

***Murphydrela* gen. n., a new genus of ant-eating spiders from central and east Africa (Araneae: Zodariidae)**

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Abstract

A new genus of ant-eating spider, *Murphydrela* gen. n. is described from central and east Africa. Three new species, *Murphydrela johannis* gen. n. et sp. n. (type species, ♂♀), *M. francescae* gen. n. et sp. n. (♂♀), and *M. michaelis* gen. n. et sp. n. (♂) are described and illustrated. Two species originally described in the genus *Cydrela* Thorell, 1873 are transferred to *Murphydrela*: *M. kreagra* (Nzigidahera & Jocqué, 2010) comb. n. and *M. neptuna* (Nzigidahera & Jocqué, 2010) comb. n. The genus is unique within the Zodariidae in having the retrolateral tibial apophysis substituted by 3 or 4 stout spines arranged in a single row. A key to the species of *Murphydrela* is provided and their distribution is mapped and discussed.

Keywords: Cydrelineae • distribution • modified RTA • new species • taxonomy

Introduction

Zodariidae is a family of medium-sized spiders with over 1200 species and 87 described genera worldwide (World Spider Catalog 2022). The family is well represented in the Afrotropical region where 260 species and 33 genera are currently known. Among these *Cydrela* Thorell, 1873, a genus distributed across much of the Old World tropics, currently includes 13 Afrotropical species. However, several of these have a genitalic morphology which is quite different to that of the type species, *Cydrippe unguiculata* O. Pickard-Cambridge, 1871. In particular, the recently described *Cydrela kreagra* (Nzigidahera & Jocqué, 2010) and *C. neptuna* (Nzigidahera & Jocqué, 2010) show a striking modification of the retrolateral tibial apophysis which is replaced by a single row of three or four stout, flattened setae (Nzigidahera & Jocqué 2010). This, in combination with other putative synapomorphies (see generic diagnosis below) lead us to propose a new genus for these and three other newly described species. A generic diagnosis and a key to the species are provided.

Material and methods

The specimens examined in the current study were preserved in 70% ethanol and examined using a Leica MZ16 stereomicroscope for measurements and descriptions. Male and female genitalia were drawn using a WILD M10 stere-

omicroscope. Epigynes were dissected and cleared in methyl salicylate. Photographs of habitus, male palp and epigyne were manipulated with the Leica Application Suite (LAS) automontage software (ver. 3.8; Leica, <https://leica-camera.com>), with a Z-stack of 15–20 images merged into a single photomontage. For SEM photos, specimens were dried overnight in hexamethyldisilazane, gold coated and examined and photographed with a JEOL 6480 LV scanning electron microscope.

The map was created with the online tool SimpleMappr (Shorthouse 2010). Coordinates are decimal. The type material is deposited in the Royal Museum for Central Africa, Tervuren, Belgium (RMCA).

Abbreviations: ALE = anterior lateral eyes, AME = anterior median eyes, AW = anterior width, d = dorsal, disp = dispersed, not in obvious rows, dl = dorsolateral, F = femur, L = length, MOQ = median ocular quadrangle, Mt = metatarsus, P = patella, pl = prolateral, PLE = posterior lateral eyes, PME = posterior median eyes, PW = posterior width, rl = retrolateral, RMCA = Royal Museum for Central Africa (Tervuren, Belgium), t = tarsus, T = tibia, v = ventral.

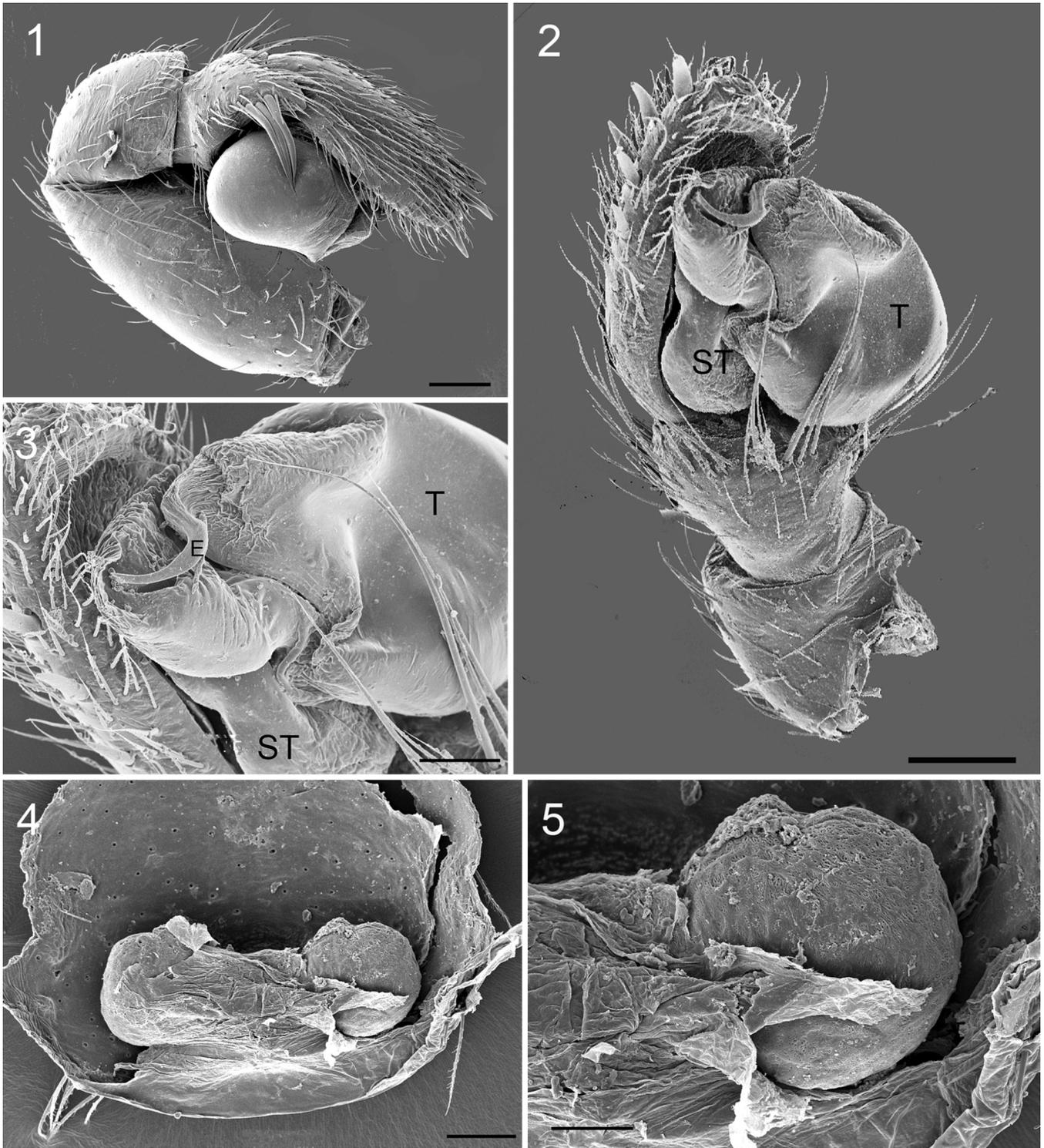
***Murphydrela* gen. n.**

Type species: *Murphydrela johannis* gen. et sp. n.; by original designation.

Etymology: The generic name is a patronym honouring the late John and Frances Murphy in recognition of their important contributions to arachnology both in Britain and world-wide.

Diagnosis: *Murphydrela* is a member of the subfamily Cydrelineae on the basis of the eye arrangement (2-2-4) and is closest to *Cydrela* which it resembles strongly in somatic morphology (Jocqué 1991). It differs from *Cydrela* in the following respects. The chilum consists of a single sclerite rather than being divided (Fig. 17). In the male palp, the RTA is substituted by three or four stout, flattened setae which in the expanded palp are hooked in the cleft between the subtegulum and the tegulum (Fig. 15). Viewed ventrally, the subtegulum is visible over the entire length of the bulbus (Figs. 2–3). Finally, the male palpal embolus is long and tapered to a sinuous tip rather than being minute and pin-like as in *Cydrela* (Figs. 2–3, 13–15, 22–24, 37–41).

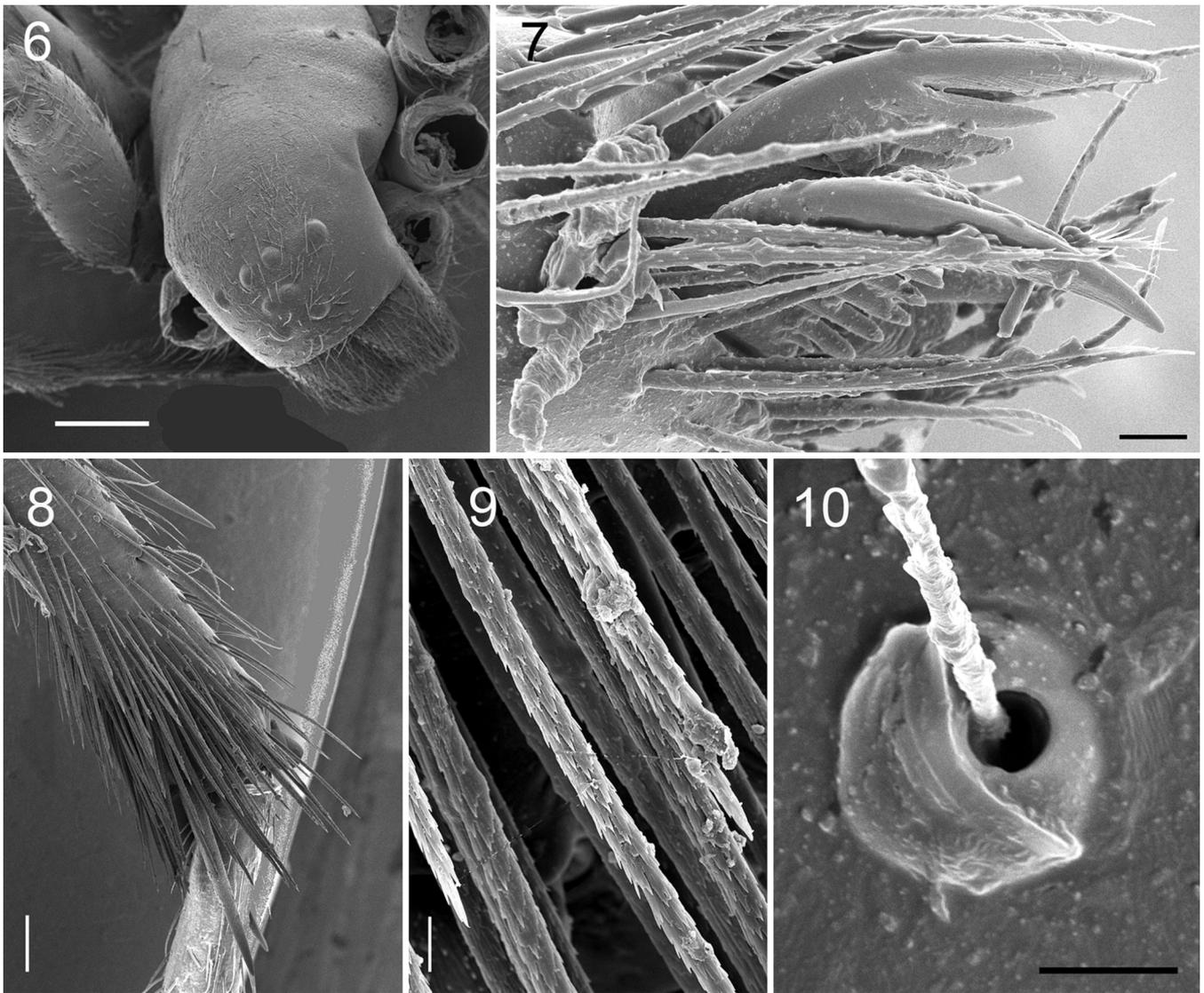
Description: Medium-sized spiders, 6.0–8.8 in total length. Carapace elongate, pale brown to black, broadest at level of coxae III. Fovea a deep slit situated centrally at level of coxae II & III and with V-shaped mark anterior to it. Head region moderately elevated, sloping gently to thoracic portion (Figs. 6, 31). Eyes arranged in three rows (2-2-4,) second narrowest and last broadest. Eye diameter ALE>AME, PLE>PME. MOQ trapezoid slightly narrower anteriorly than posteriorly. Chelicerae coloured as carapace, densely clothed in decumbent or erect black setae. Sternum scutiform, orange yellow to chestnut brown, sparsely clothed in erect dark setae. Legs orange yellow to almost black, robust with stout spines on all segments other than tarsi. Leg length IV>III>II≥I. Metatarsi III and sometimes



Figs. 1–5: *Murphydrela johannis* gen. n. et sp. n., male paratype 165013 (1–3), female paratype 144574 (4–5). **1** male palp, retrolateral view; **2** same, ventral view; **3** same, detail; **4** epigyne, dorsal view; **5** same, detail of spermatheca. Abbreviations: E = embolus, St = subtegulum, T = tegulum. Scale bars = 200 μ m (1–2), 100 μ m (3–4), 50 μ m (5).

II with terminal scopulae. Abdomen (Figs. 16, 25, 35) dorsally brown to black with characteristic pattern of anterior inverted U-shaped pale marking; posterior to this five paired pale spots, the last three joined to form transverse bars. In the type species the anterior marking is reduced to a single spot. Male palp: The RTA is substituted by three or four stout, flattened setae which in the expanded palp are hooked in the cleft between the subtegulum and the tegulum (Figs.

1, 14–15, 23, 29–30, 39–41, 47). The cymbium has a varying number of large stout spines at the distal tip and some smaller spines on the prolateral margin. Viewed ventrally, the subtegulum is visible over the entire length of the bulbus (Figs. 22, 37, 42). The tegulum has a large membranous median apophysis beneath which the embolus is situated. The embolus has a broad base tapering to a long, usually sinuous distal portion (Figs. 2–3). Epigynes are variable in



Figs. 6–10: *Murphydrela johannis* gen. n. et sp. n., male paratype 165013 (6–9), female paratype 144574 (10). **6** cephalothorax, frontal view; **7** tarsal claws, leg II, lateral view; **8** preening brush, Mt leg IV, ventrolateral view; **9** same, detail; **10** bothrium, Mt I. Scale bars = 500 µm (6), 100 µm (8), 20 µm (7), 10 µm (9–10).

ventral view. In *M. johannis* gen. n. et sp. n. and *M. francescae* gen. n. et sp. n. (Figs. 24, 33–34), they appear to have a small central pit anterior to which there is a dark U-shaped structure and to the sides of which the spermathecae can be seen through the cuticle. In *M. neptuna*, the structure is similar but the spermathecae have a section that extends anteriorly along the centre of the epigyne (Figs. 18–21, 24, 33–34, 43).

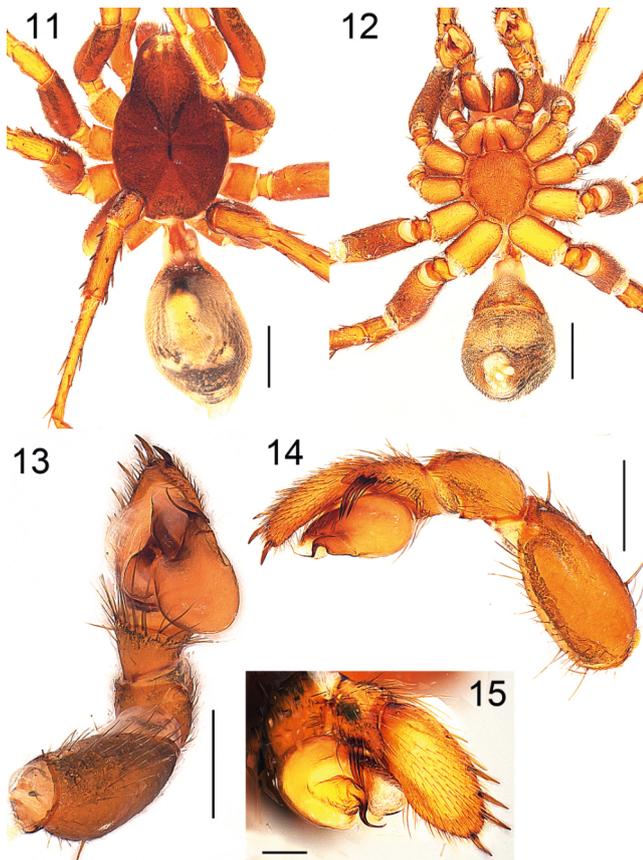
Composition: Five species: *Murphydrela johannis* gen. n. et sp. n. (type species, ♂♀; Figs. 1–24), *M. francescae* gen. n. et sp. n. (♂♀; Figs. 25–34), *M. kreagra* (Nzigidahera & Jocqué, 2010) comb. n. (♂; Figs. 46, 47), *M. michaelis* gen. n. et sp. n. (♂; Figs. 35–40), and *M. neptuna* (Nzigidahera & Jocqué, 2010) comb. n. (♂♀; Figs. 41–45).

Distribution: Central and east Africa (Fig. 48).

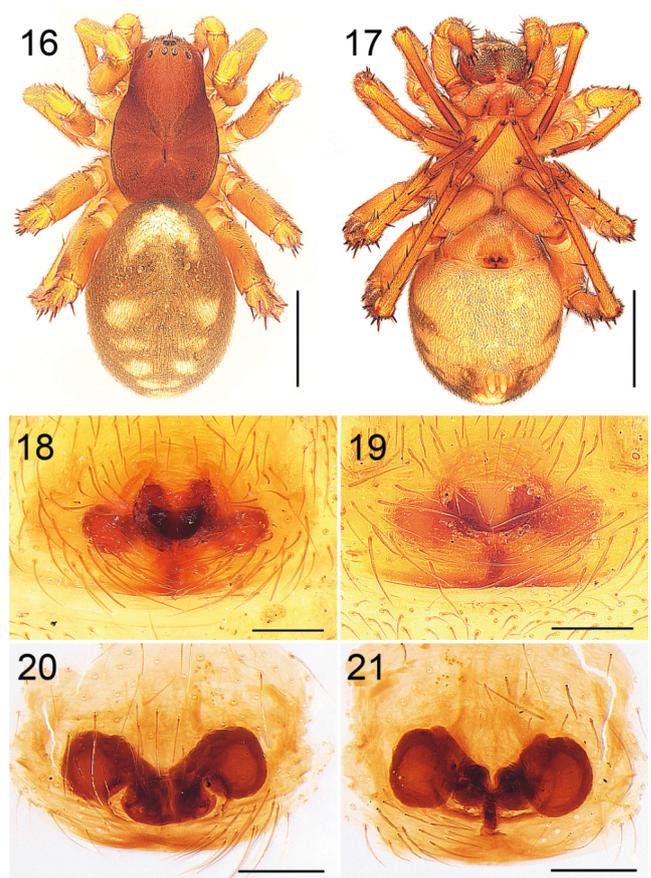
Key to the species

Male 1

- Female 5
- 1 RTA substituted by three flattened curved spines in a single row (Fig. 1)..... 2
 - RTA substituted by four flattened curved spines in a single row (Fig. 47) 4
 - 2 Embolus viewed ventrally sinuous distally (Fig. 22) 3
 - Embolus viewed ventrally long and straight distally (Fig. 42) *M. neptuna*
 - 3 Embolus viewed laterally needle-like, tapered to a fine point (Fig. 22) *M. johannis*
 - Embolus viewed laterally broad, not tapered, with rounded tip (Fig. 37) *M. michaelis*
 - 4 Embolus viewed ventrally narrow distally, needle-like (Figs. 27–28)..... *M. francescae*
 - Embolus viewed ventrally broad, distally sharply angled (Fig. 47)..... *M. kreagra*
 - 5. Epigyne viewed ventrally with a wide scape-like structure anteriorly (Fig. 24) and a V-shaped notch posteriorly *M. johannis*



Figs. 11–15: *Murphydrela johannis* sp. n., holotype male (11–14), male paratype 165013 (15). **11** habitus, dorsal view; **12** same, ventral view; **13** male palp, ventral view; **14** same, retrolateral view; **15** same, expanded and locked. Scale bars = 1 mm (11–12), 200 µm (13–15).



Figs. 16–21: *Murphydrela johannis* sp. n., female paratype 144397 (16–17, 19–21), female paratype 112644 (18). **16** habitus, dorsal view; **17** same, ventral view; **18–19** epigyne, ventral view; **20** same, cleared, ventral view; **21** same, cleared, dorsal view. Scale bars = 2 mm (16–17), 200 µm (18–21).

- Epigynes lacking a defined scape-like structure anteriorly 6
- 6 Epigyne viewed ventrally with a small central pit and paired ovate structures at 45° to the pit giving the appearance of the head of a small animal (Figs. 33–34). *M. francescae*
- Epigyne with two loops of internal ducts seen through the cuticle extending anteriorly along the mid-line and a broad, bow-shaped hind margin (Figs. 43–44) *M. neptuna*

***Murphydrela johannis* gen. n. et sp. n.** (Figs. 1–24, 48)

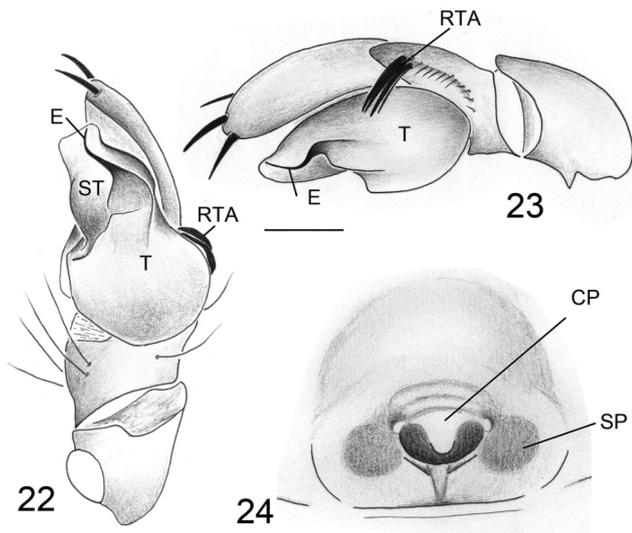
Types: Holotype ♂ (BE_RMCA_ARA.Ara165516; Figs. 11–14, 22–23), RWANDA, P. N. Akagera, Lac Ihema, 5 km S de la pêcherie, -1.92 30.75, forêt sèche à *Sansevieria*, au bordure de la pêcherie, 14 November 1985, R. Jocqué, C. Nsengimana, J. P. Michiels. Paratypes: BURUNDI: 1♀ (BE_RMCA_ARA.Ara131469), Ruzizi, plaine de la Ruzizi, -3.35 29.28, February 1967, S. Ndani. RWANDA: 7♂ (BE_RMCA_ARA.Ara165013), P. N. Akagera, Lac Mihindi, 50 km N. de la pêcherie Ihema, -1.53 30.72, pièges en forêt sèche, 23 November 1985, R. Jocqué, C. Nsengimana, J. P. Michiels. D. R. CONGO: 1♀ (BE_RMCA_ARA.Ara144397), Ruindi, Kivu N, Plaine de la Ruindi,

-0.8 29.3, dans crottins d’éléphants, 09 July 1972, M. Lejeune; 2♂, 3♀ (BE_RMCA_ARA.Ara144574), Ruindi, Kivu N, Plaine de la Ruindi, Muwe, vallée de la Muwe, -0.63 29.36. Dans un terrier de phacochère, 23 June 1972, M. Lejeune; 1♀ (BE_RMCA_ARA.Ara112644), Uvira, Kivu S. Terr. D’Uvira, Ruiss, Kalyambutu, June 1958, N. Leleup.

Other material: RWANDA: 1♂ (BE_RMCA_ARA.Ara165503), P. N. Akagera, Lac Ihema, 4 km S de la pêcherie, -1.92 30.75, prairie humide au bord de marais à papyrus, 14 November 1985, R. Jocqué, C. Nsengimana, J. P. Michiels; 1♂ (BE_RMCA_ARA.Ara165045), P. N. Akagera, Lac Ihema, -1.92 30.75, fourré dense avec herbes, pièges, 14 November 1985, R. Jocqué, C. Nsengimana, J. P. Michiels. MALAWI: 2♂ (BE_RMCA_ARA.Ara155873), Chelinda, Nyika plateau, -10.32 33.8, grassland burned in 1981, pitfalls, 07 December 1981, R. Jocqué.

Etymology: This species is named in honour of the late John Murphy (1922–2021), in recognition of his important contributions to the study of world Gnaphosidae, the spiders of south-east Asia and to arachnology more widely.

Diagnosis: *Murphydrela johannis* sp. n. most closely resembles *M. kreagra* but is distinguished by having only three curved flattened spines replacing the RTA (four in *M. kreagra*). The distal portion of the embolus is thinner and more sinuously curved than that of *M. kreagra*. The female



Figs. 22–24: *Murphydrela johannis* gen. n. et sp. n., male holotype (22–23), female paratype 144397 (24). **22** male palp, ventral view; **23** same, retrolateral view; **24** epigyne, ventral view. CP = central process, E = embolus, RTA = retrolateral tibial apophysis, SP = spermatheca, ST = subtegulum, T = tegulum. Scale bars = 200 μ m.

epigyne somewhat resembles that of *M. francescae* gen. n. et sp. n. but the spermathecae as seen through the cuticle are spherical rather than oval and the wider central scape-like structure is distinctive.

Distribution: Rwanda, Burundi, Democratic Republic of Congo, Malawi (Fig. 48).

Description of holotype ♂ (Figs. 11–14, 22–23): Total length 6.67. Carapace length 3.00, width 1.83. General appearance as in Figs. 11–12. Carapace chestnut brown, with dark V-shaped mark in front of fovea and two pairs of faint grey lines radiating from fovea to lateral and posterior margins of carapace; head region moderately elevated with slightly sloping posterior margin. Eyes: AME 0.10; ALE 0.10; PME 0.12; PLE 0.15; AME-AME touching; AME-ALE 0.07; PM E-PME 0.15; MOQ: AW 0.25; PW 0.28; L 0.35. Chelicerae chestnut brown, densely clothed in long adpressed black setae. Sternum orange-yellow with sparse covering of fine erect black setae; scutiform, lacking precoxal sclerites. Legs: femora yellow, heavily suffused with dark grey; patellae and tibiae yellow, suffused dorsally with dark grey; metatarsi and tarsi yellow. Abdomen dorsum greyish black, with one anterior central pale spot and 2 pairs of smaller pale spots posteriorly; venter pale yellow. Spinnerets bi-articulated, both segments pale yellow. Palps (Figs. 1–3, 13–15, 22–23): RTA absent, substituted by three curved and flattened spines of equal length and a single seta in the same row; cymbium with three large spines near distal margin and four smaller spines near prolateral margin; tegulum with large membranous median apophysis; embolus with broad swollen base abruptly tapering to long narrow distal portion, forming an S-shaped curve and located immediately below the median apophysis.

Leg spination for *M. johannis* gen. n. et sp. n., holotype male.

Leg	F	P	Ti	Mt	Ta
I	d 1-1 pl 1	–	d 1 pl 1 v 2-2-2	pl 1 v 2-2-2	v 2-2-2
II	d 1-1 pl 1-1	pl 1-1	d 1-1-1 v 2-2-2	d 1 v 2-2-2	v 2-2-2
III	d 1-1 pl 1-1	d 1-1 pl 1-1 rl 1	d 1-1-1 1 1-1-1 v 1-1-1	d 2 pl 2 rl 2 v 2-2-2	v 2-2-2
IV	d 1-1 pl 1	d 1 pl 1 rl 1-1	d 1-1-1 pl 3 rl 3 v 2-2-2	d 1 pl 2 rl 2 v 2-2-2	v 5

Leg measurements for *M. johannis* gen. n. et sp. n., holotype male.

Leg	F	P	Ti	Mt	Ta	Total
I	1.87	0.60	1.50	1.50	1.12	6.59
II	1.75	0.50	1.12	1.15	1.00	5.52
III	1.57	0.62	1.25	2.25	1.20	6.89
IV	2.00	0.50	1.62	2.12	1.62	7.86

Description of paratype ♀ (BE_RM-CA_ARA.Ara131469, 144397, 112644; Figs. 16–21, 24): Total length 7.66. Carapace length 3.75, width 2.17. General appearance as in Figs. 16–17. Carapace colouration as in male but carapace margin with narrow grey line. Eyes: AME 0.10; ALE 0.12; PME 0.10; PLE 0.12; AME-AME 0.05; AME-ALE 0.12; PME-PME 0.22; MOQ: AW 0.27; PW 0.37; L 0.45. Chelicerae as in male. Sternum as in male but setae longer. Legs: femora greyish yellow with black retrolateral patches; all other segments orange yellow; metatarsi II–IV with terminal scopulae, most extensive on metatarsi III. Abdomen dorsally black with anterior inverted U-shaped pale marking; posterior to this, 5 paired pale spots, last three joined to form transverse bars; venter and spinnerets as in male. Epigyne (Figs. 18–21, 24) in ventral view with central anterior scape-like structure with rounded posterior margin; spermathecae seen through cuticle situated laterally to this structure, circular, situated well anterior of posterior margin of epigyne; copulatory openings located at anterior margins of scape-like structure; with central, elongate V-shaped structure between hind margin of scape and posterior margin of epigyne.

Leg spination for *M. johannis* gen. n. et sp. n., paratype female.

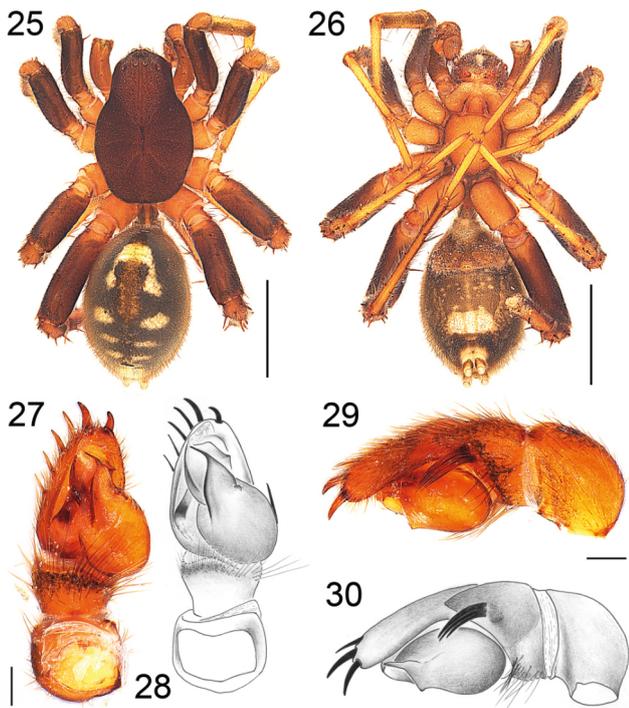
Leg	F	P	Ti	Mt	Ta
I	d 3 pl 1	–	d 1 v 2	v 2-2-2	–
II	d 3	d 3 pl 1	pl 2 v 2	v 2-2-2	v 3
III	d 3 pl 1 rl 1	d 3 pl 1 rl 3	d 1 pl 4 rl 4 v 2	d 1 pl 3 rl 3 v 2	v 3
IV	d 3 rl 1	d 3 pl 1 rl 3	d 2 pl 3 rl 3 v 2	d 3 pl 3 rl 3 v 1-2-2	v 3

Leg measurements for *M. johannis* gen. n. et sp. n., paratype female.

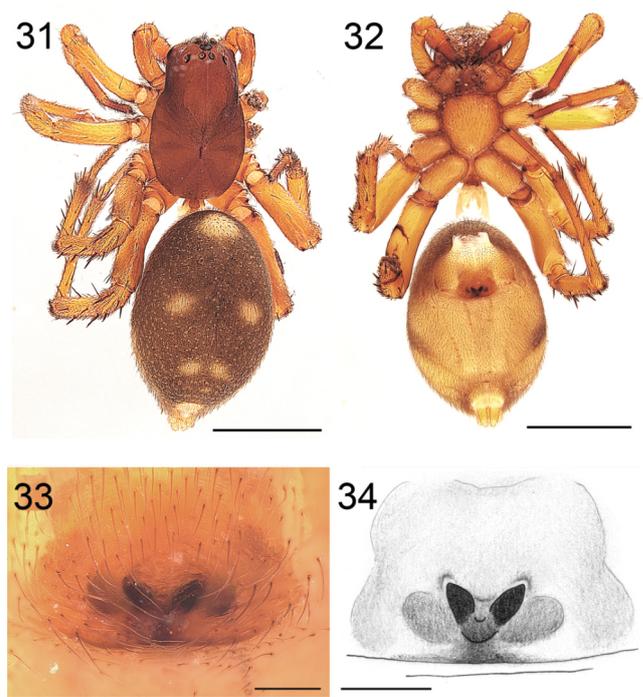
Leg	F	P	Ti	Mt	Ta	Total
I	2.00	0.62	1.50	1.52	1.12	6.76
II	1.95	0.87	2.00	1.40	0.87	7.09
III	2.25	0.87	1.25	2.12	1.00	7.49
IV	2.50	1.00	1.75	3.00	1.55	9.80

***Murphydrela francescae* gen. n. et sp. n.** (Figs. 25–34, 48)

Types: Holotype ♂ (BE_RMCA_ARA.Ara90603 ; Figs. 25–30), D. R. CONGO, Kasompi, Katanga, Ht. Katanga, terr. de Jadotville, -10.98 25.88, dans une grande termitière,



Figs. 25–30: *Murphydrela francescae* gen. n. et sp. n., male holotype. **25** habitus, dorsal view; **26** same, ventral view; **27–28** palp, ventral view; **29–30** same, retrolateral view. Scale bars = 2 mm (25–26), 200 μ m (27–30).



Figs. 31–34: *Murphydrela francescae* gen. n. et sp. n., female paratype 237255. **31** habitus, dorsal view; **32** same, ventral view; **33–34** epigyne, ventral view. Scale bars = 2 mm (31–32), 200 μ m (33–34).

17 October 1956, mission Z. Bacq. Paratypes: 1♀ (BE_RM-CA_ARA.Ara237264), P. N. A. sect. Sud, riv. Musugereza, affl. Kahanga, alt. 1175 m, -1.15 29.45, 13 December 1954, G-F. De Witte; 1♀ (BE_RMCA_ARA.Ara237255), P.N.A. sect. Sud, riv. Busholinka, affl. Rodahira, -1.18 29.48, 02 September 1954, G-F. De Witte.

Other material: D. R. CONGO: 1♂ (BE_RM-CA_ARA.Ara85268), Elisabethville, Haut Shaba, Karavia, -11.67 27.47, 07 November 1955, M. Lips; 3♀♀ (BE_RM-CA_ARA.Ara92460), Kivu, Mukera, Fizi, mine d'or de la Mukera, -4.30 28.93, dans humus, February 1952, N. Leleup.

Etymology: The specific name honours the late Frances Murphy (1926–1995) for her important contributions to promoting arachnology including the study of live spiders in captivity and spider photography.

Diagnosis: The male palp of *M. francescae* gen. n. et sp. n. somewhat resembles that of *M. kreagra* but the cymbium has only two large curved spines on the tip (four in *M. kreagra*) and the distal portion of the embolus is thinner and less acutely curved than that of *M. kreagra*. The female epigyne of *M. francescae* gen. n. et sp. n. most closely resembles that of *M. johannis* gen. n. et sp. n. but the spermathecae seen through the cuticle are oval rather than spherical and are situated much closer to the posterior margin of the epigyne than those of *M. johannis* gen. n. et sp. n.

Distribution: Only known from the Democratic Republic of Congo (Fig. 48).

Description of holotype ♂ (Figs. 25–30): Total length 6.89. Carapace length 3.12 width 1.90. General appearance as in Figs. 25–26. Carapace blackish brown with dark V-

shaped mark in front of fovea and two pairs of paler lines radiating from fovea to carapace margin; margin of carapace with narrow black border; head region moderately elevated with gently sloping posterior margin. Eyes: AME 0.10; ALE 0.12; PME 0.10; PLE 0.12; AME-AME 0.10; PME-PME 0.07; PME-PL 0.17. MOQ: AW 0.05; PW 0.10; L 0.15. Chelicerae chestnut brown with blackish blotch centrally, densely clothed in short recumbent black setae. Sternum orange yellow with sparse black setae, scuti-form; lacking pre-coxal sclerites. Abdomen dorsally coloured as for female of *M. johannis* gen. n. et sp. n., venter with white trapezium immediately anterior to spinnerets. Spinnerets bi-articulated, basal segment grey, distal segment white. Legs: femora brown dorsally, blackish brown ventrally and laterally; patellae and tibiae orange yellow dorsally, blackish brown ventrally; metatarsi and tarsi yellow; metatarsi III with distal scopulae. Palps (Figs. 27–30): RTA absent, substituted by four curved and flattened spines of equal length; cymbium with two large curved spines distally and row of four smaller spines on prolateral margin; tegulum with large membranous median apophysis; embolus with swollen base tapering to narrow curved needle-like distal portion at *c.* half its length.

Leg spination for *M. francescae* gen. n. et sp. n., holotype male.

Leg	F	P	Ti	Mt	Ta
I	d 2 pl 1	–	v 2-2-2	v 2-2	–
II	d 2 pl 1	d 1 pl 2 rl 1	pl 3 v 2-2-2	v 2-2-2	–
III	d 2 pl 1	d 2 pl 3 rl 1	d 3 pl 3 rl 3	d 2 pl 3 rl 3 v 3	v 5
IV	d 2 pl 1	d 2 pl 3 rl 1	d 3 pl 3 rl 3	d 2 pl 3 rl 2 v 2-2-2	v 5

Leg measurements for *M. francescae* gen. n. et sp. n., holotype male.

Leg	F	P	Ti	Mt	Ta	Total
I	1.32	0.75	1.37	1.50	1.12	6.06
II	1.12	0.75	1.25	1.62	1.00	5.75
III	1.87	0.75	1.20	1.70	0.87	6.39
IV	2.45	1.12	2.45	2.50	1.87	10.39

Description of paratype ♀ (BE_RM-CA_ARA.Ara237255; Figs. 31–34): Total length 7.33. Carapace length 3.05 width 1.25. General appearance as in Figs. 31–32. Carapace coloured as in male; head region slightly more elevated than in male and broader anteriorly. Eyes: AME 0.10; ALE 0.12; PME 0.12; PLE 0.17; AME-AME 0.05; AME-ALE 0.07; PME-PME 0.07; PME-PLE 0.17. MOQ: AW 0.22; PW 0.27; L 0.35. Chelicerae coloured as in male. Setae longer and stouter than in male. Sternum shape and colouration as in male. Legs: femora, patellae and tibiae I & II orange yellow, III & IV orange yellow suffused with light grey; metatarsi and tarsi yellow; metatarsi III with distal scopulae. Abdomen dorsally dark grey with central pale cream spot anteriorly and two pairs of similar spots centrally and posteriorly. Spinnerets bi-articulated, both segments cream. Epigyne (Figs. 33–34) viewed ventrally with small circular central pit with pair of dark oval structures anterior to this, giving the overall appearance of the head of a bat with large ears. To either side, spermathecae seen through cuticle small and oval, located quite close to posterior margin of epigyne.

Leg spination for *M. francescae* gen. n. et sp. n., paratype female.

Leg	F	P	Ti	Mt	Ta
I	d 2	–	–	–	–
II	d 3	d 3	pl 3	d 2	–
III	d 3	d 3 pl 3 rl 1	d 3 pl 3 rl 3	d 2 pl 3 rl 3	–
IV	d 3	d 3 pl 3 rl 1	d 2 pl 2 rl 1	d 2 pl 2 rl 2	–

Leg measurements for *M. francescae* gen. n. et sp. n., paratype female.

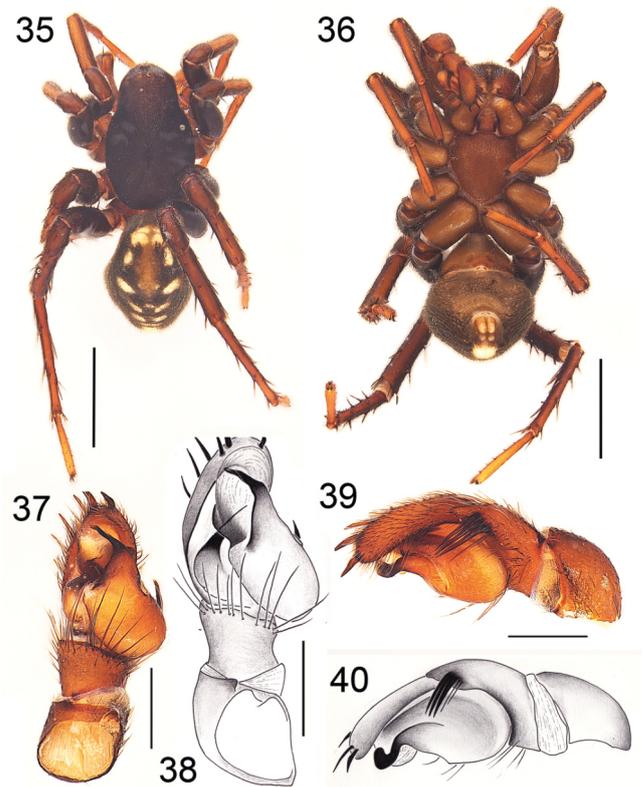
Leg	F	P	Ti	Mt	Ta	Total
I	1.75	0.62	1.45	1.00	0.85	5.67
II	1.40	0.62	1.00	1.05	0.62	4.69
III	1.25	0.75	0.87	1.25	0.87	4.99
IV	1.75	0.62	1.37	2.37	1.25	7.36

Murphydrela michaelis gen. n. et sp. n. (Figs. 35–40, 48)

Type: Holotype ♂ (BE_RMCA_ARA.Ara212217), KENYA: Nanyuki, Mpala ranch, 0.28 37.87, night catch after heavy rain, 19 April 2002, C. Warui, R. Jocqué.

Etymology: This species is named in honour of the late Dr Michael Roberts (1945–2020) in recognition of his major contribution to the study of British spiders in particular but also his magnificent illustrations of spiders from many other parts of the world.

Diagnosis: The structure of the male palp of *M. michaelis* gen. n. et sp. n. is closest to that of *M. francescae* gen. n. et sp. n. Both species have three curved, flattened spines substituting for the RTA but in *M. michaelis* gen. n. et sp. n. there is an additional normal seta in the same row. Viewed

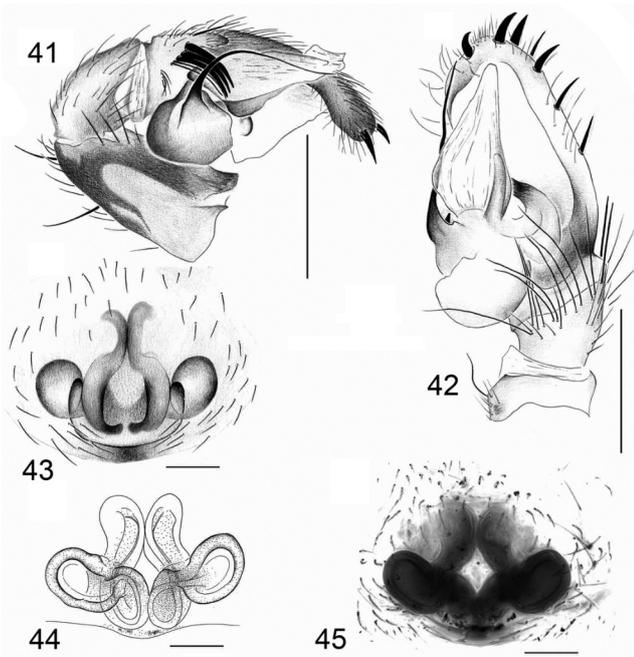


Figs. 35–40: *Murphydrela michaelis* sp. n., male holotype. **35** habitus, dorsal view; **36** same, ventral view; **37–38** palp, ventral view; **39–40** same, retrolateral view. Scale bars = 2 mm (35–36); 200 μ m (37–40).

ventrally, the embolus has the distal portion much thicker than in *M. francescae* gen. n. et sp. n. Viewed laterally, the distal embolus is flattened, curved in an S-shape and has a broadly rounded tip as opposed to the narrow sharp tip in *M. francescae* gen. n. et sp. n.

Distribution: Only known from the type locality, Mpala ranch, Kenya (Fig. 48).

Description of holotype ♂: Total length 7.16. Carapace length 3.50, width 2.00. General appearance as in Figs. 35–36. Carapace black with V-shaped groove anterior to fovea and two pairs of shallow grooves radiating from fovea to carapace margin; head region moderately raised. Eyes: AME 0.13; ALE 0.18; PME 0.13; PLE 0.18; AME-AME 0.10; AME-ALE 0.13; PME-PME 0.10; PME-PLE 0.20; MOQ: AW 0.28; PM 0.30; L 0.33. Chelicerae very dark chestnut brown, densely clothed in long recumbent black setae. Sternum scutiform, pale chestnut brown with sparse scattering of erect black setae; lacking pre-coxal sclerites. Legs: femora black; patellae and tibiae dorsally greyish-orange, laterally and ventrally blackish-chestnut brown; metatarsi and tarsi dorsally orange-yellow, ventrally greyish-chestnut; metatarsi II and III with distal scopulae. Abdomen (Figs. 35–36) dorsally black with anterior pale inverted U-shape marking; posterior to this, 4 paired pale spots decreasing in size; venter pale grey. Spinnerets bi-articulated, both segments pale grey. Palps (Fig. 8C–F): RTA absent, substituted by three curved and flattened spines of equal length and single seta in the same row; cymbium with



Figs. 41–45: *Murphydrela neptuna* (Nzigidahera & Jocqué, 2010), comb. n. **41** male palp of holotype, slightly expanded, retrolateral view; **42** male palp (MRAC 22175), ventral view; **43** epigyne, ventral view; **44** same, cleared, dorsal view; **45** same, cleared, dorsal view. Scale bars = 0.5 mm (41–42), 0.1 mm (43–45). Drawings from Nzigidahera & Jocqué (2010).

two large curved spines distally and four smaller spines on prolateral margin; tegulum with large, membranous median apophysis; embolus with long, swollen base and flattened, S-shaped distal portion, broadly rounded at its tip.

Leg spination for *M. michaelis* gen. n. et sp. n., holotype male.

Leg	F	P	Ti	Mt	Ta
I	d 2 pl 1	–	pl 1 v 2-2-2	v 2-2-2	v 2-2-2-2
II	d 2 pl 1	pl 2	v 2-2-2	v 2-2-2	v 2-2-2
III	d 2	d 3 pl 1 rl 1	d 3 pl 3 rl 3	d 2 pl 3 rl 3 v 2-2-2	pl 3 v 2-2
IV	d 3 pl 1	d 2 pl 1 rl 1	d 3 pl 3 rl 3 v 2-2-2	v 2-2-2	pl 1 v 2-2-2

Leg measurements for *M. michaelis* gen. n. et sp. n., holotype male.

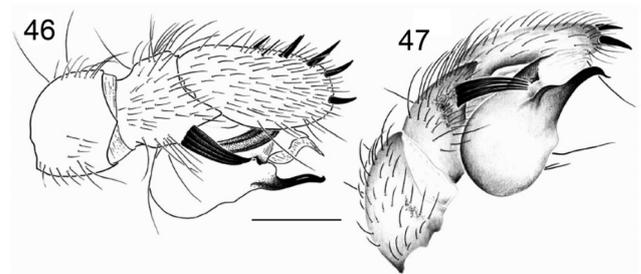
Leg	F	P	Ti	Mt	Ta	Total
I	2.37	0.87	1.55	1.50	1.00	7.29
II	2.25	0.80	1.37	1.62	1.00	7.04
III	1.87	1.00	1.30	2.00	1.00	7.17
IV	2.37	1.00	1.75	2.62	1.25	8.99

Female unknown.

***Murphydrela neptuna* (Nzigidahera & Jocqué, 2010), comb. n. (Figs. 41–45, 48)**

Remarks: This species was originally placed in *Cydrela* but the flattened spines substituting for the RTA and the long, narrow sinuous embolus (cf. figs. 1A–B in Nzigidahera & Jocqué, 2010) clearly show that it is not congeneric with *C. unguiculata* and it is here transferred to *Murphydrela*.

Distribution: Only known from Burundi (Fig. 48).



Figs. 46–47: *Murphydrela kreagra* (Nzigidahera & Jocqué, 2010), comb. n. **46** male palp of holotype, dorsal view; **47** same, retrolateral view. Scale bars = 0.5 mm. Drawings from Nzigidahera & Jocqué (2010).

***Murphydrela kreagra* (Nzigidahera & Jocqué, 2010), comb. n. (Figs. 46–48)**

Remarks: This species was also originally placed in *Cydrela* and is here transferred to *Murphydrela* for the same reasons as for *M. neptuna* (see above, and Nzigidahera & Jocqué, 2010: 66).

Distribution: Only known from Burundi (Fig. 48).

Discussion

The substitution of the RTA in *Murphydrela* gen. n. by a series of flattened spines is unique amongst the genera of the Zodariidae. It is also extremely rare in the RTA clade more generally, although examples of the substitution of the RTA by a single macroseta have been recorded in *Xenoctenus* Mello-Leitão, 1938 and in *Odo bruchi* Mello-Leitão, 1938, both in the family Xenoctenidae (Ramírez 2014). The position of these spines in the expanded palp of *Murphydrela* gen. n. (Fig. 15) suggests that their function may be in the bracing of the bulb during copulation which is apparently a pre-requisite for the evolution of complex male palps (Jocqué *et al.* 2013) but further research is needed to confirm this.

The distribution of *Murphydrela* gen. n. species appears to be closely associated with the Albertine Rift Valley, except for *M. michaelis* gen. n. et sp. n. which was collected in the Eastern Rift Valley (Fig. 48). This region, at the boundary between east and central Africa, is known for its high species richness and endemism of vertebrates, higher plants and butterflies (reviewed in Plumpton *et al.* 2007). Other than butterflies, knowledge of the diversity of most invertebrate groups in the region is fragmentary but, among spiders, two gnaphosid genera, *Zelotibia* Russell-Smith & Murphy, 2005 and *Zelowan* Murphy & Russell-Smith, 2010 have species swarms distributed in the region. *Murphydrela* gen. n. may well represent a third genus with its centre of diversity in the Albertine Rift Valley.

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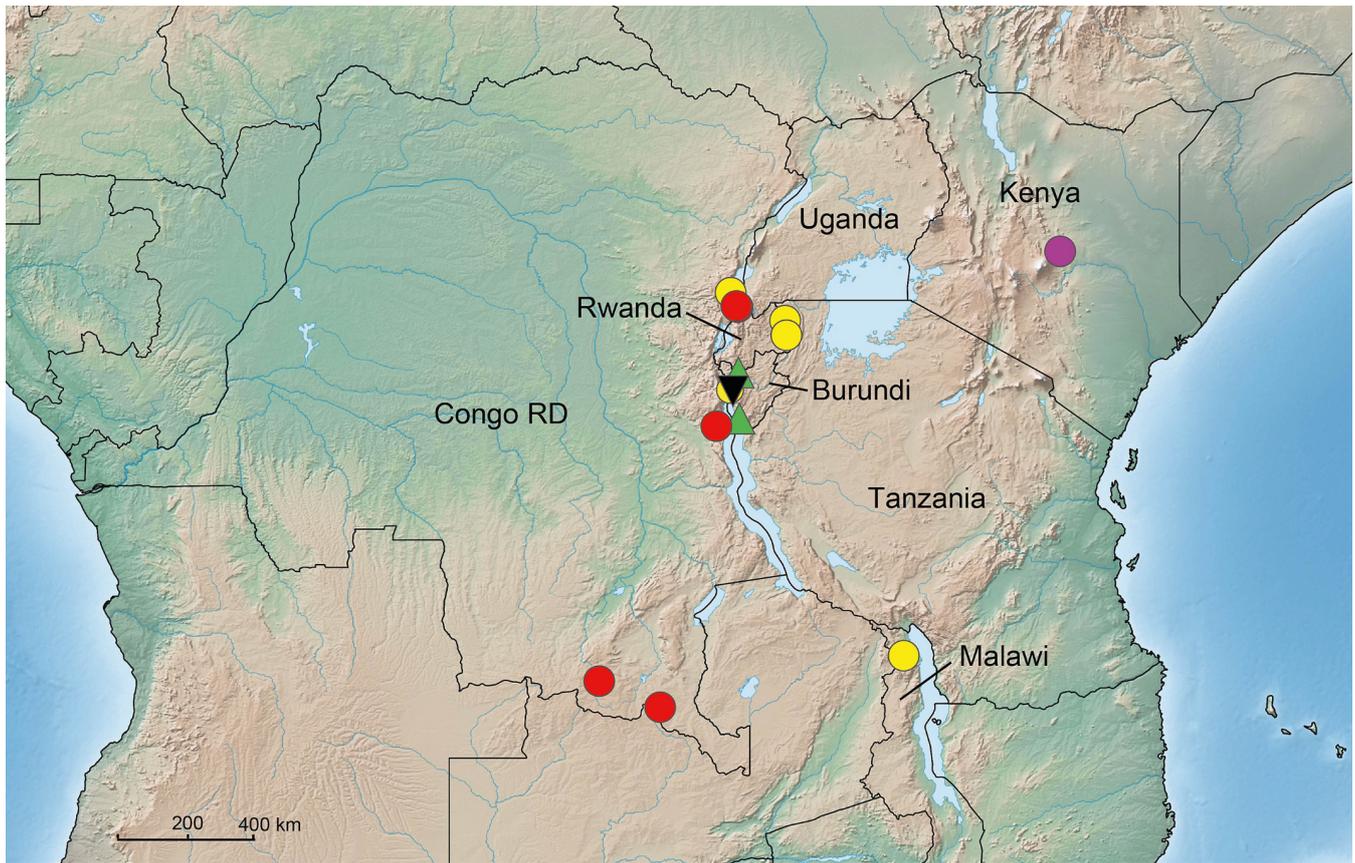


Fig. 48: Distribution map of *Murphydrela* species. *M. johannis* gen. n. et sp. n. (yellow), *M. francescae* gen. n. et sp. n. (red), *M. michaelis* gen. n. et sp. n. (fuchsia), *M. kreagra* (Nzigidahera & Jocqué, 2010) (black), *M. neptuna* (Nzigidahera & Jocqué, 2010) (green).

ogy of the RTA in *Murphydrela* gen. n. We also thank two anonymous referees for their constructive comments on the first draft of this paper.

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