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Two new species of the Afrotropical sac spider genus *Afroceto* Lyle & Haddad, 2010 (Araneae: Trachelidae)

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ABSTRACT

Two new species of trachelids of the Afrotropical genus *Afroceto* Lyle & Haddad, 2010 are described. Both species, *A. ansieae* sp. n. and *A. dippenaarae* sp. n., are endemic to South Africa. An updated identification key to males of the genus is provided.

KEY WORDS: South Africa, endemic, identification key, taxonomy.

INTRODUCTION

In the last decade there has been a dramatic increase in the number of described species of Afrotropical trachelid spiders (Haddad 2006, 2010; Haddad & Lyle 2008; Lyle & Haddad 2006, 2009, 2010; Haddad *et al.* 2011; Lyle 2008, 2011, 2013) through renewed interest in the group. Trachelids were elevated to family level by Ramirez (2014), where he placed it in the Claw Tuft Clasper (CTC) clade. This paper furthers the knowledge with two new species of the genus *Afroceto* Lyle & Haddad, 2010, raising the total number of species to 16 and the number of South African endemic *Afroceto* to 13. This increases the total endemic South African trachelids to 32, with a total of 60 species found in the Afrotropical Region (World Spider Catalog 2015).

The most significant morphological characteristic of *Afroceto* is the presence of one to four strong prolateral leg spines on the femora of leg I. Both of the new species have a single prolateral spine on leg I. As with other males within the genus, leg cusps are present on the three distal leg segments of legs I and II. Females of only three *Afroceto* species, *A. martini* (Simon, 1897), *A. corcula* Lyle & Haddad, 2010 and *A. plana* Lyle & Haddad, 2010, share leg cusps similar to the males (Lyle & Haddad 2010).

The two new species, namely *A. ansieae* sp. n. and *A. dippenaarae* sp. n., are named after Professor Ansie Dippenaar-Schoeman. She worked for over 46 years at the Agricultural Research Council – Plant Protection Research Institute where she established the National Collection of Arachnida (NCA). As project manager of the South African National Survey of Arachnida (SANSA), Ansie drove this project from 1997 to the current undertaking of evaluating all South African species for placement on the International Union for Conservation of Nature Red List (Dippenaar-Schoeman *et al*. 2010). She has made a massive contribution to the field of Arachnology in the Afrotropical Region, with many peer-reviewed articles, popular articles and books.

MATERIAL AND METHODS

Spiders were studied under a stereomicroscope. The left palp was dissected from each specimen using fine insect pins and observed for sketches and photography in 70% ethanol. Dissected genitalia were placed in microvials in the vial of the specimen

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from which they were removed. Leg spination follows the format of Bosselaers and Jocqué (2000).

Digital habitus and morphological character photographs were taken using a high resolution microscopy camera AxioCam MRc5 mounted on a Zeiss Axio Zoom V16 microscope. Extended focal range images were stacked using the ZEN module Z-stack software.

Body measurements were taken of the specimens to determine a size range. All measurements are given in millimetres (mm). Leg measurements are given in sequence from femur to tarsus, and a total length for all.

The following abbreviations are used: AER – anterior eye row, AL – abdomen length, ALE – anterior lateral eye, AME – anterior median eye, AW – abdomen width, CL – carapace length, CW – carapace width, *do* – dorsal, E – embolus, FL – fovea length, MOQAW – median ocular quadrangle anterior width, MOQL – median ocular quadrangle length, MOQPW – median ocular quadrangle posterior width, PER – posterior eye row, *pl* – prolateral, PLE – posterior lateral eye, *plv* – prolateral ventral, PME – posterior median eye, *rl* – retrolateral, *rlv* – retrolateral ventral, SW – sternum width, T – tegulum, TL – total length and *vt* – ventral terminal.

The type specimens are deposited in the National Collection of Arachnida (NCA), Agricultural Research Council – Plant Protection Research Institute, Pretoria, South Africa, which is managed by P. Marais.

TAXONOMY

Family Trachelidae Simon, 1897
Genus *Afroceto* Lyle & Haddad, 2010

Type species: *Afroceto martini* (Simon, 1897), by original designation.

Afroceto ansieae sp. n.
Figs 1, 3–5

Etymology: This species is named after Dr Ansie Dippenaar-Schoeman in recognition of the important work she has done for the National Collection of Arachnida at the Agricultural Research Council – Plant Protection Research Institute, Biosystematics division. Also to recognise and acknowledge the pivotal role she played in initiating the South African National Survey of Arachnida (SANSA).

Diagnosis: The male of this species can easily be recognised by the embolus that extends along the retrolateral margin of the cymbium and the sharply pointed tegular extension, which is medially situated (Fig. 4). It differs from *A. capensis* Lyle & Haddad, 2010, where the embolus is curved retrolaterally towards the cymbium tip and the tegular extension is prolaterally situated (Lyle & Haddad 2010: fig. 60).

Description:

Male.

Measurements: CL 2.15, CW 1.65, AL 2.33, AW 1.43, TL 4.48, FL 0.19, SL 1.12, SW 1.02, AME–AME 0.06, AME–ALE 0.04, ALE–ALE 0.35, PME–PME 0.14, PME–PLE 0.13, PLE–PLE 0.59 MOQAW 0.31, MOQPW 0.36, MOQL 0.25. Length of leg segments: I 1.58+0.59+1.30+1.06+0.82 = 5.35; II 1.49+0.64+1.12+0.96+0.77 = 4.98; III 1.16+0.48+0.79+0.82+0.46 = 3.71; IV 1.60+0.68+1.33+1.48+0.54 = 5.63.

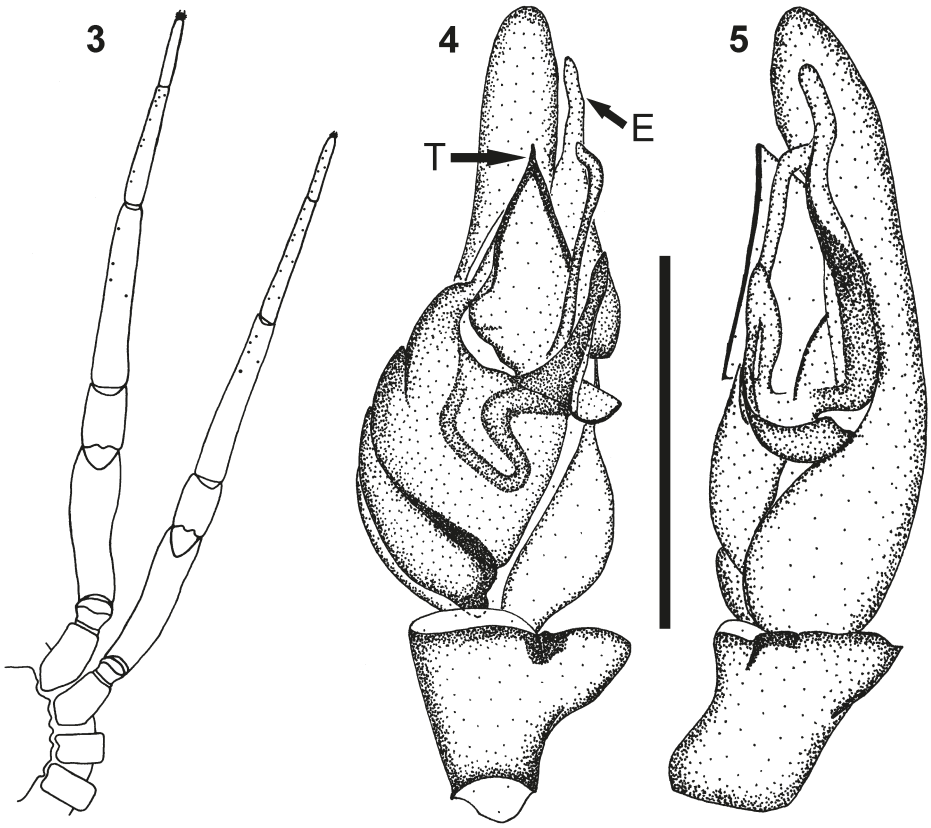
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Figs 1–2. Habitus (dorsal) of two male *Afroceto* Lyle & Haddad, 2010: (1) *A. ansieae* sp. n. and (2) *A. dippenaarae* sp. n. Scale bars = 2 mm.

Carapace: Reddish brown, brown towards ocular region; first two-thirds gradually rounded with highest point at one-third carapace length; surface finely granulated, almost smooth; steep decline in last third; fovea distinct, black, at two-thirds carapace length.
Eyes: Black rings around eyes; AER slightly procurved, PER recurved; AME larger than ALE; clypeus height equal to 0.6× AME diameter; AME separated by distance 0.6× their diameter, AME separated from ALE by distance 0.3× AME diameter; PLE slightly smaller than PME, PME separated by distance 1.3× their diameter, PLE separated from PME by distance 1.2× PME diameter.
Chelicerae: Brown; anterior surface covered with scattered long, setae; cheliceral furrow with three promarginal teeth, largest tooth medially situated; two retromarginal teeth, largest situated distally; fangs brown.
Sternum: Shield-shaped; brown, surface texture smooth, covered with long, fine setae scattered on surface.
Abdomen: Pale yellow with mottled grey; broader anteriorly, tapering posteriorly; dorsal scutum extending almost entire abdominal length; venter pale grey, covered in fine setae.
Legs: Uniform light brown, with incomplete grey bands on all legs; anterior legs more robust than posteriors; leg spines and cusps present.
Leg spination: Femora: I *pl* 1, II *pl* 1, III *pl* 1 *rl* 1 IV *rl* 1; patellae spineless; tibiae: I *plv* 2 spines *plv* 3 cusps *rlv* 1 spine *rlv* 1 cusp, II *plv* 4 cusps *rlv* 3 spines *rlv* 1 cusp, III *pl* 1

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Figs 3–5. *Afroceto ansieae* sp. n. male: (3) schematic representation of cusp arrangement on legs I and II; (4) left palp, ventral view (E – embolus, T – tegular extension); (5) left palp, retrolateral view. Scale bar (4, 5) = 0.5 mm.

plv 2 *rl* 1 *rlv* 1 *vt* 2, IV *pl* 2 *plv* 3 *rl* 2 *rlv* 1 *vt* 2; metatarsi: I *plv* 9 cusps r*lv* 1 cusp, II *plv* 4 cusps *rlv* 3 cusps, III *pl* 1 *plv* 2 *rl* 1 *rlv* 1, IV *pl* 1 *plv* 2 *rl* 1; tarsi: II *plv* 4 cusps (Fig. 3). *Palp*: Brown; embolus originating prolaterally, curving beneath large pointed tegular extension (Fig. 4), emerging retrolaterally, extending along cymbium margin to tip (Fig. 5); retrolateral tibial apophysis broad, short, with small pointed dorsally directed excrescence. No patellar apophysis present.

Female. Unknown.

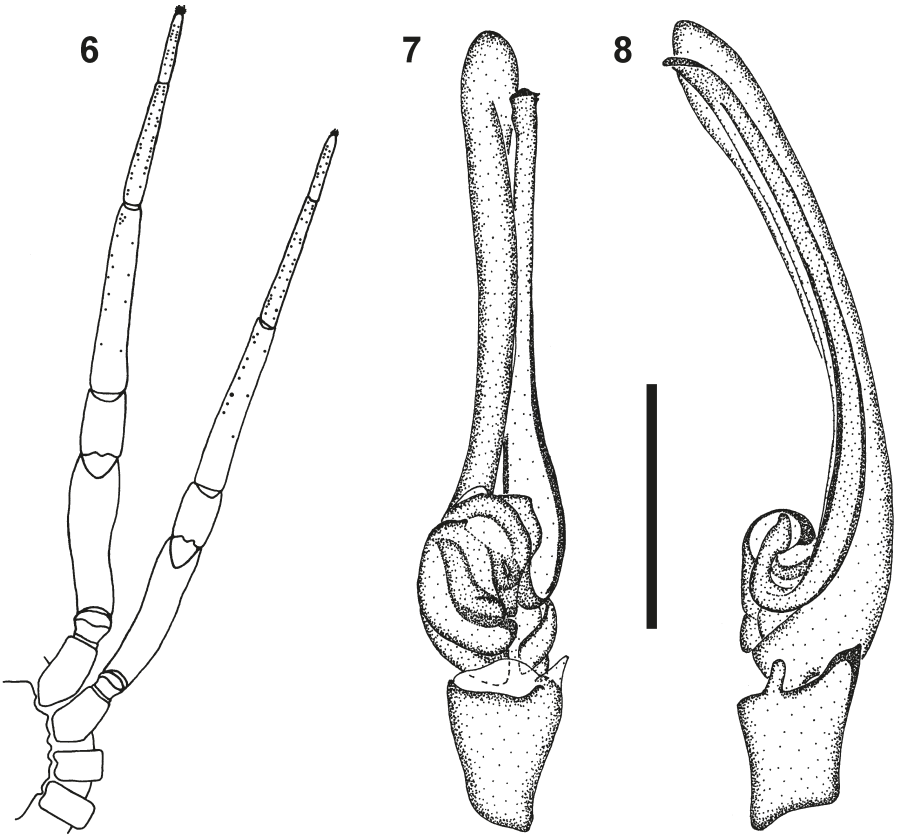
Holotype: ♂ SOUTH AFRICA: *KwaZulu-Natal*: Sani Pass, 26.65°S 29.44°E, 2700 m, 1.i.2009, University of Pretoria students, pit traps (2b) (NCA 2011/760).

Distribution: Known only from type locality (Fig. 9).

Afroceto dippenaarae sp. n.
Figs 2, 6–8

Etymology: This species is named after Dr Ansie Dippenaar-Schoeman, in recognition of the significant contribution she has made throughout her career in the field of Arachnology on the African continent, especially in South Africa.

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Figs 6–8. *Afroceto dippenaarae* sp. n. male: (6) schematic representation of cusp arrangement on legs I and II; (7) left palp, ventral view; (8) left palp, retrolateral view. Scale bar (7, 8) = 0.5 mm.

Diagnosis: *A. dippenaarae* sp. n. and *A. porrecta* Lyle & Haddad, 2010 both have an elongated embolus and cymbium. These two species are the only *Afroceto* species with two clearly separated retrolateral tibial apophyses. *Afroceto dippenaarae* sp. n. is recognised from *A. porrecta* by the broader, elongated embolus that ends with a folded tip, the less strongly ventrally curved cymbium, and the smaller dorsal retrolateral apophysis (Fig. 8).

Description:

Male.

Measurements: CL 2.68, CW 2.13, AL 2.71, AW 1.84, TL 5.39, FL 0.23, SL 1.48, SW 1.28, AME–AME 0.09, AME–ALE 0.05, ALE–ALE 0.44, PME–PME 0.17, PME–PLE 0.20, PLE–PLE 0.70, MOQAW 0.37, MOQPW 0.40, MOQL 0.34. Length of leg segments: I 2.48+1.14+2.04+1.82+1.19=8.67; II 2.26+1.06+1.76+1.66+1.13=7.87; III 2.45+0.73+1.13+1.36+0.67=6.34; IV 1.51+0.96+1.91+2.30+0.60=7.28.

Carapace: Reddish brown, darker at ocular region; first two-thirds gradually rounded, with highest point at one third carapace length; surface finely granulated, almost smooth; fovea distinct, black, at two thirds carapace length.

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Eyes: Black rings around eyes; AER recurved, PER slightly recurved, almost straight; AME larger than ALE, AME separated by distance 0.3× their diameter, AME separated from ALE by distance 0.8× AME diameter; PME slightly smaller than PLE, PME separated by distance 1.3× their diameter, PLE separated from PME by distance 1.3× PME diameter.

Chelicerae: Brown, orange towards fang base; anterior surface covered with scattered long setae; cheliceral furrow with four promarginal teeth, second distal tooth largest; two retromarginal teeth, largest situated proximally; fangs orange.

Sternum: Shield-shaped; brown, surface texture smooth, covered with long, fine setae scattered on surface.

Abdomen: Pale yellow with mottled grey; broader anteriorly, tapering posteriorly; dorsal scutum extending almost entire abdominal length; venter pale grey, covered in fine setae.

Legs: Uniform light brown, with incomplete grey bands on all legs; anterior legs more robust than posteriors; leg spines and cusps present (Fig. 6).

Leg spination: Femora: I *pl* 1, II *pl* 1, III *pl* 3 IV *rl* 1; patellae spineless; tibiae: I *plv* 2 spines *plv* 12 cusps *rlv* 4 cusps *vt* 1 cusp, II *plv* 9 *rlv* 2 cusps, III *pl* 1 *plv* 7 *rlv* 3 *vt* 1, IV *pl* 2 *plv* 2 *rl* 2 *vt* 2; metatarsi: I *pl* 1 *plv* 2 *plv* 20 cusps *rl* 1 *rlv* 1 *rlv* 15 cusps; tarsi: I *plv* 15 cusps *rlv* 10 cusps, II *plv* 8 cusps *rlv* 6 cusps (Fig. 6).

Palp: Brown; tegulum small; embolus broad, originating retrolaterally on tegulum, curving retrolaterally on narrow elongated cymbium; embolus basally almost as wide as post-tegular cymbium, tip folded (Fig. 7), two retrolateral apophyses, ventral apophysis small, rounded, two thirds of dorsal apophysis length, dorsal apophysis sharply pointed (Fig. 8). No patellar apophysis present.

Female. Unknown.

Holotype: ♂ SOUTH AFRICA: *Western Cape*: Cederberg, Crystal Pools, Wupperthal, 32°19.934'S 19°08.460'S, 1113 m, 1.iii.2009, S. Kritzinger-Klopper, pit traps (15.1.6) (NCA 2012/1901).

Distribution: Known only from type locality in the Cederberg Mountain range, Western Cape Province, South Africa (Fig. 9).

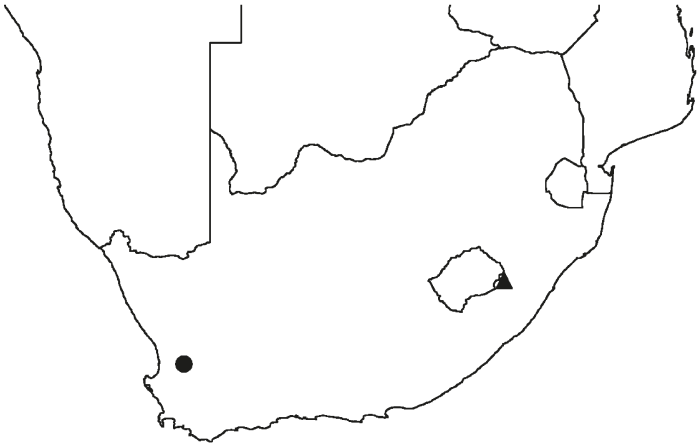


Fig. 9. Distribution of *Afroceto ansieae* sp. n. (▲) and *A. dippenaarae* sp. n. (●) in South Africa, known only from their type localities.

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Key to males of *Afroceto* species

1 Retrolateral patellar apophysis present 2
– Retrolateral patellar apophysis absent.....4

2 Embolus curving transversely, ending in sharp point; tibial apophysis simple, triangular, with sharp point, situated dorsally; distal spines on cymbium absent (Lyle & Haddad, 2010: figs 112, 113)..... ***spicula*** Lyle & Haddad, 2010
– Embolus orientated obliquely for much of its length, distal section curved, ending in swollen, fist-like point; tibial apophysis complex, situated retrolaterally, broader distally than at base in lateral view, with one or three excrescences (Lyle & Haddad, 2010: figs 40, 98); cymbium with two distal spines (Lyle & Haddad, 2010: fig. 39) 3

3 Embolus curving prolaterally after emerging from beneath tegulum, tip directed retrolaterally, ending close to distal tip of cymbium (Lyle & Haddad, 2010: fig. 39); retrolateral tibial apophysis in lateral view with three excrescences (Lyle & Haddad, 2010: figs 40, 41)..... ***martini*** (Simon, 1897)
– Embolus directed distally after emerging from beneath tegulum, tip close to retrolateral margin of cymbium (Lyle & Haddad, 2010: fig. 97); retrolateral tibial apophysis in lateral view broad and flat, with dorsally directed tooth-like excrescence (Lyle & Haddad, 2010: fig. 98).....***plana*** Lyle & Haddad, 2010

4 Embolus very broad and tongue-shaped, projecting ventrally; retrolateral tibial apophysis in lateral view with single base split into two tooth-like projections, ventral one rounded and directed anteriorly, dorsal one directed dorsally (Lyle & Haddad, 2010: fig. 53)..... ***bisulca*** Lyle & Haddad, 2010
– Embolus narrower with distinct curvature, varying in length; retrolateral apophysis simple or comprising two distinctly separated apophyses 5

5 Embolus originating prolaterally, directed transversely across cymbium, with nearly parallel sides and flattened tip near retrolateral margin (Lyle & Haddad, 2010: fig. 73) .....***flabella*** Lyle & Haddad, 2010
– Embolus shaped otherwise, origin variable 6

6 Cymbium strongly curved ventrally, twice as long as tegulum, post tegular section narrow; embolus elongated, running along retrolateral margin of cymbium; palpal tibia with two retrolateral apophyses 7
– Cymbium only slightly curved, post-tegular section less than tegular length; embolus position variable; palpal tibia with single apophysis 8

7 Embolus very long, slender, tapering into fine tip; palpal tibia with two retrolateral apophyses, ventral one small and triangular, dorsal one angled slightly dorsally and twice as long (Lyle & Haddad, 2010: figs 103, 104) ....***porrecta*** Lyle & Haddad, 2010
– Embolus very long, wide, almost width of post-tegular section of cymbium, tip folded (Fig. 7); two retrolateral apophyses, dorsal apophysis small, rounded, two thirds of posterior apophysis length, posterior apophysis sharply pointed (Fig. 8). .....***dippenaarae*** sp. n.

8 Tegulum with large, prolateral or median distal extension; embolus emerging retrolaterally and extending towards tip of cymbium along retrolateral margin; retrolateral tibial apophysis variable in structure.....9

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– Tegulum without tegular extension; embolus originating prolaterally or distally, coiled or tapering distally to sharp point; retrolateral tibial apophysis triangular, tapering to point distally 10

9 Tegulum with large, curved, tapering prolateral distal extension containing part of sperm ducts; embolus originating prolaterally, curving beneath tegular extension, emerging retrolaterally and curving towards tip of cymbium along retrolateral margin (Lyle & Haddad, 2010: fig. 60); retrolateral tibial apophysis parallel sided, directed dorsally, ending in two sharp points (Lyle & Haddad, 2010: fig. 61) ..... ***capensis*** Lyle & Haddad, 2010

– Tegulum with large, pointed median extension; embolus emerging retrolaterally to tegular extension, extending towards tip of cymbium along retrolateral margin (Fig. 4); retrolateral tibial apophysis broad, small with pointed dorsally directed excrescence ..... ***ansieae*** sp. n.

10 Embolus coiled, tip directed distally 11

– Embolus slender, ending in sharp point directed obliquely towards retrolateral margin 12

11 Tibial apophysis situated retrolaterally, subtriangular, broadest medially, gradually tapering to tip (Lyle & Haddad, 2010: fig. 46); embolus originating prolaterally, with broad coiled base; tip pointed and located medially near cymbium tip (Lyle & Haddad, 2010: figs 47, 49); tibiae I and II with prolateral cusps only (Lyle & Haddad, 2010: fig. 45) ..... ***arca*** Lyle & Haddad, 2010

– Tibial apophysis situated dorsally (Fig. 71), triangular, with sharp tip; embolus originating retrolaterally distally, with narrow coiled base and curved, parallel sided distal section; tip broad and serrated, located near prolateral margin of cymbium (Lyle & Haddad, 2010: fig. 70); tibiae I and II with prolateral and retrolateral cusps (Lyle & Haddad, 2010: fig. 71) ..... ***croeseri*** Lyle & Haddad, 2010

12 Tegular sperm duct with sharp proximal and retrolateral loops; cymbium without *plv* distal spine (Lyle & Haddad, 2010: fig. 78) ..... ***gracilis*** Lyle & Haddad, 2010

– Tegular sperm duct U-shaped, with broad proximal loop and no distal loop; cymbium with single *plv* distal spine (Lyle & Haddad, 2010: fig. 107) ..... ***rotunda*** Lyle & Haddad, 2010

CONCLUSION

Despite the recent revision of *Afroceto* by Lyle & Haddad (2010), additional species continue to be discovered. This highlights the need for ongoing sampling and continued examination of unidentified specimens deposited within museum collections. Additional sampling is needed for several reasons: Firstly, to find undescribed sexes for species like *A. bulla* Lyle & Haddad, 2010, *A. coenosa* (Simon, 1897), *A. corcula* Haddad & Lyle, 2010, *A. gracilis* Lyle & Haddad, 2010 and *A. porrecta*. Secondly, to accurately determine the distribution of each species in the genus. Lastly, to determine the limits and intraspecific variation in each species.

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E. van der Linde (Agricultural Research Council). Any opinion, findings, conclusions or recommendations expressed in this material are those of the author and therefore the NRF does not accept any liability in regard thereto. I thank Dr C. Haddad and an anonymous referee for their discussions and comments on the manuscript, and the financial support and provision of infrastructure by the Agricultural Research Council.

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