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On *Rastellus*, a New Genus of the Spider Family Ammoxenidae (Araneae, Gnaphosoidea)

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ABSTRACT

A new genus, *Rastellus*, is established for a group of spiders from southern Africa in which the chelicerae of both sexes bear rastelliiform structures, composed of highly modified setae, that are probably used for digging in sand. On the basis of the anteriorly advanced posterior median spinnerets, and the apparent absence of piriform gland spigots on the anterior lateral spinnerets, *Rastellus* is placed

as the sister group of *Ammoxenus*, the only genus previously assigned to the family Ammoxenidae. Six species are newly described: *R. africanus*, the type species, and *R. struthio*, from Namibia and Botswana; *R. narubis* and *R. sabulosus* from Namibia; *R. kariba* from Zimbabwe; and *R. florisbad* from South Africa.

INTRODUCTION

This paper deals with some spiders from southern Africa that are easily recognized by the bizarre modification of the distal tip of their cheliceral paturon, which bears a complex cluster of highly modified setae (figs. 1–6). This structure, reminiscent of the rastellum of some mygalomorphs, is probably used

for digging in sand; most known specimens were taken in pitfall traps in sandy habitats. Extensive hand searching in some of those habitats has been unsuccessful in locating additional specimens, and the spiders probably spend most of their time buried under the sand surface.

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Although the enlarged, cylindrical, and widely separated anterior lateral spinnerets, the obliquely depressed palpal endites, and the flattened, irregularly shaped posterior median eyes of these spiders indicate that they belong to the superfamily Gnaphosoidea, their familial placement was far from obvious when we first encountered specimens a few years ago. Indeed, some of the specimens recorded below were provided by colleagues because it did not seem possible to place them in a known family.

A recent scanning electron microscopic study of the spinneret morphology of these and other gnaphosoids (Platnick, 1990) suggested, however, that these odd animals may represent the sister group of the genus *Ammoxenus* Simon. That genus, traditionally placed in the monotypic family Ammoxenidae, is also restricted to southern Africa, and contains species similarly adapted to life in dunes and other sandy habitats. The relationships of *Ammoxenus* have long been obscure, at least partly because of those adaptations; various authors have suggested that they might be related to the Homalonychidae, Hersiliidae, or Zodariidae (Roewer, 1955; Benoit, 1972; Dippenaar and Meyer, 1980). Other authors (Petrunkevitch, 1933; Lehtinen, 1978, 1980) have suggested that ammxenids are only distantly related to any other araneomorph families.

As argued elsewhere (Platnick, 1990), however, the latter conclusion seems to have been based primarily on an erroneous interpretation of the spinneret morphology of *Ammoxenus*, which differs from other araneomorphs (except those of the haplogyne family Caponiidae) in that the posterior median spinnerets are anteriorly advanced, and largely separate the two anterior lateral spinnerets. The six new species described below resemble those of *Ammoxenus* in this respect, although the anterior advancement of their posterior median spinnerets is sometimes not as striking as in female *Ammoxenus* because these species do not have the greatly enlarged and anteriorly deflected posterior median spinneret shape typical of female *Ammoxenus* and many other gnaphosoids.

In addition to the posterior median spinneret displacement, the new species share with *Ammoxenus* the apparent loss of all piriform

gland spigots on the anterior lateral spinnerets (Platnick, 1990: figs. 149–157), a feature that is otherwise unknown, to date, in any other gnaphosoids. We have therefore opted to expand the limits of the Ammoxenidae to accommodate the new taxa, even though they differ from *Ammoxenus* in the details of their cheliceral morphology as well as the lack of pseudosegmented tarsi and an anteriorly advanced posterior spiracle.

In addition to material in the collections of the American Museum of Natural History (AMNH) and the State Museum of Namibia, Windhoek (SMN), specimens were kindly provided by Rudy Jocqué of the Musée Royal de l'Afrique Central, Tervuren (MRAC), John Murphy of Hampton, England, who generously sorted material from pitfall samples, including some belonging to the National Museum, Bloemfontein (NMB, courtesy of Schalk Louw and Leon Lotz), and Tony Russell-Smith of Harleston, England (CRS, AMNH); Mohammad Shadab (AMNH) assisted with illustrations. Helpful comments on a draft of the manuscript were contributed by Charles Dondale (Biosystematics Research Centre, Ottawa), Rudy Jocqué, and John Murphy. The format of the descriptions follows that of Platnick and Shadab (1975); measurements (in mm) are provided only for type material.

SYSTEMATICS

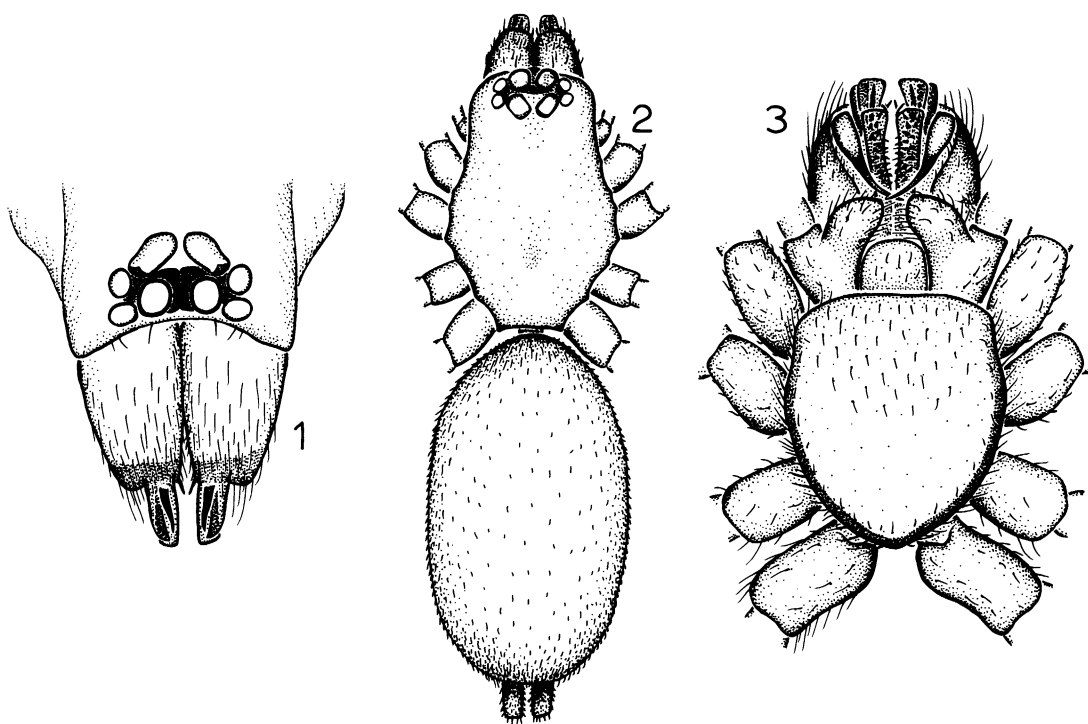
Rastellus, new genus

TYPE SPECIES: *Rastellus africanus*, new species.

ETYMOLOGY: The generic name refers to the rastelliform projection on the distal end of the chelicerae, and is masculine in gender.

DIAGNOSIS: Specimens of *Rastellus* can easily be distinguished from those of *Ammoxenus* by their differently modified chelicerae; whereas the chelicerae of *Ammoxenus* bear spiniform setae over most of their anterior surface (fig. 9), those of *Rastellus* bear modified setae only at their distal end (figs. 1–6).

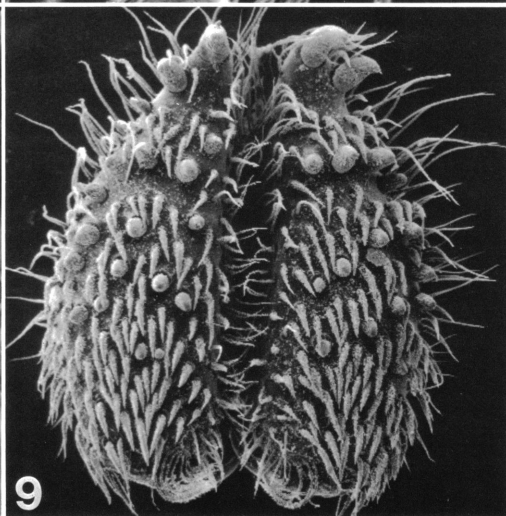
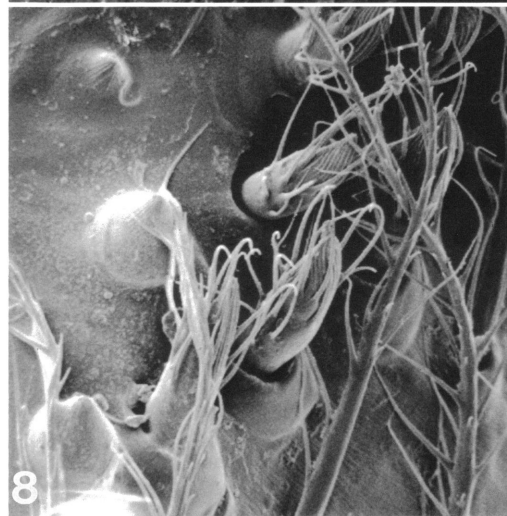
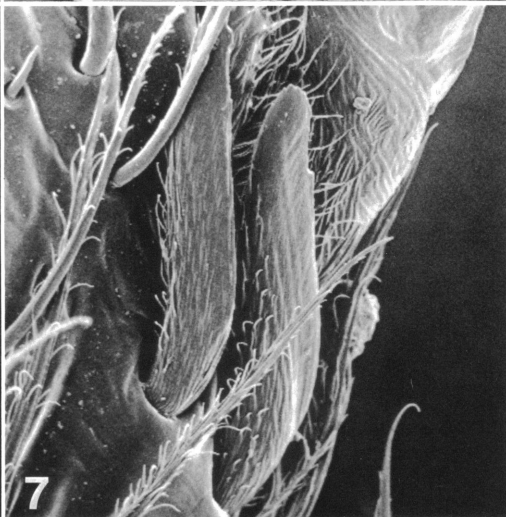
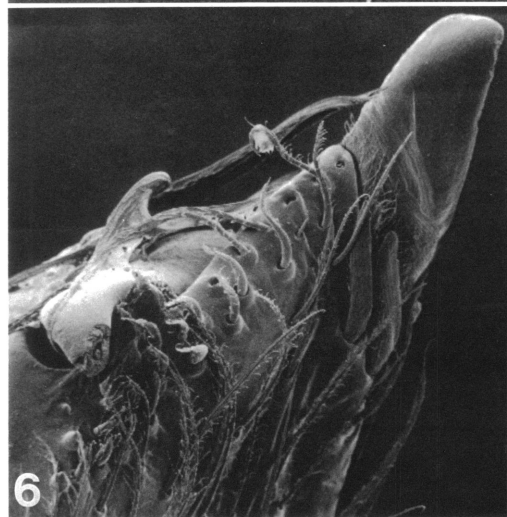
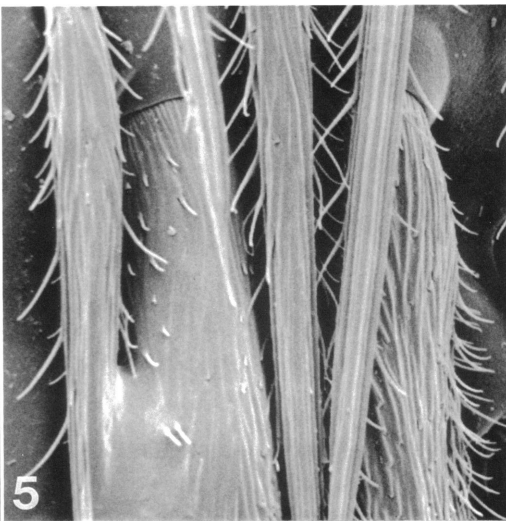
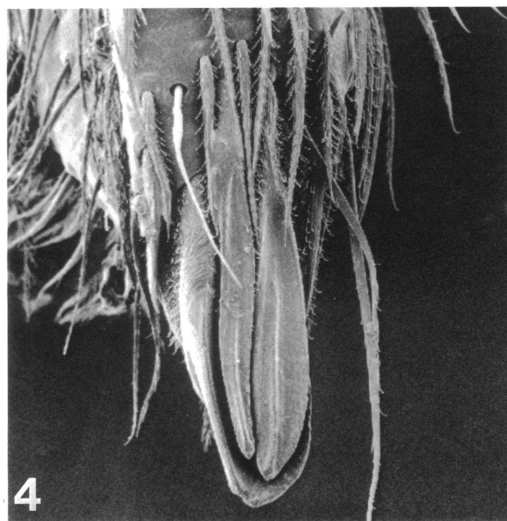
DESCRIPTION: Small ecribellate, entelegyne, gnaphosoid spiders. Total length 1.3–2.8. Carapace oval in dorsal view, widest between coxae II and III, truncated anteriorly and posteriorly, gradually narrowed at level

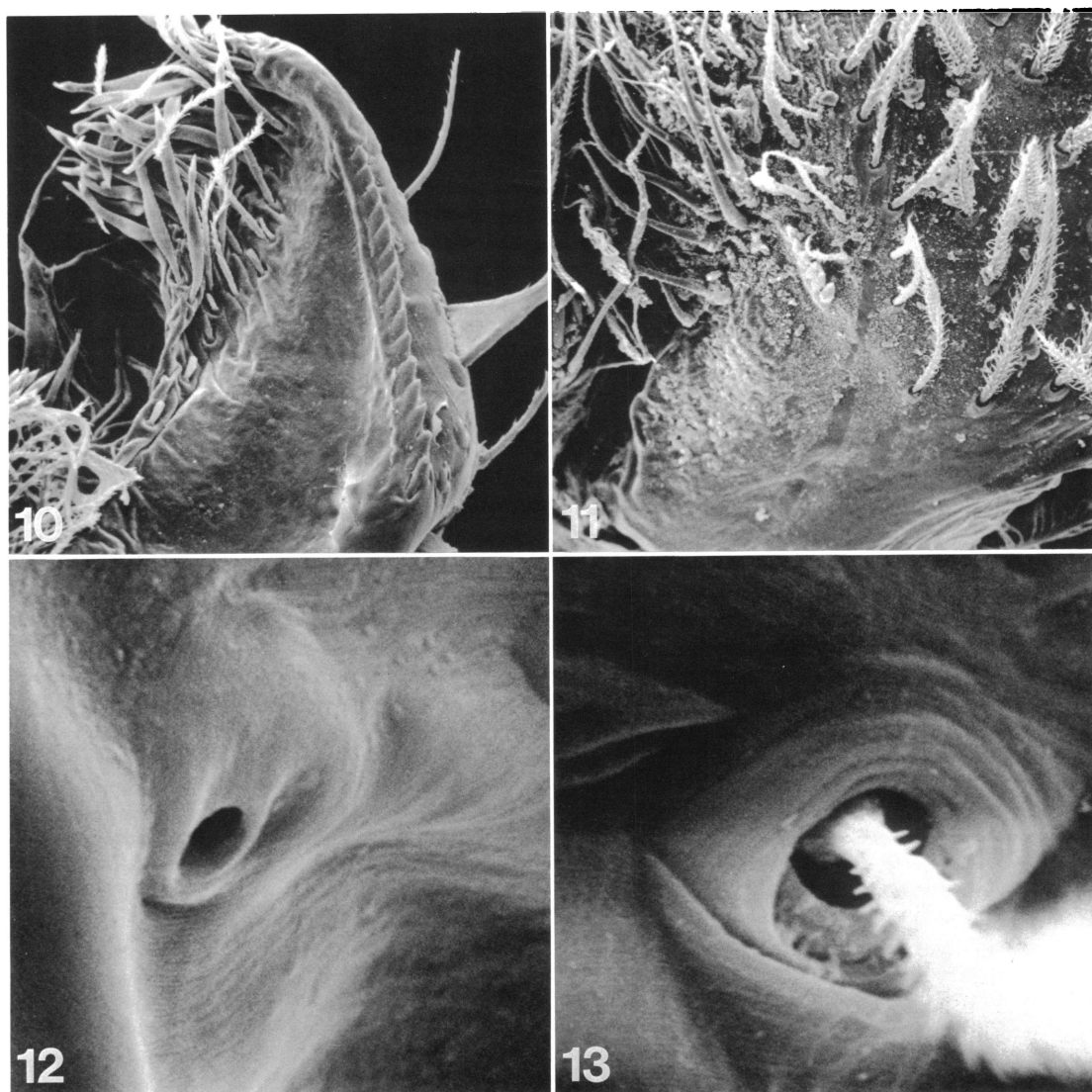


Figs. 1–3. *Rastellus africanus*, new species. 1. Carapace and chelicerae, anterior view. 2. Carapace and abdomen, dorsal view. 3. Cephalothorax, ventral view.

of palpi, pale yellow, darkest anteriorly, without dark reticulations, with few strong setae along midline and in ocular area; cephalic area low, smoothly sloping to T-shaped thoracic groove (sometimes represented only by slight depression). From above, anterior eye row recurved, posterior row strongly procurved; from front, both rows strongly procurved; AME circular, dark, ALE and PLE oval, light; PME flattened, irregularly oval, light; PME largest, ALE and PLE subequal, smaller than AME; AME separated by roughly their radius, subcontiguous with ALE; PME separated by much less than their radius, about as far from PLE; lateral eyes of each side separated by less than their radius; MOQ slightly wider than long, only slighter wider in back than in front. Clypeal height less than AME diameter. Chelicerae armed anteriorly with distal, rastelliform digging scoop (figs. 1–3) composed of three enormously enlarged and modified setae (figs. 4, 5), posterior surface of scoop preceded proximally by two enlarged setae (figs. 6, 7); fang tiny, accom-

panied by three retromarginal teeth and promarginal row of short setae bearing long hair-like projections (fig. 8). Endites almost triangular, with distinct, deep oblique depression; serrula normal (fig. 10), not reduced as in *Ammoxenus* (fig. 11); labium slightly wider than long, rebordered; sternum shield-shaped, with heavily sclerotized lateral and posterior margins, sparsely coated with dark, recumbent setae, without sclerotized extensions to or between coxae; coxae IV separated by almost their width. Leg formula 4123. Typical leg spination pattern (only surfaces bearing spines listed; in some species, leg spines reduced to few fine bristles, scarcely distinguishable from normal setae, situated dorsally on femora, ventrally on tibiae and metatarsi): femora: I–III d1-0-1, p0-0-1; IV d1-0-0; patella III p0-1-0; tibiae: II v1p-2-0; III d0-1-0, p1-1-1, v2-0-2, r1-0-1; IV p1-1-1, v2-2-2, r1-1-1; metatarsi: II v0-0-1r; III, IV p0-0-1, v0-0-2, r0-0-1. Legs pale yellow; tarsi not scopulate or pseudosegmented, with two weak claws but no claw tufts; trochanters



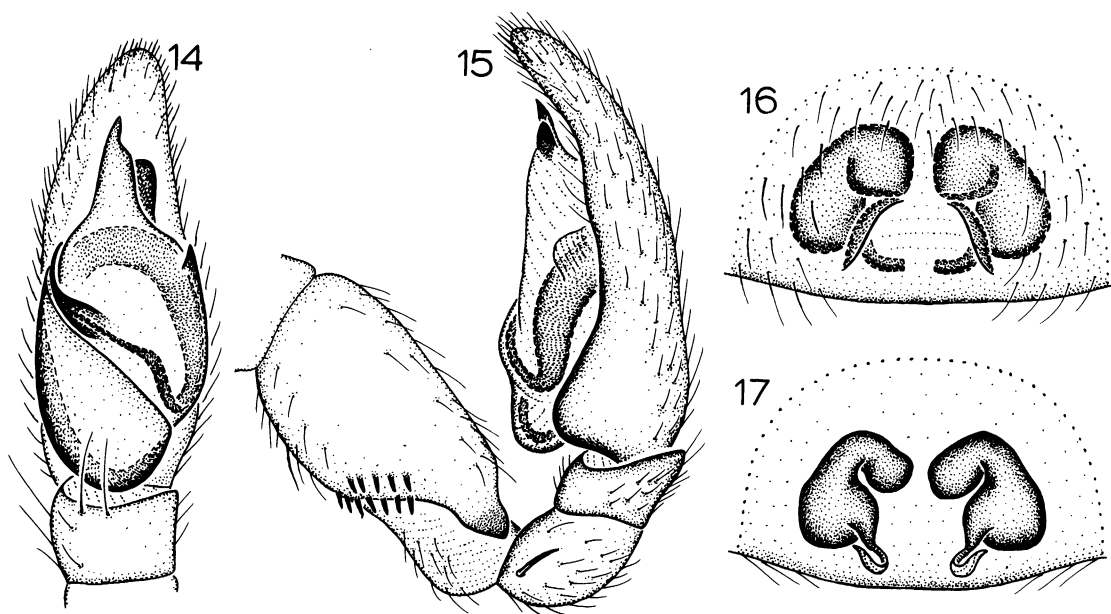


Figs. 10–13. 10, 12, 13. *Rastellus africanus*, new species. 11. *Ammoxenus psammodromus* Simon. 10, 11. Serrula on palpal endite, lateral view. 12. Tarsal organ from leg I, dorsal view. 13. Trichobothrial base from tarsus I, dorsal view.

not notched; metatarsi without preening combs; trichobothria present on tarsi and metatarsi, base transversely ridged (fig. 13); tarsal organ capsulate (fig. 12). Abdomen pale

yellow, thickly coated with fine, brown setae; males without anterior scutum; six spinnerets, anterior laterals apparently without piriform gland spigots (Platnick, 1990: figs. 154,

←
Figs. 4–9. Chelicerae of ammxenids. 4–8. *Rastellus africanus*, new species. 9. *Ammoxenus psammodromus* Simon. 4. Distal tip, showing rastelliiform setal structure, anterior view. 5. Base of anterior setae composing rastelliiform structure, anterior view. 6. Rastelliiform structure and fang (broken), posterior view. 7. Modified setae at base of rastelliiform structure, posterior view. 8. Retromarginal teeth and promarginal modified setae of fang furrow, posterior view. 9. Setae on anterior face (fang at bottom).



Figs. 14–17. *Rastellus africanus*, new species. 14. Left male palp, ventral view. 15. Same, retrolateral view. 16. Epigynum, ventral view. 17. Same, dorsal view.

155), posterior medians advanced anteriorly, at least partially separating anterior laterals (Platnick, 1990: fig. 153); posterior respiratory system consisting of spiracle situated near base of spinnerets, leading to short atrium from which emerge two thin tubes that almost immediately bifurcate, producing four narrow tracheae extending anteriorly about three-quarters of abdomen length before doubling back toward spinnerets. Male palpal femur modified distally with variously shaped protuberances; tibia without distinct retrolateral apophysis; bulb with large subtegulum, prolaterally originating embolus, and retrolateral functional conductor. Epigynum small, inconspicuous, with small spermathecae.

DISTRIBUTION: Known only from Namibia, Botswana, Zimbabwe, and South Africa.

***Rastellus africanus*, new species**

Figures 1–8, 10, 12–17

TYPES: Male holotype and female allotype taken in pitfall traps in mopane [*Colophospermum mopane* (Kirk)] woodland at an elevation of 1000 m at Smiti, 19°37'S, 23°47'E, in the Okavango Delta, northwestern Bot-

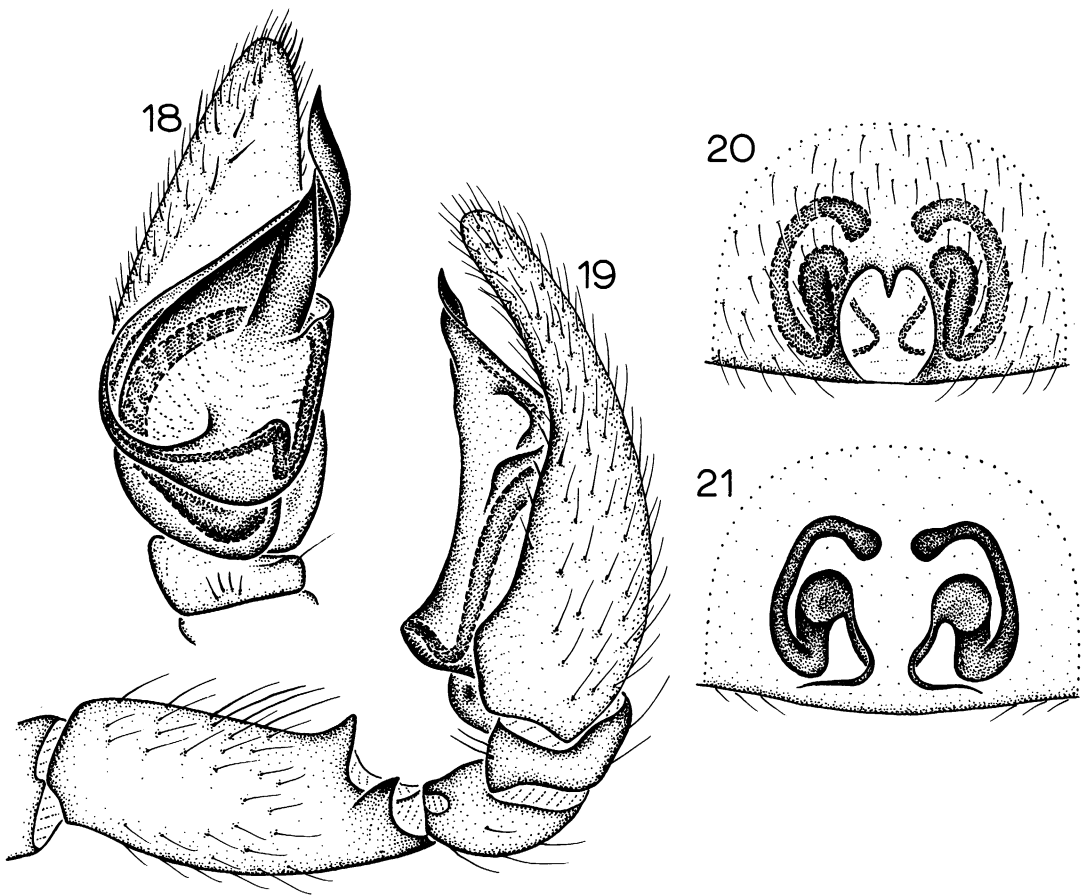
swana (Oct. 3, 1975; A. Russell-Smith), deposited in AMNH. For details on the type locality, see Russell-Smith (1981).

ETYMOLOGY: The specific name refers to the African distribution.

DIAGNOSIS: Males can be recognized by the cluster of dark cusps on the retrolateral surface of the palpal femur (fig. 15), females by the anteriorly expanded and rounded spermathecae (fig. 16).

MALE: Total length 1.99. Carapace 0.77 long, 0.49 wide. Femur II 0.53 long. Eye sizes and interdistances: AME 0.08, ALE 0.05, PME 0.10, PLE 0.06; AME-AME 0.04, AME-ALE 0.01, PME-PME 0.02, PME-PLE 0.02, ALE-PLE 0.02; MOQ length 0.19, front width 0.20, back width 0.22. Leg spines reduced to bristles. Palpal femur with triangular, heavily sclerotized ledge near distal tip of ventral surface, and cluster of dark cusps distally on retrolateral surface (fig. 15); patella with strong retrolateral spine at base; tibia short, without apophyses; bulb with distally constricted conductor (fig. 14).

FEMALE: Total length 2.24. Carapace 0.83 long, 0.60 wide. Femur II 0.49 long. Eye sizes and interdistances: AME 0.06, ALE 0.05, PME 0.07, PLE 0.05; AME-AME 0.06, AME-



Figs. 18–21. *Rastellus narubis*, new species. 18. Left male palp, ventral view. 19. Same, retrolateral view. 20. Epigynum, ventral view. 21. Same, dorsal view.

ALE 0.01, PME-PME 0.03, PME-PLE 0.02, ALE-PLE 0.02; MOQ length 0.17, front width 0.18, back width 0.17. Leg spines reduced to bristles. Epigynum with pair of lateral ridges (fig. 16); spermathecae anteriorly expanded, rounded (fig. 17).

OTHER MATERIAL EXAMINED: **Botswana:** Smiti, Okavango Delta, Oct. 3, 1975, elev. 1000 m, pitfalls, mopane woodland (A. Russell-Smith, AMNH, CRS), 5♂, 3♀. **Namibia:** Dorstland, 18°46'S, 14°44'E, Aug. 4–Sept. 13, 1987, pitfalls (E. Griffin, SMN 40598), 3♂, 40♀; Garib, 23°06'S, 17°36'E, Dec. 13–20, 1988, pitfalls (E. Griffin, SMN 40976), 3♂, 3♀; Kameseb, 19°04'S, 16°41'E, Aug. 8–Sept. 14, 1987, pitfalls (E. Griffin, SMN 40712), 4♂, 24♀; 26 km W Kongola, W Caprivi, 17°48'S, 23°05'E, Oct. 31–Nov. 5, 1987, pit-

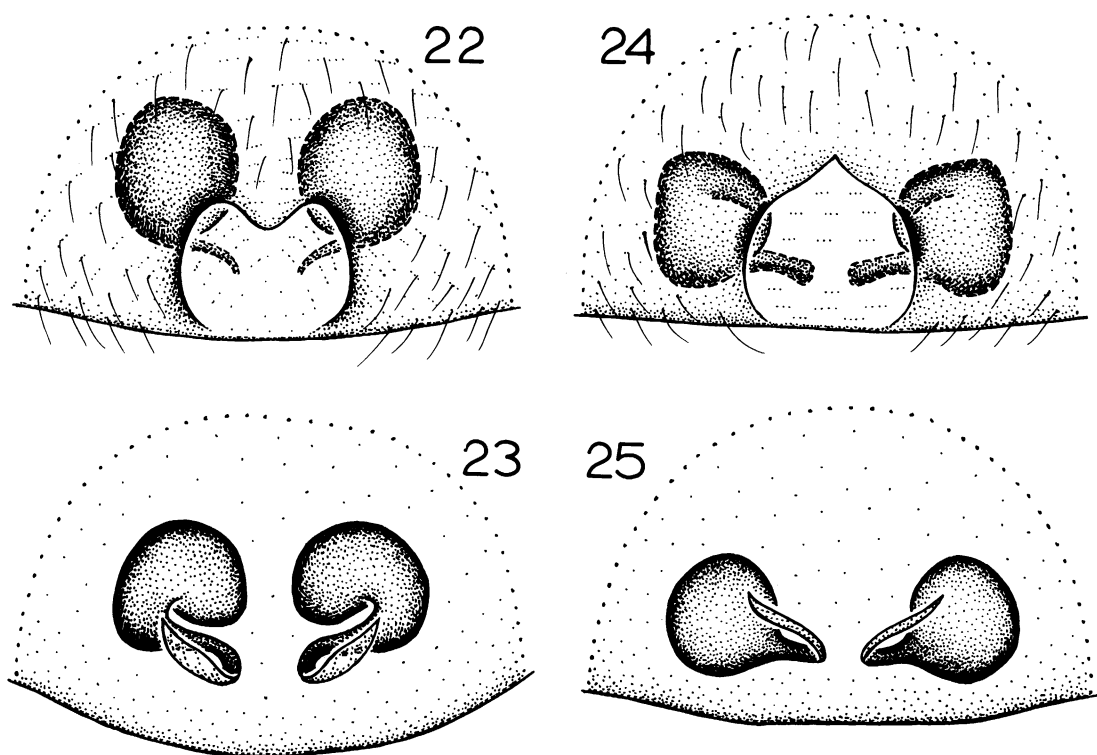
falls (E. Marais, SMN 41460), 1♀; junction, Mushare and Kameeldoring roads, Etosha Game Park, 18°37'S, 16°53'E, Oct. 14–Nov. 15, 1986, pitfalls (E. Griffin, SMN 39797), 2♂, 2♀; 4 km SW Ruacana Falls, 17°25'S, 14°13'E, July 25–Aug. 12, 1989, pitfalls (E. Marais, SMN 41438), 30♂, 27♀; 94 km S Rundu, Oct. 16–24, 1987, ungrazed woodland (R. Jocqué, MRAC 168.428), 3♂.

DISTRIBUTION: Known only from Botswana and Namibia.

***Rastellus narubis*, new species**

Figures 18–21

TYPES: Male holotype and female allotype taken in pitfall traps on a rocky hillside at



Figs. 22–25. 22, 23. *Rastellus struthio*, new species. 24, 25. *R. sabulosus*, new species. 22, 24. Epigynum, ventral view. 23, 25. Same, dorsal view.

Narubis, Namibia (Mar. 6–Apr. 24, 1988; S. Schubert), deposited in SMN.

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males can be recognized by the erect spur at the distoventral edge of the palpal femur (fig. 19), females by the elongate epigynal ducts (fig. 20).

MALE: Total length 1.37. Carapace 0.66 long, 0.53 wide. Femur II 0.47 long. Eye sizes and interdistances: AME 0.06, ALE 0.05, PME 0.07, PLE 0.05; AME-AME 0.05, AME-ALE 0.00, PME-PME 0.02, PME-PLE 0.02, ALE-PLE 0.02; MOQ length 0.14, front width 0.17, back width 0.15. Leg spines reduced to bristles. Palpal femur with ventrally directed spur on distal tip of ventral surface and retrolateral clump of soft distal setae (fig. 19); patella with retrolateral ridge; tibia short; palpal conductor elongate (fig. 18).

FEMALE: Total length 2.21. Carapace 0.85 long, 0.63 wide. Femur II 0.46 long. Eye sizes and interdistances: AME 0.05, ALE 0.05,

PME 0.07, PLE 0.06; AME-AME 0.05, AME-ALE 0.01, PME-PME 0.02, PME-PLE 0.01, ALE-PLE 0.02; MOQ length 0.13, front width 0.15, back width 0.16. Leg spination reduced, definite spines only as follows: femora: III p1-0-0; IV p1-0-1; tibia III v1p-0-1p; metatarsus IV v0-0-2. Epigynal ducts long, curling around spermathecae (figs. 20, 21).

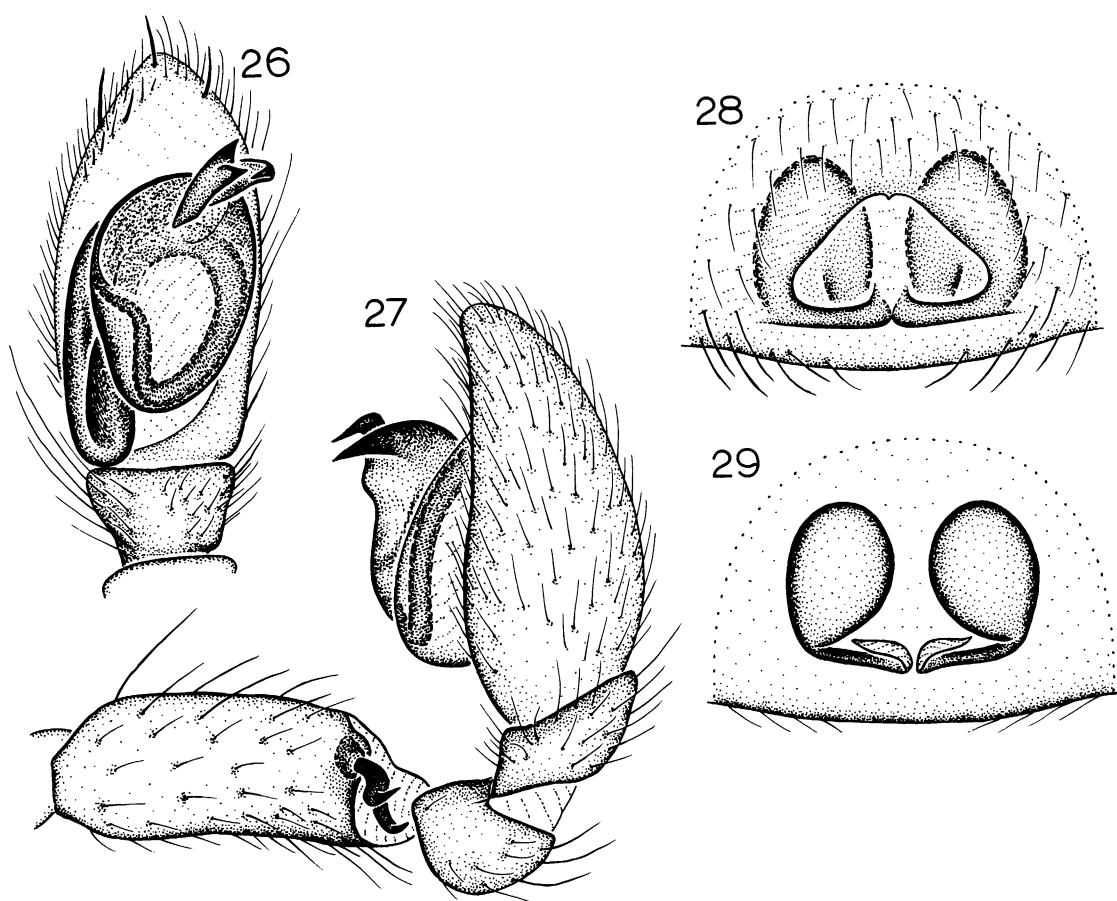
OTHER MATERIAL EXAMINED: **Namibia:** Dome Gorge, 22°28'S, 15°04'E, July 3–30, 1984, pitfalls (J. Irish, H. Rust, SMN 38202), 1♀; Narubis, 22°02'S, 15°39'E, Mar. 6–Apr. 24, 1988, pitfalls, rocky hillside (S. Schubert, SMN 40783), 2♂, 3♀; Otjongoro, 20°53'S, 15°38'E, Apr. 27–May 27, 1988, pitfalls (J. Komen, SMN 40784), 1♂, 1♀.

DISTRIBUTION: Known only from Namibia.

***Rastellus struthio*, new species**

Figures 22, 23

Type: Female holotype taken from pitfall traps at Upper Ostrich Gorge, 22°29'S,



Figs. 26–29. 26, 27. *Rastellus florisbad*, new species. 28, 29. *R. kariba*, new species. 26. Left male palp, ventral view. 27. Same, retrolateral view. 28. Epigynum, ventral view. 29. Same, dorsal view.

14°59'E, Namibia (Sept. 28–Oct. 22, 1984; J. Irish, H. Rust), deposited in SMN.

ETYMOLOGY: The specific name is a noun in apposition taken from the generic name of the ostrich.

DIAGNOSIS: The paired, closely spaced posterior epigynal openings (fig. 22) are diagnostic.

MALE: Unknown.

FEMALE: Total length 2.14. Carapace 0.83 long, 0.60 wide. Femur II 0.64 long. Eye sizes and interdistances: AME 0.06, ALE 0.05, PME 0.08, PLE 0.05; AME-AME 0.06, AME-ALE 0.00, PME-PME 0.03, PME-PLE 0.03, ALE-PLE 0.02; MOQ length 0.15, front width 0.18, back width 0.19. Leg spination reduced, definite spines only as follows: femur IV p1-0-0; tibiae: II v0-0-1r; III p0-1-1, v0-0-1p,

r0-0-1; IV v1p-0-1p; metatarsi: III v0-0-2; IV p0-0-1, v0-0-2. Spermathecae small, rotund, situated at closely spaced epigynal openings (figs. 22, 23).

OTHER MATERIAL EXAMINED: **Botswana:** Smiti, Okavango Delta, Sept. 15, 1975, elev. 1000 m, pitfall, mopane woodland (A. Russell-Smith, AMNH), 1♀. **Namibia:** Lower Ostrich Gorge, 22°30'S, 14°58'E, July 3–30, 1984, pitfalls (J. Irish, H. Rust, SMN 38193), 4♀; 19 km E Omega, W Caprivi, 18°01'S, 22°26'E, Oct. 30–Nov. 5, 1987, pitfalls (E. Marais, SMN 41493), 1♀; Upper Ostrich Gorge, 22°29'S, 14°58'E, Sept. 28–Oct. 22, 1984, pitfalls (J. Irish, H. Rust, SMN 38336), 1♀; unnamed locality, 17°37'S, 12°12'E, Oct. 13–16, 1988, pitfalls (E. Griffin, SMN 40845), 2♀.

DISTRIBUTION: Known only from Namibia and Botswana.

***Rastellus sabulosus*, new species**

Figures 24, 25

TYPE: Female holotype taken in a pitfall trap on a slope in the Namib Desert, 23°43'S, 15°44'E, Namibia (Aug. 13, 1981; J. Irish), deposited in SMN.

ETYMOLOGY: The specific name refers to the sandy habitat.

DIAGNOSIS: The small, round spermathecae resemble those of *R. struthio*, but are more widely separated (figs. 24, 25).

MALE: Unknown.

FEMALE: Total length 2.39. Carapace 0.83 long, 0.60 wide. Femur II 0.53 long. Eye sizes and interdistances: AME 0.05, ALE 0.04, PME 0.06, PLE 0.04; AME-AME 0.05, AME-ALE 0.02, PME-PME 0.06, PME-PLE 0.00, ALE-PLE 0.01; MOQ length 0.16, front width 0.15, back width 0.18. Leg spines reduced to bristles. Spermathecae circular, widely separated, situated at epigynal openings (figs. 24, 25).

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Known only from Namibia.

***Rastellus kariba*, new species**

Figures 28, 29

TYPE: Female holotype from pitfall trap in mopane woodland 60 km E of Lake Kariba, on the W shore of Nabusenga Dam, Zimbabwe, between 17°10' and 17°30'S, and 28°00' and 28°15'E (Oct. 6, 1988; C. Tingle), deposited in AMNH courtesy of the collector and John Murphy.

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: The large, ovoid spermathecae (figs. 28, 29) are diagnostic.

MALE: Unknown.

FEMALE: Total length 2.40. Carapace 1.01 long, 0.75 wide. Femur II 0.60 long. Eye sizes and interdistances: AME 0.06, ALE 0.05, PME 0.08, PLE 0.05; AME-AME 0.06, AME-ALE 0.00, PME-PME 0.05, PME-PLE 0.02, ALE-PLE 0.01; MOQ length 0.18, front width 0.18, back width 0.21. Leg spination: femur III p0-0-0; tibiae: II v0-0-0; III p2-2-1, r0-0-1; IV p1-0-1, v2-0-2, r0-0-1; metatarsi: III

p0-1-2, v2-0-2; IV v2-0-2. Spermathecae large, ovoid, closely spaced, situated at epigynal openings (figs. 28, 29).

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Known only from Zimbabwe.

***Rastellus florisbad*, new species**

Figures 26, 27

TYPE: Male holotype taken in pitfall trap at Florisbad, Orange Free State, South Africa (Nov. 9–23, 1987; L. Lotz), deposited in NMB.

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: The bifid distal projection on the retrolateral surface of the palpal femur (fig. 27) is diagnostic.

MALE: Total length 2.74. Carapace 1.13 long, 0.68 wide. Femur II 0.68 long. Eye sizes and interdistances: AME 0.07, ALE 0.05, PME 0.09, PLE 0.05; AME-AME 0.06, AME-ALE 0.01, PME-PME 0.05, PME-PLE 0.04, ALE-PLE 0.03; MOQ length 0.19, front width 0.21, back width 0.23. Leg spination strong, as detailed in generic description. Palpal femur with strong, bifid projection at distal tip of retrolateral surface (fig. 27); patella and tibia unmodified; palpal conductor short (fig. 26).

FEMALE: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Known only from South Africa.

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