43 and 236, without scape but with short median protrusion posteriorly. Dorsal view as in Figure 237.

Distribution. Known from two close localities in the E Usambara Mountains (Map 4).

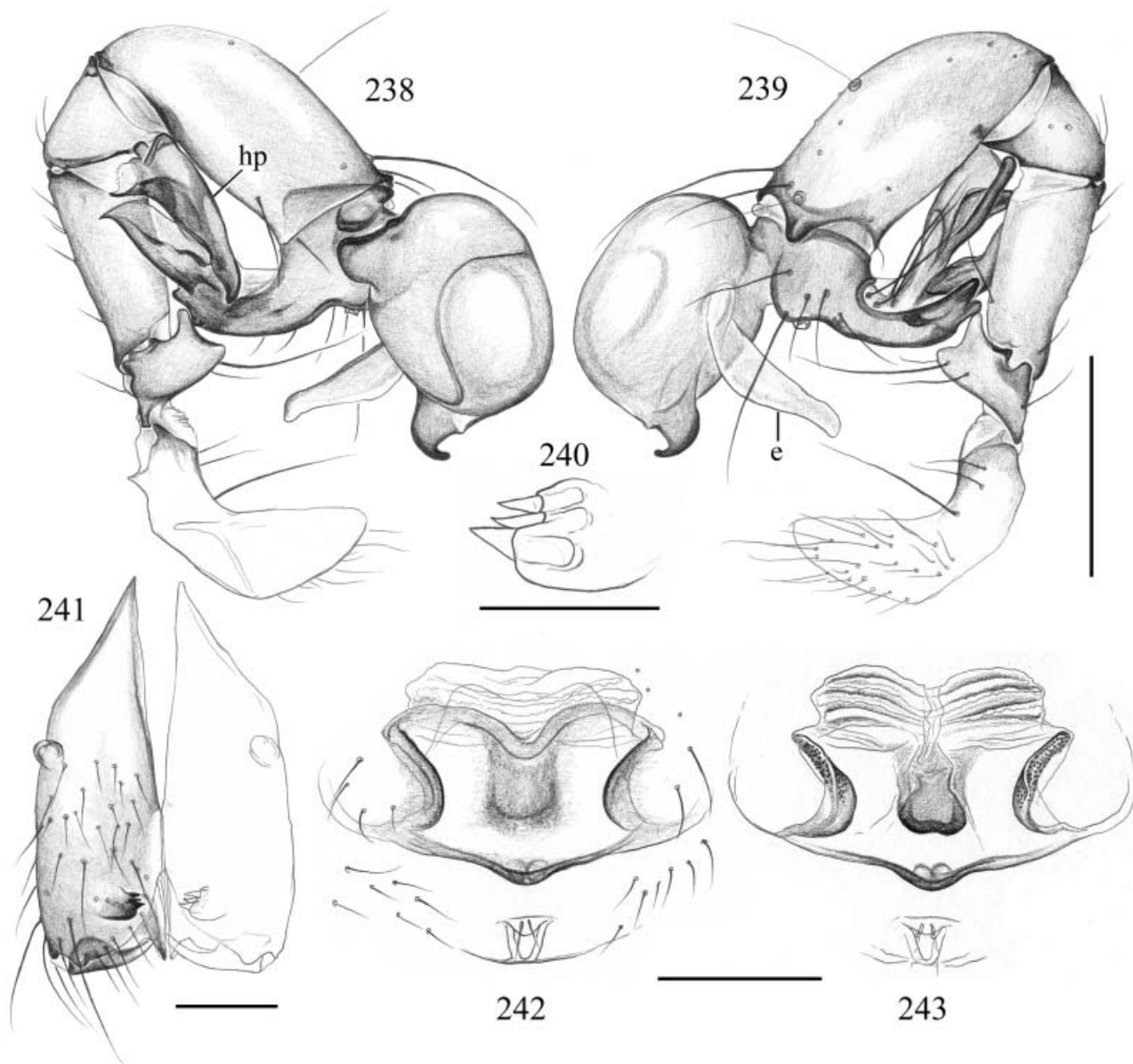
Material examined. TANZANIA: TANGA: E Usambara Mountains: type above, together with 1♀ and 2 juveniles. Same collection data, 3♂1♀ in CAS. Amani forest (5°05.7'S, 38°38'E), 950 m elev., October 27–

November 9, 1995 (C. E. Griswold, N. Scharff, D. Ubick), 2♂1♀ in ZMUC. Same collection data, 3♂2♀ in CAS. Amani, 1000 m elev., July 10, 1980 (M. Stoltze, N. Scharff), 1♂1♀ (2 vials), in ZMUC.

'SPERMOPHORA' USAMBARA N. SP.

(FIGS 20, 44, 238–243, 250–254)

Type. Male holotype from Amani, Mbomole Hill (5°05.7'S, 38°37'E), E Usambara Mountains, 1000 m



Figures 238–243. *'Spermophora' usambara*. Left male palp in prolateral (238) and retrolateral (239) views, modified hairs distally on male chelicerae (240), male chelicerae in frontal view (241), and cleared epigynum in ventral (242) and dorsal (243) views. 'e': embolus; 'hp': hinged process. Scale bars = 0.3 mm (238, 239), 0.2 mm (242, 243), 0.1 mm (241), 50 µm (240).

elev., Tanga District, Tanzania; November 5–8, 1995 (C. E. Griswold, N. Scharff, D. Ubick), in ZMUC.

Etymology. Refers to the type locality.

Diagnosis. Easily distinguished from known congeners by the opisthosoma drawn into pointed tip posteriorly (Fig. 20), and by the shapes of procursus and bulbal apophysis (Figs 238, 239). The ZMUC has a close relative from Mt. Rungwe (1900 m elev.) that differs by the shape of the hinged process, larger bulb and embolus, and significantly by the habitus (opisthosoma rounded as in *B. tingatingai*: Fig. 15; prosoma pattern as in *B. mbomole*: Fig. 11).

Male (holotype). Total length 2.2, carapace width 0.72. Leg 1: 21.0 (5.0 + 0.3 + 5.1 + 7.8 + 2.8), tibia 2: 3.3, tibia 3: 2.2, tibia 4: 3.1; tibia 1 L/d: 80. Habitus as in Figure 20. Carapace ochre-yellow with dark mark across ocular area and above petiole; sternum pale. Legs ochre-yellow, without rings. Opisthosoma pale ochre-grey with black marks dorsally; ventrally no marks. Ocular area barely elevated; distance PME–PME 220 µm; diameter PME 70 µm; distance PME–ALE 35 µm. Thoracic furrow reduced to barely indented line. Sternum wider than long (0.52/0.40). Chelicerae as in Figure 241, with three modified hairs embedded in each distal apophysis (Figs 240, 250). Palps as in Figures 238 and 239; trochanter with retrolateral apophysis and bifid ventral apophysis, procursus complex, with large hinged process ('hp' in Figs 238, 251) and additional distal process that also appears hinged; bulb with simple membranous embolus ('e' in Fig. 239), and strong curved apophysis. Legs without spines, without curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 10%; tarsus 1 with >20 pseudosegments, but only distally ~15 fairly distinct. Four epiandrous spigots as in Figure 252.

Variation. Black mark across ocular area rarely missing. Tibia 1 in 11 other males: 4.8–5.6 (\bar{x} = 5.17).

Female. In general similar to male; colour pattern more variable than in males; most females with black rings at tibia-metatarsus joints; some females with large black spot medially on opisthosoma (dorsally); some females with black margin on carapace and without dark spot in ocular area; some females with dark sternum. Tibia 1 in 11 females: 4.2–4.6 (\bar{x} = 4.33). Epigynum very simple, without scape, with posterior pocket (Figs 242, 254). Dorsal view as in Figure 243. ALS as in Fig. 253.

Distribution. Known from two close localities in Tanga District (single dot in Map 4).

Material examined. TANZANIA: TANGA: E Usambara Mountains: Amani: type above, together with

16♂14♀, in ZMUC. W Usambara Mountains: Mazumbai (4°49'S, 38°3'E), forest, 1400–1800 m elev., November 10–20, 1995 (C. E. Griswold, N. Scharff, D. Ubick), ~28♂25♀, in CAS.

'SPERMOPHORA' MASISIWE N. SP.

(FIGS 21, 45, 244–249, 255–257)

Type. Male holotype from 11 km SE Masisiwe, Kihanga Stream (8°22'05.7"S, 35°58'41.6"E), 1800 m elev., low vegetation, Uzungwa Scarp Forest Reserve, Iringa District, Tanzania; May 17–27, 1997 (ZMUC-SI Expedition); in USNM ('TA 078').

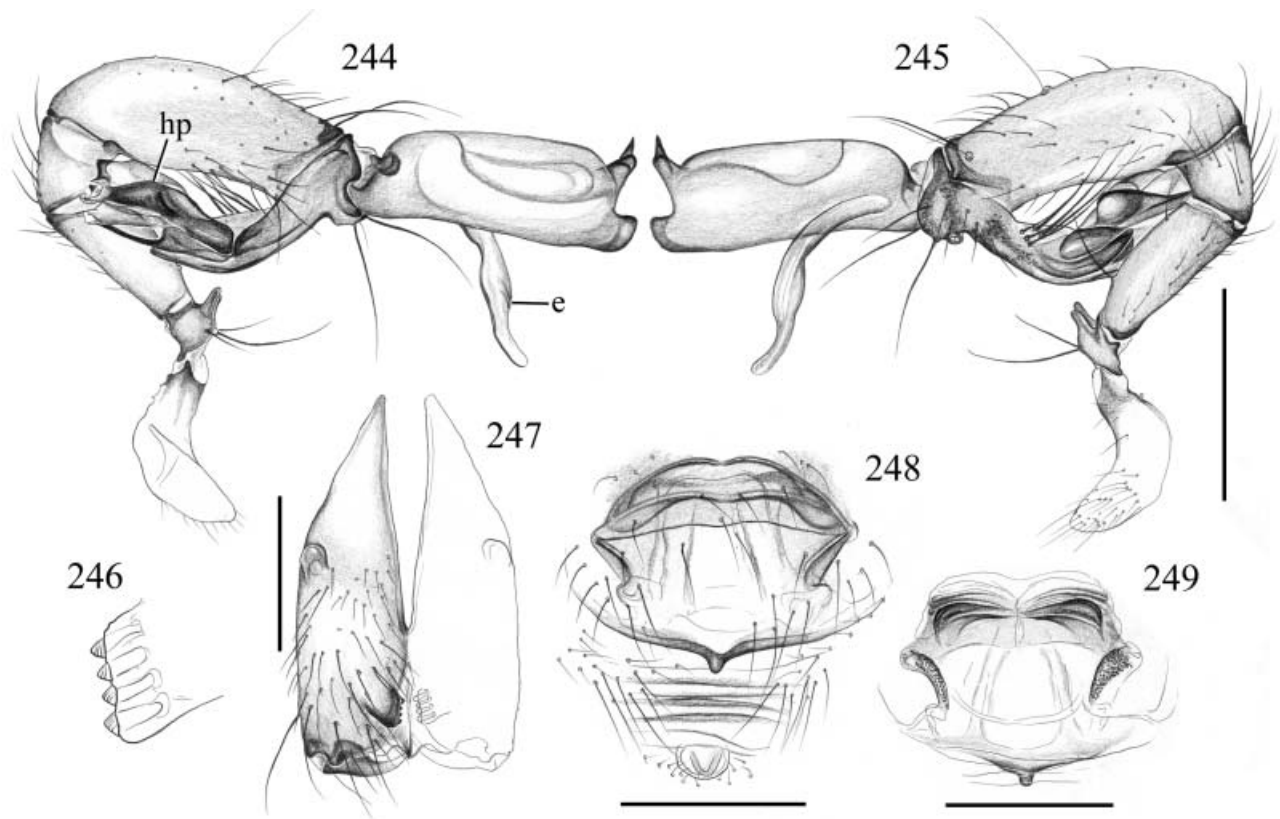
Etymology. Refers to the type locality.

Diagnosis. Easily distinguished from most known congeners by the long bulb and the shapes of its distal modifications (Figs 244, 245), from species with similar bulbs (*Buitinga kanzuiri*, '*S. tonkoui*') by the armature of the male chelicerae (Fig. 247), and the shape of the procursus (Figs 244, 245).

Male (holotype). Total length 1.7, carapace width 0.80. Leg 1: 14.6 (3.4 + 0.3 + 3.6 + 5.0 + 2.3), tibia 2: 2.3, tibia 3: 1.7, tibia 4: 2.2; tibia 1 L/d: 51. Habitus as in Figure 21. Carapace ochre-yellow with dark brown pattern as in Figure 21; sternum dark brown with tiny light spots. Legs ochre-yellow with dark rings on femora (subdistally), in patella area, on tibiae (subdistally). Opisthosoma ochre-grey with dark brown marks as in Figure 21, ventrally also with dark pattern. Ocular area slightly elevated; distance PME–PME 230 µm; diameter PME 60 µm; distance PME–ALE 30 µm. Thoracic furrow shallow but distinct. Sternum wider than long (0.58/0.48). Chelicerae as in Figure 247, with four modified hairs embedded in each distal apophysis (Fig. 246). Palps as in Figures 244 and 245; trochanter with retrolateral and prolateral apophyses, procursus with distinct hinged process prolaterally ('hp' in Fig. 244); bulb elongated, with membranous embolus ('e' in Fig. 244) and distal modifications. Legs with spines distally on femora 1 (about 15 in single row ventrally) and femora 2 (about 4), without curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 16%; tarsus 1 with >20 pseudosegments, very difficult to see in dissecting microscope. Four epiandrous spigots in two pairs (Fig. 255).

Variation. Tibia 1 in 5 other males: 3.7–3.9.

Female. In general similar to male, but without spines on femora. Tibia 1 in 17 females: 2.9–3.3 (\bar{x} = 3.18). Epigynum simple light brown plate (Fig. 45), without scape but with posterior pocket (Figs 248, 256, 'p' in 257). Dorsal view as in Figure 249.



Figures 244–249. *'Spermophora' masisiwe*. Left male palp in prolateral (244) and retrolateral (245) views, modified hairs distally on male chelicerae (246), male chelicerae in frontal view (247), and cleared epigynum in ventral (248) and dorsal (249) views. 'e': embolus; 'hp': hinged process. Scale bars = 0.5 mm (244, 245), 0.3 mm (248, 249), 0.2 mm (247).

Distribution. Known only from type locality (Map 4).

Material examined. TANZANIA: IRINGA: Uzungwa Scarp Forest Reserve: type above, together with 2♂4♀, in USNM. Same collection data, 2♂4♀, in ZMUC. Same collection data, litter and logs, 2♂4♀, in USNM, and 1♂7♀, in ZMUC. Uzungwa Scarp Forest Reserve, above Chita Village, 1600–1650 m elev., pit-fall traps in montane rain forest, November 8–13, 1984 (N. Scharff), 1♂, in ZMUC.

'SPERMOPHORA' KIVU N. SP.
(FIGS 22, 258–261)

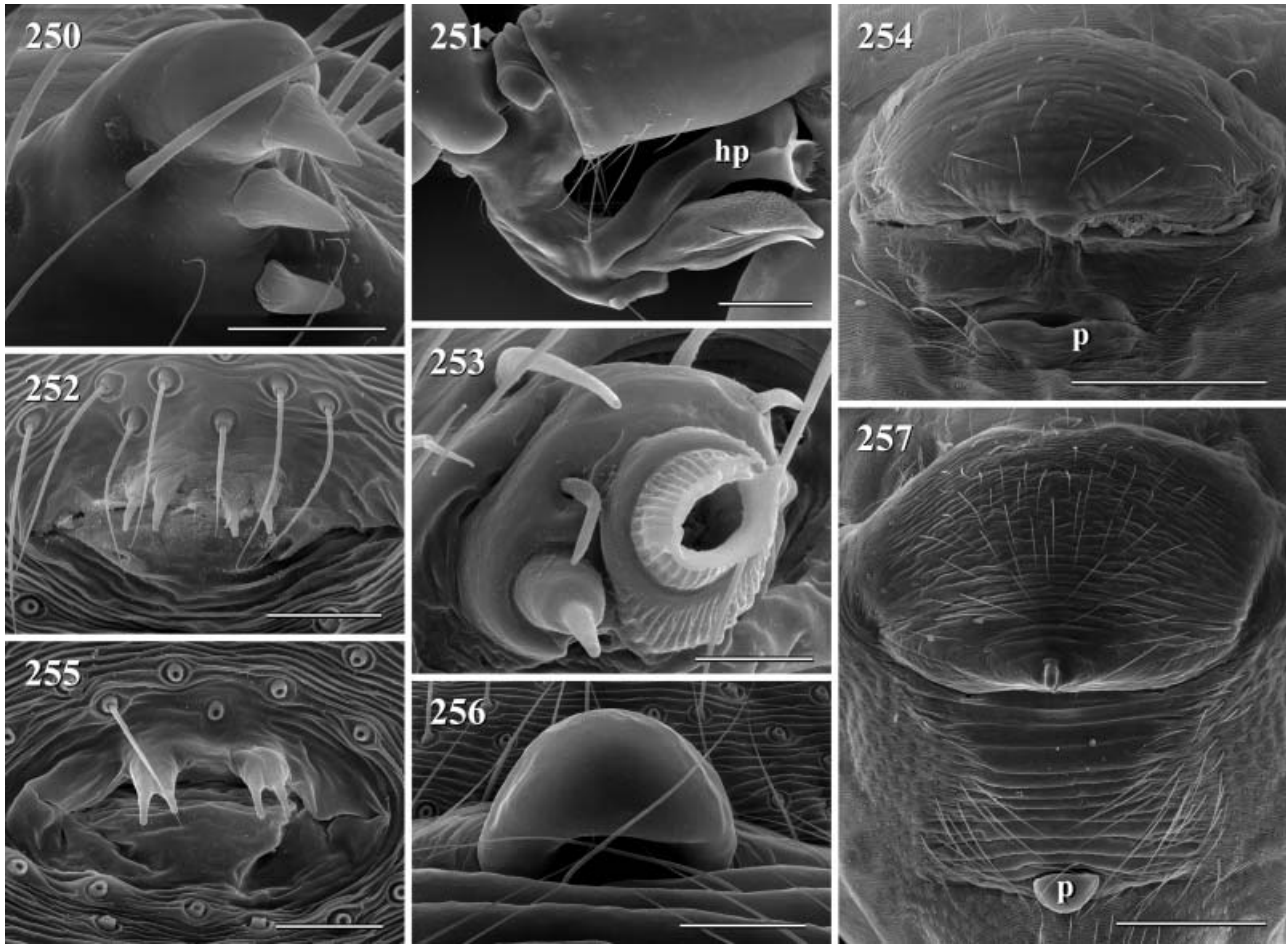
Type. Male holotype from Kivu, Itombwe, terr. Mwenge, lac Lungwe, camp de Kikura (3°03'S, 28°49'E), 2700 m elev., humus, bamboo forest, Nord-Kivu District, Congo; August 1953 (N. Leleup); in MRAC (74.887).

Etymology. Refers to the type locality.

Diagnosis. Easily distinguished from known congeners by the prolateral palpal femur apophysis ('fa' in

Fig. 258), and by the shapes of bulb (pair of long straight projections) and procursus (Figs 258, 259).

Male (holotype). Total length 2.2, carapace width 0.95. Leg 1: 15.4 (3.7 + 0.4 + 3.8 + 5.3 + 2.2), tibia 2: 2.3, tibia 3: 1.7, tibia 4: 2.3; tibia 1 L/d: 48. Habitus as in Figure 22. Carapace ochre-yellow with brown and black pattern as in Figure 22; sternum dark brown. Legs ochre-orange, with short dark rings on femora (subdistally), tibiae (proximally and subdistally), and metatarsi (proximally). Opisthosoma grey with brown to black marks. Ocular area slightly elevated; distance PME–PME 140 µm; diameter PME 100 µm; distance PME–ALE 20 µm. Thoracic furrow present but very shallow. Sternum slightly wider than long (0.68/0.60). Chelicerae as in Figure 260, with about 8–10 modified hairs embedded in each distal apophysis (Fig. 261). Palps as in Figures 258 and 259; trochanter with retrolateral and ventral apophyses, femur with distinctive apophysis proximally prolaterally ('fa' in Fig. 258); procursus apparently with largely membranous hinged process; bulb with embolus ('e' in Fig. 259) and long apophysis ending in hook. Legs



Figures 250–257. *'Spermophora' usambara* (250–254) and *masisiwe* (255–257). 250. Modified hairs on distal male cheliceral apophysis. 251. Right procursus, prolateral view ('hp': hinged process). 252, 255. Male gonopores with epiandrous spigots. 253. Female ALS spigots. 254, 257. Epigyna with posterior pockets ('p'). 256. Posterior pocket in frontal view. Scale bars = 8 μ m (253), 20 μ m (250), 30 μ m (252, 255), 40 μ m (256), 100 μ m (251), 200 μ m (254, 257).

without spines, without curved hairs, few vertical hairs (most hairs missing); retrolateral trichobothrium of tibia 1 at 14%; only ~15 pseudosegments visible on tarsus 1.

Female. Unknown.

Distribution. Known only from type locality (Map 4).

Material examined. CONGO: NORD-KIVU: Kivu: type above.

'SPERMOPHORA' BERLANDI FAGE, 1936
(FIGS 23, 46, 262–267, 284–285)

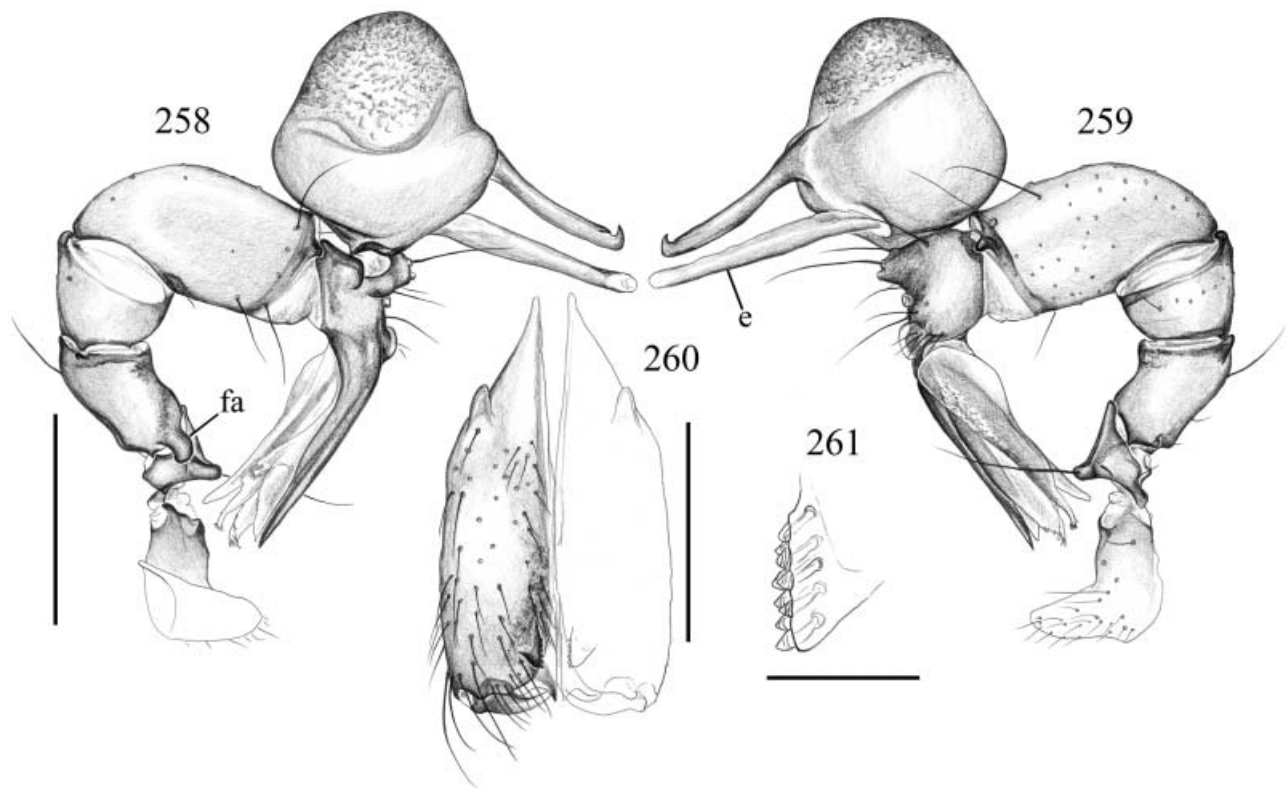
Spermophora berlandi Fage, 1936 (in Fage & Simon, 1936): 317–319, figs 10, 11a–c.

Types. Two male and three female syntypes from Massiv du Marakwet, 'Campi Cherangani' (Cheran-

gani Hills: ~1°N, 35.5°E), Rift Valley Province, Kenya; March 10, 1933 (Mission de l'Omo), in MNHN (AR 10391), examined.

Diagnosis. Distinguished from known congeners by the shapes of procursus (distal elements), bulb and embolus (Figs 262, 263), and by the armature of the male chelicerae (Figs 264, 265). The MRAC has a very close relative from Mt. Kenya (MRAC 161.899) that differs only by the shape of the procursus (ventral flap, distal structures), and the more slender trochanter apophysis.

Male (syntype). Total length 3.25, carapace width 1.4. Leg 1: 21.5 (5.3 + 0.6 + 5.4 + 7.2 + 3.0), tibia 2: 3.5, tibia 3: 2.7, tibia 4: 3.6; tibia 1 L/d: 39. Habitus as in Figure 23. Carapace ochre with brown pattern as in Figure 23; sternum dark brown. Legs ochre-yellow, with slightly darker rings on femora (subdistally),



Figures 258–261. '*Spermophora*' *kivu*. Left male palp in prolateral (258) and retrolateral (259) views, male chelicerae in frontal view (260), and modified hairs distally on male chelicerae (261). 'e': embolus; 'fa': distinctive femur apophysis. Scale bars = 0.5 mm (258, 259), 0.3 mm (260), 50 μ m (261).

patella area, and tibiae (subdistally). Opisthosoma grey with dark brown pattern. Ocular area elevated, with pair of distinctive horns between ALE; distance PME–PME 215 μ m; diameter PME 115 μ m; distance PME–ALE 45 μ m. Thoracic furrow shallow frontally, absent posteriorly. Sternum wider than long (0.98/0.75). Chelicerae as in Figure 264, with two pairs of frontal apophyses, one associated with three modified hairs (Fig. 265). Palps as in Figures 262 and 263; coxa with small hump ventrally, trochanter with retrolateral apophysis, femur with proximo-dorsal projection, procurus with ventral flap, very complex distally, with hinged process ('hp' in Fig. 262); bulb distinctive in shape, with white indented area ('i' in Fig. 263) and embolus with subterminal sclerotized hook. Legs without spines, without curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 9%; tarsus 1 with >20 pseudosegments, only about 10 fairly distinct distally. Four epiandrous spigots as in Figure 284. ALS as in Figure 285.

Variation. Tibia 1 in other male examined: 5.0.

Female. In general similar to male, but without horns between ALE. Tibia 1 in 3 females: 4.4, 4.5, 4.6. Epi-

gynum as in Figure 46, with scape at posterior rim and distinctive posterior structure (Fig. 266). Dorsal view as in Figure 267.

Distribution. Known only from type locality (Map 4).

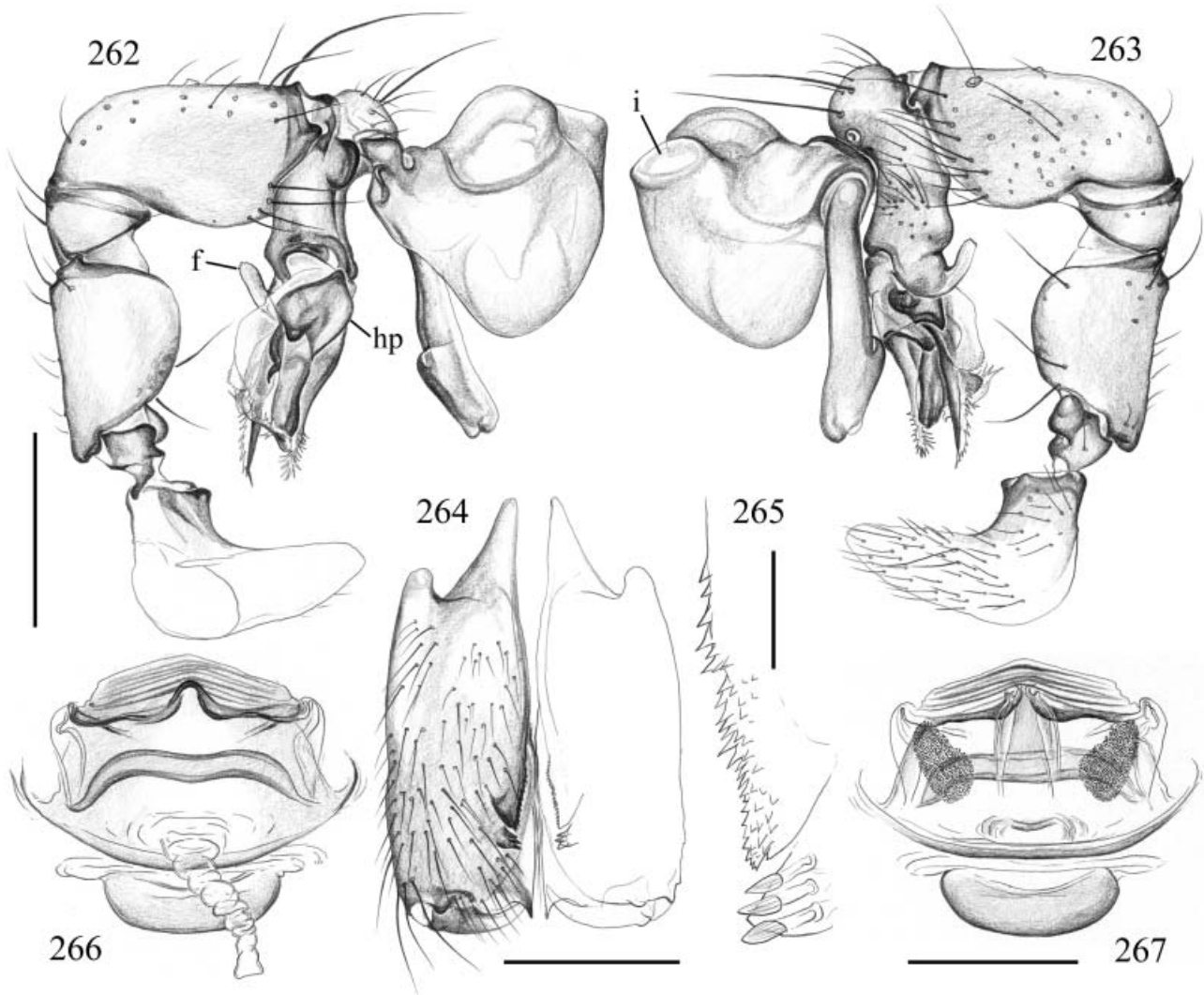
Material examined. KENYA: RIFT VALLEY: Massif du Marakwet: types above.

'SPERMOPHORA' MINOTAURA BERLAND (1920)
(FIGS 24, 47–48, 268–273, 280–283)

Spermophora minotaura Berland, 1920: 133–136, figs 154–161; Simon & Fage, 1922: 542; Fage, in Fage & Simon, 1936: 318, fig. 11d.

Types. I have only seen a penultimate female labelled 'cotype', from 'st. n°41', Mt. Kenya, Kenya; February 1912 (C. Alluaud, R. Jeannel), in MNHN (AR 10369). Other type material could not be found at the MNHN (C. Rollard, pers. comm.).

Diagnosis. Easily distinguished from known congeners by the modifications of the male clypeus (figs 154 and 156 in Berland, 1920); also by the shapes of

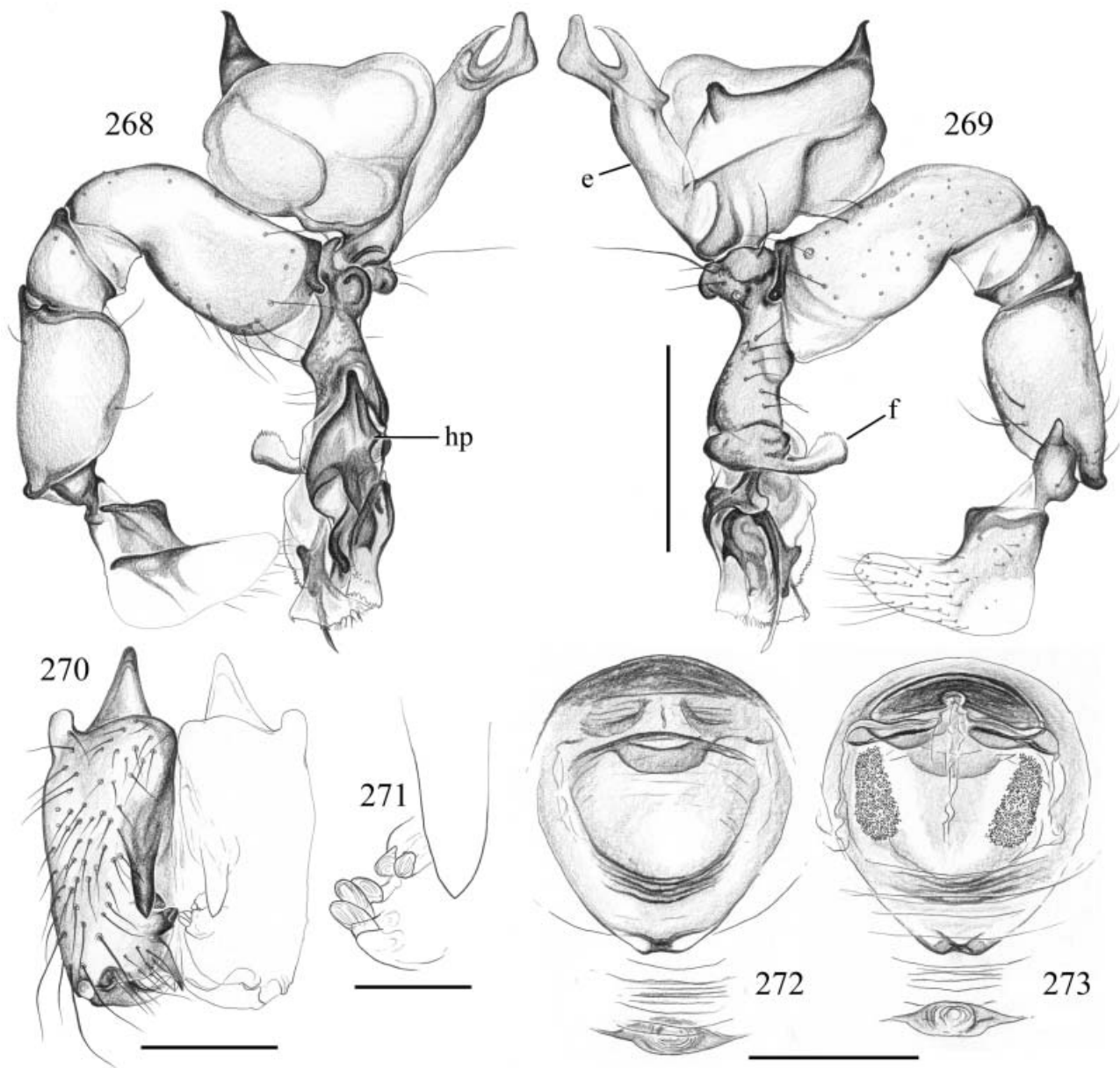


Figures 262–267. *'Spermophora' berlandi*. Left male palp in prolateral (262) and retrolateral (263) views, male chelicerae in frontal view (264), apophysis and modified hairs distally on male chelicerae (265), and cleared epigynum in ventral (266) and dorsal (267) views. 'f': 'Spermophora-flap'; 'hp': hinged process; 'i': indented area on bulb. Scale bars = 0.5 mm (262, 263, 266, 267), 0.3 mm (264), 50 µm (265).

procursus (distal elements) and bulb (embolus and two distinctive projections; Figs 268, 269), and by the armature of the male chelicerae (Figs 270, 280).

Male (Mt. Kenya). Total length 2.75, carapace width 1.12. Leg 1: 22.2 (5.3 + 0.4 + 5.5 + 8.3 + 2.7), tibia 2: 3.2, tibia 3: 2.2, tibia 4: 3.0; tibia 1 L/d: 57. Habitus as in Figure 24. Carapace ochre-yellow with pair of brown stripes and black line frontally; clypeus brown with whitish membranous median part; sternum blackish with some ochre-orange marks. Legs ochre-yellow, with dark rings on femora (subdistally) and tibiae (proximally and subdistally). Opisthosoma grey with black pattern. Ocular area distinctly elevated,

with pair of dark horns between ALE; distance PME–PME 230 µm; diameter PME 100 µm; distance PME–ALE 30 µm. Thoracic furrow distinct frontally, absent posteriorly. Sternum slightly wider than long (0.76/0.72). Clypeus with cuticular fold forming pouch that opens dorsally, and two pairs of processes extending from cuticular fold: spines facing inwards and unsclerotized processes pointing upwards; central part of fold whitish. Chelicerae as in Figure 270, with two pairs of frontal apophyses, one associated with modified hairs (Figs 271, 280, 281). Palps as in Figures 268 and 269; coxa with small hump ventrally, trochanter with retrolateral apophysis, femur with proximo-dorsal projection, procursus with ventral flap ('f' in



Figures 268–273. *'Spermophora' minotaura*. Left male palp in prolateral (268) and retrolateral (269) views, male chelicerae in frontal view (270), apophysis and modified hairs distally on male chelicerae (271), and cleared epigynum in ventral (272) and dorsal (273) views. 'e': embolus; 'f': 'Spermophora-flap'; 'hp': hinged process. Scale bars = 0.5 mm (268, 269, 272, 273), 0.2 mm (270), 50 μ m (271).

Fig. 269), very complex distally, with hinged process ('hp' in Fig. 268); bulb distinctive in shape, with embolus ('e' in Fig. 269) and two sclerotized processes. Legs without spines, without curved hairs, few vertical hairs (most hairs missing); retrolateral trichobothrium of tibia 1 at 12%; tarsus 1 with >20 pseudosegments, only about 15 fairly distinct distally. Four epiandrous spigots as in Figure 282. Spinnerets as in Figure 283.

Variation. Tibia 1 in 4 other males examined: 5.0–5.4.

Female. In general similar to male, but without clypeus modifications and only small cone between ALE. The males studied are accompanied by females with two different epigyna (Figs 47, 48). It is not clear whether these are two species, samples from a continuous variation, or two morphs in a case of dimorphism. However, the striking exter-

nal differences result mainly from differences in coloration, while external and internal structures appear to be monomorphic (as shown in Figs 272, 273). Tibia 1 in 'morph a' (Fig. 47) females: 4.3, 4.5; in 'morph b' (Fig. 48) females: 4.9, 5.1, 5.4. Epigynum without scape but with distinctive posterior structure (Fig. 272). Dorsal view as in Figure 273.

Distribution. Known from Mt. Kenya (Map 4), and from 'grotte de Campbell' in 'district de Nyéré' (Simon & Fage, 1922) (not on map).

Material examined. KENYA: Mt. Kenya: 'cotype' above. Mt. Kenya (~0°10'S, 37°20'E), July 1975 (R. Bosmans), 2♂2♀ (both morphs), in MRAC (161.893). Same collection data, 1♂2♀ (morph b), in MRAC (161.919). Same collection data, 1♀ (morph b), in MRAC (161.887). Same collection data, 2560 m elev., 2♂, in MRAC (161.879). Mt. Kenya, Omgeving camp, 2650 m elev., July 21, 1975 (R. Bosmans), 2♀ (morph a), in MRAC (161.895). Same collection data, Sirimon track, 2750 m elev., July 25, 1975 (U. Dall'Asta), 1♀ (morph b), in MRAC (147.333).

'SPERMOPHORA' LAMBILLONI N. SP.
(FIGS 25, 49, 274–279, 286–287)

Type. Male holotype from Grotte du Bois (11°35'S, 43°20'E), Grande Comore, Comoros; July 1968 (A. Lambillon), in MRAC (142.993).

Etymology. Named after the collector.

Diagnosis. Small dark species with oval opisthosoma, distinguished from its closest known relative ('S.' *jocquei*) by the much smaller palpal trochanter apophyses, the shape of the procurus (Figs 274, 275), and the absence of a lateral pair of cheliceral apophyses (cf. Fig. 290). The MRAC has an additional (undescribed) close relative from Mohéli (160.854) with almost identical chelicerae but very different procurus (ventral spine much longer).

Male (holotype). Total length 1.7, carapace width 0.8. Leg 1: 21.0 (5.3 + 0.4 + 5.3 + 7.5 + 2.5), tibia 2: 3.5, tibia 3: 2.4, tibia 4: 3.2; tibia 1 L/d: 59. Habitus as in Figure 25. Carapace ochre-yellow with dark brown pattern; sternum dark brown with large ochre-yellow central mark. Legs pale ochre-yellow. Opisthosoma ochre-grey, with blackish pattern as in Figure 25; ventrally similar to female, genital area light ochre. Ocular area slightly elevated, triads on additional low elevation; distance PME–PME 260 µm; diameter PME 100 µm; distance PME–ALE 20 µm; no trace of AME. Thoracic furrow distinct only frontally. Clypeus unmodified.

Sternum wider than long (0.64/0.44). Chelicerae as in Figure 276, with two modified hairs embedded in tip of each distal apophysis (Fig. 277); distance between tips of apophyses about 50 µm. Palps as in Figures 274 and 275; trochanter with one retrolateral and one prolateral apophysis; procurus with short ventral spine, apparently with hinged process ('hp' in Fig. 274); embolus ('e' in Fig. 275) slightly sclerotized, widening distally, without distal spine. Legs without spines, without curved hairs, without vertical hairs (most hairs missing in type, but present in other specimen); retrolateral trichobothrium of tibia 1 at 13%; tarsus 1 with >20 pseudo-segments, distinct distally. Four epiandrous spigots as in Figure 286. ALS spigots as in Figure 287.

Variation. Tibia 1 in other male examined: 5.5.

Female. In general similar to male, but legs darker in patella area and distally on tibiae. Tibia 1 in 3 females: 4.1, 4.5, 5.6 (see Note below). Epigynum as in Figure 49, with pair of pockets ('p' in Fig. 278) close together (about 50 µm apart). Dorsal view as in Figure 279.

Note. The female from Kartala (see below) is unusual in being larger than the males examined. The epigynum illustrated is from this specimen, but the epigyna of the other two females are not perceptibly different.

Distribution. Known only from Grande Comore.

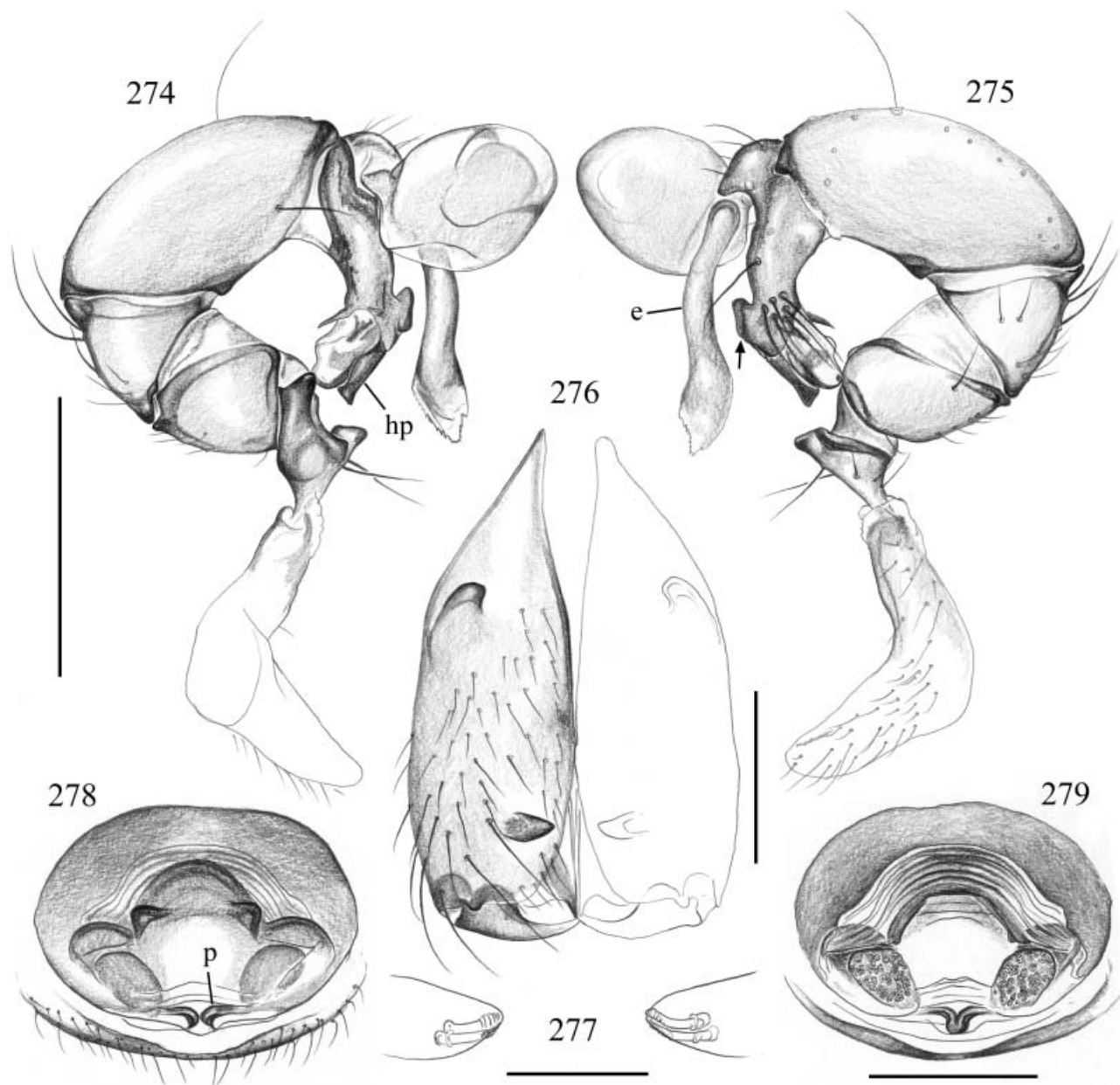
Material examined. COMOROS: GRANDE COMORE: Grotte du Bois: type above. 'Grotte', 1968 (A. Karmali), 1♀ in MRAC (143.035). Nioumbadjou (11°46'S, 43°18'E), pitfall, August 2–20, 1981 (R. Jocqué), 1♂ in MRAC (156.915). Kartala (11°45'S, 43°22'E), 2100 m elev., zone des bruyères, tamisage, November 26, 1983 (R. Jocqué), 1♀ in MRAC (160.716). Maoueni (11°27'S, 43°19'E), Fente Bonde, November 22, 1983 (R. Jocqué), 1♀ in MRAC (160.708).

'SPERMOPHORA' JOCQUEI N. SP.
(FIGS 288–291)

Type. Male holotype from Mt. Choungui, Mayotte, Comoros; July 19–August 2, 1998 (R. Jocqué), pitfalls in forest, in MRAC (208.091).

Etymology. Named for the collector, Rudy Jocqué from the Musée royale de l'Afrique Centrale in Tervuren.

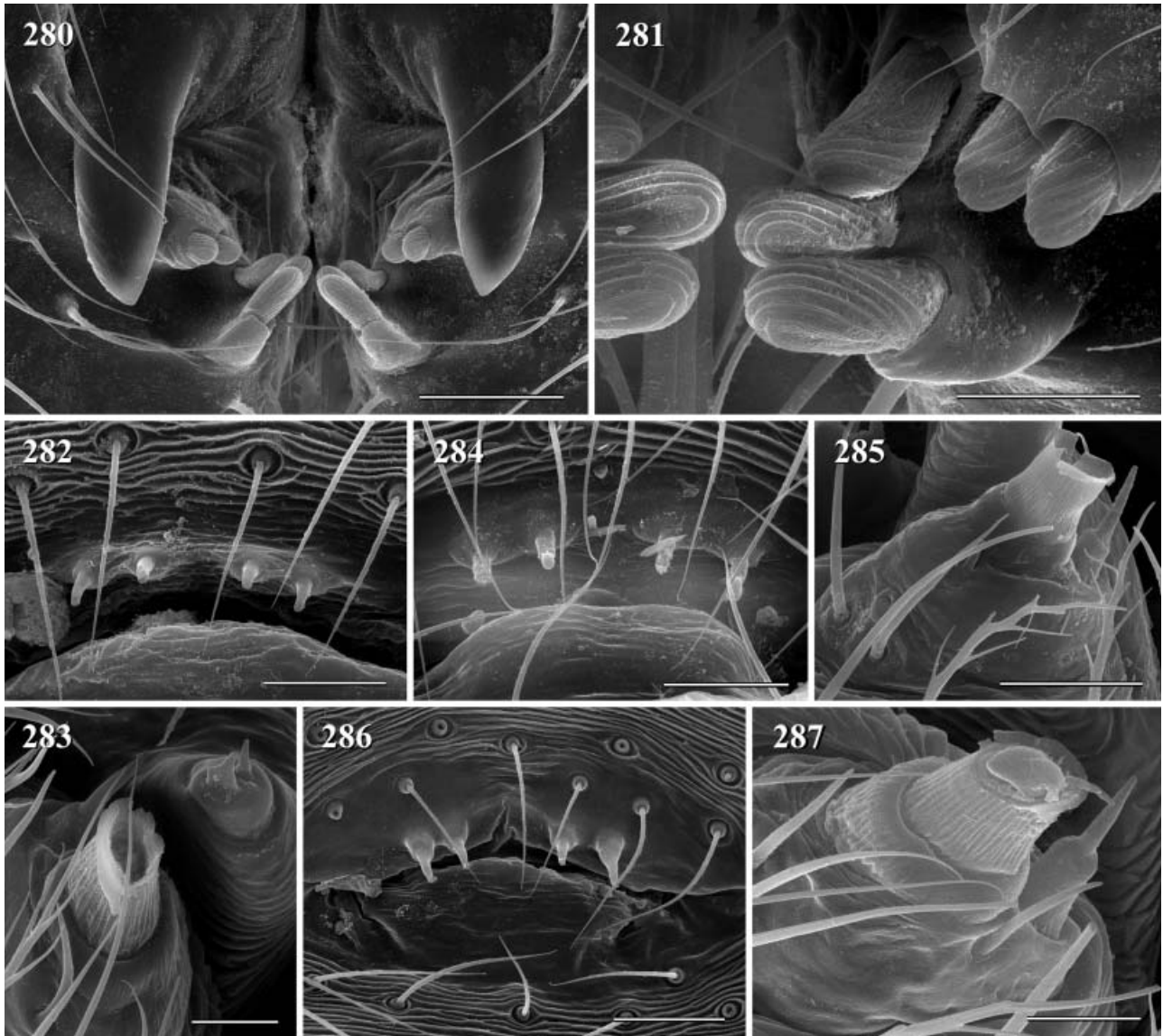
Diagnosis. Small species with oval opisthosoma, distinguished from its closest known relatives ('S.' *lambilloni* and an undescribed species from Mohéli) by the large prolateral palpal trochanter apophysis ('ta' in Fig. 288), the shape of the procurus (Fig. 289), and the presence of a lateral pair of cheliceral apophyses (Fig. 290).



Figures 274–279. *'Spermophora' lambilloni*. Left male palp in prolateral (274) and retrolateral (275) views, male chelicerae in frontal view (276), modified hairs distally on male chelical apophyses (277), and cleared epigynum in ventral (278) and dorsal (279) views. 'e': embolus; 'hp': putative hinged process; arrow points to structure distinctive for Comoran *'Spermophora'* species. Scale bars = 0.5 mm (274, 275), 0.4 mm (278, 279), 0.2 mm (276), 50 μ m (277).

Male (holotype). Total length 1.9, carapace width 0.9. Leg 1: 19.1 (4.8 + 0.4 + 4.8 + 7.2 + 1.9), tibia 2: 2.8, tibia 3: 2.0, tibia 4 missing; tibia 1 L/d: 65. Habitus very similar to *'S. lambilloni'* (cf. Fig. 25). Prosoma and legs ochre to light brown. Opisthosoma grey, without dark pattern (the pigmentation seems artificially removed). Ocular area slightly elevated, triads on additional low elevations; distance PME–PME 260 μ m; diameter PME 80 μ m; distance PME–ALE

30 μ m; no trace of AME. Thoracic furrow distinct only frontally. Clypeus unmodified. Sternum wider than long (0.64/0.48). Chelicerae as in Figure 290, with two modified hairs embedded in tip of each distal apophysis (Fig. 291); distance between tips of apophyses about 30 μ m. Palps as in Figures 288 and 289; trochanter with two retrolateral apophyses and large prolateral apophysis ('ta' in Fig. 288); femur with small prolateral apophysis and large conical projec-



Figures 280–287. *'Spermophora' minotaura* (280–283), *berlandi* (284, 285), and *lambilloni* (286, 287). 280. Frontal modifications on male chelicerae. 281. Modified hairs on male chelicerae. 282, 284, 286. Male gonopores with epiandrous spigots. 283. Male ALS and PMS. 285, 287. Male ALS spigots. Scale bars = 10 μ m (283, 287), 20 μ m (281), 30 μ m (282, 284–286), 50 μ m (280).

tion retrolaterally; procursus dorsodistally with distinctive projection (arrow in Fig. 289), apparently with hinged process ('hp' in Fig. 288); embolus ('e' in Fig. 288) simple, slightly sclerotized, without distal spine. Legs apparently with row of spines ventrally on femora 1 (most spines missing, but bases suggest that about 10 spines were present), without curved hairs, without vertical hairs; retrolateral trichobothrium of tibia 1 at 12%; tarsus 1 with >20 pseudosegments, distinct distally.

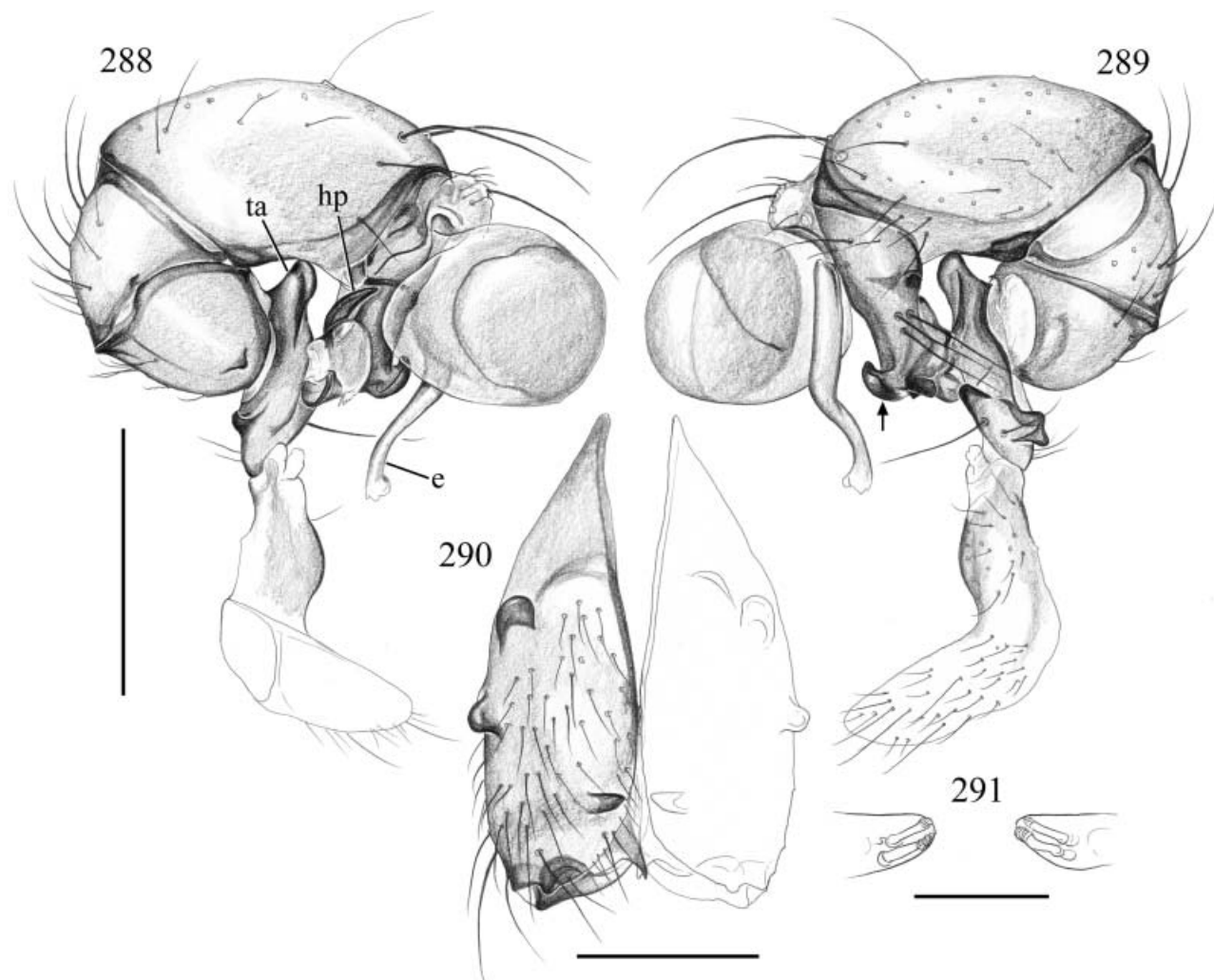
Female. Unknown.

Distribution. Known only from type locality.

Material examined. COMOROS: MAYOTTE: Mt. Choungui: type above.

'SPERMOPHORA' TONKOU N. SP.
(FIGS 50, 292–298)

Type. Male holotype from Mt. Tonkoui, Man, Ivory Coast; 1200 m elev., August 22, 1975 (C. L. Deeleman), in CLD.



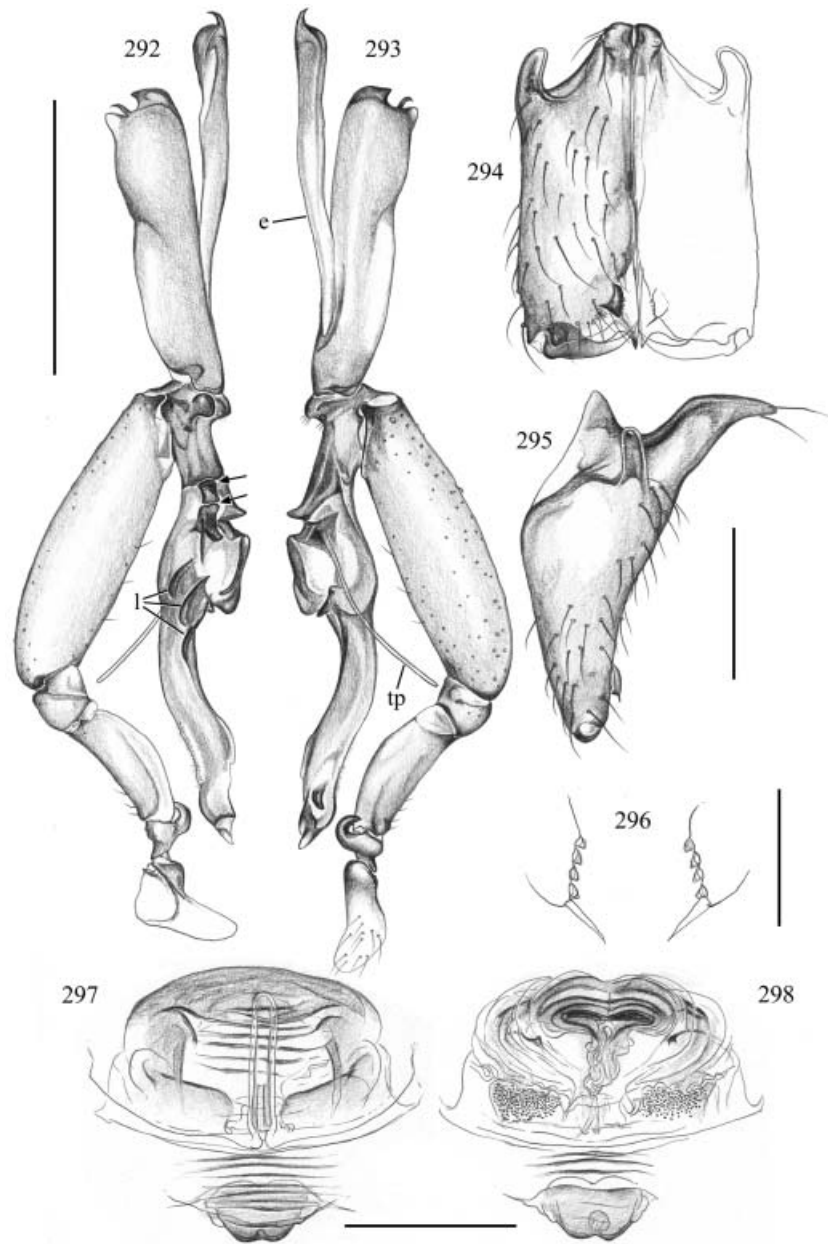
Figures 288–291. *'Spermophora' jocquei*. Left male palp in prolateral (288) and retrolateral (289) views, male chelicerae in frontal view (290), and modified hairs distally on male cheliceral apophyses (291). 'e': embolus; 'hp': hinged process; 'ta': prolateral trochanter apophysis; arrow points to structure distinctive for Comoran *'Spermophora'* species. Scale bars = 0.4 mm (288, 289), 0.2 mm (290), 50 µm (291).

Etymology. Refers to the type locality.

Diagnosis. Easily distinguished from known congeners by the elongated bulb with its distal modifications (Figs 292, 293), from *'S.' masisiwe* (which has a similar bulb) and other species also by the shape of the procursus (Figs 292, 293), the armature on the male chelicerae (Figs 294–296), and the hook-shaped apophysis on the male palpal trochanter (Fig. 293).

Male (holotype). Carapace width 0.92; opisthosoma missing. Leg 1: 19.2 (4.7 + 0.4 + 4.9 + 7.2 + 2.0), tibia 2: 2.9, tibia 3: 2.1, tibia 4: 2.7; tibia 1 L/d: 46. Carapace ochre-yellow with light brown pattern; sternum dark brown. Legs ochre-yellow, slightly darker subdistally on femora, on patellae, and on tibiae (subdistally).

Ocular area barely elevated; distance PME–PME 365 µm; diameter PME 80 µm; distance PME–ALE 25 µm. Thoracic furrow absent. Sternum wider than long (0.70/0.52). Chelicerae as in Figures 294 and 295, with four modified hairs and one spine embedded in tip of each distal apophysis (Fig. 296). Palps as in Figures 292 and 293; trochanter with distinctive apophysis retrolaterally, femur with indistinct hump dorso-proximally, procursus complex, apparently with at least two hinges (arrows in Fig. 292), with three flat sclerotized lamellae prolaterally ('l' in Fig. 292) and long transparent projection retrolaterally ('tp' in Fig. 293); bulb elongated, with distinctive modifications distally and embolus ('e' in Fig. 293) ending with small hooked apophysis. Legs without spines, without



Figures 292–298. *'Spermophora' tonkouei*. Left male palp in prolateral (292) and retrolateral (293) views, male chelicerae in frontal (294) and lateral (295) views, modified hairs distally on male cheliceral apophyses (296), and cleared epigynum in ventral (297) and dorsal (298) views. 'e': embolus; 'l': sclerotized lamellae on procursus; 'tp': transparent projection of procursus; arrows point to putative hinges in procursus. Scale bars = 1 mm (292, 293), 0.2 mm (294, 295), 0.4 mm (297, 298), 50 μ m (296).

curved hairs, few vertical hairs; retrolateral trichobothrium of tibia 1 at 13%; pseudosegments on tarsi not visible in dissecting microscope.

Variation. Tibia 1 in other male examined: 4.7. Opisthosoma globular, ochre-grey with large brown spots dorsally and brown pattern ventrally.

Female. In general similar to male. Tibia 1 in 3 females: 3.9, 4.0, 5.1. Epigynum as in Figure 50, with distinctive structure between epigynum and spinnerets (Fig. 297; pockets are not visible on this structure). Dorsal view as in Figure 298.

Distribution. Known only from type locality.

Material examined. IVORY COAST: Mt. Tonkoui: type above, together with 1♂3♀, in CLD.

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APPENDIX 1: TAXA USED IN CLADISTIC ANALYSIS

FILISTATIDAE

1. *Kukulcania hibernalis* (Hentz)

Costa Rica: San José Prov. (UCR)

OCHYRO CERATIDAE

2. *Ochyrocera* sp.

Costa Rica: San José Prov. (AMNH)

DIGUETIDAE

3. *Digueta signata* Gertsch

USA: Arizona (AMNH)

PLECTREURIDAE

4. *Plectreurys tristis* Simon

USA: Arizona (AMNH)

PHOLCIDAE (in alphabetical order)

5. *Artema atlanta* Walckenaer
6. *Belisana australis* Huber
7. *'Belisana'* sp. 1
8. *'Belisana'* sp. 2
9. *'Belisana'* sp. 3
10. *Buitinga amani* n. sp.
11. *Buitinga asax* n. sp.
12. *Buitinga buhoma* n. sp.
13. *Buitinga griswoldi* n. sp.
14. *Buitinga kadogo* n. sp.
15. *Buitinga kihanga* n. sp.
16. *Buitinga lakilingo* n. sp.
17. *Buitinga mazumbai* n. sp.
18. *Buitinga mbomole* n. sp.
19. *Buitinga nigrescens* (Berland)
20. *Buitinga ruwenzori* n. sp.
21. *Buitinga safura* n. sp.
22. *Buitinga uzungwa* n. sp.
23. *Ciboneya nuriae* Huber & Pérez González
24. *Coryssocnemis simla* Huber
25. *Crossopriza lyoni* (Blackwall)
26. *Holocnemus pluchei* (Scopoli)
27. *Leptopholcus delicatulus* Franganillo
28. *Mesabolivar junin* Huber
29. *Metagonia argentinensis* Mello-Leitão
30. *Metagonia rica* Gertsch
31. *Metagonia delicata* (O. Pickard-Cambridge)
32. *Micromerys gracilis* Bradley
33. *Micromerys daviesae* Deeleman-Reinhold
34. *Micropholcus fauroti* (Simon)
35. *Ninetis subtilissima* Simon
36. *Paramicromerys rothorum* Huber
37. *Paramicromerys betsileo* Huber
38. *Paramicromerys marojezy* Huber
39. *Paramicromerys rabeariveloi* Huber
40. *Paramicromerys coddingtoni* Huber
41. *Paramicromerys ralamboi* Huber
42. *Paramicromerys scharffi* Huber
43. *Paramicromerys nampoinai* Huber
44. *Paramicromerys mananteina* Huber
45. *Pholcophora americana* Banks
46. *Pholcus phalangioides* (Fuesslin)
47. *Physocylus globosus* (Taczanowski)
48. *Psilochorus pullulus* (Hentz)
49. *Smeringopus pallidus* (Blackwall)
50. *'Spermophora' berlandi* (Fage)

USA: Arizona (AMNH)
 Australia: Northern Territory (QMB)
 Sumatra: Ketambe, Gn Leuser, no further data (CLD)
 Sumatra: Ketambe, leg. Suharto, March 2–4, 1986 (CLD)
 Thailand: Chiang Mai Prov., leg. Schwendinger,
 August 22–September 22, 1990 (MHNG)
 Tanzania: Tanga (CAS)
 Tanzania: Iringa (USNM)
 Uganda: Rukungiri Dist. (CAS)
 Uganda: Rukungiri Dist. (CAS)
 Tanzania: Tanga (CAS)
 Tanzania: Iringa (USNM)
 Tanzania: Tanga (CAS)
 Tanzania: Tanga (CAS)
 Tanzania: Tanga (CAS)
 Tanzania: Arusha (AMNH)
 Uganda: Ruwenzori (BMNH)
 Tanzania: Iringa (USNM)
 Tanzania: Iringa (ZMUC)
 Cuba: Pinar del Rio (IES)
 Trinidad: Arima Valley (AMNH)
 India: West Bengal (AMNH)
 Spain: Almeria (AMNH)
 Cuba: Oriente (AMNH)
 Peru: Junin (AMNH)
 Brazil: Rio Grande do Sul (MCN)
 Costa Rica: San José Prov. (UCR)
 Nicaragua: Bluefields (UCR)
 Australia: Northern Territory (QMB)
 Australia: Queensland (QMB)
 USA: Texas (AMNH)
 Yemen: Ja'ar (AMNH)
 Madagascar: Antsiranana (CAS)
 Madagascar: Fianarantsoa (CAS)
 Madagascar: Antsiranana (CAS)
 Madagascar: Antsiranana (CAS)
 Madagascar: Antsiranana (CAS)
 Madagascar: Antsiranana (CAS)
 Madagascar: Fianarantsoa (CAS)
 Madagascar: Antsiranana (CAS)
 Madagascar: Antsiranana (CAS)
 USA: California (AMNH)
 USA: San Francisco (AMNH)
 Costa Rica: San José (UCR)
 USA: Arkansas (AMNH)
 Costa Rica: San José Prov. (AMNH)
 Kenya: Rift Valley (MNH)

APPENDIX 1: *continued*

51. ' <i>Spermophora</i> ' <i>jocquei</i> n. sp.	Comoros: Mayotte (MRAC)
52. ' <i>Spermophora</i> ' <i>lambilloni</i> n. sp.	Comoros: Grande Comore (MRAC)
53. ' <i>Spermophora</i> ' <i>morogoro</i> n. sp.	Tanzania: Morogoro (ZMUC)
54. ' <i>Spermophora</i> ' <i>masisiwe</i> n. sp.	Tanzania: Iringa (USNM)
55. <i>Spermophora</i> <i>peninsulae</i> Lawrence	South Africa: Western Cape Prov. (CAS)
56. ' <i>Spermophora</i> ' <i>ranomafana</i> Huber	Madagascar: Fianarantsoa (CAS)
57. ' <i>Spermophora</i> ' <i>sangaraue</i> n. sp.	Tanzania: Tanga (ZMUC)
58. <i>Spermophora</i> <i>senoculata</i> (Dugès)	USA: New York City (AMNH)
59. ' <i>Spermophora</i> ' <i>usambara</i> n. sp.	Tanzania: Tanga (ZMUC)
60. ' <i>Spermophora</i> ' <i>vyvato</i> Huber	Madagascar: Antsiranana (CAS)
61. <i>Spermophora</i> <i>yao</i> Huber	Australia: Queensland (QMB)
62. <i>Spermophora</i> sp. 1	Sumatra: Kerinci Nat. Park, leg. Djojosedharmo, July 21–30, 1988 (CLD)
63. <i>Spermophora</i> sp. 2	Lesser Sunda Isl. Sumbawa, leg. Djojosedharmo, January 1–3, 1990 (CLD)
64. <i>Spermophora</i> sp. 3	South Africa: Western Cape Prov., leg. Dippenaar-S., February 1, 1989 (NCP)
65. ' <i>Spermophora</i> ' sp. 4	South Africa: Kwa Zulu-Natal, Bonamanzi, leg. Huber, April 1, 2001 (ZFMK)
66. ' <i>Spermophora</i> ' sp. 5	South Africa: Kwa Zulu-Natal, Cape Vidal, leg. Huber, April 3, 2001 (ZFMK)
67. <i>Spermophorides</i> sp. 1	Canary Islands: Lanzarote, leg. Wunderlich (ZFMK)
68. <i>Spermophorides</i> sp. 2	Mallorca, leg. Hillyard, December 21, 1980 (BMNH)
69. <i>Trichocyclus</i> <i>arabana</i> Huber	Australia: Western Australia (WAM)
70. <i>Zatavua</i> <i>isalo</i> Huber	Madagascar: Fianarantsoa (MCZ)
71. <i>Zatavua</i> <i>madagascariensis</i> (Fage)	Madagascar: Toliara (MNHN)
72. <i>Zatavua</i> <i>zanahary</i> Huber	Madagascar: Antsiranana (CAS)
73. <i>Zatavua</i> <i>voahangyae</i> Huber	Madagascar: Fianarantsoa (CAS)
74. <i>Zatavua</i> <i>analalava</i> Huber	Madagascar: Toamasina (MRAC)
75. <i>Zatavua</i> <i>vohiparara</i> Huber	Madagascar: Fianarantsoa (CAS)
76. <i>Zatavua</i> <i>tamatave</i> Huber	Madagascar: Toamasina (MRAC)
77. <i>Zatavua</i> <i>griswoldi</i> Huber	Madagascar: Antsiranana (CAS)

APPENDIX 2: CHARACTERS SCORED FOR CLADISTIC ANALYSIS

The numbers at the end of each character description are the consistency index and the retention index (CI/RI) as calculated by NONA.

1. Eye number: (0) eight; (1) six. All taxa treated in this paper have six eyes. It must be noted that the presumably ancestral state of eight eyes is regained twice in the cladogram shown in Appendix 4 (in the node leading to *Pholcus*, *Leptopholcus* and *Micropholcus*, and in '*Spermophora*' sp. 4). Regaining a complex character is dubious and suggests a flaw in data choice. (20/76)
2. Distance between posterior median eyes (PME): (0) $> 1.75 \times$ diameter of PME; (1) $< 1.75 \times$ diameter of PME. Cladistic analysis suggests that grouping of all eyes close together is primitive, while a large distance between the triads is derived. However, reversals occur, and both states are present in the taxa treated herein. (12/80)
3. Distance between PME and anterior lateral eyes (ALE): (0) $< 0.55 \times$ diameter of PME; (1) $> 0.55 \times$ diameter of PME. State '1' is common only in the New World clade. (50/66)
4. Sculpture of carapace: (0) without median indentation; (1) with median groove; (2) with roughly circular indentation behind ocular area. A groove is suggested to be primitive in pholcids. However, the groove of the taxa treated herein is considered secondary (node 2 in Appendix 4). (28/84)
5. Conical median elevation on female carapace: (0) absent; (1) present. This character is a synapomorphy of a species group within *Zatavua*; it has convergently evolved in *Physocyclus*. (50/66)

6. Clypeus height: (0) shorter than chelicerae; (1) as long as or longer than chelicerae. State '1' is a synapomorphy of Pholcidae. (100/100)
7. Paired modification on male clypeus: (0) absent; (1) present. State '1' is a synapomorphy of a species group within *Zatavua*; it has convergently evolved in *Metagonia*. (50/80)
8. Sternum width: (0) wider than long; (1) longer than wide. All pholcids have a wide sternum. In the present matrix, state '1' unites *Diguetia* and *Plectreurys*. (100/100)
9. Anterior humps on male sternum: (0) absent; (1) present. In the present data set, humps are a synapomorphy of ninetines. However, they also occur in the New World clade (Huber, 2000). (100/100)
10. Epiandrous spigots: (0) absent; (1) present. Epiandrous spigots seem to be present in all pholcines except in *Spermophorides*. (25/66)
11. Spigots on posterior lateral spinnerets (PLS): (0) present; (1) absent. State '1' is a synapomorphy of Pholcidae. (50/50)
12. Spigots on anterior lateral spinnerets (ALS): (0) about seven spigots present; (1) only basic set of two spigots present. The presence of several spigots is ancestral. *Buitinga* and some related genera (node 2 in Appendix 4) have reduced the spigots to the basic set of two, as has convergently occurred in several other taxa (Huber, 2000). (20/87)
13. Pseudoentelegyny: (0) absent; (1) present. State '1' (in which the spermatheca is provided with two ducts, in analogy to the insemination and fertilization ducts of entelegyne spiders – see Huber, 1997) occurs in *Metagonia* only (Huber, 2000). (100/100)
14. Long folded scape on epigynum: (0) absent; (1) present. This unique structure (e.g. Figs 56, 69, 90, 118) is a synapomorphy of *Buitinga* (node 8 in Appendix 4). The scape of '*Spermophora*' *berlandi* is here considered to have evolved independently. (50/92)
15. Position of scape: (0) in front of epigynum; (1) close to posterior rim. Within *Buitinga*, a scape in frontal position is considered primitive. At node 12 in Appendix 4, the scape moved to a posterior position. However, Pee-Wee at K = 1 reverses the transformation. (50/80)
16. Scape morphology: (0) coiled up; (1) pointing straight back; (2) pointing to the front and turning around. A coiled up scape (e.g. Figs 129, 131, 158, 162) is considered primitive; state '2' defines node 15 in Appendix 4. (100/100)
17. Female internal genitalia: (0) symmetric; (1) asymmetric. State '1' occurs only in *Metagonia* (Huber, 2000). (100/100)
18. Posterior pocket or pockets on female opisthosoma: (0) absent; (1) present between epigynum and spinnerets; (2) present on posterior plate. State '2' is presumably a synapomorphy of *Spermophorides* ('aa' in figs 7, 15, 23, 31, 48 in Senglet, 1972); state '1' is here considered to have evolved twice: in 'true' *Spermophora*, and in East African taxa including the Malagasy '*S.*' *ranomafana* (node 3 in Appendix 4). (50/75)
19. Trochanter cuneal notch: (0) absent; (1) present. This character unites Pholcidae with Diguettidae + Plectreuridae (Huber, 2000). (100/100)
20. Relative length of male femur 1 and tibia 1: (0) about same length; (1) femur 1 > 1.15 × tibia 1. In the present data set, state '1' unites *Diguetia* and *Plectreurys*. (50/50)
21. Enlarged femora of walking legs: (0) absent; (1) present. Present only in the New World clade (Huber, 2000). (100/100)
22. Spines (macrotrichia) in single row ventrally on male femora: (0) absent; (1) present. Spines have independently evolved several times (Huber, 2000), but still seem to be valuable for grouping of species. Within the taxa treated herein, spines are considered to have evolved five times convergently. (14/62)
23. Relative length of tibia 1 and tibia 4: (0) about same length; (1) tibia 1 > 1.15 × tibia 4. Relatively long tibiae 4 (state '0') occur in ninetines, in *Micromerys*, and in *Ciboneya*. The ancestral state is presumably state '1'. (25/50)
24. Number of trichobothria on tibiae: (0) more than three; (1) three. The reduction to three trichobothria on legs 2–4 is a synapomorphy of Pholcidae. For legs 1 see next character. (100/100)
25. Prolateral trichobothrium on tibia 1: (0) present; (1) absent. The optimization of this character is ambiguous. The prolateral trichobothrium is absent in all pholcines except in *Micromerys*. Within the present data set it is further absent in ninetines, in *Crossopriza*, and in *Ciboneya*. (20/55)
26. Position of retrolateral trichobothrium on tibia: (0) distal (after 45% of tibia length); (1) proximal (before 45% of tibia length). In the present data set, state '0' is a synapomorphy of ninetines. (100/100)
27. Leg length: (0) short-legged: male tibia 1 up to 2.5 × carapace width; (1) long-legged: male tibia 1 longer than 2.5 × carapace width. In the present data set, short legs are a synapomorphy of ninetines, and have convergently evolved in '*Belisana*' sp. 3. (33/50)

28. Tarsal pseudosegments: (0) absent; (1) present. Pseudosegments are a synapomorphy of Pholcidae, and have secondarily been reduced in *Micromerys* (Huber, 2001). (50/80)
29. Number of tarsal pseudosegments on male tarsi 1: (0) up to 10; (1) more than 10. Only ninetines have less than 10 pseudosegments. (100/100)
30. Regularity of pseudosegments: (0) regular segmentation; (1) irregular, 'broken' cuticle. State '1' is considered a synapomorphy of holocnemines, but the regaining of regular segmentation in *Trichocyclus* is dubious. (50/75)
31. Sexual dimorphism of chelicerae: (0) absent; (1) present. The presence of modifications on the male chelicerae is a synapomorphy of Pholcidae. (100/100)
32. Proximal frontal projections on chelicerae: (0) absent; (1) present. These projections (e.g. Figs 54, 60, 102, 138) are a synapomorphy of a clade within *Buitinga* (node 11 in Appendix 4). (100/100)
33. Pair of teeth on proximal rounded projections: (0) absent; (1) present. These characteristic teeth (e.g. Figs 54, 71, 87) are a synapomorphy of a core group within *Buitinga* (node 14 in Appendix 4). (100/100)
34. Macrosetae proximally on male chelicerae: (0) absent; (1) present. These macrosetae (e.g. Figs 102, 108, 137) are a synapomorphy of *Buitinga* (node 8 in Appendix 4) but have been reduced at node 14. (33/60)
35. Stridulatory files laterally on male chelicerae: (0) absent; (1) present. In the present data set, cheliceral stridulation is interpreted as having evolved four times convergently (*Plectreuryx*, ninetines, *Holocnemus* + *Crossopriza*, *Physocyclus* + *Trichocyclus*). It is not known in pholcines with the exception of some *Metagonia* species (Huber, 2000). (25/50)
36. Shape of cheliceral lamina: (0) not pointed; (1) pointed. A strongly pointed lamina is a synapomorphy of holocnemines. (100/100)
37. Proximolateral apophyses on the male chelicerae: (0) absent; (1) present. These apophyses are present in all pholcines except in *Metagonia*. They have rarely evolved in other taxa (not in the present data set; see Huber, 2000). (50/94)
38. Direction of proximolateral cheliceral apophyses: (0) pointing upwards (1) pointing backwards. State '0' is usual in pholcines, only *Zatavua* has state '1'. (100/100)
39. Globular or conical hairs on male chelicerae: (0) absent; (1) spread over surface; (2) 1–3 embedded in apophysis (if 3, then tip rounded); (3) 3–5 and more embedded in apophysis (if 3, then tip pointed). Globular or conical hairs that are spread over the surface have evolved at least twice (*Metagonia*, *Artema*). In several occasions, modified hairs evolved that are embedded in the tip of an apophysis. Even the characteristic row of 3 or more hairs found in many East African taxa is here considered to have evolved twice (nodes 4 and 9 in Appendix 4). (27/75)
40. Pair of long modified hairs on tip of male cheliceral apophyses: (0) absent; (1) present. These distinctive hairs are a synapomorphy of a group of mainly Southern African '*Spermophora*' species, here represented by '*Spermophora*' spp. 4 and 5. (100/100)
41. Retrolateral apophysis in the 'knee' of the male palpal coxa: (0) absent; (1) present. This apophysis is a synapomorphy of the New World clade (Huber, 2000). (100/100)
42. Ventral apophysis distally on male palpal coxa: (0) absent; (1) present. This apophysis is characteristic for many East African taxa (e.g. Figs 58, 64, 99, 135), but is here considered to have evolved twice in East Africa and once in a Malagasy species. (33/77)
43. Retrolateral apophysis on male palpal trochanter: (0) absent; (1) present. This apophysis is present in most pholcines with the exception of *Zatavua* (also absent in *Metagonia argentinensis*, *Paramicromerys marojezy*, and *Spermophora* sp. 2). (20/84)
44. Proximodorsal apophysis on male palpal femur: (0) absent or simple hump; (1) present, pointing ventrally; (2) present, pointing dorsally. State '1' is a synapomorphy of a group of species within *Paramicromerys*; state '2' is a synapomorphy of a group of species of South African *Spermophora* (represented herein by *S. peninsulae* and *S.* sp. 3). (66/75)
45. Position of the dorsal male palpal trichobothrium: (0) regular, i.e. not extremely distal; (1) extremely distal. *Buitinga* and '*Spermophora*' *vyvato* from Madagascar (node 7 in Appendix 4) are characterized by an extremely distal dorsal trichobothrium (e.g. Figs 59, 86, 93, 219). (100/100)
46. Rotation of male palpal tibia-cymbium joints: (0) absent; (1) prolateral joint shifted to ventral position, retrolateral joint shifted to dorsal position (2) prolateral joint shifted to dorsal position, retrolateral joint shifted to ventral position. State '1' is a synapomorphy of *Zatavua*, state '2' is a synapomorphy of *Paramicromerys*. (50/88)
47. Retrolateral notch on cymbium: (0) absent; (1) present. A notch retrolaterally on the cymbium is

- a synapomorphy of a species group within *Zatavua*. (100/100)
48. Procursus (paracymbium): (0) absent; (1) present. The procurus is a synapomorphy of Pholcidae. Only one species is known to lack a procurus (Huber, 2002). (100/100)
 49. Procursus attachment site on cymbium: (0) straight or ventrally; (1) dorsally. State '1' is a synapomorphy of *Spermophorides* (see figs 3, 11, 19, etc. in Senglet, 1972; fig. 229 in Wunderlich, 1992; figs 188, 228, 243 in Wunderlich, 1987). A similar situation in '*Spermophora*' *sangarawe* (Fig. 235) is a convergency. (50/50)
 50. Procursus strongly bent ventrally: (0) no; (1) yes. The ventrally bent procurus (e.g. Figs 222, 239, 245) is a synapomorphy of a group of East African '*Spermophora*' species treated herein (node 5 in Appendix 4). *Buitinga mulanje* is not assigned to this group because of the epigynal scape. (100/100)
 51. Hinged process on procurus: (0) absent; (1) present. A hinged process on the procurus is here considered to unite a large clade within pholcines (node 1 in Appendix 4). It was reduced within *Buitinga* (node 13). (50/96)
 52. Process winding ventrally around procurus: (0) absent; (1) present. This characteristic process ('wp' in Figs 141, 142, 147, 148, 160, 165, 175) is a synapomorphy of a clade within *Buitinga* (node 10 in Appendix 4). (100/100)
 53. '*Spermophora* flap': (0) absent; (1) present (a ventral unhinged process of the procurus; see Huber, 2001). This structure characterizes true '*Spermophora*' or a subgroup thereof (*S. senoculata*, *yao*, *peninsulae*, and spp. 1–3 herein). The flaps in *berlandi* and *minotaura* ('f' in Figs 262, 269) may have evolved independently. (50/83)
 54. Ventral pocket and dorsal apophysis on procurus: (0) absent; (1) present. This putative functional unity (Huber & Eberhard, 1997) unites the genera *Trichocyclus*, *Physocyclus* and *Artema*. (100/100)
 55. 'Brush' of pseudotrichia distally on procurus: (0) absent; (1) present. Like the previous character, this also unites *Trichocyclus*, *Physocyclus* and *Artema*. (100/100)
 56. Dorsal knob on procurus: (0) absent; (1) present. This refers to a unique sclerotized structure dorsally on the procurus in the Comoran taxa treated herein (arrows in Figs 275, 289). (100/100)
 57. Palpal tarsal organ shape: (0) flat/exposed; (1) cup-shaped/capsulate. Most pholcines have capsulate tarsal organs. The only known exceptions are *Buitinga kadogo* males (Fig. 77) and '*Belisana*' spp. 1 and 3. However, since females of *Buitinga kadogo* have capsulate tarsal organs (Fig. 78), it is coded as capsulate. (33/66)
 58. Orifice of capsulate tarsal organ: (0) wide: > 35% of outer diameter; (1) narrow: < 35% of outer diameter. Ninetines share a narrow orifice (and small size; see Huber, 2000). State '1' has convergently evolved in *Trichocyclus* and in *Spermophora* sp. 2. (33/33)
 59. Palpal tarsal organ position: (0) proximal; (1) distal. A distal tarsal organ is the synapomorphy of a clade within *Zatavua*. (100/100)
 60. Serrate apophysis on bulb: (0) absent; (1) present. This apophysis has long been known as uncus in *Pholcus* and *Leptopholcus*. A similar serrate structure in some 'true' *Spermophora* species is here considered a homoplasy. (50/75)

APPENDIX 3: DATA MATRIX USED FOR CLADISTIC ANALYSIS

	10	20	30	40	50	60
	↓	↓	↓	↓	↓	↓
1. <i>Kukulcania</i> h.	0111?00001	00?0--0000	0010??10--	00-00?0-00	00000000--	-----1000
2. <i>Ochyrocera</i> sp.	1??1000001	0000--0000	0010??10--	00-00-0-00	00000000--	-----1000
3. <i>Digueta</i> s.	1??0000100	00?0--0011	0000??00--	00-0000-00	00000000--	-----1000
4. <i>Plectreuryx</i> t.	0010000100	10?0--0011	0000??00--	00-0100-00	0000?000--	-----0-00
5. <i>Ninetis</i> s.	0100010011	1000--0010	0001100100	10-0100-00	0000000100	0000001100
6. <i>Pholcophora</i> a.	0101010011	1000--0010	0001100100	10-0100-00	0000000100	0000001100
7. <i>Psilochorus</i> p.	0101010000	1100--0010	0011011110	10-0000-00	1000000100	0000000-00
8. <i>Mesabolivar</i> j.	0111010000	11?0--0010	1011011110	10-0000-00	1010000100	0000000-00
9. <i>Coryssocnemis</i> s.	0111010000	1100--0010	1011011110	10-0000-00	1000000100	0000000-00
10. <i>Ciboneya</i> n.	0101010000	1100--0010	0001111110	10-0000-00	1000020100	0000000-00
11. <i>Smeringopus</i> p.	0102010001	1000--0010	0011011111	10-0010-20	0000000100	0000001000
12. <i>Crossopriza</i> l.	0102010001	1100--0010	0111111111	10-0110-20	0000000100	0000001000
13. <i>Holocnemus</i> p.	0102010001	1100--0010	0111011111	10-0110-20	0000000100	000000?000
14. <i>Physocylus</i> g.	0102110000	1000--0010	0011011111	10-0110-00	0000000100	0001101000
15. <i>Artema</i> a.	0102010001	1000--0010	0011011111	10-00?0-10	0000000100	0001101000
16. <i>Trichocylus</i> a.	0101010000	1000--0010	0011011110	10-0110-00	0000000100	0001101100
17. <i>Zatavua</i> a.	110001100?	1000--0010	0011111110	10-0001100	0000011100	000000??10
18. <i>Zatavua</i> g.	1100111001	1000--0010	0011111110	10-0001100	0000011100	0000001010
19. <i>Zatavua</i> i.	110101000?	1000--001?	00?1?11110	10-0001100	0000011100	000000??00
20. <i>Zatavua</i> m.	110101000?	1000--001?	00?1?11110	10-0001100	0000011100	000000??00
21. <i>Zatavua</i> t.	110011100?	??00--0010	0011111110	10-0001100	0000011100	000000??10
22. <i>Zatavua</i> voh.	110011100?	1000--0010	0011111110	10-0001100	0000011100	000000??10
23. <i>Zatavua</i> voa.	1100010001	1000--0010	0011111110	10-0001100	000001?100	0000001010
24. <i>Zatavua</i> z.	1100010001	??00--0010	0011111110	10-0001100	0000011100	000000??10
25. <i>Belisana</i> a.	1100010001	1000--0010	0011?11110	10-0001000	0011000100	0000001000
26. " <i>Belisana</i> " sp. 1	1100010001	1000--0010	0011111110	10-0001000	0010000100	0000000-00
27. " <i>Belisana</i> " sp. 2	1000010001	1000--0010	0011111110	10-0001000	0010000100	00?0001000
28. " <i>Belisana</i> " sp. 3	1100010001	1000--0010	00?1110110	10-0001000	0010000100	0000000-00
29. <i>Micropholcus</i> f.	0000010001	1000--0010	0011111110	10-0001020	0010000100	0000001000
30. <i>Pholcus</i> p.	0000010001	1000--0010	001111111?	10-0001020	0010000100	0000001001
31. <i>Leptopholcus</i> d.	0000010001	1000--0010	0011111110	10-0001020	0010000100	0000001001
32. <i>Micromerys</i> d.	1000010001	1100--0010	00010110--	10-0001000	0010000100	1000001000
33. <i>Micromerys</i> g.	1000010001	1100--0011	00010110--	10-0001000	0010000100	1000001000
34. <i>Metagonia</i> a.	1100011001	1010--1010	0011?11110	10-0000-10	0000000100	1000001000
35. <i>Metagonia</i> d.	1000010001	1110--1010	0011111110	10-0000-10	0010000100	1000001000
36. <i>Metagonia</i> r.	1100011001	1010--1010	0011111110	10-0000-10	0010000100	1000001000
37. " <i>Spermophora</i> " b.	1001010001	1101100?10	0011111110	10-0001030	0?10000100	1010001000
38. " <i>Spermophora</i> " j.	1001?1000?	????--??10	01?1111110	10-0001020	0010000100	1000011000
39. " <i>Spermophora</i> " l.	1001010001	1100--0010	0011111110	10-0001020	0010000100	100001??00
40. " <i>Spermophora</i> " ma.	1001010001	1100--0110	0111111110	10-0001030	0010000101	1000001000
41. " <i>Spermophora</i> " mo.	1001010001	1100--0110	0111111110	10-0001030	0010000101	1000001000
42. <i>Spermophora</i> p.	1100010001	1000--0010	0011111110	10-0001020	0012000100	1010001000
43. " <i>Spermophora</i> " r.	1001010001	1100--0110	0011111110	10-0001000	0010000100	1000001000
44. " <i>Spermophora</i> " sa.	100101000?	1100--0010	0111111110	10-0001030	0010000111	100000??00
45. <i>Spermophora</i> se.	1000010001	1000--0110	0011111110	10-0001020	0010000100	1010001001
46. " <i>Spermophora</i> " u.	1001010001	1100--0110	0011111110	10-0001030	0010000101	100000??00
47. " <i>Spermophora</i> " v.	110101000?	1100--0010	0011111110	10-0001020	0010100100	100000??00
48. <i>Spermophora</i> y.	1000010001	1000--0110	0011?11110	10-0001000	0010000100	?010001001
49. <i>Spermophora</i> sp. 1	1000010001	1000--0110	0011111110	10-0001000	0010000100	1010001001
50. <i>Spermophora</i> sp. 2	1000010001	1000--0110	0011111110	10-0001000	0000000100	1010001100
51. <i>Spermophora</i> sp. 3	1100010001	1000--0010	0011111110	10-0001020	0012000100	1010001000
52. " <i>Spermophora</i> " sp. 4	0100010001	1000--0010	0011111110	10-0001001	0010020100	0000001000
53. " <i>Spermophora</i> " sp. 5	1100010001	1000--0010	0011111110	10-0001001	0010000100	0000001000
54. <i>Spermophorides</i> sp. 1	1101010000	1100--0210	0011111110	10-0001000	0010000110	1000001000

	10	20	30	40	50	60
	↓	↓	↓	↓	↓	↓
55. <i>Spermophorides</i> sp. 2	1101010000	1100--0210	0011111110	10-0001000	0010000110	1000001000
56. <i>Paramicromerys</i> b.	1001010001	1100--0010	0011111110	10-0001000	0010020100	1000001000
57. <i>Paramicromerys</i> c.	1001010001	1100--0010	0111111110	10-0001000	0010020100	1000001000
58. <i>Paramicromerys</i> n.	100101000?	1100--0010	0111111110	10-0001020	0111020100	100000??00
59. <i>Paramicromerys</i> man.	1001010001	1100--0010	01?1111110	10-0001020	0011020100	1000001000
60. <i>Paramicromerys</i> mar.	100101000?	1100--0010	0011111110	10-0001000	0000020100	100000??00
61. <i>Paramicromerys</i> rab.	100101000?	1100--0010	0011111110	10-0001000	0010020100	100000??00
62. <i>Paramicromerys</i> ral.	100101000?	1100--0010	0111111110	10-0001000	0010020100	100000??00
63. <i>Paramicromerys</i> ro.	100101000?	1100--0010	0011111110	10-0001000	0010020100	100000??00
64. <i>Paramicromerys</i> s.	100101000?	1100--0010	0111111110	10-0001000	0011020100	100000??00
65. <i>Buitinga</i> as.	1001010001	1101000010	0011?11110	10-?001030	0010100100	1100001000
66. <i>Buitinga</i> am.	110101000?	1101100010	0111111110	1110001030	0110100100	0?00001000
67. <i>Buitinga</i> b.	100101000?	1101010010	0011111110	1101001030	0010?00100	?00000??00
68. <i>Buitinga</i> g.	100101000?	1101100010	0111111110	1101001030	0110100100	100000??00
69. <i>Buitinga</i> ka.	1001010001	1101120010	0111111110	1110001030	0110100100	0000001000
70. <i>Buitinga</i> ki.	1001010001	1101000010	0011111110	10-0001030	0110100100	1100001000
71. <i>Buitinga</i> l.	110101000?	1101120010	0111111110	1110001030	0110100100	0000001000
72. <i>Buitinga</i> ma.	100101000?	1101120010	0111111110	1110001030	0110100100	?000001000
73. <i>Buitinga</i> mb.	1001010001	1101000010	0011111110	10-1001?30	0010100100	1100001000
74. <i>Buitinga</i> n.	110101000?	1101?00010	0011111110	1110001030	0110100100	?000001000
75. <i>Buitinga</i> r.	1101010001	1101000010	0111111110	10-1001000	0010?00100	1000001000
76. <i>Buitinga</i> s.	1001010001	1101100010	0011111110	1101001030	0110100100	0000001000
77. <i>Buitinga</i> u.	1001010001	1101000010	0011111110	10-1001030	0110100100	1100001000

APPENDIX 5: INDEX OF GENERIC AND SPECIFIC NAMES

<i>amani</i> n. sp.	568	<i>lambilloni</i> n. sp.	605
<i>asax</i> n. sp.	580	<i>masisiwe</i> n. sp.	599
<i>berlandi</i> Fage	601	<i>mazumbai</i> n. sp.	564
<i>buhoma</i> n. sp.	574	<i>mbomole</i> n. sp.	578
<i>Buitinga</i> n. gen.	557	<i>minotaura</i> Berland.	602
<i>ensifera</i> (Tullgren).	561	<i>morogoro</i> n. sp.	594
<i>globosa</i> (Tullgren).	561	<i>mulanje</i> n. sp.	591
<i>griswoldi</i> n. sp.	571	<i>nigrescens</i> (Berland).	568
<i>jocquei</i> n. sp.	605	<i>ruhiza</i> n. sp.	575
<i>kadogo</i> n. sp.	562	<i>ruwenzori</i> n. sp.	583
<i>kanzuiri</i> n. sp.	591	<i>safura</i> n. sp.	571
<i>kihanga</i> n. sp.	583	<i>sangarawe</i> n. sp.	596
<i>kikura</i> n. sp.	586	<i>Spermophora</i> Hentz.	593
<i>kivu</i> n. sp.	600	<i>tingatingai</i> n. sp.	589
<i>lakilingo</i> n. sp.	566	<i>tonkoui</i> n. sp.	607
		<i>usambara</i> n. sp.	598
		<i>uzungwa</i> n. sp.	581