

A revision of the crab spider genus *Heriaeus* Simon, 1875 (Araneae: Thomisidae) in the Afrotropical Region

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ABSTRACT

The genus *Heriaeus* Simon, 1875 is revised in the Afrotropical Region. Ten new species are described: *H. allenjonesi* (♂♀ South Africa), *H. antoni* (♂♀ Yemen), *H. copricola* (♂♀ South Africa), *H. foordi* (♂♀ South Africa), *H. madagascar* (♂ Madagascar), *H. müzenberg* (♂ South Africa), *H. peterwebbi* (♂♀ South Africa), *H. sossusvlei* (♀ Namibia), *H. xanderi* (♂♀ South Africa) and *H. zanii* (♂♀ South Africa and Tanzania). *Heriaeus fimbriatus* Lawrence, 1942 is redescribed and recognized as the male of *H. crassispinus* Lawrence, 1942, and synonymized here. Two other previously known Afrotropical species are redescribed: *H. transvaalicus* Simon, 1895 (including the first male description) and *H. latifrons* Lessert, 1919.

KEY WORDS: Afrotropical, Araneae, Thomisidae, *Heriaeus*, crab spiders, identification key, new species.

INTRODUCTION

The genus *Heriaeus* Simon, 1875 is characterized by the lateral eye tubercles being separated from each other and the anterior lateral eye tubercle being larger than the posterior eye tubercle (Jézéquel 1964; Ono 1988).

Prior to this study, *Heriaeus* was represented by 25 species (Platnick 2012), of which seven were known from Africa and four from the Afrotropical Region. Members of *Heriaeus* are small to medium-sized spiders characterized by numerous, strong erect setae and fine hairs covering the body and legs (Fig. 1), the oval-shaped abdomen and the presence of distinct eye tubercles and a wide clypeus (Figs 2–6). Living specimens are usually creamish white with tints of green and pink. Their pilose bodies camouflage them well on grasses and foliage, and they are not easily seen.

Loerbroks (1983) revised the European species of *Heriaeus* and provided short notes on the African species. The first Afrotropical species, *H. transvaalicus* Simon, 1895, was described from South Africa, followed by *H. latifrons* Lessert, 1919 from East Africa. A further two South Africa species were added later: *H. crassispinus* Lawrence, 1942, based on a male specimen, and *H. fimbriatus* Lawrence, 1942 based on a female.

The material studied in this revision was collected mainly from grass and foliage, indicating that these spiders are mainly plant-dwelling. In this paper ten new species are described, one species is synonymized and the three valid known species are redescribed. A key is provided for both males and females.

MATERIAL AND METHODS

The area covered by this study is the Afrotropical Region, including Yemen and Madagascar. All available specimens were studied, and 225 adults were examined from the following collections (curators are named in parentheses):

AMGS – Albany Museum, Grahamstown, South Africa (A. Kirk-Spriggs);

- MNHG – Muséum d'Histoire Naturelle de la Ville de Genève, Geneva, Switzerland (P. Schwendinger);
- MNHN – Muséum National d'Histoire Naturelle, Paris, France (C. Rollard);
- MRAC – Royal Museum for Central Africa, Tervuren, Belgium (R. Jocqué);
- NCA – National Collection of Arachnida, ARC-Plant Protection Research Institute, Pretoria, South Africa (A. Dippenaar-Schoeman);
- NMBA – National Museum, Bloemfontein, South Africa (L. Lotz);
- NMSA – KwaZulu-Natal Museum, Pietermaritzburg, South Africa (A. Ndaba);
- SAMC – Iziko South African Museum, Cape Town, South Africa (M. Cochrane);
- SMFD – Naturmuseum und Forschungsinstitut Senckenberg, Frankfurt am Main, Germany (P. Jäger);
- TMSA – Ditsong National Museum of Natural History (formerly Transvaal Museum), Pretoria, South Africa (M. Kruger).

Characters were examined under 40× magnification using a Wild M3C light microscope fitted with a calibrated 10× micrometer ocular lens. Measurements have been taken with the ocular micrometer and are given in millimetres with 0.01 mm accuracy.

The description format and the abbreviations of morphological terms used in this paper follow those of Dippenaar-Schoeman (1983). The following abbreviations were used: measurements: CL – carapace length, CW – carapace width, TL – total length of body in dorsal view; eyes: AER – anterior eye row, ALE – anterior lateral eyes, AME – anterior median eyes, LE – lateral eyes, ME – median eyes, MOQ – median ocular quadrangle, MOQAW – median ocular quadrangle anterior width, MOQL – median ocular quadrangle length, MOQPW – median ocular quadrangle posterior width, PE – posterior eyes, PER – posterior eye row, PLE – posterior lateral eyes, PME – posterior median eyes; legs: Fe – femur, Mt – metatarsus, Pat – patella, Ta – tarsus, Tib – tibia; male genitalia: ITA – intermediate tibial apophysis, RTA – retrolateral tibial apophysis, VTA – ventral tibial apophysis.

Coordinates in the distribution records are provided as extracted from the South African National Survey of Arachnida (SANSA) database.

TAXONOMY

Genus *Heriaeus* Simon, 1875

Heriaeus: Simon 1875: 203; Lessert 1919: 137; Lawrence 1942: 159; Levy 1973: 135; Loerbroks 1983: 95; Ono 1988: 170.

Type species: *Thomisus hirtus* Latreille, 1819, designated by ICZN (1988).

When describing *Heriaeus*, Simon (1875) included three species in the genus but did not designate a type species. Twenty years later, Simon (1895) designated *Thomisus hirsutus* Walckenaer, 1826 as the type species but it turned out to be a junior synonym of *T. hirtus* Latreille, 1819. Simon (1918) then designated a new type for *Heriaeus*, *H. oblongus* Simon, 1918. However, after Loerbroks (1983) had revised the genus, a recommendation was made by Kraus and Loerbroks to recognize *Thomisus hirtus* as the type species of *Heriaeus* (ICZN 1988).

Diagnosis: *Heriaeus* is characterized by the body and legs covered with erect setae and long hairs (Fig. 1); the eyes are borne on small tubercles, with LE tubercles larger than those of the ME; both eye rows are recurved; the abdomen is round to oval with indistinct

markings; the male palp with VTA short, digitiform; RTA elongated, with distal tooth (Fig. 14); ITA sometimes present (Fig. 36); the embolus is variable in length; female with epigynal area raised, dome-shaped area with hood (Fig. 16). No distinct sexual dimorphism between sexes, except males smaller in size with relatively longer legs.

Description:

Body size: Females 3.2–6.0 mm, males 2.5–3.8 mm.

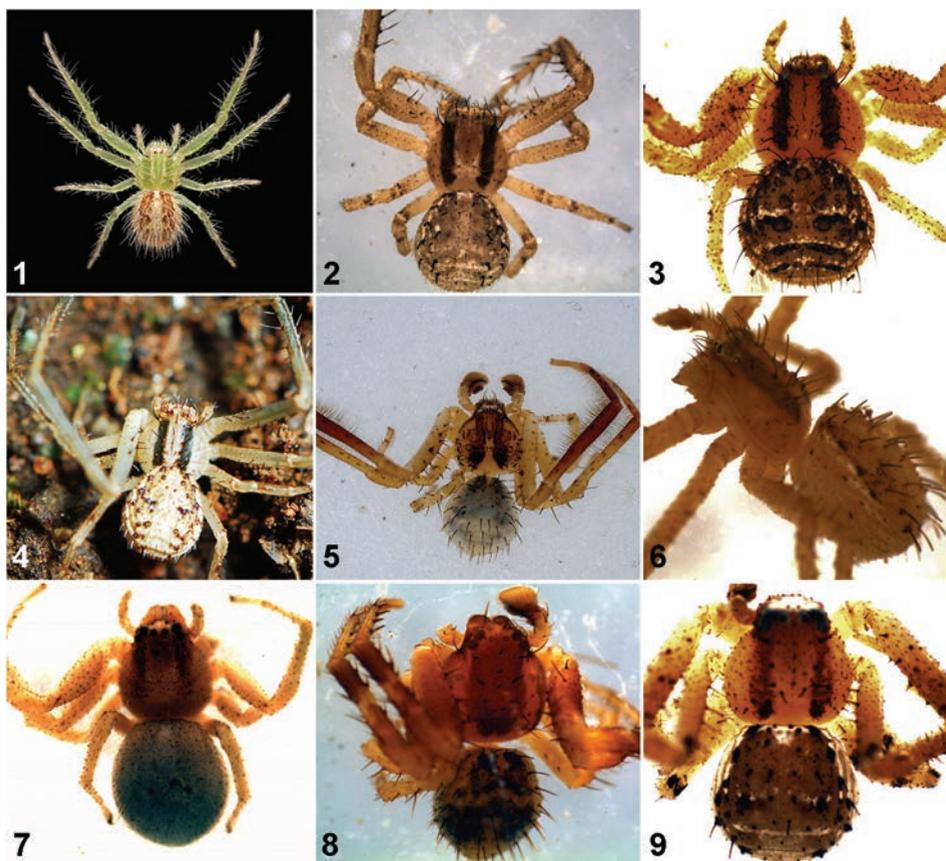
Colour: Live specimens creamish white to greyish white, in some species carapace and legs pale green and abdomen with pink tint; body colour fades in alcohol to cream or yellow-brown; body setae vary from white to almost translucent (Fig. 1) to dark (Fig. 6); species with white setae usually with darker setae scattered in-between, especially on abdomen; base of white setae frequently darker, giving body a spotted appearance (Fig. 10); carapace in all species with two broad brown longitudinal stripes stretching from eye region to posterior border (Fig. 2), except *H. madagascar* sp. n., with median broad stripe; these stripes vary from very distinct to faded; in species with less distinct brown stripes, two white irregular V-shaped markings usually present (Fig. 9); clypeus of some species with white markings or a white line; chelicerae frequently with dark bands anteriorly; eye region white or brown with eye tubercles greyish white; abdomen cream to yellow-brown, mottled with white, brown or blackish brown, some with a white pattern of longitudinal and cross lines; variably shaped brown markings on abdomen, leg segments, palpi and sternum.

Setae: Carapace covered in long, erect setae; eye region with strong, long setae; clypeal edge with six long erect setae, except *H. madagascar* sp. n. with only four. Abdomen strongly pilose, dorsum usually covered with dense long setae, in some species interspersed with a number of dark setae in a fixed pattern in posterior half (Fig. 9); shape of setae varies from club-shaped (Fig. 2) to long with blunt tips (Fig. 6) to short, medium or long and spiniform with acute tips (Fig. 1); abdomen laterally and ventrally with shorter setae and hairs.

Carapace: Longer than wide; anteriorly obtuse, narrower in eye region, posteriorly with slight declivity (Fig. 11); fovea indistinct; clypeus narrow; sternum shield-shaped, longer than wide, with brown or transparent hairs along edge; mouthparts with endites long with rounded tips, longer than wide; labium and endites with scattered short hairs or setae; cheliceral furrow edentate; dorsal surfaces of chelicerae with variable number of short, thick, erect setae. *Eyes:* Both rows recurved; PER less recurved than AER; eyes on small raised tubercles, LE tubercles twice as high as those of ME tubercles; PME closer together than to PLE; LE 1.5–2.0× the size of ME; AME usually smaller than PME; MOQ trapezoid, narrower anteriorly than posteriorly, or equal.

Abdomen: Round-oval; anteriorly obtuse; ventro-laterally with longitudinal striae (Fig. 6); venter smooth centrally, with short fine hairs; spinnerets short, conical, anterior and posterior spinnerets same length.

Legs: Formula I–II–IV–III; legs I and II of males twice as long or longer than hind legs (Fig. 5); legs long with numerous hairs, setae and strong spines; femora I dorsally bearing strong setae in both sexes; also on femora II of males; females with variable number (3–5 pairs) of strong paired spines on ventral surface of tibiae and metatarsi I and II; tibiae, metatarsi and tarsi I and II with a fringe of long fine hairs in *H. crassispinus* (Fig. 5); tarsi with two claws and reduced claw tufts.



Figs 1–9. *Heriaeus* spp., habitus: (1) *Heriaeus* sp. long spiniform abdominal setae; (2) *H. allenjonesi antoni* sp. n. female; (3) *H. antoni* sp. n. female; (4) *H. copricola* sp. n. male; (5) *H. crassispinus* Lawrence, 1942 male; (6) *H. foordi* sp. n. male; (7) *H. latifrons* Lessert, 1919 female; (8) *H. madagascar* sp. n. male; (9) *H. muizenberg* sp. n. female.

Female palp: Tibia and tarsus bearing short dark setae, more abundant and stronger on dorsal surfaces; tarsus slender.

Female genitalia: Epigyne simple; genital area may be slightly sclerotized, raised and dome-shaped, with hood and epigynal opening of various shapes; two small posterior sclerotized marks close to each other indicate position of internal fertilization ducts; copulatory duct and spermathecae long and tubular (Fig. 25) or S-shaped (Fig. 21).

Male palp: VTA short, two-lobed, or digitiform and curved; RTA longer, elongated, with protuberance(s) and with short or long distal tooth (Fig. 23); ITA present in *H. madagascar* sp. n. (Fig. 36); cymbium rounded, longer than wide; bulb circular, without apophysis; embolus short or long, winding once or less around tegulum; embolus tip darkly sclerotized, slender or broad, straight or with U-shaped curve, often resting in a shallow cavity against cymbium.

Distribution: Afrotropical, Oriental and Palearctic regions. In the Afrotropics it is newly recorded for Botswana, Burundi, the Democratic Republic of the Congo, Ethiopia,



Figs 10–13. *Heriaeus* spp., habitus: (10) *H. peterwebbi* sp. n. female; (11) *H. transvaalicus* Simon, 1895 female; (12) *H. xanderi* sp. n. female; (13) *H. zanii* sp. n. female.

Madagascar, Malawi, Mozambique, Namibia, Rwanda, Senegal, Swaziland, Tanzania, Yemen, Zaire and Zimbabwe.

Natural history: Little is known about general behaviour of the spiders. Specimens have been collected from shrubs, trees and grass, mainly from the Forest, Savanna, Grassland and Fynbos biomes using beating, sweeping, hand collection and fogging. They have also been sampled with pitfall traps from the soil surface. A few specimens were collected in agro-ecosystems such as cotton and strawberries.

Key to the Afrotropical species of *Heriaeus*

Females

- 1 Abdomen bearing short club-shaped or blunt setae (Fig. 2)2
- Abdomen bearing long slender spiniform setae with blunt or acute tips (Fig. 4)..5
- 2 Epigyne with internal organs clearly visible externally (Fig. 16).....3
- Internal organs only faintly visible externally (Fig. 20)4
- 3 Epigyne with internal organs clearly visible as very dark ear-shaped structures that enclose hood (Fig. 51)..... **xanderi** sp. n.
- Epigyne with internal organs visible as large bean-shaped structures (Fig. 16).....
..... **allenjonesi** sp. n.
- 4 Copulatory ducts two S-shaped coiled tubes (Fig. 21) **antoni** sp. n.
- Copulatory ducts two C-shaped tubes, with anterior ends slightly enlarged (Fig. 44)
..... **sossusvlei** sp. n.
- 5 Abdominal setae long and blunt (Fig. 4)..... **copricola** sp. n.
- Abdominal setae long with acute tips (Fig. 11)6

- 6 Epigynum with wide transverse hood (Fig. 47).....**transvaalicus** Simon
 – Epigynum with hood not as above7
- 7 Abdomen widest at posterior end; dorsum blackish brown; femora I–IV ventrally
 with blackish brown half-rings **crassispinus** Lawrence
 – Not as above.....8
- 8 Epigyne with narrow elongated (Fig. 41) or horseshoe-shaped hood (Fig. 55).....9
 – Epigyne with round or oval hood.....10
- 9 Epigyne with a narrow elongated hood (Fig. 41).....**peterwebbi** sp. n.
 – Epigyne with horseshoe-shaped hood, becoming wider posteriorly (Fig. 55).....
**zanii** sp. n.
- 10 Internal organs visible as two indistinct bean-shaped structures lying diagonally
 below hood (Fig. 32).....**foordi** sp. n.
 – Internal organs visible as pear-shaped structures (Fig. 34).....**latifrons** Lessert

Males

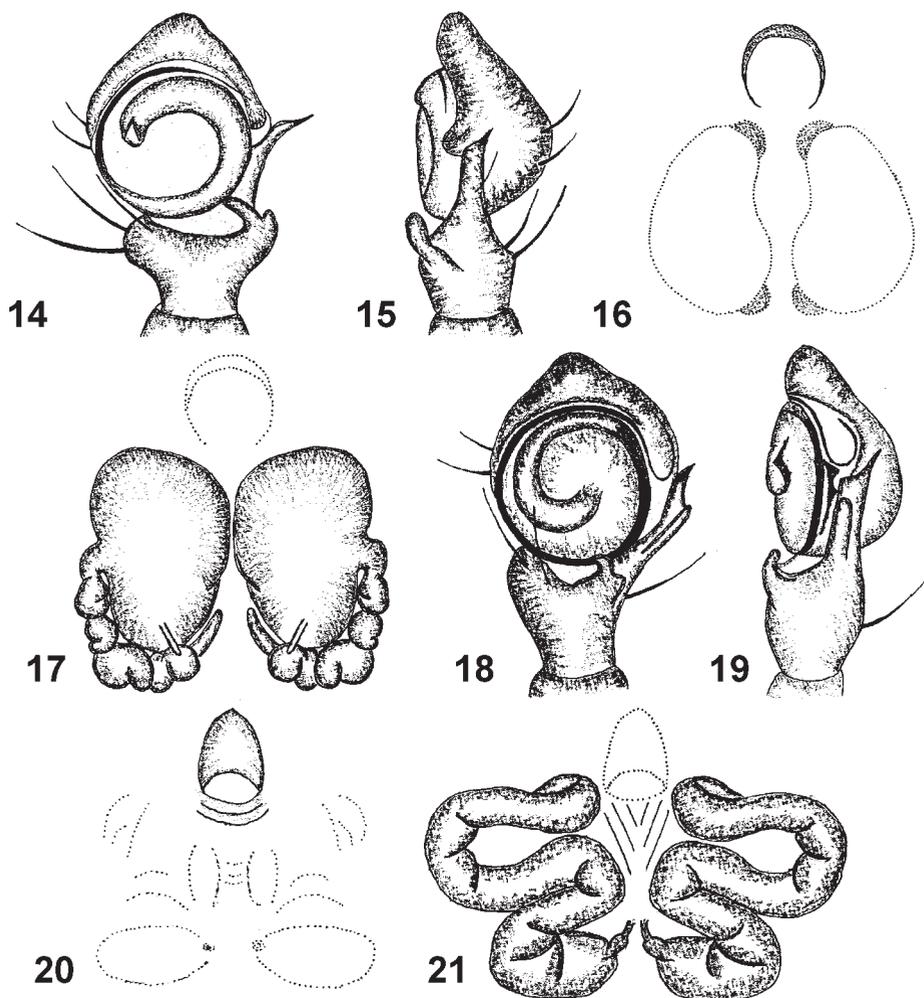
- 1 Tibiae and metatarsi of legs I and II with fringe of long black hairs (Fig. 5).....
**crassispinus** Lawrence
 – Tibiae and metatarsi of legs I and II without fringe of long black hairs.....2
- 2 Abdominal setae short, club-shaped or blunt (Fig. 2).....3
 – Abdominal setae long, spiniform (Fig. 8).....6
 – Abdominal setae long and blunt (Fig. 4).....**copricola** sp. n.
- 3 Palp with long embolus, winding once around tegulum, tip U-shaped (Fig. 49)
4
 – Palp with short embolus, winding less than once around tegulum, tip straight
 (Fig. 15).....5
- 4 VTA short and digitiform; RTA without ventral lobe; retrolateral cymbial apophysis
 present (Fig. 50)**xanderi** sp. n.
 – VTA small with two lobes; RTA with ventral lobe; retrolateral cymbial apophysis
 absent (Fig. 19) **antoni** sp. n.
- 5 RTA shorter than bulb (Fig. 14)**allenjonesi** sp. n.
 – RTA very long, longer than bulb, notched laterally (Fig. 38)**muizenberg** sp. n.
- 6 ITA prominent; embolus tip curving dorsally (Fig. 36) **madagascar** sp. n.
 – ITA absent; embolus not as above.....7
- 7 Embolus tip broad (Fig. 39)9
 – Embolus tip slender (Fig. 30).....8
- 8 RTA long with darkly sclerotized elongated hooked tip (Fig. 39)
**peterwebbi** sp. n.
 – RTA shorter, with darkly sclerotized comma-shaped hooked tip (Fig. 45).....
**transvaalicus** Simon
- 9 Palp with long embolus, winding once around tegulum; RTA with short curved
 distal tooth and basal lobe (Fig. 30).....**foordi** sp. n.
 – Palp with short embolus, winding less than once around tegulum; RTA with apical
 lobe (Fig. 54).....**zanii** sp. n.

***Heriaeus allenjonesi* sp. n.**

Figs 2, 14–17, 58

Etymology: Named for Allen Jones of Mpetsane Conservation Estate in the Free State, in recognition of his contribution of spider photos to the South African National Survey of Arachnida Virtual Museum.

Diagnosis: The species is recognized by the combination of numerous short, club-shaped or blunt abdominal setae (Fig. 2) and the shape of the large semi-circular epigynal hood, with the spermathecae visible as large bean-shaped structures (Fig. 16). The male palp has a slender embolus with a straight tip and a narrow RTA that ends in a tooth-like process (Figs 14, 15).



Figs 14–21. (14–17) *Heriaeus allenjonesi* sp. n.: (14) male palp, ventral view; (15) male palp, lateral view; (16) epigyne, ventral view; (17) epigyne, dorsal view; (18–21) *Heriaeus antoni* sp. n.: (18) male palp, ventral view; (19) male palp, lateral view; (20) epigyne, ventral view; (21) epigyne, dorsal view.

Description:*Female* (allotype).

Size: TL 4.58, CL 2.01, CW 1.89. *Colour:* Carapace mottled with white; bearing brown setae anteriorly, transparent setae posteriorly; two longitudinal brown bands extending from eyes to posterior edge; clypeus brown, faintly marked with white centrally; chelicerae brown, mottled with white; eye region white. Abdomen yellow-brown, mottled with white, with some reddish brown to dark brown spots at base of dark brown setae (Fig. 2); venter and sides white, with dark brown spots. Legs yellow-brown, all segments with white spots or bands except tarsus; some specimens with grey mottling on most leg segments, others with dark brown spot at base of tibiae III and IV. *Carapace:* *Eye measurements:* AME–AME 0.29, ALE–AME 0.15, PME–PME 0.25, PLE–PME 0.29, AME–PME 0.26, MOQL AME–PME 0.32, MOQAW AME–AME 0.35, MOQPW PME–PME 0.32. *Leg measurements:* leg I Fe 1.49, Pat 0.87, Tib 1.41, Mt 1.23, Ta 0.66, total 5.66; leg II Fe 1.41, Pat 0.72, Tib 1.11, Mt 0.92, Ta 0.67, total 4.83; leg III Fe 0.79, Pat 0.56, Tib 0.51, Mt 0.64, Ta 0.47, total 2.97; leg IV Fe 1.11, Pat 0.56, Tib 0.64, Mt 0.71, Ta 0.52, total 3.54. *Abdomen:* Oval, truncated anteriorly; abdominal dorsum bearing short, transparent club-shaped setae interspersed with 12–14 long dark brown blunt setae arranged in two lateral groups; other abdominal setae transparent. *Epigyne:* Large semi-circular hood; spermathecae visible as large bean-shaped structures (Fig. 16); copulatory ducts very large and bulbous, with tubular coils posteriorly (Fig. 17).

Male (holotype).

Size: TL 3.27, CL 1.52, CW 1.53. *Colour:* Carapace with two longitudinal brown bands (Fig. 5); setae light brown; chelicerae sometimes with white spots; sternum yellow-brown, sometimes with white marks; endites and labium yellow-brown; clypeus brown, sometimes white at anterior edge, markings may extend up to AME; eye region white; eye tubercles greyish white. Abdomen yellow-brown or with white mottling; setae light to dark brown, interspersed with transparent setae; bases of some setae reddish brown; venter yellow-brown, laterally with few brown spots. Legs with numerous white markings; setae brown. Palp with white marks on some segments. *Carapace:* *Eye measurements:* AME–AME 0.20, ALE–AME 0.10, PME–PME 0.17, PLE–PME 0.24, AME–PME 0.22, MOQL AME–PME 0.26, MOQAW AME–AME 0.26, MOQPW PME–PME 0.23. *Leg measurements:* leg I Fe 2.32, Pat 0.85, Tib 1.74, Mt 1.77, Ta 0.87, total 7.55; leg II Fe 1.76, Pat 0.65, Tib 1.29, Mt 1.30, Ta 0.72, total 5.72; leg III Fe 0.91, Pat 0.35, Tib 0.63, Mt 0.55, Ta 0.41, total 2.85; leg IV Fe 1.23, Pat 0.49, Tib 0.82, Mt 0.82, Ta 0.53, total 3.89. *Abdomen:* Oval, truncated anteriorly; abdominal dorsum bearing short, transparent and club-shaped setae interspersed with 12–16 dark brown club-shaped setae. *Palp:* Embolus short, winding less than once around tegulum; tip straight (Fig. 14); VTA short; RTA narrow with short curved distal tooth (Fig. 15).

Juveniles. Recognized by the presence of club-shaped abdominal setae.

Holotype: ♂ SOUTH AFRICA: *Free State:* Deelhoek Farm, 38 km NW of Bloemfontein (29.11°S 26.22°E), 10.ii.2000, C. Haddad, sweepnetting grass layer (NCA 2002/641a).

Allotype: 1 ♀ same data as holotype (NCA 2002/641b).

Paratypes: SOUTH AFRICA: *Free State:* 1 ♂ Bloemfontein, Naval Hill (29.06°S 26.14°E), i.1991, L.N. Lotz, pitfall traps (NMBA 7089); 1 ♀ 1 ♂ Brandfort, Florisbad (28.46°S 26.05°E), 1988, L.N. Lotz, pitfall

traps (NMBA 5226, 4058); 1♂ same locality, 1.i.1983, Museum Staff (NMBA 0323); 1♂ Erfenis Dam Nat. Res., Theunissen District (Site 5) (28.30°S 26.48°E), 28.x–4.xii.2009, R. Fourie & A. Grobler, pitfall traps, overgrazed grassland (NCA 2012/2051); 1♂ same locality (Site 4), 28.x–4.xii.2009, R. Fourie & A. Grobler, pitfall traps, gravel plain (NCA 2012/2052); 1♂ same locality (Site 7), rocky hillside, 28.x–4.xii.2009, R. Fourie & A. Grobler, pitfall traps (NCA 2012/2054); 1♂ same locality, xii.2005–i.2006, C. Haddad, S. Otto & R. Poller, pitfall traps (NMBA 13325). *Northern Cape*: 1♀ Benfontein Nat. Res. (27.42°S 23.30°E), 1.v.1981, S. Erasmus, pitfall traps (NCA 88/331). *Western Cape*: 1♂ Prince Albert, Farm Tierberg (33.13°S 22.01°E), 14.iv.1988, R. Dean, pitfall traps (NCA 91/1266).

Other material examined: SOUTH AFRICA: *Free State*: 1 imm. ♀ Erfenis Dam Nat. Res., Theunissen District (Site 5) (28.30°S 26.48°E), 28.x–4.xii.2009, R. Fourie & A. Grobler, pitfall traps, shore of dam (NCA 2012/2053); 1 imm. ♂ same locality, 8.x–4.xii.2009, R. Fourie & A. Grobler, pitfall traps, overgrazed grassland (NCA 2012/2055); 1 imm. ♀ Deelhoek Farm 38 km NW of Bloemfontein (29.11°S 26.22°E), 10.ii.2000, C. Haddad, sweepnetting grass layer (NCA 2002/608); 1 imm. ♀ Bultfontein (28.54°S 25.57°E), 12.x.1990, R. Adam, by hand (NMBA 5669); 1 imm. ♂ Brandfort, Florisbad (28.46°S 26.05°E), x.1982, Museum Staff, pitfall traps (NMBA 0235).

Distribution: South Africa (Free State, Northern Cape and Western Cape provinces) (Fig. 58).

Natural history: Most of the specimens were sampled with pitfall traps from the soil surface from a variety of habitats ranging from rocky hillsides, gravel plains to the shore of a dam. The holotype male and allotype female were sampled by sweeping grassland. The adult females were collected from January to August and again in November to December. Males were sampled from October to April, while juveniles were found from February to May.

***Heriaeus antoni* sp. n.**

Figs 3, 18–21, 57

Etymology: Named for Antonius van Harten, the collector of the paratype material, for his contribution in documenting the arachnid fauna of Yemen.

Diagnosis: The species is recognized by the numerous very short, blunt abdominal setae and the epigyne, which is very small with a small knob-like hood (Fig. 20). The male palp is distinct with its embolus having a U-shaped tip and a ventral lobe on the RTA (Figs 18, 19). The embolus tip of the male palp resembles that of *H. xanderi* sp. n. (Fig. 50), but the much longer RTA of this species has a ventral lobe, which *H. xanderi* sp. n. lacks.

Description:

Female (allotype).

Size: TL 4.80, CL 1.47, CW 1.52. *Colour*: Carapace with two broad longitudinal brown stripes; lateral edge with white line; setae brown; chelicerae yellow-brown; clypeus with white line on anterior edge; eye region white or with white markings between median eyes. Abdomen cream, slightly mottled with brown and white; specimen from Senegal differs in having six round marks arranged in two longitudinal lines centrally (Fig. 3) venter white, may be mottled with white or have a few brown spots laterally. Legs cream, dorsally with brown marks on femora II and III, tarsus I and metatarsi I–IV; slight variations in Senegal specimens, markings absent in Yemen specimens. *Carapace*: *Eye measurements*: AME–AME 0.17, ALE–AME 0.11, PME–PME 0.18, PLE–PME 0.20, AME–PME 0.16, MOQL AME–PME 0.23, MOQAW AME–AME 0.18, MOQPW PME–PME 0.23. *Leg measurements*: leg I Fe 1.42, Pat 0.76, Tib 1.17, Mt 1.07, Ta 0.52,

total 4.94; leg II Fe 1.39, Pat 0.48, Tib 1.02, Mt 0.70, Ta 0.57, total 4.16; leg III Fe 0.84, Pat 0.42, Tib 0.60, Mt 0.52, Ta 0.43, total 2.81; leg IV Fe 1.18, Pat 0.32, Tib 0.60, Mt 0.57, Ta 0.41, total 3.08. *Abdomen*: Round, bearing numerous very short blunt setae; venter clothed with fine hairs. *Epigyne*: Very small with an unsclerotized small knob-like hood; two dark brown spots posteriorly indicating position of spermathecae (Fig. 20); copulatory ducts two S-shaped coiled tubes (Fig. 21).

Male (holotype).

Size: TL 2.60, CL 1.23, CW 1.31. *Colour*: Carapace with two very broad longitudinal brown stripes extending from PEs and towards carapace sides, becoming dark brown at posterior end; setae brown; chelicerae yellow-brown; clypeus yellow-brown with brown marks; eye region yellow-brown; eye tubercles grey. Abdomen yellow-brown, lateral thirds dark brown to yellow-brown with brown and white markings; venter white; setae brown. Legs cream with brown marks on distal part of tibia and metatarsus I. *Carapace*: *Eye measurements*: AME–AME 0.12, ALE–AME 0.8, PME–PME 0.15, PLE–PME 0.19, AME–PME 0.13, MOQLAME–PME 0.20, MOQAW AME–AME 0.18, MOQPW PME–PME 0.23. *Leg measurements*: leg I Fe 1.54, Pat 0.71, Tib 1.45, Mt 1.33, Ta 0.71, total 5.74; leg II Fe 1.52, Pat 0.54, Tib 1.10, Mt 1.15, Ta 0.68, total 4.99; leg III Fe 0.91, Pat 0.35, Tib 0.62, Mt 0.59, Ta 0.38, total 2.85; leg IV Fe 1.05, Pat 0.31, Tib 0.72, Mt 0.66, Ta 0.40, total 3.14. *Abdomen*: Oval, truncated anteriorly; bearing numerous very short, blunt setae; venter with fine hairs. *Male palp*: Embolus long, winding once around tegulum (Fig. 18); embolus tip slender with U-shaped curve; VTA small and two-lobed, RTA with ventral lobe and long distal tooth (Fig. 19).

Holotype: ♂ SENEGAL: 5–10 km S of Richard Toll (16.33°N 15.50°E), viii.1989, J. Everts, semi-arid thorn bush (MRAC 172.021a).

Allotype: 1 ♀ same data as holotype (MRAC 172.021b).

Paratypes: SENEGAL: 3 ♂ 6 ♀ 14 imm. same data as holotype (MRAC 172.021); 12 ♂ 12 ♀ 1 imm. same data but ix.1989 (MRAC 171.999, 172.005); 1 ♂ same data but viii–xi.1989 (MRAC 174.239); 1 ♀ 20 km S of Richard Toll (16.33°N 15.50°E), 18.ix.1991, H. van der Valk, pitfall traps (MRAC 200.583). YEMEN: 1 ♀ near Sana'a (15.35°N 44.20°E), 15.v.1998, A. van Harten (NCA 2012/2056); 1 ♀ same locality, vii.1998, A. van Harten (NCA 2012/2058); 2 ♀ Abs (16.00°N 43.20°E), 20.iv.1998, A. van Harten, in garden (NCA 2012/2057); 1 ♀ Wadi Warazan (13.40°N 44.23°E), 17.xii.1999, A. van Harten (NCA 2012/2059).

Distribution: Senegal and Yemen (Fig. 57).

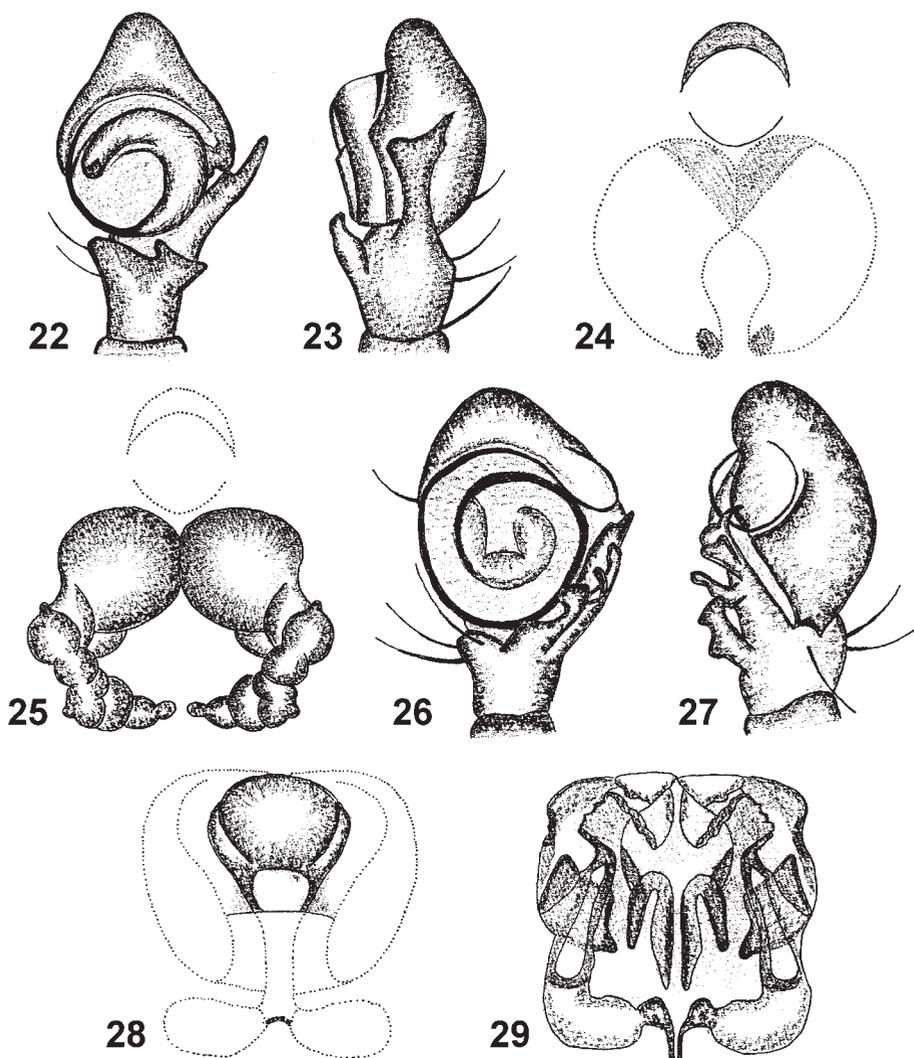
Natural history: Females collected during April, May, June and December and adult males from August to November.

***Heriaeus copricola* sp. n.**

Figs 4, 22–25, 59

Etymology: From Latin *copros* (dung) and *colere* (to dwell in). The species name was suggested by Dr R.F. Lawrence (*in litt.*), who marked the type specimens as being a new species but did not publish its description.

Diagnosis: The species is recognized by the combination of long, slender, blunt abdominal setae and the epigyne having a shallow hood over a small round opening (Fig. 24), with the internal organs visible as two light brown kidney-shaped structures below the hood (Fig. 24). The embolus of the male palp is short, winding less than once around tegulum, with the tip slender and straight; VTA broad (Fig. 23); RTA with short distal



Figs 22–29. (22–25) *Heriaeus copricola* sp. n.: (22) male palp, ventral view; (23) male palp, lateral view; (24) epigyne, ventral view; (25) epigyne, dorsal view; (26–29) *Heriaeus crassispinus* Lawrence, 1942: (26) male palp, ventral view; (27) male palp, lateral view; (28) epigyne, ventral view; (29) epigyne, dorsal view.

tooth when viewed laterally (Fig. 22). The male palp resembles that of *H. zanii* sp. n. (Fig. 53) but differs in the shape of the RTA, having a single tooth and the uniquely shaped abdominal setae (Fig. 4).

Description:

Female (allotype).

Size: TL 4.88, CL 2.31, CW 2.04. *Colour*: Carapace with two longitudinal brown bands extending to PEs; setae brown; clypeus with brown marks; sternum white along edge;

chelicerae yellow-brown; eye region white. Abdomen beige, mottled with white, with faint transverse lines posteriorly as well as a number of dark brown markings; venter white with fine hairs, with some brown spots laterally. Legs beige with brown spot on proximal end of tibiae and distal ends of metatarsi III and IV; some white mottling on coxae. *Carapace: Eye measurements:* AME–AME 0.14, ALE–AME 0.30, PME–PME 0.22, PLE–PME 0.31, AME–PME 0.24, MOQL AME–PME 0.31, MOQAW AME–AME 0.36, MOQPW PME–PME 0.28. *Leg measurements:* leg I Fe 1.89, Pat 1.04, Tib 1.76, Mt 1.80, Ta 0.51, total 7.0; leg II Fe 1.50, Pat 0.82, Tib 1.23, Mt 1.23, Ta 0.36, total 5.14; leg III Fe 0.92, Pat 0.59, Tib 0.74, Mt 0.74, Ta 0.55, total 3.54; leg IV Fe 1.37, Pat 0.41, Tib 0.94, Mt 0.76, Ta 0.48, total 3.96. *Abdomen:* Oval, truncated anteriorly, with long slender either transparent or pale brown setae with blunt tips; darker brown setae along lateral edge of dorsum. *Epigyne:* Hood shallow with small round opening, internal organs visible as two pale brown kidney-shaped structures, touching anteriorly and narrower posteriorly (Fig. 24); copulatory ducts large and bulbous anteriorly, tubular posteriorly (Fig. 25).

Male (holotype).

Size: TL 3.88, CL 1.89, CW 1.70. *Colour:* Carapace with two longitudinal brown bands extending to PEs and into eye region; setae brown (Fig. 4); chelicerae yellow-brown; clypeus with brown marks; eye region white. Abdomen brown, mottled with white; laterally with some brown marks; setae on abdomen dark brown with dark spots at their bases laterally; venter white, covered with fine hairs. Legs yellow-brown, with white spot on each coxa. *Carapace: Eye measurements:* AME–AME 0.23, ALE–AME 0.53, PME–PME 0.23, PLE–PME 0.30, AME–PME 0.21, MOQL AME–PME 0.29, MOQAW AME–AME 0.28, MOQPW PME–PME 0.29. *Leg measurements:* leg I Fe 2.69, Pat 0.76, Tib 2.23, Mt 2.17, Ta 1.06, total 8.91; leg II Fe 2.26, Pat 0.64, Tib 1.76, Mt 1.56, Ta 0.99, total 7.21; leg III Fe 1.31, Pat 0.44, Tib 1.02, Mt 0.71, Ta 0.58, total 4.06; leg IV Fe 1.62, Pat 0.37, Tib 0.97, Mt 0.87, Ta 0.54, total 4.37. *Abdomen:* Oval, truncated anteriorly, but narrower than that of female. *Male palp:* Embolus short, winding less than once around tegulum; embolus tip slender and straight (Fig. 22); VTA short, somewhat flattened but variable in shape; RTA broad anteriorly, ending in short distal tooth viewed laterally (Fig. 23).

Juveniles. Recognized by long and blunt setae.

Holotype: ♂ SOUTH AFRICA: *KwaZulu-Natal:* Pietermaritzburg (29.60°S 30.38°E), xi.1942, R.F. Lawrence (NMSA 3844a).

Allotype: 1 ♀ same data as holotype (NMSA 3844b).

Paratypes: SOUTH AFRICA: *Gauteng:* 1 ♂ Krugersdorp (26.09°S 27.78°E), 2.xii.2003, H. Roux, pitfall trap (NCA 2009/1552); 1 ♀ 1 ♂ Krugersdorp, Magaliesberg, Farm Nooitgedacht, 4171Q (25.88°S 27.52°E), 2.xii.2003, H. Roux, pitfall trap, grassland (NCA 2010/2877). *KwaZulu-Natal:* 3 ♀ Pietermaritzburg, Scottsville (29.60°S 30.40°E), x.1943, R.F. Lawrence (NMSA 3906). *Limpopo:* 1 ♀ 1 ♂ Polokwane Nat. Res. (23.9°S 29.47°E), 8.xii.2005, T. Khoza & M. Madiba, hand sampling, false grassland (NCA 2008/1792).

Distribution: South Africa (Gauteng, KwaZulu-Natal and Limpopo) (Fig. 59).

Natural history: Most specimens were collected with pitfall traps in grassland and savanna. Adult females were collected in October and December, and males during November and December.

Heriaeus crassispinus Lawrence, 1942

Figs 5, 26–29, 57

Heriaeus crassispinus: Lawrence 1942: 159, fig. 13a, b (♀); Loerbroks 1983: 131, figs 93, 94 (♀).*Heriaeus fimbriatus* Lawrence, 1942: 160, fig. 14a–c (♂); Loerbroks 1983: 132, figs 90–92 (♂). **Syn. n.**

Both *H. crassispinus* and *H. fimbriatus* were described by Lawrence (1942) in the same publication based on a female and male specimen. During this study large series of specimens became available and the data showed that they are different sexes of the same species. *Heriaeus fimbriatus* is here recognized as a junior synonym of *H. crassispinus*.

Diagnosis: The species is recognized by the blackish brown abdomen, mottled with yellow-brown, and bearing short, dark brown spiniform setae; legs ventrally with blackish brown bands around femora III–IV; males very distinct, with a fringe of long, black hairs on tibiae, metatarsi and tarsi of legs I–II (Fig. 5). The epigyne has a dome-shaped hood, over a small round opening (Fig. 28), while the male palp has an embolus with a slender tip that coils back in a U-shape and RTA (Fig. 26) with two narrow digitiform apophyses and distal tooth (Fig. 27). The males have several unique features and differ from all other species by the shape of the VTA and RTA. In the female, the vulva is also more complex than in other species.

Redescription:*Female* (NCA 2007/54).

Size: TL 4.45, CL 1.81, CW 1.66. **Colour:** Carapace with two dark irregular bands, extending into eye region; lateral margins mottled with blackish brown; sternum, labium and endites yellow-brown, or with slight black markings in darker individuals; chelicerae and clypeus mottled with dark brown; eye tubercles white. Abdomen dorsum blackish brown, slightly mottled with yellow-brown, sometimes with some white spots, some specimens paler; dark transverse bands present across broadest part of abdomen; venter yellow-brown with white spots; laterally with dark lines and spots on striae; setae dark brown with few short, transparent setae scattered in between. Legs with variable markings; femora I–IV ventrally usually with dark half-circles; circle on femora II often reduced to a single mark or absent; white marks on all segments except metatarsi and tarsi. **Carapace:** *Eye measurements:* AME–AME 0.16, ALE–AME 0.07, PME–PME 0.10, PLE–PME 0.21, AME–PME 0.20, MOQL AME–PME 0.26, MOQAW AME–AME 0.20, MOQPW PME–PME 0.16. **Leg measurements:** leg I Fe 1.44, Pat 0.81, Tib 1.36, Mt 0.96, Ta 0.47, total 5.04; leg II Fe 1.45, Pat 0.73, Tib 1.20, Mt 0.94, Ta 0.52, total 4.84; leg III Fe 0.83, Pat 0.48, Tib 0.62, Mt 0.49, Ta 0.52, total 2.91; leg IV Fe 1.10, Pat 0.55, Tib 0.72, Mt 0.54, Ta 0.43, total 3.34. **Abdomen:** Posterior end broader; bearing spiniform setae with acute tips. **Epigyne:** Hood dome-shaped with small round opening, flattened posteriorly, internal organs visible externally (Fig. 28). Copulatory ducts a complex set of folded membranes and tubes (Fig. 29).

Male (NCA 2009/3119).

Size: TL 3.34, CL 1.42, CW 1.37. **Colour:** Carapace with two dark irregular bands, extending into eye region; darkly mottled laterally; setae dark brown; chelicerae and clypeus darkly mottled; central eye region white; eye tubercles white, forming distinct white line across eye region and lateral eyes. Abdomen dark dorsally, only slightly

mottled with yellow-brown and some white spots, some specimens paler in colour with dark transverse band across broadest part of abdomen; venter yellow-brown with white spots, with dark marks laterally; abdominal setae dark brown. Legs with tibiae, metatarsi and tarsi I–II dark brown, dark half-circles around femora I–IV; tarsus of palp dark dorsally or much darker than rest of palp. *Carapace: Eye measurements:* AME–AME 0.11, ALE–AME 0.07, PME–PME 0.11, PLE–PME 0.17, AME–PME 0.21, MOQLAME–PME 0.22, MOQAW AME–AME 0.16, MOQPW PME–PME 0.15. *Leg measurements:* leg I Fe 1.69, Pat 0.79, Tib 2.20, Mt 1.75, Ta 0.57, total 6.99; leg II Fe 1.53, Pat 0.64, Tib 2.01, Mt 1.43, Ta 0.48, total 6.09; leg III Fe 0.94, Pat 0.39, Tib 0.92, Mt 0.38, Ta 0.37, total 3.00; leg IV Fe 0.99, Pat 0.47, Tib 0.97, Mt 0.57, Ta 0.43, total 3.43. *Abdomen:* Setae spiniform with acute tips. *Legs:* Fringe of long, black hairs on tibiae, metatarsi and tarsi of leg I–II (Fig. 5). *Male palp:* Embolus long, winding once around tegulum; tip slender and U-shaped (Fig. 26); VTA long and with anterior hooked end; RTA with two narrow digitiform apophyses and long distal tooth when seen laterally (Fig. 27).

Juveniles. Colour similar to that of adult female, especially leg bands, shape of abdomen, and colour and shape of abdominal setae. Fringe of long black hairs absent from legs I–II.

Type material examined: Lectotype of *H. crassispinus* (designated here): ♂ SOUTH AFRICA: *KwaZulu-Natal:* Umhhlali, Sheffield Beach (29.46°S 31.26°E), x.1940, R.F. Lawrence (NMSA 3319).

Paralectotypes: 2♂ same data as lectotype.

Holotype of *H. fimbriatus*: ♀ SOUTH AFRICA: *KwaZulu-Natal:* Ingwavuma (27.12°S 32.01°E), 1942, R.F. Lawrence (NMSA 242).

Other material examined: BURUNDI: 1♂ Plaine du la ruzizi, sectaur de Gihanga (3.18°S 29.28°E), 790 m, v.1966, S. Ndani (MRAC 130.611); 1 imm. ♂ 1 imm. ♀ Bubanza Prov., crete Congo-Nil (3.0°S 29.40°E), alt. 2000 m, S. Ndani (MRAC 132.775); 1 imm. Ruyigi, marais Nyamasheshi (3.47°S 30.23°E), J. Ruabunesa (MRAC 129.824). DEMOCRATIC REPUBLIC OF THE CONGO: 1 ♀ Kivu, Parc National Albert [= Virunga National Park], sect. Ruwenzori, Kamosonge (0.38°N 29.90°E), 1900 m, 3.xi.1953, P. Vanschuytbroek & V. Hendrickx (MRAC 211.179); 1 imm. ♂ Kivu, terr. Kabare (2.48°S 28.47°E), 1600 m, iii.1951, N. Leleup (MRAC 92.559); 1 imm. ♀ Kivu, terr. de Mwenga, poste Kitutu, Bilumanzi (3.28°S 28.08°E), 5.iv.1958, N. Leleup, plants, herbs (MRAC 111.338); 1♂ Kivu, terr. de Mwenga, poste Kitutu, Bac de l'Elila (3.28°S 28.08°E), iv.1958, N. Leleup, from humus (MRAC 111.345); 1♀ D'Uvira, Ruiss. Kalyambutu (3.42°S 29.13°E), vi.1985, N. Leleup (MRAC 112.646); 4♀ 2♂ Katanga, Luiswishi, 28 km NE Lubumbashi (11.52°S 27.45°E), 1208 m, 1974, F. Malaisse, savannah (MRAC 145.523); 4 imm. Shaba, Luiswishi (11.52°S 27.45°E), i–ii.1974, F. Malaisse, forest (MRAC 148.948); 3♂ 4♀ 7 imm. same data but ii–iii.1974 (MRAC 149.167). ETHIOPIA: *Gojam Prov.:* 2♀ 1♂ Tsiss-Isat falls (11.53°S 37.50°E), 19.x.1973, G. De Rougemont (MRAC 158.902). MALAWI: 1♂ Chisasira forest, 25 km S Chinthchehe (11.83°S 33.22°E), 27.ix–14.x.1977, R. Jocqué, *Brachystegia* woodland (MRAC 153 030); 1♀ same locality, 6.v.1978, R. Jocqué (MRAC 153.193). RWANDA: 1 imm. ♂ Bugesera, Biharagu (2.10°S 30.00°E), 27.ii.1960, N. Leleup, on large termite mound in savannah, among dead leaves (MRAC 172.029). SOUTH AFRICA: *Eastern Cape:* 1♂ Keurkloof, Farm Ferndale (33.76°S 24.81°E), 24.iii.2008, A. Honiball, beating trees in forest (NCA 2009/3119); 1♂ Baviaanskloof Nat. Res. (33.75°S 24.80°E), 24.iii.2008, A. Honiball, pitfall traps, riverine forest (NCA 2009/3231); 2♀ East London, Pineapple Research Station (33.01°S 27.90°E), 1.v.1979, G. Petty, pitfall traps (NCA 81/286). *KwaZulu-Natal:* 1♂ Ndumo Game Reserve (26.87°S 32.24°E), 12.i.2007, C. Haddad, broadleaf woodland (NCA 2007/3069); 1 imm. ♂ same locality, 6.ii.2005, C. Haddad, broadleaf woodland (NCA 2005/27); 1♀ Tembe Elephant Park (27.03°S 32.42°E), 15.iii.2003, A. Honiball, pitfall traps, woodland (NCA 2003/1014); 1♀ Mkuzi Game Reserve (27.63°S 32.25°E), 4.ii.2003, S. Lovell, palm tree (NCA 2003/1493); 1 imm. ♀ same locality, 4.ii.2003, S. Lovell, *Acacia nigrescens* (NCA 2003/1491); 1 imm. same locality, 31.i.2003, S. Lovell, *A. nigrescens* (NCA 2003/1492); 1♂ Phinda Game Reserve (27.72°S 32.38°E), 15.iv.2001, M. Ramirez, beating plants (NCA 2002/222); 2 imm. ♀ same locality, 7.xi.2002, S. Lovell, palm tree (NCA 2003/1530); 1♀ Ngotsche District, Toggekry, Vetspruit Farm (27.77°S 31.06°E), 12.iv.1968, T.W. Schofield (NMSA 12404); 1♂ Lake Sibayi, between lake edge & road, vi.1967, R.F. Lawrence & R. Lamoral, sieved from humus under mostly *Acacia* trees at campsite (AMGS); 1♀ Hell's Gate

(28.00°S 32.48°E), 6.ix.2004, J. Esterhuizen, blue traps (NCA 2012/1881); 1♀ 1 imm. 15 km N Richards Bay (28.78°S 32.10°E), 1.xii.1995, T. Wassenaar, pitfall traps (NCA 96/591); 1♀ 1♂ same data but 10.xii.1995, sweep net (NCA 99/337); 2 imm. ♀ same data but beating (NCA 99/82); 2♀ 1♂ same data but 3.vii.1996, pitfall traps (NCA 97/84); 3♀ same data but 2.viii.1996 (NCA 97/83, 97/85); 1♂ same data but 28.viii.1996 (NCA 97/109); 9♀ 3♂ same data but 29.viii.1996 (NCA 97/108); 1♀ same data but 30.viii.1996, pitfall traps, coastal dune forest (NCA 97/107); 1♀ same data but 11.xii.1996 (NCA 97/884); 4♂ same data but 5.vi.1997 (NCA 97/931, 97/932); 1♀ Pietermaritzburg (29.60°S 30.38°E), vi.1951, A.Y. Lawrence & R.F. Lawrence (NMSA 5477); 1 imm. same locality, x.1937, R.F. Lawrence & W.G. Rump (NMSA 2118). *Limpopo*: 1♀ Tsulu (22.70°S 30.79°E), 21.ii.2008, V. Gelebe, pitfall traps, riparian vegetation (NCA 2012/2049); 1 imm. ♂ same data but 26.ii.2008 (NCA 2012/2050); 1♀ 5♂ 2 imm. Mokopane, Sovenga Hill, University of Limpopo (24.17°S 29.00°E), 14.v.2001, M. Modiba, pitfall traps (NCA 2005/1071); 2♂ Lajuma Mountain Retreat, Soutpansberg (23.03°S 29.45°E), 11.v.2004, M. Mafadza, pitfall traps (NCA 2005/2379); 3♂ same locality, 6.ii.2008, S. Foord, grassveld, by hand (NCA 2008/521); 1♂ same locality, 1.vi.1997, M. van der Merwe, pitfall traps (NCA 98/20). *Mpumalanga*: 1♀ Nelspruit, 10 km NE Hall & Sons (25.47°S 30.96°E), 8.i.1998, M. van den Berg, fogging, avocado orchard (NCA 98/767); 2♀ Nelspruit (25.47°S 30.99°E), i.1939, R.F. Lawrence (NMSA 2586); 1 imm. ♀ Nelspruit, Lowveld National Botanical Gardens (25.47°S 31.00°E), 25.i.2004, A. Leroy (NCA 2008/2673); 1♀ Nylsvley Nat. Res. (24.31°S 28.43°E), 8.xi.1979, G. Ferreira, pitfall traps (NCA 79/242); 2 imm. Lydenburg (25.09°S 30.46°E), 21.iii.1962, N. Leleup (MRAC 132.570); 4 imm. same locality, 21.iii.1962, N. Leleup, from humus (MRAC 132.573); 2 imm. Carolina, 52 miles on road to Barberton (26.06°S 30.11°E), x.1961, N. Leleup (MRAC 132.604); 1♀ Bergvliet Forest Station, Sabie to Nelspruit Rd (25.10°S 30.78°E), 14.iv.1979, M. Stiller, plants (NCA 84/658); 1♀ 1♂ Kruger National Park, Skukuza Camp (22.93°S 31.02°E), 1.iv.2006, K. Harris, sifting leaf litter (NCA 2007/4228, 2007/4229); 1♀ Kruger National Park, Makhuthwanini (25.38°S 31.60°E), 16.vi.2007, G. Ellis, pitfall traps (NCA 2008/54); 1♂ same data but Lwakahle (25.43°S 31.75°E), 30.vi.2007 (NCA 2008/70). *North West*: 1♂ Buffelspoort Research Station (25.62°S 27.77°E), 22.i.1981, D. Uys, plants (NCA 89/642); 1♀ Rustenburg Nat. Res. (25.72°S 27.18°E), 11.xii.1979, A.S. Dippenaar, sweepnetting herb layer (NCA 84/249); 1 imm. ♀ Zeerust (25.53°S 26.08°E), 2.v.2010, S. Foord, gallery forest, sifting leaf litter (NCA 2013/1882). *SWAZILAND*: 1 imm. ♀ Hlatikulu (26.96°S 31.31°E), i.1939, R.F. Lawrence (NMSA 2570). *ZIMBABWE*: 1♀ Harare (17.86°S 31.02°E), 15.i.1999, soil surface, M. Cumming (NCA 2004/1402); 1♀ same data but 15.v.1999 (NCA 2004/1401); 1♂ same data but 14.i.2003, under rocks (NCA 2004/738); 2♂ same data but iii.2004 (NCA 2004/1410); 2♀ 1♂ same data but, 15.iii.2004, soil surface (NCA 2004/1400, 2004/1417); 1 imm. Umtali [= Mutare, 18.96°S 32.66°E], 5.i.1966, P. Stead, on plants (NCA 84/656).

Distribution: Eastern and southern Afrotropical (South Africa, and new records from Burundi, Ethiopia, D.R. Congo, Malawi, Rwanda, Swaziland, Zimbabwe; Fig. 57).

Natural history: This species was sampled from a variety of habitats ranging from coastal dunes, orchards (avocados), forests (*Brachystegia* woodland), palm tree forest, grassland, riverine sweet thorn and *Acacia nigrescens* woodland.

***Heriaeus foordi* sp. n.**

Figs 6, 30–33, 58

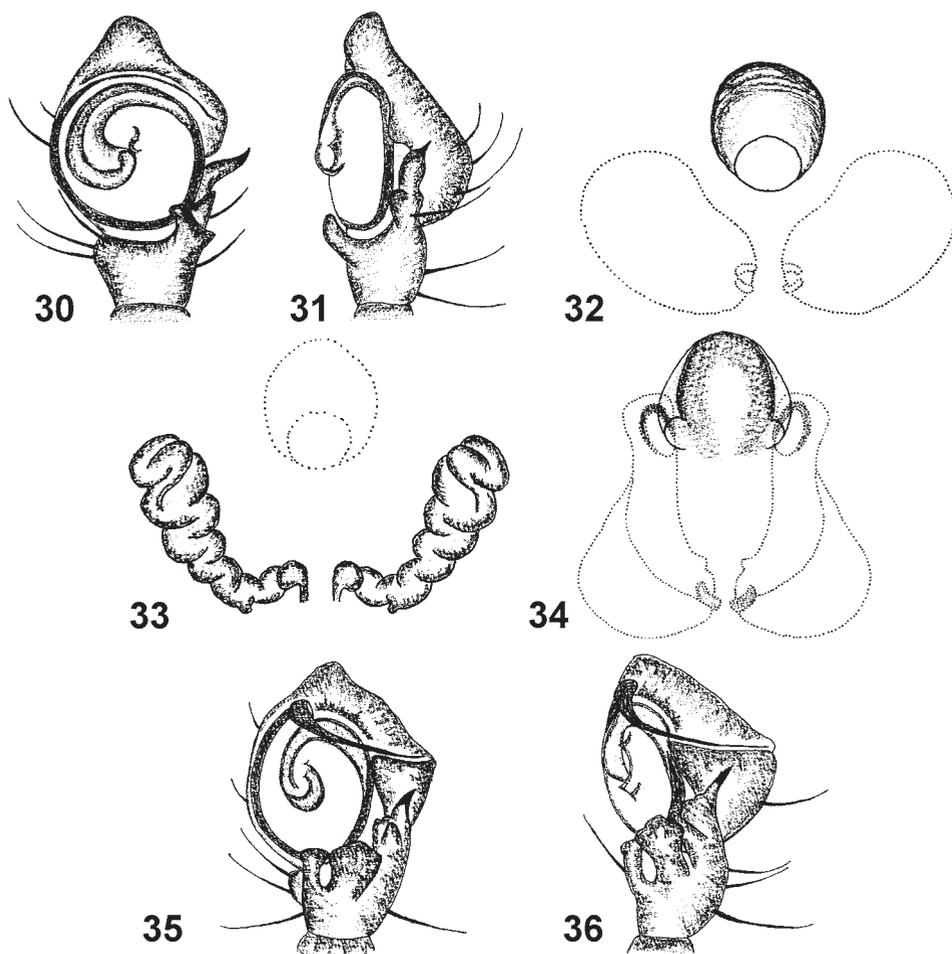
Etymology: Named for Stefan Foord of the University of Venda, who collected the holotype. He is recognized for his contribution in recording spider diversity in the African savannah.

Diagnosis: The species is recognized by a combination of long, dark brown, spiniform abdominal setae (Fig. 6), the small dome-shaped hood of the female epigyne (Fig. 32) and the long embolus with straight tip in the male (Fig. 30). The RTA is long, with a prolaterally curved distal tooth and a basal lobe (Fig. 31).

Description:

Female (allotype).

Size: TL 4.61, CL 2.25, CW 2.18. *Colour:* Carapace yellow-brown, with two broad irregularly shaped longitudinal dark brown stripes; setae dark brown; sternum with white markings; clypeus brown; chelicerae yellow-brown, with brown marks proximally



Figs 30–36. (30–33) *Heriaeus foordi* sp. n.: (30) male palp, ventral view; (31) male palp, lateral view; (32) epigyne, ventral view; (33) epigyne, dorsal view; (34) *Heriaeus latifrons* Lessert, 1919, epigyne, ventral view; (35, 36) *Heriaeus madagascar* sp. n.: (35) male palp, ventral view; (36) male palp, lateral view.

and white marks distally and laterally; eye region white between anterior eyes, brown between posterior eyes; eye tubercles white or greyish white. Abdomen brown dorsally, mottled with white, with dark brown circular marks usually forming a distinct pattern; venter lined with white; laterally with white striae with brown spots. Legs yellow-brown, with white marks on all segments except metatarsi and tarsi. Palp segments all with white markings except tibia with brown markings. *Carapace: Eye measurements:* AME–AME 0.25, ALE–AME 0.14, PME–PME 0.19, PLE–PME 0.30, AME–PME 0.27, MOQL AME–PME 0.34, MOQAW AME–AME 0.31, MOQPW PME–PME 0.27. *Leg measurements:* leg I Fe 1.76, Pat 0.91, Tib 1.75, Mt 1.66, Ta 0.95, total 7.03; leg II Fe 1.41, Pat 0.74, Tib 1.27, Mt 1.25, Ta 0.83, total 5.50; leg III Fe 1.06, Pat 0.53, Tib 1.00, Mt 0.67, Ta 0.66, total 3.92; leg IV Fe 1.15, Pat 0.65, Tib 1.02, Mt 0.75, Ta

0.62, total 4.19. *Abdomen*: Round, truncated anteriorly; setae long and dark brown or short and transparent. *Epigyne*: With small dome-shaped hood; internal organs visible as two indistinct bean-shaped structures lying diagonally below hood (Fig. 32); four small dark posterior spots indicate position of fertilization ducts; copulatory ducts two tubes lying diagonally below hood (Fig. 33).

Male (holotype).

Size: TL 3.18, CL 1.66, CW 1.74. *Colour*: Carapace yellow-brown, with two broad irregularly shaped longitudinal dark brown stripes; setae dark brown; clypeus brown; chelicerae with brown marks; eye region white between anterior eyes, brown between posterior eyes; eye tubercles white or greyish white. Abdomen yellow-brown, mottled with brown; some males with faint circular pattern similar to that of female; setae dark brown. Legs with white markings on coxae I–IV; leg I (patella to tarsus) much darker than legs II–IV. *Carapace*: *Eye measurements*: AME–AME 0.16, ALE–AME 0.09, PME–PME 0.12, PLE–PME 0.21, AME–PME 0.22, MOQL AME–PME 0.27, MOQAW AME–AME 0.22, MOQPW PME–PME 0.20. *Leg measurements*: leg I Fe 1.96, Pat 0.78, Tib 1.54, Mt 1.61, Ta 0.94, total 5.83; leg II Fe 1.67, Pat 0.69 Tib 1.34, Mt 1.25, Ta 0.68, total 5.63; leg III Fe 0.91, Pat 0.46, Tib 0.82, Mt 0.66, Ta 0.47, total 3.32; leg IV Fe 1.08, Pat 0.47, Tib 0.85, Mt 0.57, Ta 0.39, total 3.36. *Abdomen*: Round, truncated anteriorly; dorsum with scattered long spiniform, acute setae. *Legs*: Very hairy with numerous long setae. *Male palp*: Embolus long, winding once around tegulum, tip slender and straight; VTA large and two-lobed; RTA with prolaterally curved distal tooth and basal lobe; cymbial apophysis present (Figs 30, 31).

Juveniles. Immature males can usually be recognized by brown dorsum, mottled with white, with dark brown circular markings forming a characteristic pattern.

Holotype: ♂ SOUTH AFRICA: *Limpopo*: Atherstone Nat. Res. (26.75°S 24.42°E), 11.ix.2009, S. Foord, sweeping grass (NCA 2011/2044).

Allotype: 1♀ same data as holotype (NCA 2011/2045a).

Paratypes: SOUTH AFRICA: *KwaZulu-Natal*: 1♀ Umkhuze Game Reserve (27.63°S 32.25°E), 26.xi.2003, M. Hamer, beating tree layer (NCA 2004/884); 1♀ same locality, 1.ii.2003, S. Lovell, yellow pan trap in *Terminalia sericea* field (NCA 2004/122); 1♀ Ndumo Game Reserve, Crocodile farm (26.87°S 32.24°E), 12.i.2007, C. Haddad, rocky area (NCA 2007/4526). *Limpopo*: 4♂ same data as holotype (NCA 2011/2045b).

Other material examined: SOUTH AFRICA: *KwaZulu-Natal*: 1 imm. Umkhuze Game Reserve (27.63°S 32.25°E), 3.viii.2008, X. Combrink, pitfall traps (NCA 2011/2048). *Mpumalanga*: 3 imm. ♂ Kruger National Park, Makhuthwanini (25.38°S 31.60°E), 16.vi.2007, pitfall traps, G. Ellis (NCA 2008/68, 2008/69).

Distribution: South Africa (KwaZulu-Natal, Limpopo and Mpumalanga) (Fig. 58).

Natural history: Collected from yellow pan traps and pitfall traps as well as sweeping of vegetation. Adult females collected during October, males during September and October, and juveniles during June and August.

Heriaeus latifrons Lessert, 1919

Figs 7, 34, 59

Heriaeus latifrons: Lessert 1919: 137, pl. 2, figs 1, 9 (♀); Loerbroks 1983: 131.

Diagnosis: It resembles other species with spiniform abdominal setae but differs from them in the shape of the epigyne, which is distinct in having a flat, oval hood that is raised posteriorly (Fig. 34). Male unknown.

Redescription:

Female (lectotype).

Size: TL 5.19, CL 2.31, CW 2.13. *Colour:* Carapace with two longitudinal brown stripes extending to PEs, medially with three irregular white lines between brown bands (Fig. 7); sternum yellow; endites and labium mottled with white; clypeus and chelicerae yellow-brown; eye region white and eye tubercles grey. Abdomen with dorsum white; abdominal setae transparent; venter white. Legs yellow-brown, bearing transparent setae. Palp yellow-brown. *Carapace: Eye measurements:* AME–AME 0.21, ALE–AME 0.18, PME–PME 0.16, PLE–PME 0.29, AME–PME 0.17, MOQL AME–PME 0.24, MOQAW AME–AME 0.30, MOQPW PME–PME 0.27. *Leg measurements:* leg I Fe 2.17, Pat 0.84, Tib 1.66, Mt 1.85, Ta 0.90, total 7.42; leg II Fe 1.81, Pat 0.89, Tib 1.46, Mt 1.38, Ta 0.67, total 6.21; leg III Fe 0.98, Pat 0.67, Tib 0.77, Mt 0.69, Ta 0.37, total 3.48; leg IV Fe 1.00, Pat 0.77, Tib 1.12, Mt 0.79, Ta 0.50, total 4.18. *Abdomen:* Round; bearing transparent long spiniform setae; venter with fine hairs; laterally with brown striae. *Epigyne:* Hood oval and flat, raised posteriorly, with lateral extensions; internal genitalia visible as pear-shaped structures; two small dark marks posteriorly indicate the position of fertilization tubes (Fig. 34).

Lectotype (designated here): ♀ TANZANIA: Ngare na nyuki, near Arusha (3.15°S 36.85°E), De Lessert (MNHG).

Paralectotype: ♀ same data as lectotype.

Distribution: Tanzania (Fig. 59).

Natural history: Unknown.

***Heriaeus madagascar* sp. n.**

Figs 8, 35, 36, 59

Etymology: The species name is a noun in apposition derived from Madagascar.

Diagnosis: The species is recognized by a combination of long spiniform setae with acute tips on the abdomen, a single broad central stripe on the carapace, short strong setae on tibiae and metatarsi I and II (Fig. 8), and only four setae on the anterior edge of the clypeus. The male palp is distinguished by the angular shape of the cymbium, which is extended into a blunt extension laterally, the shape of the embolus, a broad flat ITA and a ventral tooth-like lobe on the RTA (Figs 35, 36). Female unknown.

Description:

Male (holotype).

Size: TL 3.02, CL 1.56, CW 1.41. *Colour:* Carapace with a broad brown stripe centrally, darker brown posteriorly; setae brown; chelicerae yellow-brown with brown markings; clypeus brown; eye region yellow-brown; eye tubercles grey. Abdomen creamy with dark mottling; cream with brown spots ventrally; setae brown. Palp with all segments yellow-brown. Legs yellow-brown, with brown marks on femora, tibiae and metatarsi I and II. *Carapace: Eye measurements:* AME–AME 0.19, ALE–AME 0.11, PME–PME 0.11, PLE–PME 0.29, AME–PME 0.15, MOQL AME–PME 0.22, MOQAW AME–AME 0.25, MOQPW PME–PME 0.21. *Leg measurements:* leg I Fe 2.20, Pat 0.97, Tib 1.50, Mt 1.38, Ta 0.76, total 6.81; leg II Fe 2.15, Pat 0.89, Tib 1.41, Mt 1.38, Ta 0.70, total 6.53; leg III Fe 1.13, Pat 0.58, Tib 1.13, Mt 0.76, Ta 0.44, total 4.04; leg IV Fe 0.96,

Pat 0.53, Tib 0.78, Mt 0.81, Ta 0.45, total 3.53. *Clypeus*: Four setae on anterior clypeal edge. *Abdomen*: Oval, truncated anteriorly, slightly pointed posteriorly (Fig. 8), bearing scattered long spiniform setae with acute tips. *Legs*: Tibiae and metatarsi I and II with short strong setae. *Male palp*: Cymbium with blunt extension laterally, forming a narrow ridge for tip of embolus to fit into, embolus long, winding once around tegulum, with sharp angle distally, tip straight and extending dorsally onto cymbium; ITA broad and flat; RTA with long distal tooth and ventral lobe below; VTA knob-like (Figs 35, 36).

Holotype: ♂ MADAGASCAR: Beanana (15.73°S 49.47°E), ii.1970, A. Lambillon (MRAC 142.650).

Paratype: ♂ MADAGASCAR: Tananarive (18.15°S 49.42°E), 10.xi.1972, A. Dhondt (MRAC 142.296).

Distribution: Madagascar (Fig. 59).

Natural history: Males collected during February and November.

***Heriaeus muizenberg* sp. n.**

Figs 9, 37, 38, 58

Etymology: The species name is a noun in apposition derived from the name of the type locality.

Diagnosis: The species is recognized by the combination of short abdominal setae with blunt tips (Fig. 9) arranged in a distinct pattern, the male palp with the embolus having a slender straight tip, and a very long RTA with a very long sharp distal tooth (Figs 37, 38). Palp resembles that of *H. foordi* sp. n., but the RTA is longer in this species. Female unknown.

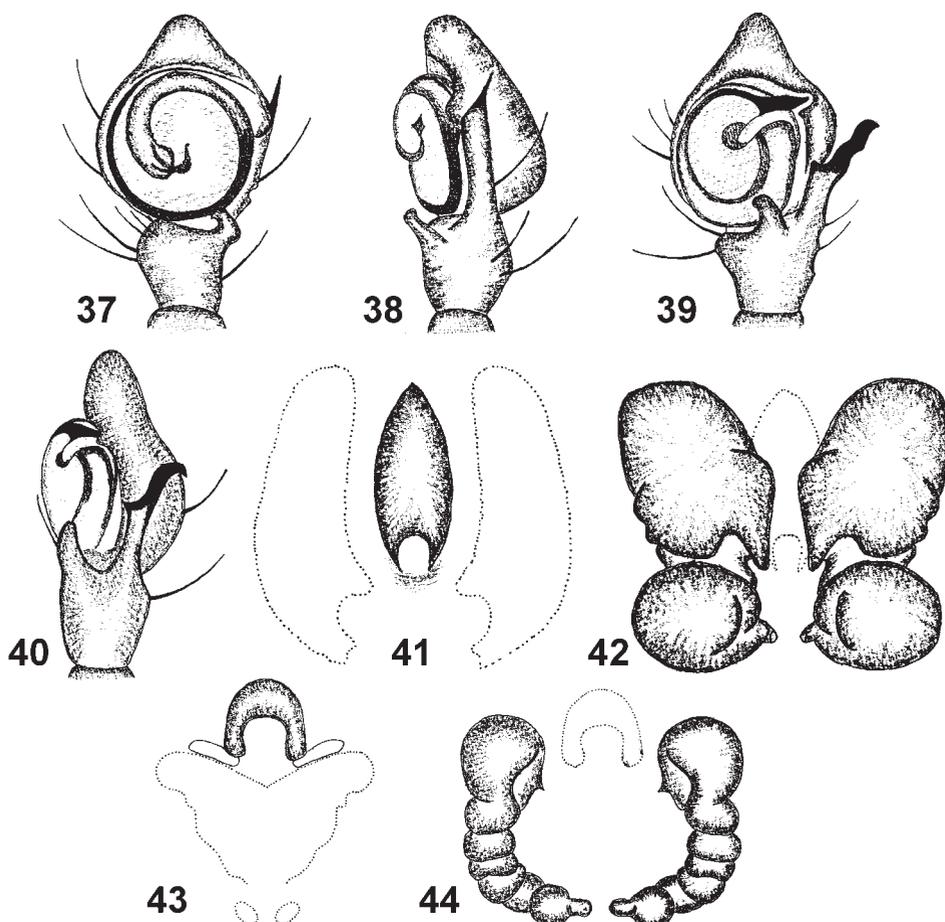
Description:

Male (holotype).

Size: TL 3.16, CL 1.49, CW 1.42. *Colour:* Carapace with two ill-defined longitudinal brown stripes; setae dark brown; clypeus white, white clypeal mark extending to above AMEs; eye region brown; eye tubercles greyish brown. Abdomen brown, slightly mottled, bearing brown setae; with two transverse bands across posterior half; bases of setae dark, forming a regular pattern (Fig. 9); laterally with two white longitudinal curved lines. Legs yellow-brown, spotted; setae pale brown; femur I and coxae I–IV with white markings; distal end of femora II and IV with dark markings, also present on proximal and distal ends of tibia IV; metatarsi III and IV with brown marks distally. *Carapace:* *Eye measurements:* AME–AME 0.19, ALE–AME 0.11, PME–PME 0.14, PLE–PME 0.20, AME–PME 0.20, MOQL AME–PME 0.25, MOQAW AME–AME 0.24, MOQPW PME–PME 0.23. *Leg measurements:* leg I Fe 2.06, Pat 0.73, Tib 1.74, Mt 1.65, Ta 0.74, total 6.92; leg II Fe 1.28, Pat 0.59, Tib 1.17, Mt 1.16, Ta 0.66, total 4.86; leg III Fe 0.52, Pat 0.35, Tib 0.62, Mt 0.48, Ta 0.37, total 2.34; leg IV Fe 0.90, Pat 0.42, Tib 0.66, Mt 0.49, Ta 0.38, total 2.85. *Abdomen:* Round, truncated anteriorly, decorated with approx. 24 short, brown blunt setae. *Male palp:* Embolus winding around three-quarters of tegulum; tip slender and straight; VTA small and two-lobed; RTA very long, longer than length of bulb, with very long sharp distal tooth and small depression near its base (Figs 37, 38).

Holotype: ♂ SOUTH AFRICA: *Western Cape:* Muizenberg (34.09°S 18.50°E), 29.ix–13.x.1991, R. Legg, north dunes (MRAC 173.842).

Paratype: ♂ same data as holotype (MRAC 173.820).



Figs 37–44. (37, 38) *Heriaeus muizenberg* sp. n.: (37) male palp, ventral view; (38) male palp, lateral view; (39–42) *Heriaeus peterwebbi* sp. n.: (39) male palp, ventral view; (40) male palp, lateral view; (41) epigyne, ventral view; (42) epigyne, dorsal view; (43, 44) *Heriaeus sossusvlei* sp. n.: (43) epigyne, ventral view; (44) epigyne, dorsal view.

Distribution: Western Cape Province of South Africa (Fig. 58).

Natural history: Males collected on coastal dunes during September and/or October.

***Heriaeus peterwebbi* sp. n.**

Figs 10, 39–42, 58

Heriaeus transvaalicus Simon, 1895: Loerbroks 1983: 130, figs 24, 85–87 (♂ misidentified).

Etymology: Named for Peter Webb for his contributions photographing South African spiders for the SANSA Virtual Museum.

Diagnosis: Species recognized by a combination of long spiniform, acute abdominal setae (Fig. 10), the epigynal shape consisting of a narrow small hood (Fig. 41), and the

broad tipped embolus (Fig. 39). The palp resembles that of *H. transvaalicus*, but differs in the RTA having a darkly sclerotized elongated hooked tip (Fig. 40).

Description:

Female (allotype).

Size: TL 4.60, CL 1.95, CW 1.79. *Colour*: Carapace with two longitudinal brown stripes extending to PEs and white irregular V-shaped lines; setae transparent; eye region white, except between MEs; eye tubercles white; clypeus yellow-brown. Abdomen yellow-brown, mottled white, with a central white mark anteriorly and three white crossbars; laterally with curving white lines and numerous dark brown spots; abdominal setae transparent, 0–6 brown setae may be present posteriorly. Legs with brown spots. *Carapace: Eye measurements*: AME–AME 0.22, ALE–AME 0.14, PME–PME 0.17, PLE–PME 0.32, AME–PME 0.24, MOQL AME–PME 0.29, MOQAW AME–AME 0.29, MOQPW PME–PME 0.26. *Leg measurements*: leg I Fe 1.94, Pat 0.81, Tib 1.43, Mt 1.51, Ta 0.90, total 6.59; leg II Fe 1.30, Pat 0.80, Tib 1.38, Mt 1.27, Ta 0.81, total 5.56; leg III Fe 0.88, Pat 0.62, Tib 1.25, Mt 0.68, Ta 0.48, total 3.91; leg IV Fe 0.84, Pat 0.57, Tib 0.84, Mt 0.69, Ta 0.57, total 3.51. *Abdomen*: Oval, setae long, spiniform, with acute tips. *Epigyne*: Hood small, narrow elongated, with a round opening (Fig. 41); copulatory ducts bulbous with folds (Fig. 42).

Male (holotype).

Size: TL 3.78, CL 1.73, CW 1.66. *Colour*: Carapace with two longitudinal brown bands extending to PEs and two irregular white V-shaped lines; white line also present laterally on carapace edge; setae transparent; chelicerae with white marks at distal and proximal ends; clypeus white; eye region and tubercles white. Legs with brown spots and white marks distally on coxae, femora and patella I–IV. Abdomen yellow-brown, with broad indistinct white central marks and six transverse white bands posteriorly; laterally with 3 or 4 longitudinal striae; abdominal macro setae transparent; venter white. *Carapace: Eye measurements*: AME–AME 0.19, ALE–AME 0.12, PME–PME 0.14, PLE–PME 0.24, AME–PME 0.18, MOQL AME–PME 0.23, MOQAW AME–AME 0.25, MOQPW PME–PME 0.19. *Leg measurements*: leg I Fe 2.64, Pat 0.96, Tib 2.50, Mt 2.61, Ta 1.09, total 9.80; leg II Fe 2.40, Pat 0.74, Tib 2.08, Mt 2.03, Ta 0.91, total 8.16; leg III Fe 1.14, Pat 0.49, Tib 1.01, Mt 0.93, Ta 0.49, total 4.06; leg IV Fe 1.38, Pat 0.45, Tib 1.20, Mt 1.15, Ta 0.52, total 4.70. *Abdomen*: Oval, narrower than that of female; setae long, spiniform, with acute tips. *Male palp*: Embolus short, winding less than once around tegulum; embolus tip broad, curving proximally; VTA digitiform but somewhat irregular; RTA elongated with anterior half sclerotized, ending in a broad hooked tooth, pointing dorsally (Figs 39, 40).

Holotype: ♂ SOUTH AFRICA: *Limpopo*: Blouberg Nat. Res. (22.99°S 29.04°E), 27.xi.2005, I. Simthumule, sweepnetting (NCA 2009/1980a).

Allotype: ♀ same data as holotype (NCA 2009/1980b).

Paratypes: NAMIBIA: 1♀ Gobabis (22.27°S 18.35°E), Museum Staff (SMFD 8487); 1♀ Etosha National Park, Site 7 (18.95°S 15.90°E), iii.1998, A. Russell-Smith (MRAC 215819). SOUTH AFRICA: *Free State*: 2♀ Swartrus (27.75°S 25.50°E), 18–19.xi.1985, Museum Staff (NMBA 1067). *Gauteng*: 1♀ Irene (25.85°S 28.16°E), 3.iv.1984, O. Nesor, sweepnetting grass layer (NCA 84/904); 1♀ Roodeplaat Dam Nat. Res. (25.64°S 28.36°E), 25.x.1982, I. van Rooyen & A. van den Berg, sweepnetting grass layer (NCA 84/68); 1♀ Roodeplaat Research Station (25.64°S 28.36°E), i.1970, T.J. Coates, strawberry plants (AMGS 29). *Limpopo*: 1♂ 'Makapan' [= Mokopane, 24.18°S 29.01°E] (MNH); 1♂ same locality as

holotype, 27.xi.2005, F. Maanda, active search (NCA 2009/2086), 1♀ same locality, 27.xi.2005, F. Mbedzi, sweepnetting plants (NCA 2009/1979); 1♀ 1 imm. ♀ same locality, 24.iii.2006, M. Muelelwa, sweepnetting plants (NCA 2009/2087); 1♀ Polokwane Nat. Res. (23.9°S 29.47°E), 26.i.2006, T. Khoza & M. Madiba, sweepnetting woodland (NCA 2008/1211); 2♂ same data but 3.ii.2006, beating riverine sweet thorn (NCA 2008/1791); 1♀ Lajuma Mountain Retreat (23.03°S 29.45°E), 6.ii.2008, AFRAS members, by hand (NCA 2008/3367); 1♀ Swartwater, Viswater Farm (22.85°S 28.19°E), 28.v.1981, R. Harris, soil surface (NCA 81/753). *Mpumalanga*: 1♀ Marble Hall (24.96°S 29.29°E), 16.i.1997, H. Loots, by hand, cotton (NCA 96/606). *North West*: 1♀ Skeerpoort (25.81°S 27.75°E), 22.iii.1980, A. Leroy, on plants (NCA 84/654).

Distribution: Namibia and South Africa (Free State, Gauteng, Limpopo, North West and Mpumalanga provinces) (Fig. 59).

Natural history: This species was collected from the ground as well as plants, such as grasses, riverine sweet thorn trees and crops (cotton and strawberries). The females were collected during January to May and again during October and November, while the males were sampled during February and November.

Remarks: Simon (1895) described *H. transvaalicus* based on female, although there were apparently two specimens available to him. When Loerboks (1983) examined the type material, he described the other specimen as the male of *H. transvaalicus*. With abundant material available now, it is clear that the male described by Loerboks is not that of *H. transvaalicus* but belongs to *H. peterwebbi* sp. n.

***Heriaeus sossusvlei* sp. n.**

Figs 43, 44, 59

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

Diagnosis: The species is recognized by the combination of their short, blunt abdominal setae, as well as the unsclerotized epigyne with a hood resembling a half dome (Fig. 43), integument below hood wrinkled and internal organs visible as two large dark spots posteriorly (Fig. 44). Male unknown.

Description:

Female (holotype).

Size: TL 6.06, CL 2.03, CW 1.99. *Colour:* Carapace with two longitudinal light brown stripes extending to PEs; medially with two longitudinal white stripes extending into eye region and a third longitudinal light brown stripe medially, extending to PMEs; sides mottled with white; setae transparent; sternum mottled with white along edge; endites and labium with some white marks; clypeus white; eye region white. Abdomen white, with transparent setae with yellow-brown spots at setal bases; sometimes with 6 brown setae in posterior half; venter white. Legs yellow-brown. Palp with white markings on femur and patella. *Carapace: Eye measurements:* AME–AME 0.20, ALE–AME 0.15, PME–PME 0.21, PLE–PME 0.33, AME–PME 0.22, MOQL AME–PME 0.28, MOQAW AME–AME 0.28, MOQPW PME–PME 0.30. *Leg measurements:* leg I Fe 2.44, Pat 1.07, Tib 1.83, Mt 1.72, Ta 0.91, total 7.97; leg II Fe 2.29, Pat 0.95, Tib 1.52, Mt 1.55, Ta 0.75, total 7.06; leg III Fe 0.93, Pat 0.68, Tib 1.01, Mt 0.53, Ta 0.45, total 3.60; leg IV Fe 1.45, Pat 0.60, Tib 1.12, Mt 0.97, Ta 0.50, total 4.64. *Abdomen:* Round, truncated anteriorly, narrower across posterior 1/3; with numerous, short, blunt abdominal setae; venter with fine hairs. *Epigyne:* Hood shaped like a half dome; integument below

hood wrinkled; copulatory ducts two C-shaped tubes with folds and slightly enlarged anterior ends (Figs 43, 44).

Holotype: ♀ NAMIBIA: 5 km of Sossusvlei (24.70°S 15.42°E), 22.iv.1979, E. Holm, hand sampled from plants (NCA 88/330).

Paratype: 1 ♀ SOUTH AFRICA: *Western Cape*: Beaufort West, Bokvlei Farm (32.73°S 23.59°E), 14.xii.2007, D.H. Jacobs, pitfall trap (NCA 2008/4693).

Distribution: Namibia and South Africa (Western Cape) (Fig. 59).

Natural history: Collected on plants and a from pitfall trap in April and December.

Heriaeus transvaalicus Simon, 1895

Figs 1, 11, 45–48, 58

Heriaeus transvaalicus: Simon 1895: 438 (♀); 1910: 195; Loerboks 1983: 130, figs 24, 85–87 (♀).

Simon (1895) described *H. transvaalicus* based on female, although there were apparently two specimens available to him. When Loerboks (1983) examined the type material, he erroneously attributed the other specimen to the male of *H. transvaalicus*. It is proved now to belong to *H. peterwebbi* sp. n. The male of *H. transvaalicus* is described here for the first time.

Diagnosis: The species is recognized by a combination of long, spiniform abdominal setae (Fig. 1), the female epigyne with a wide transverse hood, and internal organs visible externally as two black longitudinal marks below the hood (Fig. 47). Male palp with the embolus having a broad tip that resembles that of *H. peterwebbi* sp. n., but differs in the RTA being darkly sclerotized with a short, comma-shaped hooked tip (Figs 45, 46).

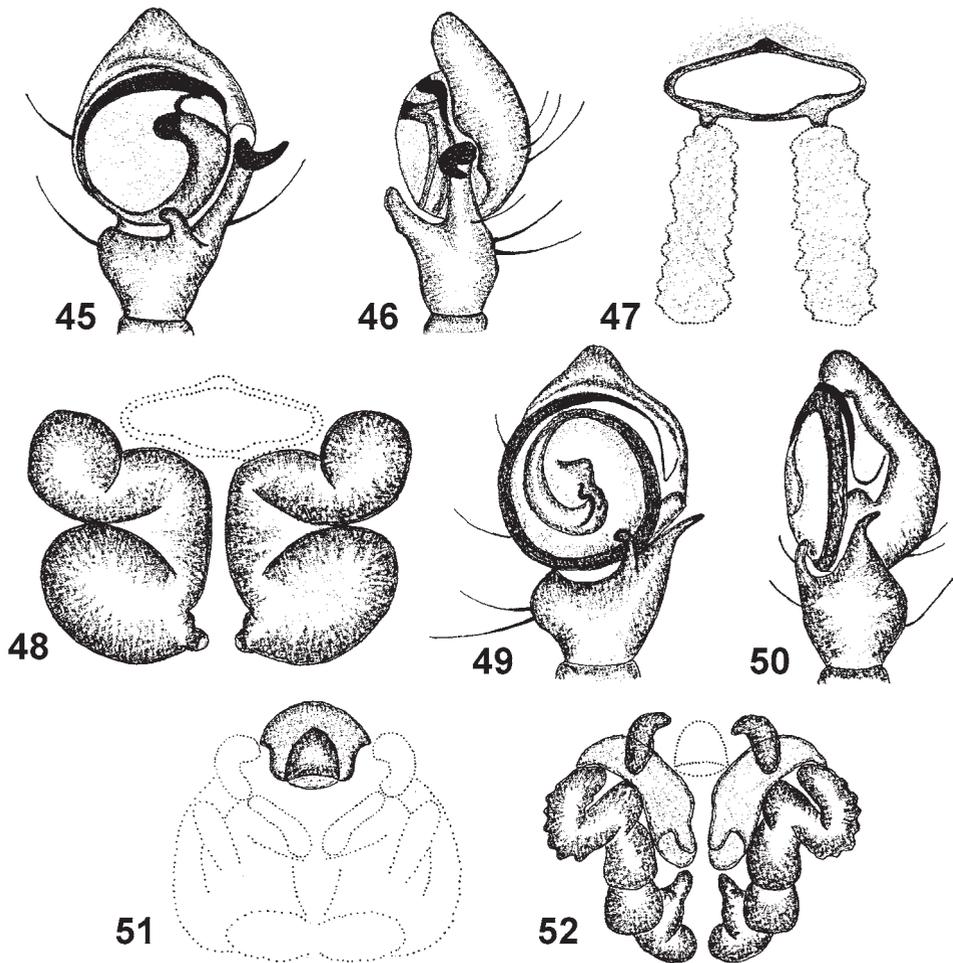
Redescription:

Female (NCA 2008/1320).

Size: TL 4.29, CL 2.04, CW 1.91. *Colour*: Carapace with two longitudinal brown stripes and irregular V-shaped white lines medially; setae transparent; clypeus yellow-brown; eye region white. Abdomen brown with central longitudinal white stripe with three white crossbars; laterally with curved white lines and number of dark spots; abdominal setae transparent except a few widely spaced posterior brown setae (Fig. 11) that are easily lost. Legs with brown spots, especially femora I and II. *Carapace*: *Eye measurements*: AME–AME 0.22, ALE–AME 0.27, PME–PME 0.19, PLE–PME 0.32, AME–PME 0.21, MOQLAME–PME 0.24, MOQAW AME–AME 0.30, MOQPW PME–PME 0.25. *Leg measurements*: leg I Fe 1.98, Pat 0.62, Tib 1.68, Mt 1.81, Ta 0.70, total 6.79; leg II Fe 1.54, Pat 0.62, Tib 1.37, Mt 1.51, Ta 0.76, total 5.80; leg III Fe 1.19, Pat 0.45, Tib 0.73, Mt 0.70, Ta 0.49, total 3.56; leg IV Fe 0.74, Pat 0.50, Tib 1.0, Mt 0.73, Ta 0.45, total 0.42. *Abdomen*: Oval; setae long, spiniform with acute tips. *Epigyne*: Wide transverse hood, internal organs externally visible as two dark longitudinal marks below hood (Fig. 47); copulatory ducts thick with coils (Fig. 48).

Male (NCA 2008/1320).

Size: TL 3.31, CL 1.43, CW 1.59. *Colour*: Carapace yellow-brown with two indistinct longitudinal brown stripes extending to PEs; setae transparent in posterior half, brown in anterior half; chelicerae yellow-brown; clypeus yellow-brown; eye region white centrally, brown around AMEs; eye tubercles white. Abdomen yellow-brown; white



Figs 45–52. (45–48) *Heriaeus transvaalicus* Simon, 1875: (45) male palp, ventral view; (46) male palp, lateral view; (47) epigyne, ventral view; (48) epigyne, dorsal view; (49–52) *Heriaeus xanderi* sp. n.: (49) male palp, ventral view; (50) male palp, lateral, view; (51) epigyne, ventral view; (52) epigyne, dorsal view.

markings form six transverse bands; 3 or 4 longitudinal striae laterally bearing some setae with dark bases. Legs spotted with brown; coxae each with distal white spot. *Carapace: Eye measurements:* AME–AME 0.16, ALE–AME 0.10, PME–PME 0.13, PLE–PME 0.27, AME–PME 0.18, MOQL AME–PME 0.24, MOQAW AME–AME 0.25, MOQPW PME–PME 0.21. *Leg measurements:* leg I Fe 2.57, Pat 0.82, Tib 2.66, Mt 2.46, Ta 1.00, total 9.51; leg II Fe 2.16, Pat 0.68, Tib 2.10, Mt 2.12, Ta 0.89, total 7.95; leg III Fe 1.03, Pat 0.59, Tib 0.88, Mt 0.74, Ta 0.51, total 3.75; leg IV Fe 0.87, Pat 0.47, Tib 1.15, Mt 0.87, Ta 0.49, total 3.85. *Abdomen:* Oval, narrower than in female; setae long, spiniform, with acute tips, sometimes with 2–6 brown setae posteriorly. *Male palp:* Embolus winding less than once around tegulum; embolus tip broad, curving

posteriorly; VTA digitiform; RTA with darkly sclerotized short comma-shaped tooth, directed dorsally (Figs 45, 46).

Holotype (examined): ♀ (together with 1♂ *H. peterwebbi* sp. n.) SOUTH AFRICA: *Limpopo*: 'Makapan' [= Mokopane, 24.18°S 29.01°E] (MNHN).

Other material examined: SOUTH AFRICA: *Limpopo*: 1♀ 3♂ Polokwane Nat. Res. (23.58°S 29.28°E), 8.iii.2005, T. Khoza & M. Modiba, sweeping open savannah (NCA 2008/1838, 2008/1319); 1♀ same locality, 9.iii.2005, T. Khoza & M. Modiba, sweeping false grassland (NCA 2008/1837); 2♂ 1♀ same locality, 15.iii.2005, T. Khoza & M. Modiba, sweeping woodland (NCA 2008/1320); 1♀ same locality, 11.v.2005, T. Khoza & M. Modiba, sweeping false grassland (NCA 2008/1338); 1♀ 4 imm. ♀ 6 imm. ♂ same locality, 21.i.2006, T. Khoza & M. Modiba, sweeping open savannah (NCA 2008/1212); 1♀ same locality, 7.ii.2006, T. Khoza & M. Modiba, sweeping open savannah (NCA 2008/1321). *North West*: 2♀ Rustenburg Nat. Res. (25.72°S 27.18°E), 17.ii.1983, A. van den Berg & T. Marren, sweeping grass (NCA 1984/402).

Distribution: South Africa (*Limpopo* and *North West* provinces) (Fig. 58).

Natural history: All the specimens were collected by sweeping grassland, false grassland, woodland and open savannah. Females were collected from January to May and adult males in March.

***Heriaeus xanderi* sp. n.**

Figs 12, 49–52, 59

Etymology: The species is named for Xander Combrink, who has made an important contribution in sampling spiders in KwaZulu-Natal.

Diagnosis: The species is recognized by a combination of short, blunt abdominal setae (Fig. 12) and the shape of the genitalia. In the male palp the embolus is long, with a U-shaped tip, RTA short and broad-based with distal tooth (Figs 49, 50); in the female the epigyne has a dome-shaped central hood and internal organs visible as very dark ear-shaped structures (Fig. 51).

Description:

Female (allotype).

Size: TL 3.20, CL 1.36, CW 1.31. *Colour*: Carapace with dark brown setae; two longitudinal brown stripes extending to PLEs; faint white mark centrally in posterior half; chelicerae brown with white marks; clypeus brown, some white mottling centrally; eye region brown, some white mottling centrally, eye tubercles greyish white; palps with white marks. Abdomen brown dorsally, mottled with white and dark brown; dark brown marks form transverse lines in posterior half; setae brown or dark brown (Fig. 12). Legs dark with brown markings at both ends of femur I, distal end of femora II–IV, and at both ends of metatarsi and tarsi I and II; white marks at distal edge of femora I–IV, white spots on coxae. *Carapace*: *Eye measurements*: AME–AME 0.15, ALE–AME 0.10, PME–PME 0.17, PLE–PME 0.22, AME–PME 0.16, MOQL AME–PME 0.20, MOQAW AME–AME 0.19, MOQPW PME–PME 0.21. *Leg measurements*: leg I Fe 1.17, Pat 0.60, Tib 0.75, Mt 0.87, Ta 0.53, total 3.92; leg II Fe 1.05, Pat 0.57, Tib 0.69, Mt 0.81, Ta 0.49, total 3.61; leg III Fe 0.68, Pat 0.37, Tib 0.45, Mt 0.41, Ta 0.37, total 2.28; leg IV Fe 0.83, Pat 0.38, Tib 0.54, Mt 0.51, Ta 0.38, total 2.64. *Abdomen*: Oval, truncated anteriorly; setae short and club-shaped. *Epigyne*: Small dome-shaped, central hood; internal organs visible as very dark ear-shaped structures that enclose hood; copulatory ducts tubular and folded on themselves, with associated membranes and extensions (Figs 51, 52).

Male (holotype).

Size: TL 2.54, CL 1.19, CW 1.15. *Colour*: Carapace with two longitudinal brown bands extending to PLEs; slight white mark centrally in posterior half, setae dark brown; chelicerae with brown mark distally; clypeus with dark brown marks; eye region white centrally. Abdomen brown dorsally, mottled with white and dark brown; dark brown marks form transverse lines in posterior half, setae brown; venter yellow-brown; laterally with brown lines. Legs with dark brown marks at both ends of femur I, distal end of femora II–IV, and at both ends of metatarsi I–IV and tarsi II–IV. *Carapace*: *Eye measurements*: AME–AME 0.08, ALE–AME 0.08, PME–PME 0.08, PLE–PME 0.09, AME–PME 0.11, MOQL AME–PME 0.17, MOQAW AME–AME 0.15, MOQPW PME–PME 0.15. *Leg measurements*: leg I Fe 1.45, Pat 0.68, Tib 1.18, Mt 1.22, Ta 0.73, total 5.26; leg II Fe 2.29, Pat 0.95, Tib 1.52, Mt 1.55, Ta 0.75, total 7.06; leg III Fe 0.93, Pat 0.68, Tib 1.01, Mt 0.53, Ta 0.45, total 3.60; leg IV Fe 1.45, Pat 0.60, Tib 1.12, Mt 0.97, Ta 0.50, total 4.64. *Abdomen*: Oval, truncated anteriorly; setae short and club-shaped. *Male palp*: Embolus long, winding once around tegulum, tip slender and curved (U-shaped); VTA short and digitiform; RTA short and broad-based with distal tooth (Figs 49, 50).

Holotype: ♂ TANZANIA: Mkomazi Game Reserve, between Ndeya & Mabula (4.18°S 38.23°E), 22.xi.1999, A. Russell-Smith, sweepnetting woodland (NCA 97/504a).

Allotype: ♀ same data as holotype (NCA 97/504b).

Paratypes: SOUTH AFRICA: *KwaZulu-Natal*: 1♀ Umkhuze Game Reserve (27.63°S 32.25°E), 17.vii.2008, X. Combrink, pitfall traps (NCA 2011/2047); 1♀ Hluhluwe Nat. Res. (28.09°S 32.1°E), 2.xii.2007, M. Mgobozi, by hand (NCA 2007/1599). *Mpumalanga*: 1♀ Klaserie, Bokmakierie Game Farm (24.33°S 31.02°E), 8.iv.2001, R. Jocqué, open grassy area (MRAC 210.094). TANZANIA: 1♂ Mkomazi Game Reserve, Ndeya (4.18°S 38.23°E), 21–24.ix.1994, A. Russell-Smith, *Acacia senegal* woodland (MRAC 215.509); 1♂ 1♀ same data but 21–22.xi.1994 (MRAC 215.510).

Distribution: South Africa (KwaZulu-Natal and Mpumalanga) and Tanzania (Fig. 59).

Natural history: Collected on grass and trees. Females were collected in April, July, November and December and males in September and November.

***Heriaeus zanii* sp. n.**

Figs 13, 53–56, 58

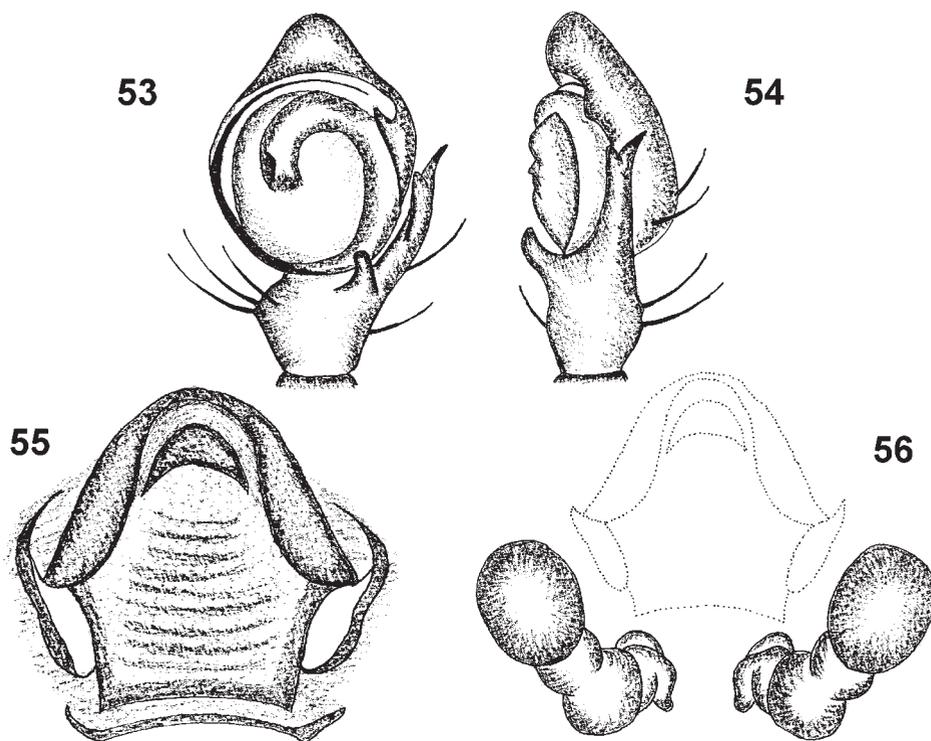
Etymology: The species is named for Zani van der Walt of Oudtshoorn for his contribution to spider research in the Western Cape.

Diagnosis: The species is recognized by their long, spiniform acute abdominal setae (Fig. 13). The epigyne has a hood with a horseshoe-shaped, darkly sclerotized and thickened edge, becoming wider posteriorly, with lateral and posterior thickening and folding of the integument (Fig. 55). The embolus of the male palp is short, winding less than once around tegulum, the tip slender and straight, and the RTA ends in small lobe and distal tooth (Figs 53, 54). The male palp resembles that of *H. copricola* sp. n., but the new species differs in the shape of the RTA and in having spiniform abdominal setae.

Description:

Female (allotype).

Size: TL 4.63, CL 2.04, CW 2.02. *Colour*: Carapace with two longitudinal brown stripes extending to PEs; medially two irregular white lines between and close to brown



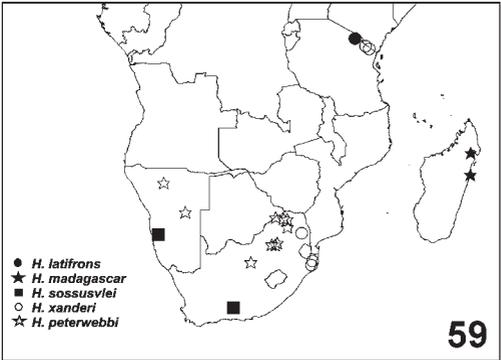
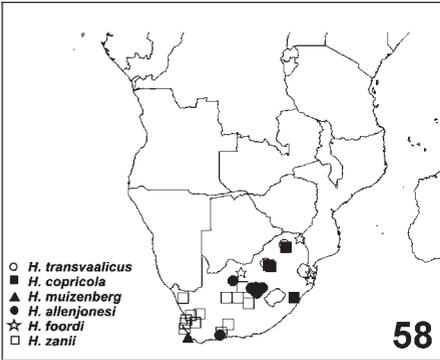
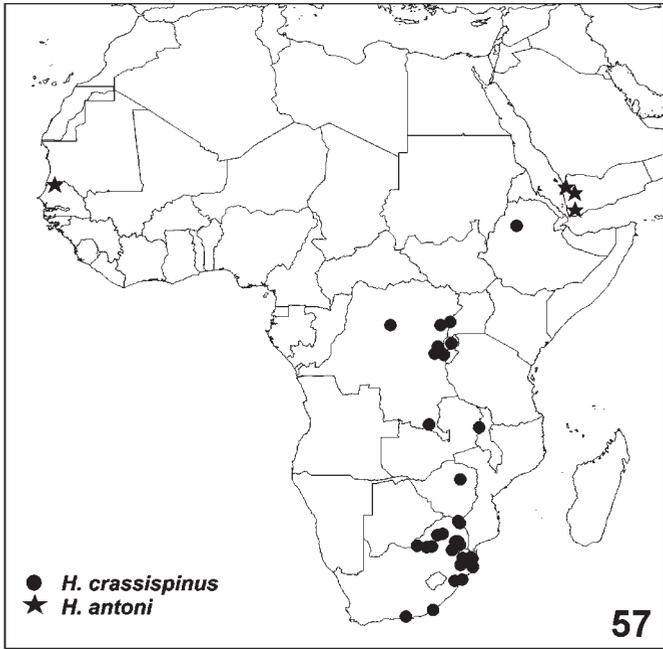
Figs 53–56. *Heriaeus zanii* sp. n.: (53) male palp, ventral view; (54) male lateral view; (55) epigyne, ventral view; (56) epigyne, dorsal view.

stripes, converging posteriorly, and thin median brown stripe between white lines; setae transparent, some pale brown; sternum mottled with white; endites and labium mottled with white; clypeus white; chelicerae yellow-brown or white; eye region yellow-brown or white, eye tubercles white. Abdominal setae transparent, with a variable number (8–24) of brown setae spread either evenly across dorsum or present only in the posterior half. Legs with white marks on all segments; white markings sometimes absent from tibia and tarsus. Palp with femora and patellae or all segments with white marks. *Carapace*: *Eye measurements*: AME–AME 0.24, ALE–AME 0.14, PME–PME 0.20, PLE–PME 0.31, AME–PME 0.19, MOQLAME–PME 0.24, MOQAW AME–AME 0.30, MOQPW PME–PME 0.26. *Leg measurements*: leg I Fe 1.79, Pat 0.94, Tib 1.75, Mt 1.58, Ta 0.54, total 6.60; leg II Fe 1.69, Pat 0.88, Tib 1.22, Mt 0.83, Ta 0.40, total 5.02; leg III Fe 1.16, Pat 0.68, Tib 0.77, Mt 0.77, Ta 0.52, total 3.90; leg IV Fe 1.43, Pat 0.59, Tib 0.93, Mt 0.95, Ta 0.54, total 4.44. *Abdomen*: Round with long, spiniform, acute setae; venter with fine hairs. *Epigyne*: With horseshoe-shaped hood with darkly sclerotized and thickened edge, wider posteriorly (Fig. 55); copulatory ducts tubular, with anterior end slightly enlarged; copulatory ducts lie diagonally below hood (Fig. 56).

Male (holotype).

Size: TL 3.26, CL 1.44, CW 1.59. *Colour*: Carapace with three longitudinal brown stripes, converging anteriorly, extending into eye region; two irregular white lines se-

parating bands, setae brown; chelicerae yellow-brown, some white mottling at distal ends; clypeus white; eye region white. Abdomen brown with white mottling, forming a distinct pattern, bordered laterally with white; setae brown dorsally and transparent laterally; lateral setae with blackish brown marks at their bases; venter white. Legs with white markings on coxae, trochanters and distal end of femora. Palp with white marks on femur and patella. *Carapace: Eye measurements:* AME–AME 0.16, ALE–AME 0.18, PME–PME 0.13, PLE–PME 0.23, AME–PME 0.18, MOQL AME–PME 0.25, MOQAW AME–AME 0.21, MOQPW PME–PME 0.19. *Leg measurements:* leg I Fe 2.69, Pat 0.92, Tib 2.44, Mt 2.50, Ta 1.18, total 9.73; leg II Fe 2.48, Pat 0.78, Tib 2.09, Mt 2.05, Ta 1.03, total 8.43; leg III Fe 1.15, Pat 0.55, Tib 1.04, Mt 0.70, Ta 0.50, total 3.94; leg IV Fe 1.26, Pat 0.40, Tib 0.81, Mt 0.96, Ta 0.51, total 3.94. *Abdomen:* Oval,



Figs 57–59. Distribution of *Heriaeus* spp. in the Afrotropical Region.

truncated anteriorly; setae long with acute tips, shorter setae laterally; venter covered in fine hairs. *Male palp*: Embolus short, winding less than once around tegulum; embolus tip slender and straight; VTA short and digitiform; RTA ends in small lobe and distal tooth (Figs 53, 54).

Holotype: ♂ SOUTH AFRICA: *Western Cape*: Vanrhynsdorp (31.60°S 18.75°E), 5.ix.1991, M.K.P. Meyer, beating *Othonna cylindrical* (NCA 92/109).

Allotype: 1 ♀ SOUTH AFRICA: *Western Cape*: Oudtshoorn (33.59°S 22.21°E), 24.ix.1988, M.K.P. Meyer, shrub layer (NCA 89/435).

Paratypes: SOUTH AFRICA: *Free State*: 1 ♂ Philippolis, P.K. Le Roux Dam (30.25°S 25.27°E), 13.iii.1986, M.K.P. Meyer, beating, herb layer (NCA 91/313); 1 ♀ Boshof, Table Farm 242 (28.43°S 24.50°E), 18.viii.1987, NMBA Entomology Staff, under rocks (NMBA 1864). *Northern Cape*: 1 ♂ 1 imm. ♀ Prieska, Green Valley Nuts, Orange R. (29.62°S 22.75°E), 26.x.2001, C. Haddad, pitfall trap (NCA 2003/1042); 1 ♂ Springbok (29.66°S 17.88°E), 17.ix.1983, herb layer, E. Ueckermann (NCA 84/226). *Western Cape*: 1 ♂ Beaufort West, Eerste Water farm (32.69°S 22.96°E), 9.xii.2007, D. Jacobs, pitfall traps, Karroo bush (NCA 2008/1582); 1 ♂ Clanwilliam, Skerpheuwel (32.18°S 18.23°E), 22.x.1987, L. Lotz, under plants (NMBA 2047); 1 ♂ Vredenburg, Olifants Kraal (32.57°S 18.09°E), 23.x.1987, L.N. Lotz, on ground (NMBA 2070); 1 ♀ Cederberg, Wilderness area (32.45°S 19.24°E), 1.x.2009, S. Kritzinger-Klopper, pitfall trap (NCA 2012/710); 1 ♀ Calvinia, 10 km N of Loeriesfontein (31.48°S 19.77°E), 22.x.1990, S. Louw, on plants (NMBA 5495); 1 ♀ Jacobsbaai (33.15°S 18.03°E), 2.x.2007, R. Lyle & C. Haddad, leaf litter, coastal fynbos (NCA 2008/389).

Other material examined: *Northern Cape*: 1 imm. ♀ Hopetown (29.62°S 24.06°E), 28.ix.1988, C. Barnard, on *Arctotis* sp. (NCA 89/482). *Western Cape*: 1 imm. ♀ Vredenburg (32.57°S 18.09°E), 23.x.1987, NMBA Entomology Staff, under plants (NMBA 3041).

Distribution: South Africa (Western Cape, Northern Cape and Free State) (Fig. 58).

Natural history: Collected on the ground, leaf litter and plants, such as *Othonna cylindrical* and *Arctotis* species. Females were collected from August to October and males during March, September to December.

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REFERENCES

- DIPPENAAR-SCHOEMAN, A.S. 1983. The spider genera *Misumena*, *Misumenops*, *Runcinia* and *Thomisus* (Araneae: Thomisidae) of southern Africa. *Entomology Memoir, Department of Agriculture Republic South Africa* **55**: 1–66.
- JÉZÉQUEL, J.-F. 1964. Araignées de la savane de Singrobo (Côte d'Ivoire). III.-Thomisidae. *Bulletin de l'Institut Français d'Afrique Noire, Sér. A* **26**: 1103–1143.
- INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE (ICZN). 1988. Opinion 1488. *Heriaeus* Simon, 1875 (Arachnida, Araneae): *Thomisus hirtus* Latreille, 1819 confirmed as type species. *Bulletin of Zoological Nomenclature* **45**: 160–161.
- LAWRENCE, R.F. 1942. A contribution to the araneid fauna of Natal and Zululand. *Annals of the Natal Museum* **10**: 141–190.
- LESSERT, R. DE. 1919. Araignées du Kilimandjaro et du Mérou (suite). 3. Thomisidae. *Revue Suisse de Zoologie* **27**: 99–234.
- LEVY, G. 1973. Crab-spiders of six genera from Israel (Araneae: Thomisidae). *Israel Journal of Zoology* **22**: 107–141.

- LOERBROKS, A. 1983. Revision der Krabbenspinnen-Gattung *Heriaeus* Simon (Arachnida: Araneae: Thomisidae). *Verhandlungen des Naturwissenschaftlichen Vereins in Hamburg* **26**: 85–139.
- ONO, H. 1988. *A revisional study of the spider family Thomisidae (Arachnida, Araneae) of Japan*. Tokyo: National Science Museum.
- PLATNICK, N.I. 2012. The world spider catalogue, version 13.0. American Museum of Natural History. <http://research.amnh.org/entomology/spiders/catalog/index.html>.
- SIMON, E. 1875. *Les arachnides de France*. T. 2. Paris: Roret.
- 1895. Descriptions d'Arachnides nouveaux de la famille des Thomisidae. *Annales de la Société Entomologique de Belgique* **39**: 432–443.
- 1910. Arachnoidea: Araneae (II). In: Schultze, L. *Zoologische und anthropologische Ergebnisse einer Forschungsreise im westlichen und zentralen Südafrika*. *Denkschriften der medicinisch-naturwissenschaftlichen Gesellschaft zu Jena* **16**: 175–218.
- 1918. Notes sur la synonymie de plusieurs espèces de la famille des Thomisides. *Bulletin de la Société Entomologique de France* (1): 51–52.