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On harvestmen from the Soutpansberg, South Africa, with description of a new species of *Monomontia* (Arachnida: Opiliones)

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ABSTRACT

The harvestman fauna of the Western Soutpansberg was investigated during two collecting trips. Comments are made on the variability, ecology and remarkable morphological features of the collected material. Characters are displayed and differences to type series are highlighted. *Monomontia neglecta* sp. n. is described from material housed at the Natal Museum. *Metabiantes leighi* Pocock, 1902 is recorded for the first time for the Soutpansberg area. A species list is provided, listing all known records and the state of endemism. The relative species richness of the eastern Soutpansberg is discussed in comparison with the western area.

KEY WORDS: Arachnida, Opiliones, *Metabiantes*, *Monomontia*, *Rhampsinitus*, new species, allometric growth, variability, diversity, ecology, checklist, new records, South Africa, Limpopo, Soutpansberg.

INTRODUCTION

In autumn 2002, a study trip brought the author to the farm Lajuma in the Western Soutpansberg, Limpopo Province, South Africa. The owners of the farm are investigating the fauna and flora of the area to underline its importance for biodiversity protection and to propose it as a Biosphere Reserve. Within this scope, harvestmen were collected, and additional material collected by Dr Peter Schwendinger (Geneva, Switzerland) was included. During the investigation it became evident that a revaluation of the type material of several species was necessary to identify the new material correctly. A list of species recorded at Lajuma was prepared, and the results also pointed to differences to the type material, gave evidence of remarkable intraspecific variation and prompted the description of one new species from material in the Natal Museum. Comments are made on the ecology and biogeography of the species. Reasons for differences in species richness within the Soutpansberg, and distribution of taxa, are discussed.

MATERIAL AND METHODS

The study area (Fig. 1) was the farm Lajuma, which is named after the nearby peak Lajuma (23°01'S:29°25'E; 1747 m) and is situated between Makhado (Louis Trichardt) and Vivo in the Western Soutpansberg Mountain Range, Limpopo Province. In this paper, the collection sites at Makhado and Entabeni are regarded as the Eastern Soutpansberg, which is separated from the western part by the dry valley of the Sand River. Lajuma has been declared a Natural Heritage Site and is part of the Thavha Ya Muno Private Nature Reserve and the Soutpansberg Conservancy. The geological setting of the study area is rather complex. The Soutpansberg is composed mainly of sandstone dipping at approximately 30° north-northwesterly (Barker *et al*. 2006). The resulting cliffs force the uplift of clouds and a frequent release of precipitation. Constant groundwater seepage at the foot of the cliffs creates stable patches of constant humidity, which are small-scale within the mountain area. Other habitats are open savannah and cloud forest characterised by poikilohydric cryptogams.

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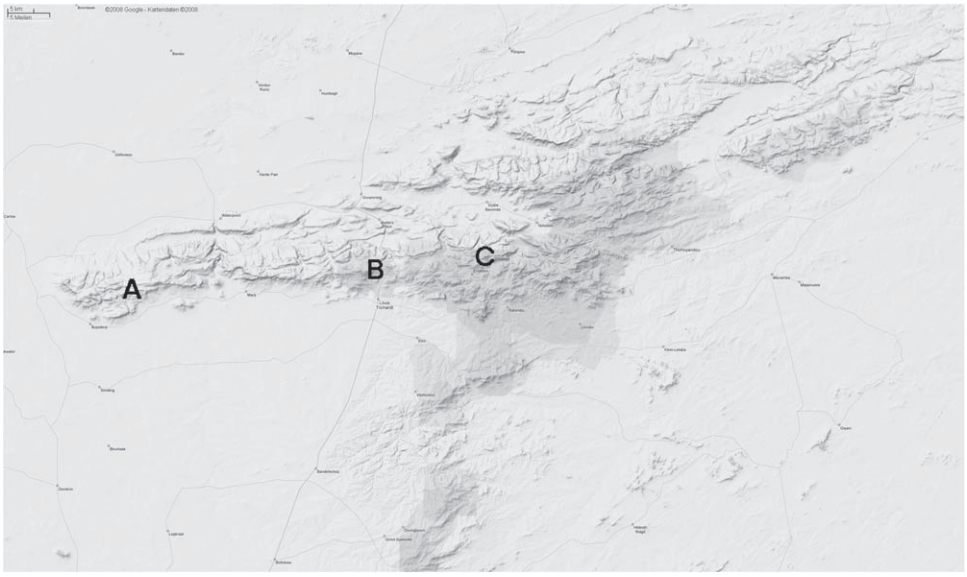

Fig. 1. Collecting sites, Soutpansberg mountain range, Limpopo Province, South Africa: (A) Farm Lajuma, (B) Hanglip Forest north of Makhado (Louis Trichardt), (C) Entabeni Forest near Entabeni, 30 km east of Makhado.

All accessible habitats were sampled for opilionids, which were collected by sieving leaf litter, turning over stones and logs in daylight, and making a few hand collections by night. Specimens are deposited in the following institutions: NMSA – Natal Museum, Pietermaritzburg, RSA (Debbie Jennings, Juthika Baijoo); MHNG – Muséum d'Histoire Naturelle, Geneva, Switzerland (Dr Peter Schwendinger); CJM – Collection of Prof. Jochen Martens, University of Mainz, Germany.

Drawings were performed with a stereomicroscope and a camera lucida. Photographs were taken with a Nikon D80, using the same microscope. Terms for genital morphological features follow Kauri (1961: 13).

RESULTS

Prior to Lawrence's (1963) comprehensive study on harvestmen of the Transvaal, only one species was known from the Soutpansberg (Lawrence 1931). Intensive collecting by R.F. Lawrence and N. Leleup increased this number to ten (Lawrence 1963). Staręga (1992) added a further species to this list. Surprisingly, Staręga (1992) lists *Metabiantes perustus* for Makhado (NMSA, 7606), Entabeni (NMSA, 7609) and Hanglip forest (NMSA, 7600). Why Lawrence (1963), who must have seen these specimens, did not include them in the original description of *M. perustus* cannot be explained. A re-examination of the type material and Staręga's new records should be done in the future.

Within this report, one species is recorded as new for the Soutpansberg and one as new to science, so that the total number of species for the area is now 13.

The number of species is much smaller in the Western Soutpansberg (Lajuma, 5; Makhado, 12) and the proportion of Soutpansberg endemics is smaller (Lajuma, 40 %;

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Makhado, 64 %), with 45 % found only near Makhado and recorded from none of the other localities. A list of all recorded species follows, with endemic species of the Soutpansberg indicated and asterisks indicating species discussed in this account.

Petallidae Shear, 1980		
Purcellia transvaalica Lawrence, 1963	Makhado	endemic
Assamiidae Sørensen, 1884		
Randilella transvaalensis Lawrence, 1963	Makhado, Entabeni	
Biantidae Thorell, 1889		
Metabiantes leighi Pocock, 1902*	Lajuma	
Metabiantes perustus Lawrence, 1963	Makhado, Entabeni	
Triaenonychidae Sørensen, 1886		
Adaeulum humifer Lawrence, 1963	Makhado	
Austromontia formosa Lawrence, 1963	Makhado	endemic
Austronuncia leleupi Lawrence, 1963	Makhado	endemic
Graemontia bicornigera Lawrence, 1963*	Makhado, Lajuma	
Heteradaeum exiduum Lawrence, 1963	Makhado	endemic
Monomontia aquilonaris Lawrence, 1963*	Makhado, Lajuma	endemic
Monomontia neglecta **sp. n.***	Makhado	endemic
Monomontia versicolor Lawrence, 1963*	Makhado, Entabeni, Lajuma	
Phalangiidae Latreille, 1802		
Rhampsinitus transvaalicus Lawrence, 1931*	Makhado, Lajuma	endemic

TAXONOMY

Family Biantidae Thorell, 1889
Genus *Metabiantes* Roewer, 1915
Metabiantes leighi (Pocock, 1902)

Figs 2, 3A, 3B

Hinzuanius leighi: Pocock 1902: 412.
Biantes leighi (Pocock): Roewer 1912: 177.
Spinibiantes leighi (Pocock): Roewer 1915: 27; 1949: 249, fig. 9.
Metabiantes leighi (Pocock): Lawrence 1931: 356; 1933: 218, fig. 3; 1938*b*: 340; Starega 1992: 327.

Comments on morphology: Sexual dimorphism is poorly developed. Chelicerae of males are more massive and therefore the carapace in the eye region is wider. The scutum is more triangular in males (Fig. 3B), whereas the opisthosoma in females is more rounded. Differences like shape of the body and intensity of coloration are strongly influenced by the age of the individual after final moult. Juveniles have larger spines on the dorsal scute than adults. This might be of interest because Kauri (1961: 62) pointed to a juvenile *Metabiantes* being distinct due to its strong spination, although he had no assignable juveniles of spined species for comparison.

Material examined: SOUTH AFRICA: *Limpopo*: 18♂ 22♀ 6 juv. Lajuma, evergreen montane forest, alt. 1300–1400 m, 1–4.iv.2001, P. Schwendinger (MHNG); 4♂ 1♀ 23°02'30.0"S:29°26'48.5"E, alt. 1325 m, 24.x.2002, A.L. Schönhofer (CJM, 4093).

Ecology: *M. leighi* inhabits the medium layer of leaf litter in subtropical evergreen forest. The species seems to require lower humidity than, for example, *Monomontia aquilonaris*. It was also absent from wet forest soils near streams and springs.

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Comments: As Lawrence (1963) recorded a considerable number of cryptic and difficult-to-access species of the genera *Monomontia* and *Purcellia* near Makhado, we can assume that *Metabiantes leighi* was not present there. At Lajuma, *M. leighi* was quite common to abundant, and is a new record for Limpopo Province.

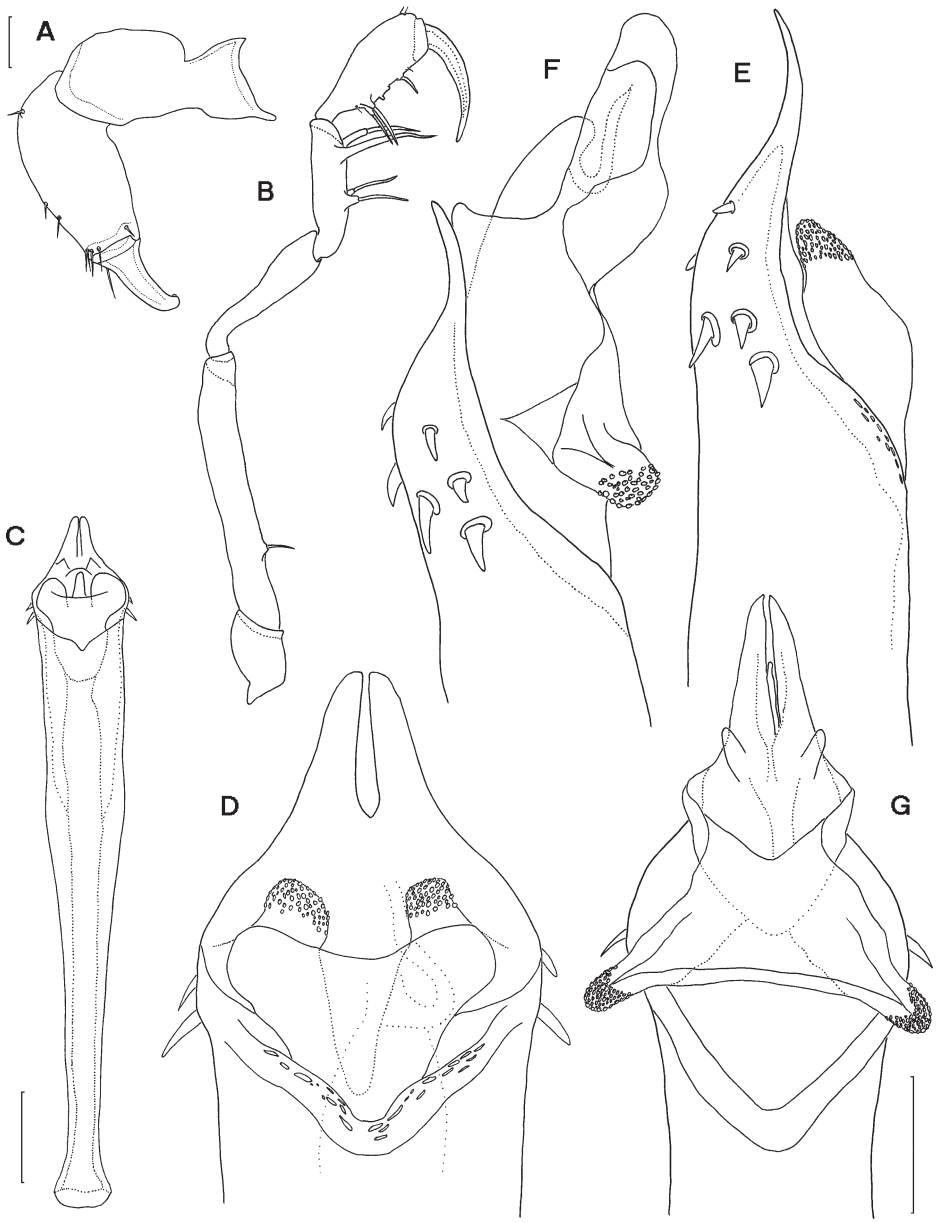

Fig. 2. *Metabiantes leighi* ♂, Lajuma: (A) chelicerae, (B) palpus, (C) penis, (D–G) glans penis, (F, G) expanded view. (A, B, E, F) lateral aspect, (C, D, G) dorsal aspect. Scale bars: top left 0.2 mm for A, B; bottom left 0.2 mm for C; bottom right 0.1 mm for D–G.

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Most species of the genus *Metabiantes* have a limited distribution, whereas the scattered records of *M. leighi* encompass a range of more than 1000 km along the eastern coast of South Africa (Lawrence 1931, 1933). A closer investigation of different geographic populations of *M. leighi* enabled Kauri (1961) to separate *Metabiantes cataracticus* Kauri, 1961 and *M. hanstroemi* Kauri, 1961 from the *M. leighi* area. All three species are close relatives by the shape of the glans penis (Lawrence 1933; Kauri 1961). Martens (1978*a*) showed allopatric speciation by geographic isolation in Biantidae from the Himalayas. This isolation forced minor morphological changes, whereas sympatric species differ strongly with respect to body size and shape of chelicerae and palps. Consequently, the syntopic *M. cataracticus* and *M. hanstroemi* should differ in the proportion of palps, body size and chelicerae, but these characters were not thoroughly investigated by Kauri (1961). Comparing body size (2.7 mm; 2.4 mm), length of the enlarged part of chelicerae (0.35 mm; 0.28 mm), spination and coloration of the two species, there is agreement with the evolutionary concept proposed by Martens (1978*a*) and parallels within the African Biantidae seem to hold true. A revision of the different populations of *M. leighi* might reveal cryptic species. For further investigation we document characters of *M. leighi* from Lajuma (Fig. 2), as recommended by Martens (1978*a*).

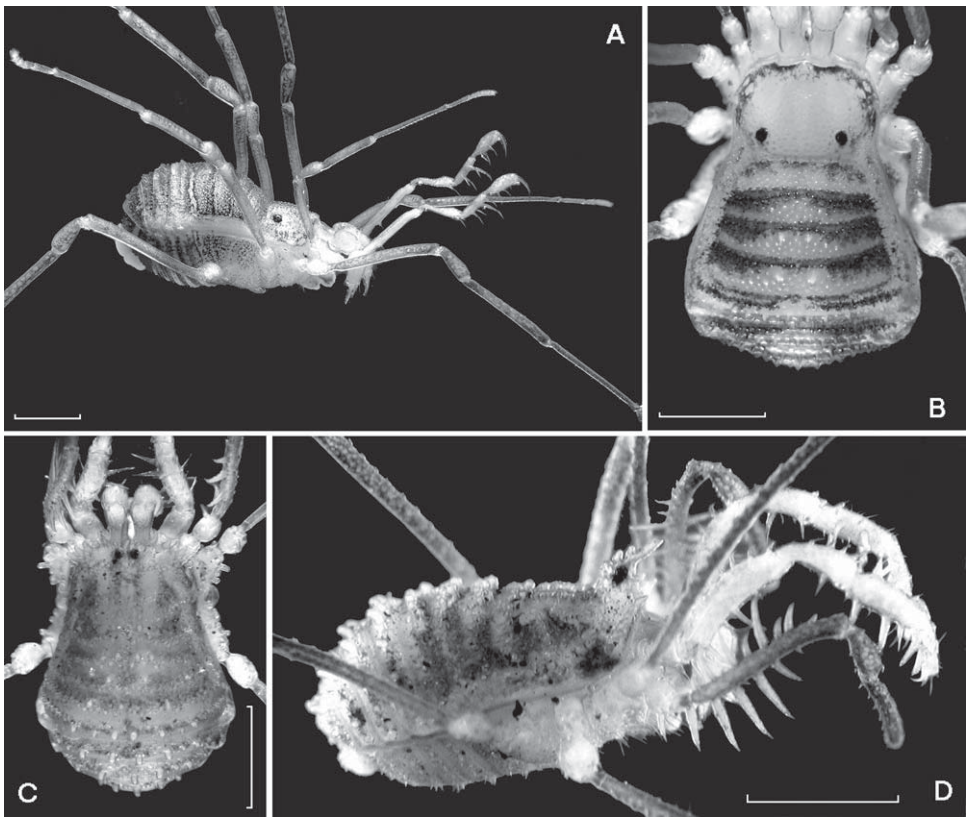

Fig. 3. General habitus of harvestmen from Lajuma: (A, B) *Metabiantes leighi* ♀ and ♂; (C, D) *Graemontia bicornigera* ♀; (A, D) lateral aspect; (B, C) dorsal aspect. Scale bars = 1.0 mm.

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Family Triaenonychidae Sørensen, 1886
Genus *Graemontia* Lawrence, 1931
Graemontia bicornigera Lawrence, 1963

Figs 3C, 3D, 4

Graemontia bicornigera: Lawrence 1963: 295, fig.10.

Diagnosis: The species is easily distinguished in both sexes by the armature of leg I (Fig. 4E).

Material examined: SOUTH AFRICA: *Limpopo*: 2♀ Lajuma, evergreen montane forest, alt. 1300–1400 m, 1–4.iv.2001, P. Schwendinger (MHNG); 1♂ (holotype) 1♀ (paratype), Mariepskop, alt. 2440 m, iii.1960,

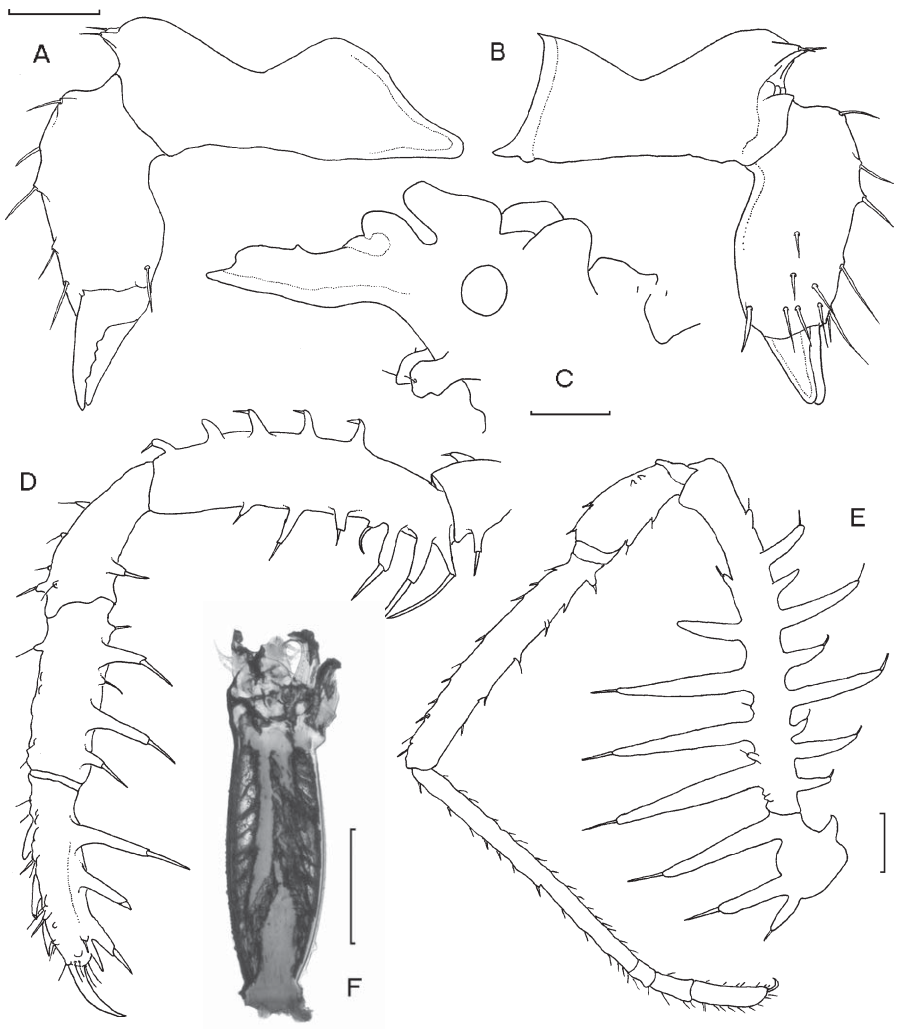

Fig. 4. *Graemontia bicornigera* ♀, Lajuma (A–E, G, H) and holotype, Mariepskop (F); (A) medial and (B–E) lateral aspects: (A, B) chelicerae; (C) ocularium, scale bar 0.1 mm; (D) palpus; (E) leg I; (F) penis, ventrolateral view, scale bar 0.2 mm. Scale bars: top left 0.2 mm, for A, B; bottom right 0.2 mm for D, E.

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R.F. Lawrence (NMSA, 7622), penis and genital operculum of male on microscope slide; 1♀ Makhado, alt. 1370 m, ii.1960, R.F. Lawrence (NMSA, 7602).

Comments: Sexual dimorphism is displayed by the prominent apophysis of the first article of the male chelicerae (Lawrence 1963: fig. 10d). The penis of the holotype is permanently mounted on a microscope slide and was slightly squeezed, so that no specific structures are detectable (Fig. 4F). For further investigation of genital morphology, additional collection is required. Comparison of the female paratype with the Lajuma material revealed no differences.

Genus *Monomontia* Lawrence, 1931

Characters used for species definition within the genus, such as armature of the femur of the palp, do not show much morphological variation within the genus or in the related genera *Ceratomontia* Roewer, 1914 and *Austromontia* Lawrence, 1931. This is most probably because of morphological stasis to maintain functionality. Other characters, like the shape of the ocularium and body size, exhibit some variability within the single species. At present it is difficult to judge the species status of single specimens or certain populations because the genital morphology for South African Opiliones was generally ignored by Lawrence. Many characters were inconsistently investigated and now are lacking for comparison. Unfortunately, it is very likely that important structures of the penis are revealed only in the expanded state, what was never studied. Nevertheless, a thorough revision of the genus by genital morphological characters is needed.

Monomontia aquilonaris Lawrence, 1963

Figs 5A–D, 6E–H, 7A–E, 8A, 8B, 9G, 9H, 10G, 10H

Monomontia aquilonaris: Lawrence 1963: 301, figs 13b–f.

Material examined: SOUTH AFRICA: *Limpopo*: 1♀ (holotype) 2♀ (paratypes) Hanglip forest, Makhado, alt. 1370 m, ii.1960, R.F. Lawrence (NMSA, 7604), ovipositor and 2 opercula genitalia mounted on microscope slide; 37♂ 18♀ Lajuma, in evergreen montane forest, alt. 1300–1400 m, 1–4.iv.2001, P. Schwendinger (MHNG); 1♂ 1♀ 23°02'30"S:29°26'48.5"E, alt. 1325 m, sieved from deep litter, 6.x & 6.xi.2002, A.L. Schönhofer (CJM, 4821).

Ecology: In deep leaf litter of evergreen montane forest.

Comments: The type series comprises three females, one indicated as the holotype by separation of chelicerae and palps to carry out drawings. The ovipositor was turned inside out, and another ovipositor is mounted on a microscope slide (paratype). In the absence of males from the type locality, specimens from Lajuma had to be assigned to *M. aquilonaris* on external characters only. This might be legitimate, as no sexual dimorphism was observed within the Lajuma material and specimens are indistinguishable from the type material from only 50 km away. Further collection and redescription of males from the type locality are necessary to confirm species recognition upon genital morphological characters. For this purpose, drawings of the penis from the Lajuma material are included, as well as those of leg I, chelicerae and palp.

The ventral armature of the palps, chelicerae and leg I are constant within the Lajuma material. The shape of the ocularium (Figs 6E–H), as well as the dorsal spination of the palp femur, vary, as does the number of granules on the front of the carapace (2 or 3). Additionally, the size of the males varies remarkably, as do the size and proportions of the palps, especially the length and shape of tibia and femur. The species shows similarity

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with *Monomontia lawrencei* Kauri, 1950 (similar in size, shape of ocularium and armature of palps; different in body shape and penis morphology, Kauri 1950), *M. corticola* Lawrence, 1938 (similar in size and armature of palps and leg I, but body and legs coloured black, Lawrence 1938*a*) and *M. brincki* Kauri, 1961 (similar in size, shape of ocularium and armature of palps; different in penis morphology, Kauri 1961). The relationships of these species should be investigated.

Monomontia cf. *versicolor* Lawrence, 1963

Figs 5E–G, 6A–D, 7F–I, 8C–H, 9A–F, 10A–F

Material examined (all NMSA material collected by R.F. Lawrence): SOUTH AFRICA: *Limpopo*: 3♂ 1♀ 1 juv. (instead of 3♂ 2♀; 1♂ holotype of *M. versicolor*, the reminder paratypes) Mariepskop, alt. 2010 m, iii.1960 (NMSA, 7615); 1♂ Lajuma, in evergreen montane forest, alt. 1300–1400 m, 1–4.iv.2001, P. Schwendinger (MHNG); 1♂ Entabeni forest, Makhado, ii.1960 (NMSA, 7610); 1♂ Makhado, alt. 1370 m, ii.1960 (NMSA, 7601).

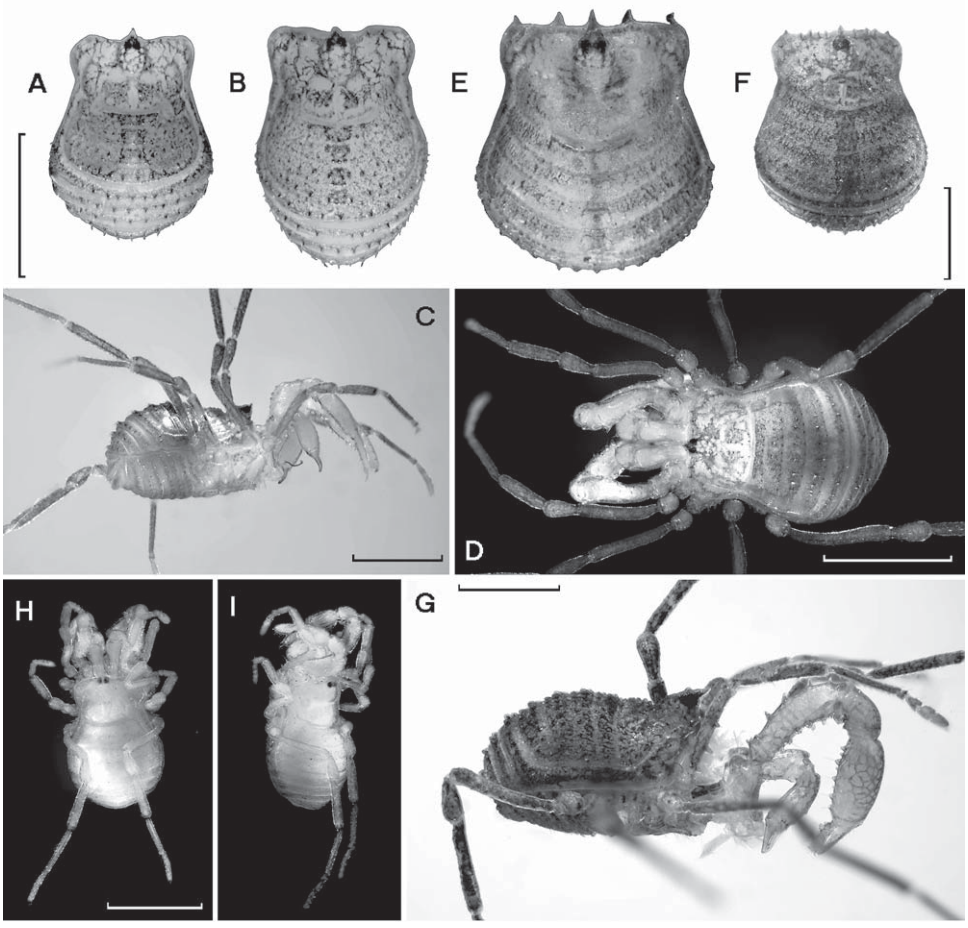

Fig. 5. *Monomontia*, general habitus, dorsal (A, B, D–F, H) and lateral (C, G, I) views: (A–D) *M. aquilonaris*, Lajuma: (A) ♂, (C, D) ♀; (E–G) *M. versicolor* ♂: (E) holotype, Mariespskop, (F, G) Lajuma; (H, I) *M. neglecta* sp. n., Makhado. Scale bars = 1.0 mm; scale bar top left for A, B, E, F; at H for H and I.

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Comments: The penis of the holotype is deformed by mounting it on a microscope slide. We therefore investigated a paratype from Mariepskop to compare genitalia with material from Makhado and Lajuma. Although very similar in body shape and coloration, the males from the type locality differ from the Soutpansberg material by larger size, more elongated ocularium, lack of fine granulation on femur of the palps, smaller straight mediolateral spine on the palpal femur, and, to a lesser degree, shape of the penis. Characters such as dorsal spination on palps and basal article of chelicerae are variable within specimens from both localities. A validation of these clearly different forms should be a subject of the revision of the genus.

Monomontia neglecta sp. n.

Figs 5H, 5I, 6I, 7K–M, 8I–K, 9I–K, 10I–K

Monomontia aquilonaris: Lawrence 1963: 299 (*partim*).
Monomontia versicolor: Lawrence 1963: 302 (*partim*).

Etymology: From Latin *neglecta* (neglected, disregarded). This clearly distinguishable species was overlooked by Lawrence (1963). He first separated smaller specimens from his material but later included them in *M. aquilonaris* and *M. versicolor*.

Diagnosis: Conspicuously small, yellow and short-legged *Monomontia*. Ocularium flat, extended over the front margin of prosoma, rounded at tip (Fig. 6I).

Description:

Small body size (Figs 5H, 5I); light yellow-brown, dorsal scute densely granulated with two large granules on front margin of carapace; no markings dorsally. Legs short, leg I (Fig. 7K): calcaneus of metatarsus more than half the length of astragalus; tarsus longer than metatarsus; femur ventrally with 4 spined tubercles, the second basal one largest, the third smallest. Ocularium (Fig. 6I) small, smooth and rounded; only faintly elevated dorsally; drawn out over the front margin of the carapace, eyes small, surrounded by a much larger background of black pigmentation. Chelicera (Figs 7L, 7M) with a few ventral granules on segment I, dorsally inflated and ending in a spine; small spines and a large triangular on segment II dorsally; a riffled area is present on ventral article

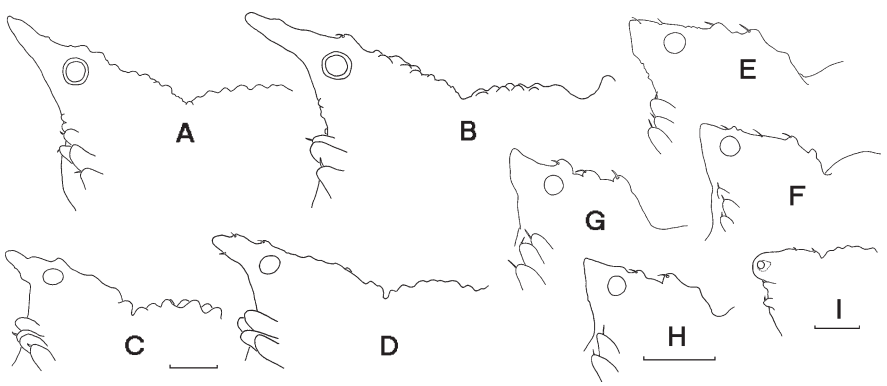

Fig. 6. *Monomontia*, ♂ headcaps, lateral view: (A–D) *M. versicolor*: (A, B) Mariepskop, holotype and paratype, (C) Lajuma, (D) Makhado; (E–H) *M. aquilonaris*, Lajuma, different individuals; (I) *M. neglecta* sp. n., Makhado. Scale bars = 0.2 mm, bottom left for A–D; at H for E–H; at I for I.

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I distal, possibly a stridulatory organ. Palps (Figs 8I–K): trochanter with 1 large spine dorsal and ventral; femur dorsal with 3 prominent equally-sized spines and one smaller distal one, ventrally basal spine with three teeth, the middle one largest, medial with 1 spine distally, from this 4 spines distally alternating in size; femur, tibia and tarsus ventrally covered with rounded granules, dorsal smooth. Penis (Figs 9I–K, 10I–K) short and stout; almost parallel sided in dorsal view; in lateral view constricted below glans and above the base of truncus; muto bent dorsally (lateral view), forming two circular lamellae diverging disto-laterally, hind wall of muto above these lamellae gradually tapering to a blunt apex (dorsal view); lamellae cinctiform at base broad, forming small medial lobes and large lateral ones, these are long and slightly curved, bent dorsally, apex folded inwards, confined by three large lateral spines and a small one dorsally. Females

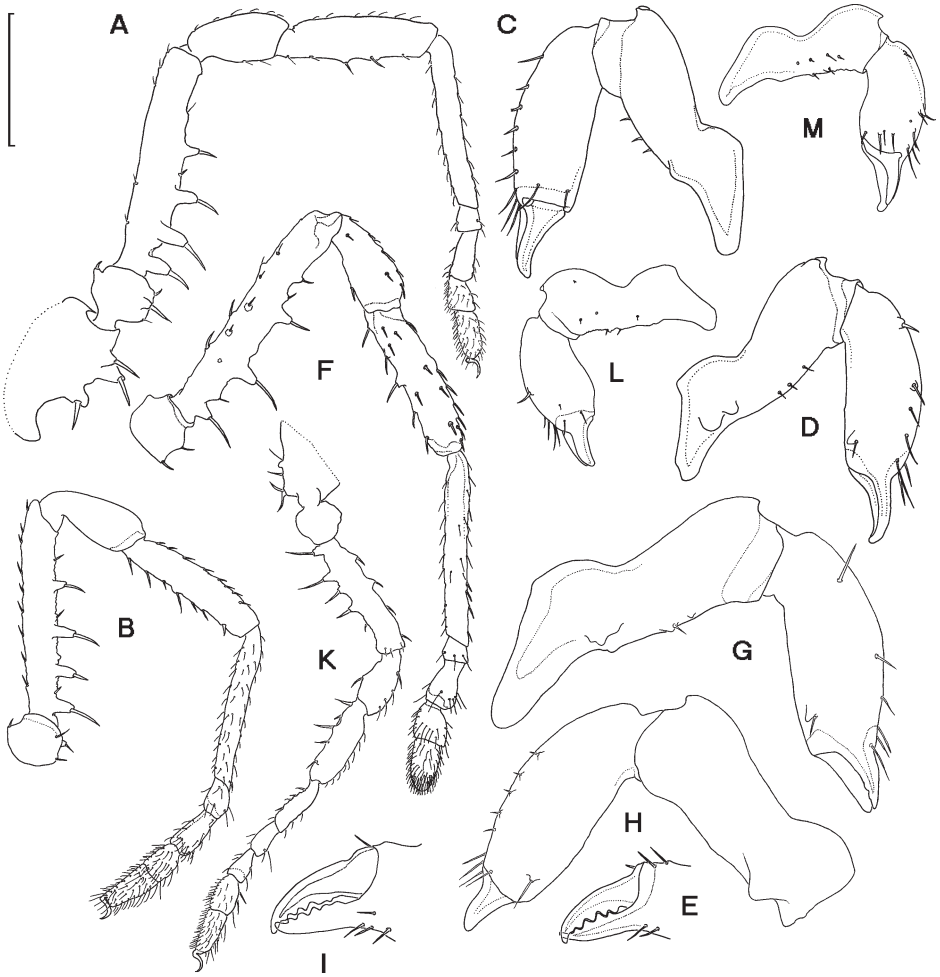

Fig. 7. *Monomontia*, ♂ leg I and chelicerae: (A–E) *M. aquilonaris*: (A) holotype, (B–E) Lajuma; (F–I) *M. versicolor*, Lajuma; (K–M) *M. neglecta* sp. n, Makhado. (A, B, F, K) leg I, lateral view, (C, D, G, H, L, M) chelicera, (I, E) pincer, (C, E, H, I, L) lateral and (D, G, M) medial aspects. Scale bar = 0.5 mm.

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similar to males but can be distinguished by shorter palps and metatarsus of leg I. Tibia of leg I variable, sometimes with one tubercle ventrally.

Measurements (mm): ♂ (n=10),♀ (n=4), data for ♀ in parentheses: body size: 1.35–1.53 (1.37–1.45); leg I: femur: 0.5–0.52 (0.45–0.47), patella: 0.26–0.28 (0.25–0.26), tibia: 0.29–0.31 (0.29–0.3), metatarsus: 0.35–0.37 (0.31–0.32), tarsus: 0.4–0.42 (0.37–0.4); palpus: femur: 0.53–0.64 (0.49–0.51), patella: 0.33–0.35 (0.28–0.29), tibia: 0.46–0.62 (0.36–0.37), tarsus: 0.5–0.52 (0.43–0.45)

Holotype: ♂ SOUTH AFRICA: *Limpopo*: Makhado [= Louis Trichardt, 23°02'S:29°54'E], ii.1960, R.F. Lawrence (NMSA, 7645); identified in 1963 as *M. versicolor*.

Paratypes: ♀ same data as holotype; 9♂ 3♀ SOUTH AFRICA: *Limpopo*: Hanglip forest north of Makhado, vi.1961, N. Leleup (NMSA, 19204). R.F. Lawrence identified these specimens in 1963 as *M. aquilonaris*.

Comments: Specimens of this species were included in the descriptions of *M. aquilonaris* and *M. versicolor* by Lawrence (1963) but represent no type material of the latter two

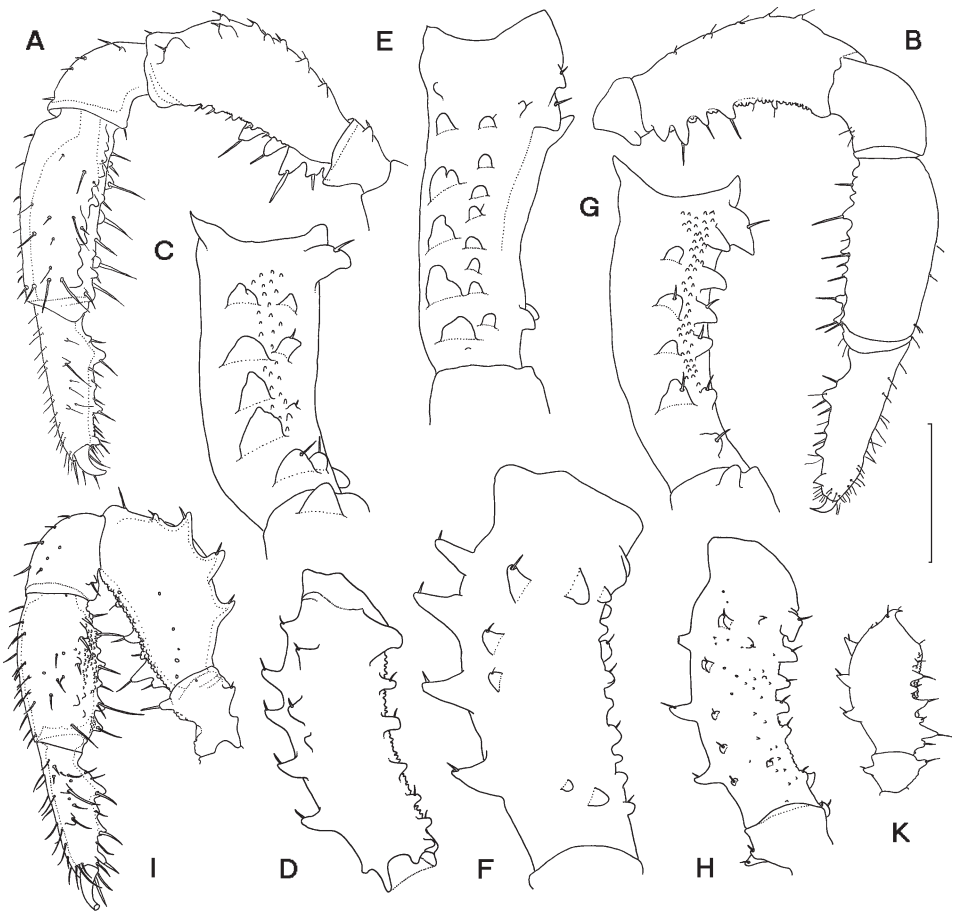

Fig. 8. *Monomontia*, ♂ palps: (A, B) *M. aquilonaris*, Lajuma; (C–H) *M. versicolor*: (C, D) Lajuma, (E, F) Mariepskop, (G, H) Makhado; (I, K) *M. neglecta* sp. n., Makhado. (A, B, I) palpus, (C–H, K) femur of palp; (B, D, F, H, K) lateral view, (A, I) medial view, (C, E, G) ventral view. Scale bar = 0.5 mm.

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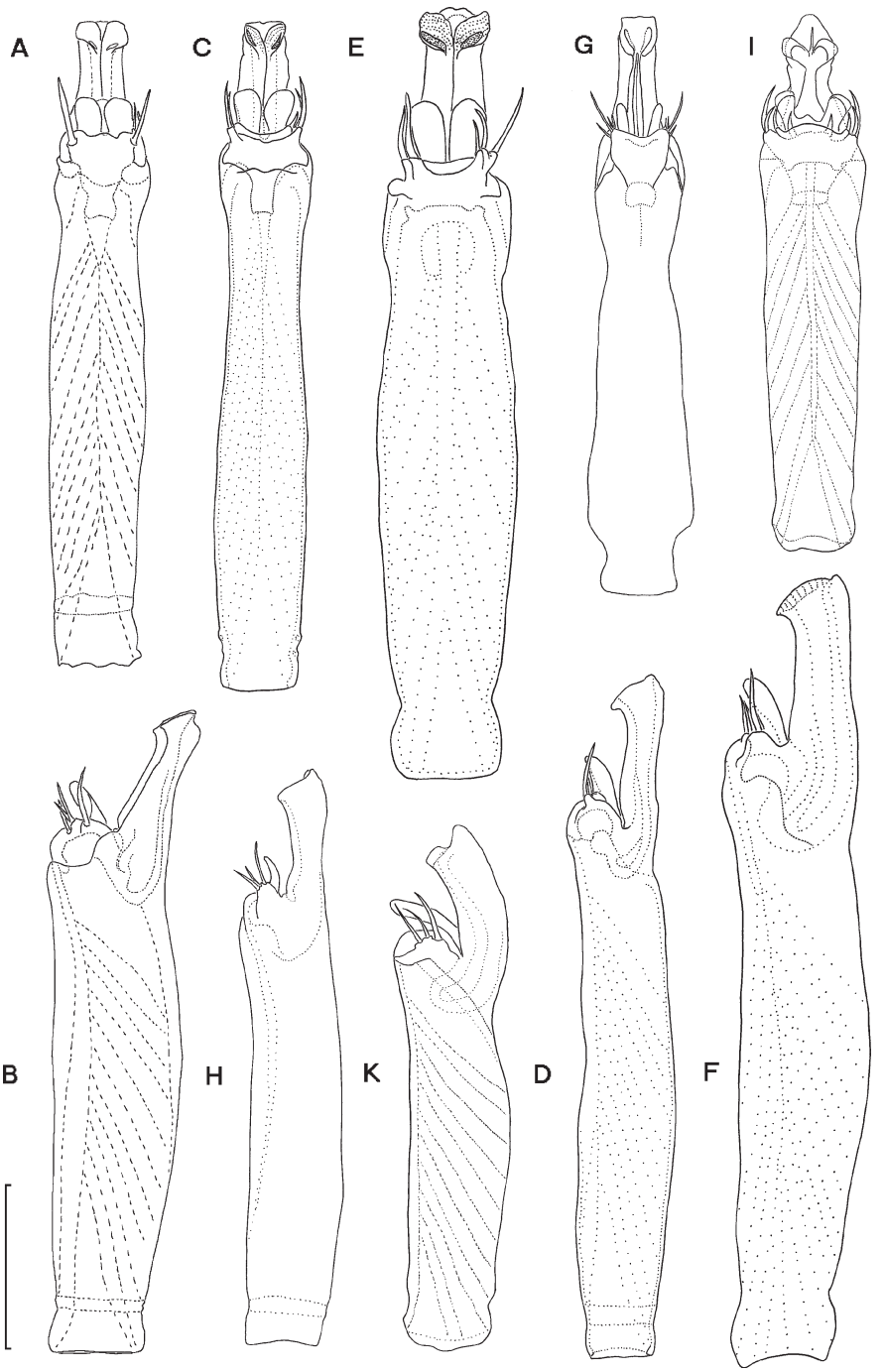

Fig. 9. *Monomontia*, penes: (A–F) *M. versicolor*: (A, B) Lajuma, (C, D) Makhado, (E, F) Mariepskop; (G, H) *M. aquilonaris*, Lajuma; (I, K) *M. neglecta* sp. n., Makhado. (A, C, E, G, I) dorsal and (B, D, F, H, K) lateral views. Scale bar = 0.2 mm.

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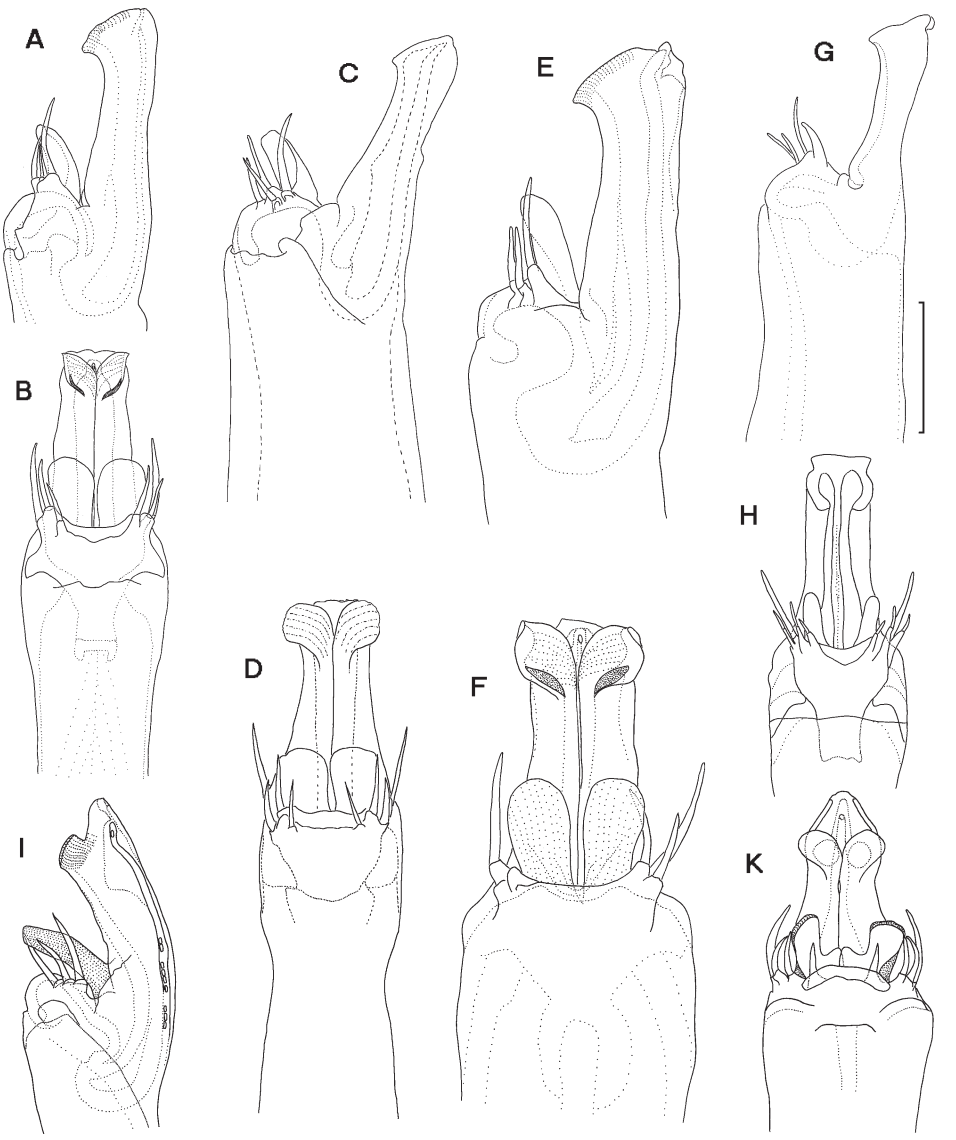

Fig. 10. *Monomontia*, glans penes: (A–F) *M. versicolor*: (A, B) Makhado, (C, D) Lajuma, (E, F) Mariepskop; (G, H) *M. aquilonaris*, Lajuma; (I, K) *M. neglecta* sp. n., Makhado. (A, C, E, G, I) lateral and (B, D, F, H, K) dorsal views. Scale bar = 0.1 mm.

species. The new species differs markedly from *M. versicolor* by its much smaller size and from both species by its small, rounded and flat ocularium with intense pigmentation around the eyes. The ocularium closely resembles that of *M. krausi* Kauri, 1961, but *M. neglecta* differs in the tarsal formula 3-3-4-4 of the legs and the strong dorsal spination of the palp femur. The penis is different from other investigated or described *Monomontia* species, but shows a close resemblance to *Ceratomontia minor* Lawrence, 1931 (Kauri 1961).

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Family Phalangiidae Latreille, 1802

Genus *Rhampsinitus* Simon, 1879

Rhampsinitus transvaalicus Lawrence, 1931

Figs 11, 12A–L

Rhampsinitus transvaalicus: Lawrence 1931: 493, text-fig. 77; 1963: 304.

Diagnosis: Although highly variable, males of this species are easily distinguished by a row of large retrolateral curved spines on the femur of chelicerae (Figs 12E, G, I–K). The closely related *R. leighi* Pocock, 1902 has smaller spines irregularly scattered on the chelicerae (Fig. 12M). The penis of *R. transvaalicus* is bulbous at the base, whereas that of *R. leighi* is slender in lateral view (Figs 12A–D, 12N, 12O).

Material examined: SOUTH AFRICA: *Limpopo*: 7♂ Hanglip Forest, north of Makhado, alt. 1370 m, ii.1960, R.F. Lawrence (NMSA, 7597); 4♂ 4♀ (NMSA, 7598); 2♀ (NMSA 7603); 1♂ 1♀ Makhado, alt. 915 m (NMSA, 7605); 1♂ 1♀ Entabeni forest, 48 km east of Makhado (NMSA, 7607); 5♂ 2♀ 316 juv. Lajuma, alt. 1350 m, evergreen montane forest, 22.x–19.xi.2002, A.L. Schönhofer (CJM, 4812–4820).

Other material examined: *R. leighi*: SOUTH AFRICA: *KwaZulu-Natal*: 1♂ Hluhluwe Game Reserve (28°S:32°E), higher altitude forest with *Celtis africana*, *Harpephyllum caffrum*, 1982, W. Wickler (CJM, 2142) (Fig. 12M–O).

Biology/Ecology: Most animals were caught walking on a road in subtropical evergreen forest at night. They were most abundant near a small permanent stream. Pitfall trapping was successful only for small juveniles. Traps recorded specimens only in forest habitats

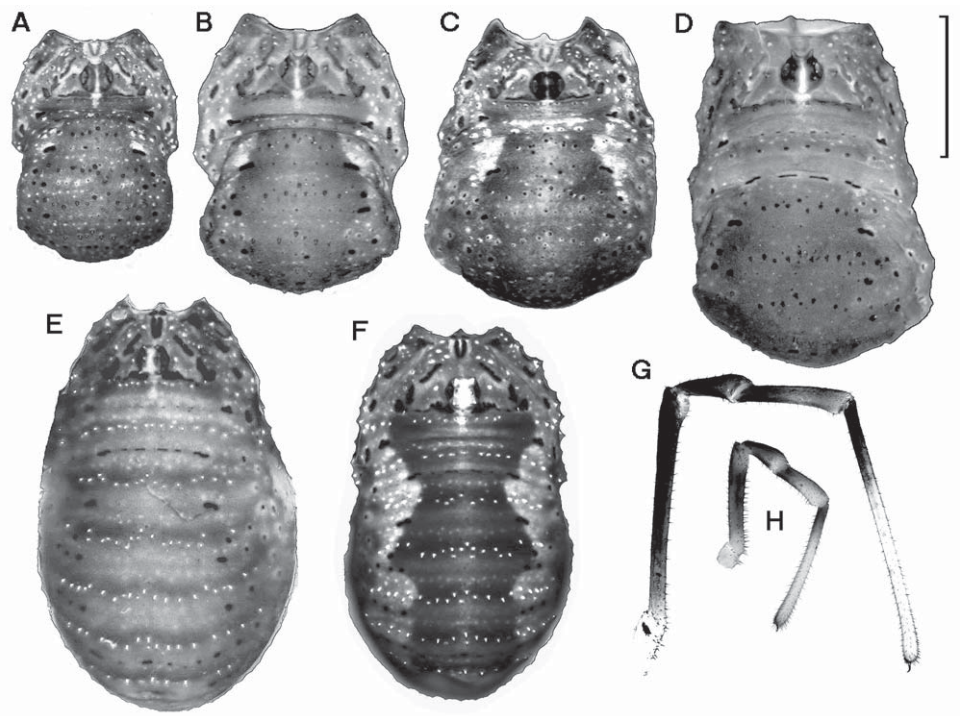

Fig. 11. *Rhampsinitus transvaalicus*, body in dorsal view, palps: (A–D) ♂, Lajuma: (A, H) CJM, 4816; (B, D, G) CJM, 4819; (C) CJM, 4820; (E, F) ♀, Makhado, NMSA, 7603; (G, H) palps, medial view. Scale bar = 2.0 mm.

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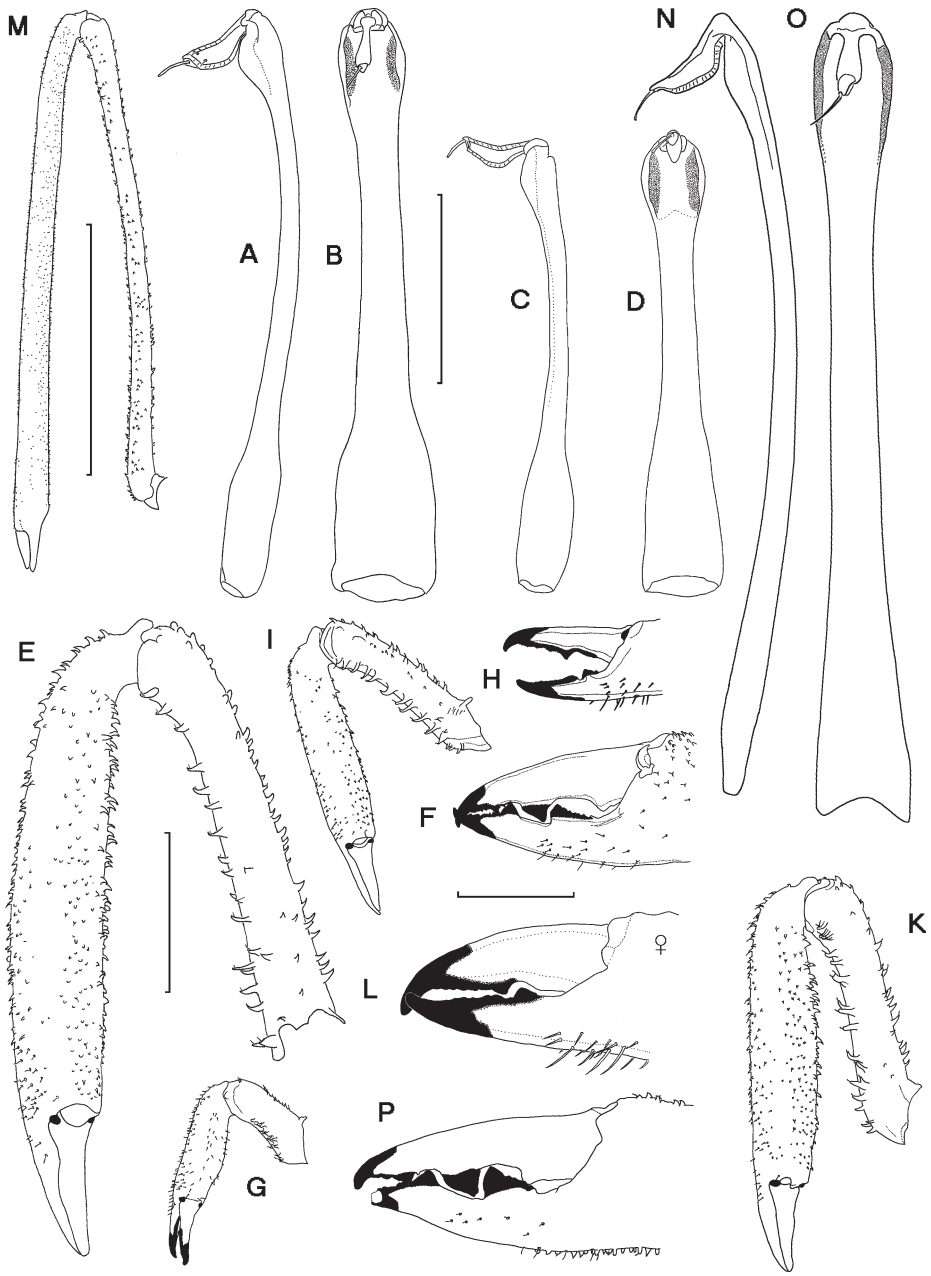

Fig. 12. *Rhampsinitus*, penes and chelicerae: (A–L) *R. transvaalicus*: (A, B) NMSA, 7597; (C, D) NMSA, 7598; (E, F) CJM, 4819; (K) CJM, 4819, different ♂; (I) CJM, 4820; (L) CJM, 4814; (G, H) CJM, 4816; (M–P) *R. leighi*, KwaZulu-Natal, Hluhluwe Game Reserve, CJM, 2142. (A–D, N, O) penes: (A, C, N) lateral and (B, D, O) dorsal views, scale bar 1.0 mm at B; (E, G, I, K, M) chelicerae, lateral view, scale bar 2.0 mm at E and 10 mm at M; (F, H, L, P) pincer, dorsal view, scale bar 1.0 mm at F. (L) ♀, all others ♂.

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with permanent water a few hundred metres away. Two males were found sitting at the side of stones near the ground, face looking down ready to catch prey. Adults' bodies were often infested by red mites. Only seven adults were caught, but 316 juveniles in predominantly early stages of development. On one occasion a juvenile was seen carrying a cockroach double its body size; whether it was caught or just picked up dead was not observed. Adults are recorded from October to December and in February. The presence of juveniles in February suggests extension of maturity beyond that date. P. Schwendinger did not collect any specimen in April.

Comments: As the material from Lajuma contained only five adult males, which were highly variable in body size, coloration and length of chelicerae, additional material from the type locality Makhado was investigated. These specimens showed allometric growth of the male chelicerae and palps with increasing body size (Fig. 13). This phenomenon is reported from other Phalangiidae like the European *Phalangium opilio* Linnaeus, 1761, *Zacheus crista* (Brullé, 1832) (for both see Martens 1978*b*; Lerma 1952), the African *Guruia africana* (Karsch, 1878) (Staręga 1984) and *R. leighi* (Pocock 1902; Lawrence 1931; Kauri 1961). Martens (1978*b*) mentioned males of European species becoming similar to females with decreasing body size and loss of external sexual characteristics. In *R. transvaalicus* this is nicely expressed in the toothing of the cheliceral pincer, which is radically changed to female appearance if body size falls below a certain value. Large specimens display three prominent teeth, whereas smaller males and females have only two (Figs 12H, 12F, 12L, 13). Kauri (1961) mentioned this circumstance for the closely related *Rhampsinitus leighi* without connecting it to allometric growth. Other characters, like length of legs, darkness of coloration or intensity of spination of chelicerae and ocularium, gradually change with body size. A convergent sexual dimorphism is exhibited in members of the Australian and New Zealand family Monoscutidae Forster, 1948. Males of the genera *Pantopsalis* Simon, 1879 and *Spinicrus* Forster, 1949 have extremely elongated palps (Forster 1949) and are polymorphic in respect to this character (Taylor 2004).

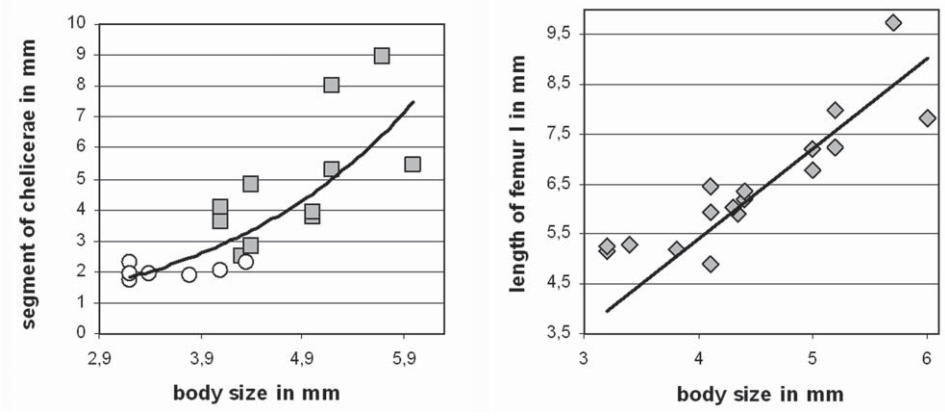

Fig. 13. Allometric and normal growth in *Rhampsinitus transvaalicus*. Scatterplot left: allometric growth of segment 2 of chelicerae; change of toothing in pincer at a body size of 4.1–4.3 mm is indicated by circles (2 teeth) and squares (3 teeth). Scatterplot right: femur I representing normal growth as for all legs.

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One male of *R. leighi* (CJM, 2142) is remarkable for its large body size, extending the variability of this species to 7.05 mm. Chelicerae length of 42 mm results in chelicerae 6 times longer than body size (Fig. 12M; chelicerae 2–4 times longer than body are reported by Lawrence (1931) and Kauri (1961)).

Rhampsinitus sp.

Description: Chelicerae smooth and of normal size; palps variously coloured; apophysis on inner side of patella densely covered by hairs and by some large rounded spines hardly visible within the hairs, femur and tibia strongly covered with hairs distally; dorsal coloration with an indistinct saddle and an inconspicuous median band; ocularium white in the upper part with three long white spines on each side.

Comments: This specimen is not related to *R. transvaalicus* and they differ ecologically and morphologically. P. Schwendinger placed it close to *R. ingae* Kauri, 1961. Distinct spines on the ocularium and a prominent apophysis on the inner side on patella of the palp are more similar to *R. maculatus* Kauri, 1961, but the specimen differs in dorsal coloration and in spination of the ocularium. This might be a new species, but requires additional adult males to be identified.

Material: SOUTH AFRICA: *Limpopo*: 1 juv. Mount Lajuma, grassland, alt. 1600–1740 m, 5.iv.2001, P. Schwendinger det. 2001, near *R. ingae* (MHNG).

DISCUSSION AND CONCLUSION

Harvestmen are cryptic soil arthropods which require habitats with constant and high humidity, and many species are restricted to forests and forest-like habitats. This dependency on habitats that are rare and scattered within South Africa has caused strong fragmentation of populations and has possibly increased speciation processes, especially in species groups with little ability to disperse. With respect to the Soutpansberg area, this hypothesis would predict different endemic species for the western and eastern parts of the mountain range, especially in groups like Pettalidae and Triaenonychidae. A different hypothesis assumes dispersal across the mountain range during more favourable climatic conditions. The dry surrounding savannahs may have had isolating effects, reducing interchange with other areas. In dry periods the suitable habitats were reduced to small fragments, and habitats may even have lost suitable conditions for several species so that population and diversity reduction occurred.

The results clearly favour the second hypothesis because only few species and no exclusive endemics were found in the western part of the Soutpansberg. As the eastern range shows higher elevation, is more humid and therefore supports more and stable forest habitats, this provides further explanation for this circumstance. Nevertheless, this investigation records one known species as new for the Western Soutpansberg and it is not unlikely that within the scattered and remote valleys of the western part some species still await discovery.

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