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New taxa of *Podapolipidae* (Acarina) from S. African *Coleoptera* : Result of the Namaqualand-Namibia Expedition of the King Leopold III Foundation for the exploration and protection of nature (1980)

by Robert W. Husband

Abstract

Eutarsopolipus lukoschusi n. sp. is described from the African carabid beetle, *Thermophilum decemguttatum* (Fabricius). *Tarsopolipus africanus* n. sp. is described from *Drepanopodus proximus* (Per.). A new genus and species, *Regenpolipus namibius*, n. gen., n. sp., is described from *Thermophilum decemguttatum* (F.). Acarina were collected by Dr. F. Lukoschus as a contributor to the Namaqualand-Namibia Expedition of 1980.

This report represents part of the results of the Namaqualand-Namibia Expedition of the King Leopold III Foundation for the Exploration and Protection of Nature, 1980. Dr. F. Lukoschus, operating with aid of grant R 87-111 by the Netherlands Foundation for Advancement of Pure Research (Z.W.O.), collected numerous Podapolipidae from South African Carabidae and Scarabaeidae. Prior to this study no podapolipid mites had been reported from African Scarabaeidae and only one podapolipid mite from African Carabidae, *Eutarsopolipus desani* Cooreman 1952. It is the purpose of this paper to present a new species of *Eutarsopolipus* collected by Dr. Lukoschus from *Thermophilum* from *Drepanopodus proximus* (Per.) and a new genus and species, *Regenpolipus namibius*, collected from S. African Carabidae, probably *Thermophilum decemguttatum* (Fabricius).

Since specimens seldom flatten in the same way when mounted, it is difficult to obtain a long series of comparable measurements for analysis. This is particularly true in the case of adult females. Thus, measurements are based on the best-mounted specimens rather than on an average of the available specimens. Measurements were taken with the aid of a Wild phase contrast microscope with a drawing tube calibrated with a stage micrometer. Terminology in this paper is based on that used by Lindquist (1976, 1977 and personal communication 1982).

Tarsopolipus Berlese, 1911

Tarsopolipus corrugatus Berlese 1911. Host, *Scarabaeus semipunctatus* collected in Maremma Toscana, Italy.

Tarsopolipus langi Husband 1978. Host, *Catharsius* sp., probably *C. mollosus* collected in Kai Khe, Viet Nam.

Tarsopolipus africanus n. sp.

Female (Figs, 1, 2). Gnathosoma longer than wide, length 65 μm , width 56 μm ; widest at anterior portion. Palps conspicuous, stylets smooth, 70 μm , coiled in anterior 1/2 of gnathosoma. Stimata conspicuous, joining under the prodorsal plate to form a V.

Idiosoma. Conspicuous striations, moderately sclerotized, with anterior and posterior bulges, length 480 μm , width 300 μm . Posteroventral genital opening. Prodorsal plate length 70 μm , width 120 μm ; setae v_1 , 12 μm , v_2 are absent, Sc_2 55 μm . Plate C divided, each plate with a pair of setae; c_1 45 μm , c_2 48 μm . Plate D divided, setae d 30 μm . Plate E divided, 10 μm in width, setae e 15 μm . Plate E not evident in all specimens.

Venter with apodemes well developed; apodemes 1 meet medially to join anterior sternal apodeme, apodemes 2 not meeting medially. No distinct posterior sternal apodeme, coxae III separated. Each coxa with a single seta. Coxal setae 12 μm .

Legs. Setal arrangements as in Table 1. Leg I with a single claw and a hook-like spine, legs II, III each a pair of small claws plus a pair of strongly curved terminal spines. Femur I with 4 setae, genua II, III with 3 setae, tibia II anterior seta spine-like.

Male (Figs. 3, 4). Gnathosoma length 38 μm , width 33 μm ; dorsal and ventral gnathosomal setae about 9 μm . Palps conspicuous, two segmented with a small sclerotized area on distal segment. Cheliceral stylets 18 μm .

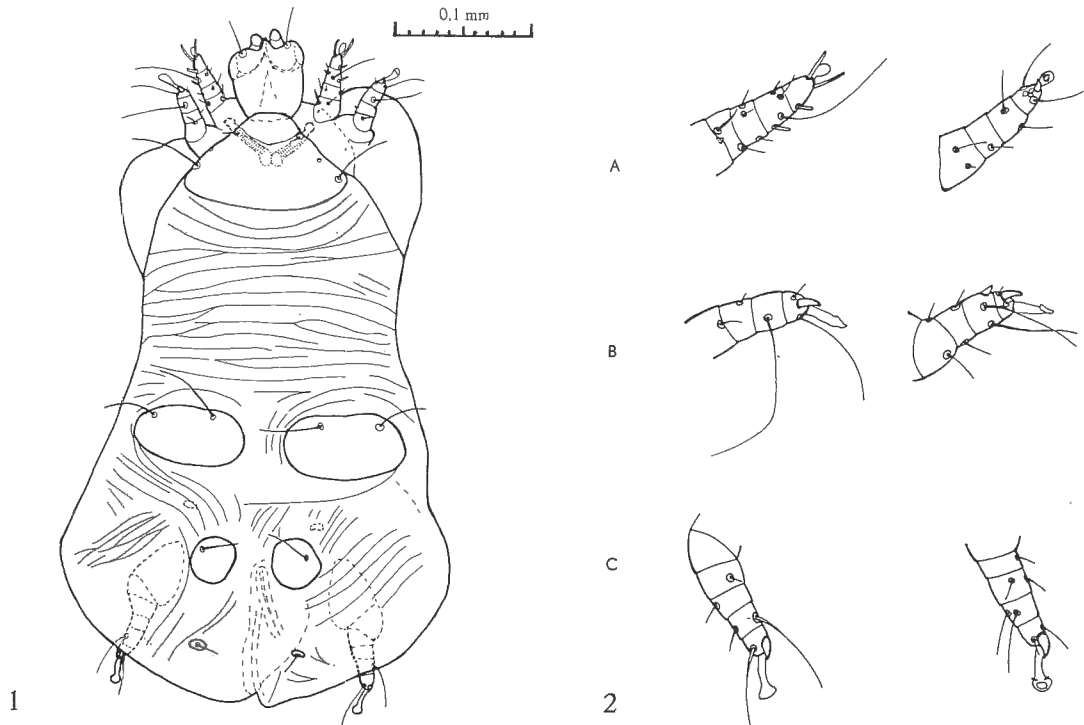


Fig. 1. *Tarsopolipus africanus* n. sp., adult ♂, dorsal aspect.

Fig. 2. *Tarsopolipus africanus* n. sp., adult ♀. A. Leg I, dorsal and ventral aspects. B. Leg II, dorsal and ventral aspects. C. Leg III, dorsal and ventral aspects.

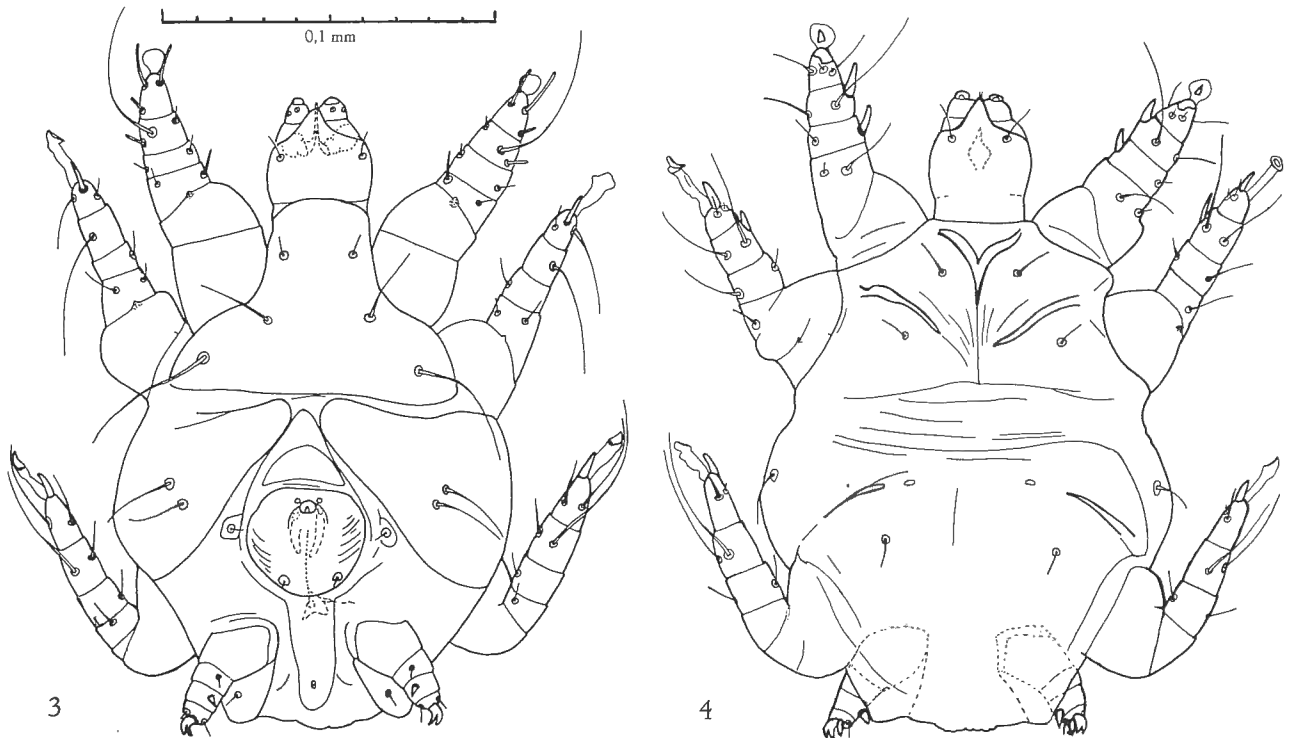


Fig. 3. *Tarsopolipus africanus* n. sp., male, dorsal aspect.

Fig. 4. *Tarsopolipus africanus* n. sp., male, ventral aspect.

Table 1.

Setae and spines on the legs of *Tarsopolipus africanus* n. sp.

	Leg I				Leg II				Leg III			
	F	G	Ti	Ta	F	G	Ti	Ta	F	G	Ti	Ta
Total setae and spines	4	4	6	8	3	3	4	6	2	3	4	6
Solenidia	0	0	1	1	0	0	0	0	0	0	0	0
Genu/tibia spines, ♂	-	0	0	-	-	0	1	-	-	0	0	-
Genu/tibia spines, ♂	-	1	1	-	-	0	1	-	-	0	0	-

Idiosoma. Length 170 μm , width 137 μm . Prodorsal plate subtriangular; setae v_1 9 μm , v_2 28 μm , Sc_2 38 μm . Plate CD divided by the medial circular aedeagal plate. Aedeagal plate length 34 μm , width 37 μm . Setae e on separate plates.

Venter with anterior apodemes well developed. Apodemes 1 meet medially to join anterior sternal apodeme; apodemes 2 and 3 not meeting sternal apodeme. All coxal setae about 10 μm in length.

Legs. Setal arrangements as in Table 1. Legs I, II, III with numbers of setae as in female. Femur I anterior seta strongly developed, genu I and tibia I with distinct spine-like anterior setae. Tibia II spine. Tarsi II, III terminal spines long, slender. Legs IV dorsal, setal pattern 0-1-2-5, tibia with 2 spines, tarsus with 2 spines plus a terminal bifid claw-like seta. Each coxa with a single seta, coxa IV dorsal.

Larval female (Figs. 5, 6). Gnathosomal length 40 μm , width 33 μm . Stylets 20 μm . Gnathosomal dorsal setae 32 μm , ventral setae 12 μm . Palps 2-segmented, distal segment with a subterminal sclerotized area.

Idiosoma. Length 217 μm , width 166 μm . Prodorsal plate subtriangular, setae v_1 22 μm , v_2 60 μm , Sc_2 66 μm . Plates C, D partially fused, setae c_1 50 μm , c_2 50 μm , d 36 μm . Plate E oval, setae e 25 μm . Caudal plate oval setae h_1 225 μm (all specimens had broken h_1 setae), setae h_2 27 μm .

Venter with apodemes 1 meeting medially to join anterior sternal apodeme, apodemes 2 not meeting medially. No distinct posterior apodemes, coxae III separated. Each coxa with a single seta, coxal setae 18 μm .

Legs. Setal arrangements as in Table 1. Setal numbers as in the adult female. Leg I with a 2-tined claw. Tarsi II, III terminal spines less developed than in adult ♀. Claws of legs II, III very small.

Diagnosis. *T. africanus* most closely resembles *T. corrugatus*. Adult female *T. africanus* has a prodorsal plate width of 120 μm vs. 150 μm in *T. corrugatus*. Setae v_1 extend about 1/4 of the distance between v_1 and Sc_2 in *T. africanus* vs. more than 1/2 the distance in *T. corrugatus*. *T. africanus* c and d setae are nearly equal to the length of plates C and D while setae c and d are distinctly shorter in *T. corrugatus*. Male *T. africanus* has aedeagal plate length 34 μm and width

37 μm vs. 50 and 60 in *T. corrugatus*. Setae e are on separate plates in *T. africanus* and on the aedeagal plate in *T. corrugatus*. *T. africanus* has a distinct trochanter IV seta. *T. africanus* has 2 short spine-like setae on tibiae IV while *T. corrugatus* has one long, dorsal spine-like seta on tibia IV. Larval female *T. africanus* have idiosomal setae c_1 and c_2 50 μm vs. 18 μm and 28 μm in *T. corrugatus*. Both setae d and e are also longer in *T. africanus*. Leg setal patterns are: I, 4-4-6-8; II, 3-3-4-6; III, 2-3-4-6. Solenidia have been included in the setal counts.

Type data. All collected from Scarabaeidae, *Drepanopodus proximus* (Per.) from Port Nolloth, S. Africa on 14 October 1980 by F. Lukoschus. Holotype, male, FL 80 1410-80. Paratypes: 2 males, 7 adult females, 6 larval females, 4 eggs, FL 80 1410 - 12, -13, -70, -80, -81, -82, -83, -84, -85, -86, -87, -88, -89, -91, -92, -93, -94, -95, -96, -98. Holotype and paratypes FL 80 1410 -12, -70, -82, -93, -88, -89, -92 and -96 deposited in the Institut Royal des Sciences Naturelles de Belgique, Brussels. Paratypes FL 80 1410 -84, -86, -91, -93 in the collection of F. Lukoschus, Katholieke Universiteit, Nijmegen, Netherlands. Paratypes FL 80 1410 -13, -81, -85, -94 at the South African Institute for Medical Research, Johannesburg. Paratypes FL 80 1410 -87, -95, -98 in the Acarology Collection, Biology Department, Adrian College, Adrian, Michigan. Additional specimens of this species have been retrieved from *D. proximus* in various localities in S. Africa. These are stored in alcohol and on slides at Adrian College and at the Transvaal Museum, Pretoria, S. Africa.

Eutarsopolipus Berlese 1913

Eutarsopolipus lagenaeformis Berlese 1913. Host *Scarites buparius* Forster collected in Maremma Toscana, Italy.

Eutarsopolipus desani Cooreman 1952. Host *Chlaenius platynoides* Allwaud collected in Bukavu, Zaire. The late Dr. Hans Regenfuss (1968, 1974) described 22 species of *Eutarsopolipus* from Central Europe and elsewhere, but none from Africa.

Eutarsopolipus lukoschusi n. sp.

Female (Figs. 7, 8). Gnathosoma longer than wide, length 61 μm , width 53 μm . Palps conspicuous, two

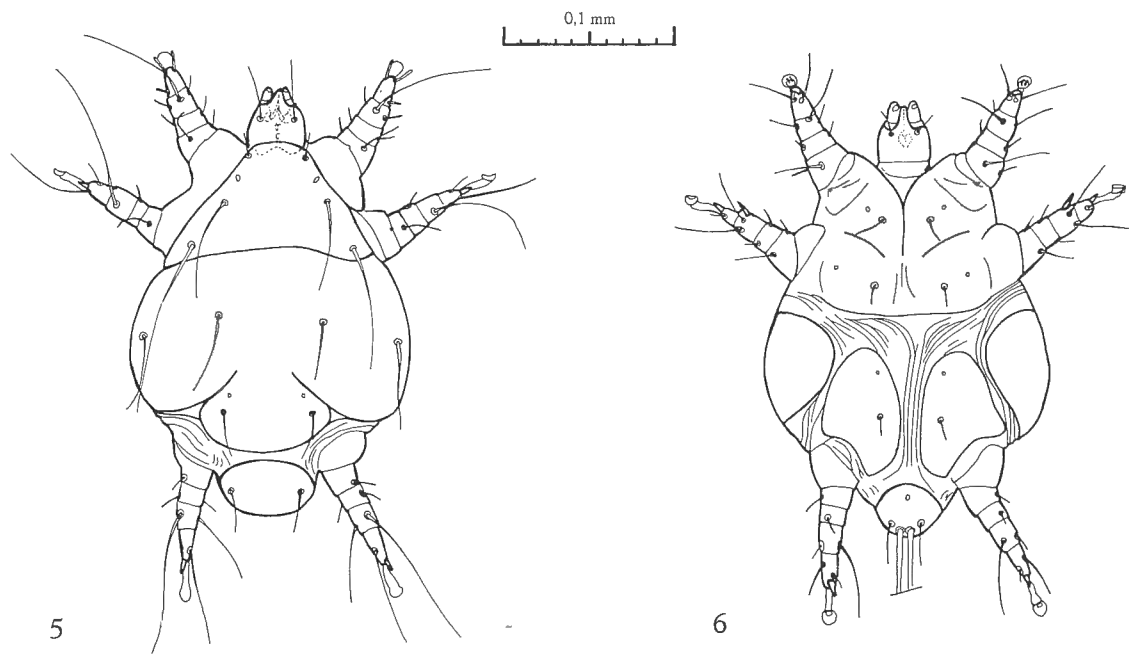


Fig. 5. *Tarsopolipus africanus n. sp.*, larval female, dorsal aspect.
 Fig. 6. *Tarsopolipus africanus n. sp.*, larval female, ventral aspect.

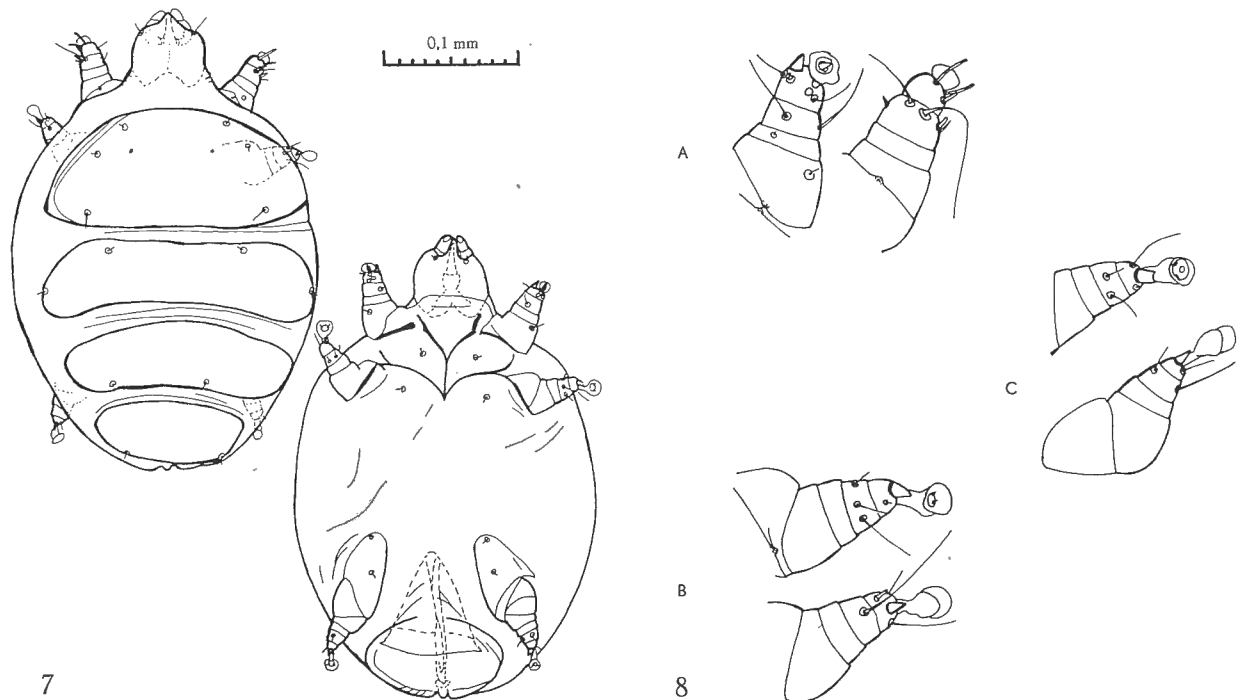


Fig. 7. *Eutarsopolipus lukoschusi n. sp.*, adult ♀.
 Fig. 8. *Eutarsopolipus lukoschusi n. sp.*, adult ♀. A. Leg I, dorsal and ventral aspects. B. Leg II, dorsal and ventral aspects. C. Leg III, dorsal and ventral aspects.

segmented, ventral sclerotized area on distal segment. Stylets 28 μm , enlarged distally.

Idiosoma. Oval, length 265 μm , width 229 μm , four dorsal plates. Prodorsal plate semilunar; setae v_1 , v_2 7 μm , Sc_2 12 μm . Setae c_1 8 μm , c_2 9 μm , d and e 7 μm . Venter with apodemes 1 and 2 well developed, meeting medially to join anterior sternal apodeme. No distinct posterior apodeme, coxae III separated, each with a pair of setae. Coxal setae 8 μm .

Legs. Seta arrangements as in Table 2. Leg I with a single claw, smaller than the terminal tarsal spine, vestigial setae at ventral base of ambulacrum. Tarsi I, II solenidia at least 4 times longer than wide. Tibia I solenidion with an adjacent seta. Tibia I with small anterior spine. No femur or genu II, III setae.

Male (Figs. 9, 10). Gnathosoma length 42 μm , width 33 μm ; dorsal gnathosomal setae 6 μm , ventral setae 12 μm . Palps conspicuous, two-segmented with a small ventral sclerotized area on the distal segment. Stylets 18 μm , enlarged distally, harpoonlike.

Idiosoma. Oval, length 172 μm , width 130 μm . Prodorsal plate semi-lunar; setae v_1 6 μm , v_2 8 μm , Sc_2 60 μm . Plates C, D fused, setae c_1 , c_2 , d about 8 μm , 9 μm and 6 μm respectively. Setae about 4 μm , on an oval plate E.

Venter with apodemes 1 and 2 well developed, meeting medially to join anterior sternal apodeme. No distinct posterior sternal apodeme, Coxae III separated, each with a pair of setae. Coxal setae 7 μm . Aedeagus with a pair of postero-lateral bulges.

Legs. Setal arrangements as in Table 2. Number of setae as in the female. Tarsi I and II solenidia at least 4 times longer than wide. Tibia I with small anterior spine, anterodorsal and posteroventral knob-like setae and a seta adjacent to solenidion \emptyset . No femur or genu II, III setae.

Larval female (Figs. 11, 12). Gnathosomal length 50 μm , width 37 μm ; dorsal gnathosomal setae 48 μm , ventral setae 10 μm . Palps conspicuous, two-segmented. Stylets 21 μm , enlarged distally, harpoon-like.

Idiosoma. Length 190 μm , width 140 μm . Prodorsal plate semi-lunar; setae v_1 , 50 μm , v_2 45 μm , Sc_2 88 μm . Plates C, D fused; setae c_1 , d and e are about 10 μm , 9 μm and 8 μm respectively, setae c_2 30 μm . Plate E oval.

Venter with apodemes 1 and 2 well developed, meeting medially to join anterior sternal apodeme.

No distinct posterior sternal apodeme, coxae III separated, each with a pair of setae. Coxal setae about 10 μm .

Legs. Setal arrangements as in Table 2. Setal numbers as in male and female. Tarsi I and II solenidia at least 4 times longer than wide. Tibia I solenidia with an adjacent seta. No femur or genu II, III setae. Leg I with 2 small parallel terminal claws. Legs II, III with small claws.

Diagnosis. Adult females of *E. lukoschusi* differ from *E. desani* from Africa in having claws on legs II and III less developed and the position of setae c_1 on the anterior border of plate C. Other stages of *E. desani* were not available at the time of this article. In the larval female, setae v_1 and v_2 are at least 1/2 the length of the prodorsal plate. No other *Eutarsopolipus* has a spine-like seta on tibia I in larval female, female and male stages. The combination of leg setal patterns, 1-0-7-9, 0-0-4-6, 0-0-4-5, is also unique.

Type data. All collected from *Thermophilum (Anthia) decemguttatum* (Fabricius) from two localities; Port Nolloth, S. Africa on 14 October 1980 and Leliefontain, S. Africa on 1 October 1980 by F. Lukoschus. Holotype, male, FL 80 1410-52. Paratypes: 8 males, 109 females, 18 larval females. Holotype and 33 paratypes deposited in the Institut Royal des Sciences Naturelles de Belgique, Brussels; 34 paratypes in the collection of F. Lukoschus, Katholieke Universiteit, Nijmegen, Netherlands, 34 paratypes at the South African Institute for Medical Research, Johannesburg; 34 paratypes in the Acarology collection, Biology Department, Adrian College, Adrian, Michigan. Additional specimens were collected from *Thermophilum decemguttatum* from various localities in S. Africa. These specimens are stored at Adrian College, the Transvaal Museum, Pretoria and at the Biosystematics Research Institute in Ottawa, Canada. The species is named in honor of Dr. F. Lukoschus in recognition of his contributions to acarology.

Regenpolipus new genus

DESCRIPTION

Adult female: Gnathosoma small, width less than 1/4 width of prodorsal plate, stylets short, less than 1/2 length of gnathosoma. Stigmata conspicuous.

Table 2.
Setae and spines on the legs of *Eutarsopolipus lukoschusi* n. sp.

	Leg I				Leg II				Leg III			
	F	G	Ti	Ta	F	G	Ti	Ta	F	G	Ti	Ta
Total setae and spines	1	0	7	9	0	0	4	6	0	0	4	5
Solenidia	0	0	1	1	0	0	0	1	0	0	0	0
Tibial spines	-	-	1	-	-	-	0	-	-	-	0	-

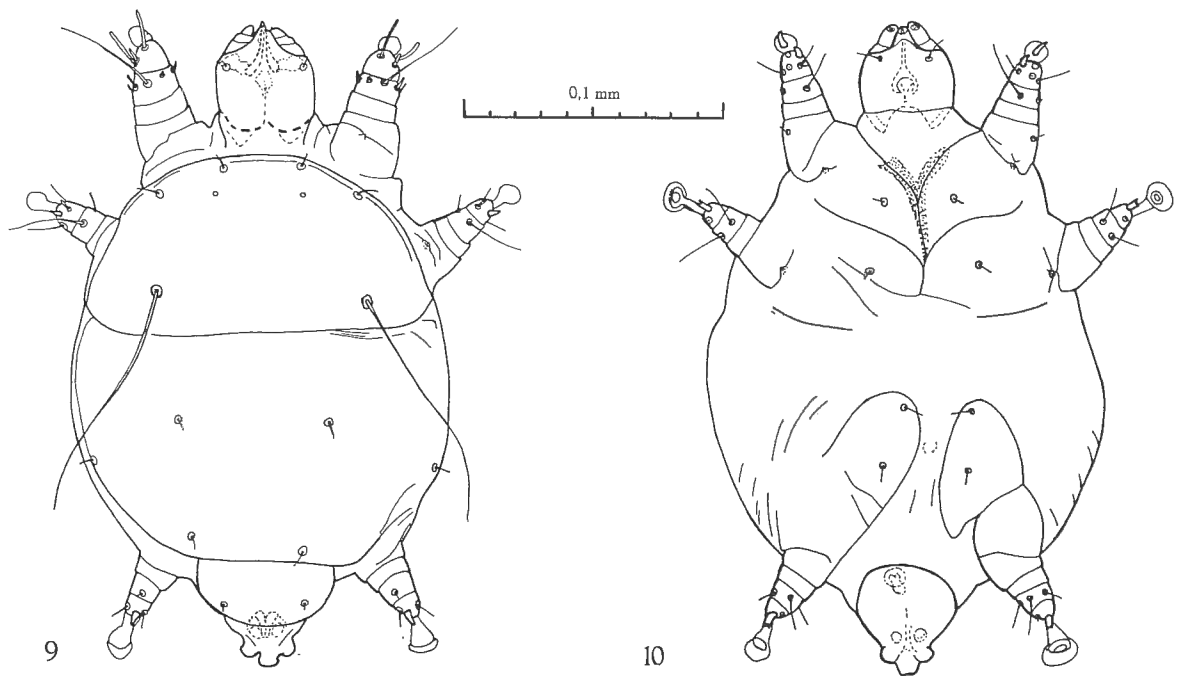


Fig. 9. *Eutarsopolipus lukoschusi* n. sp., male, dorsal aspect.
 Fig. 10. *Eutarsopolipus lukoschusi* n. sp., male, ventral aspect.

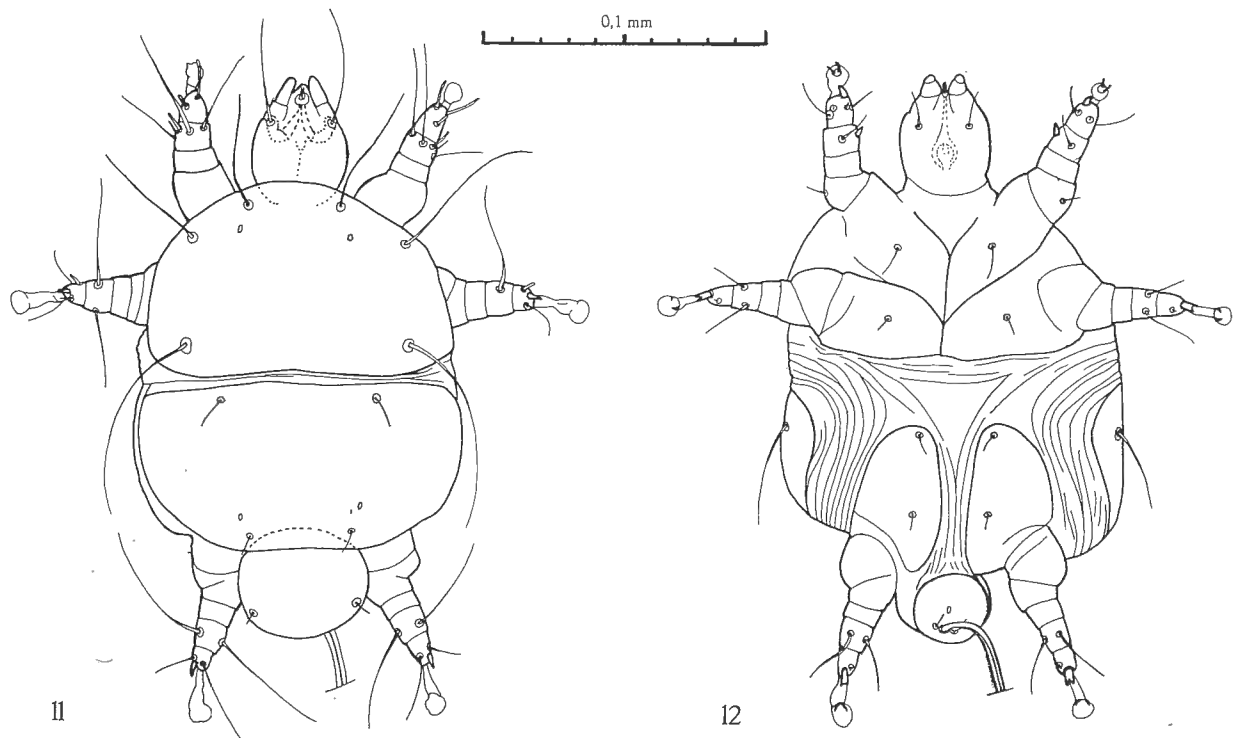
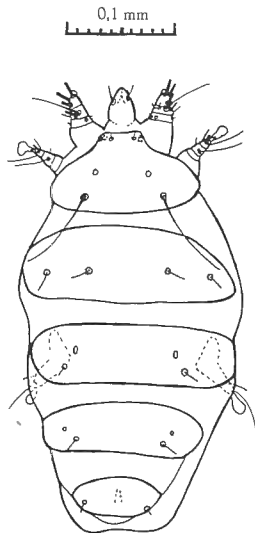
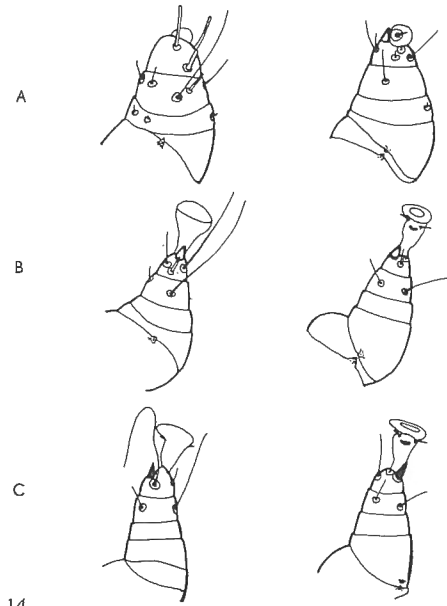


Fig. 11. *Eutarsopolipus lukoschusi* n. sp., larval female, dorsal aspect.
 Fig. 12. *Eutarsopolipus lukoschusi* n. sp., larval female, ventral aspect.



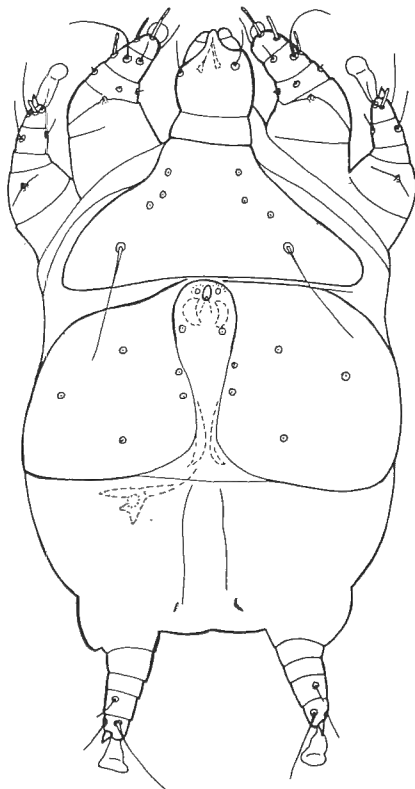
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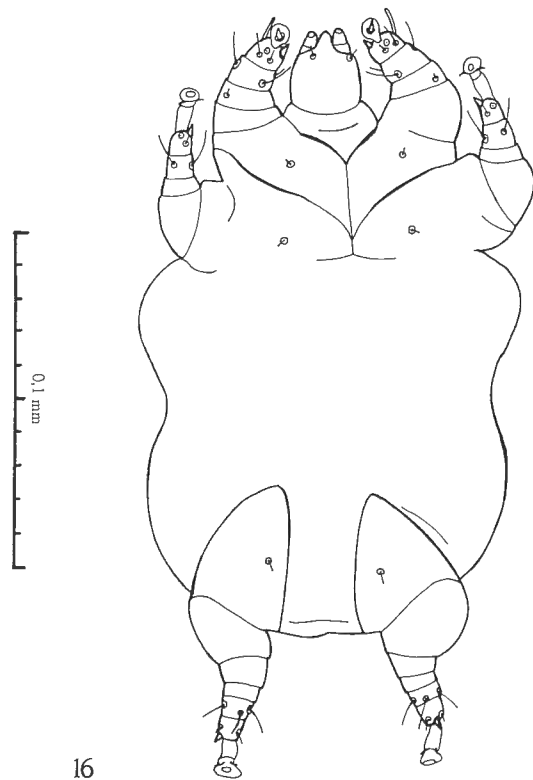
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Fig. 13. *Regenpolipus namibius* n. gen., n. sp., adult ♀, dorsal aspect.

Fig. 14. *Regenpolipus namibius* n. gen., n. sp., adult ♀. A. Leg I, dorsal and ventral aspects. B. Leg II, dorsal and ventral aspects. C. Leg III, dorsal and ventral aspects.



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Fig. 15. *Regenpolipus namibius* n. gen., n. sp., male, dorsal aspect.

Fig. 16. *Regenpolipus namibius* n. gen., n. sp., male, ventral aspect.

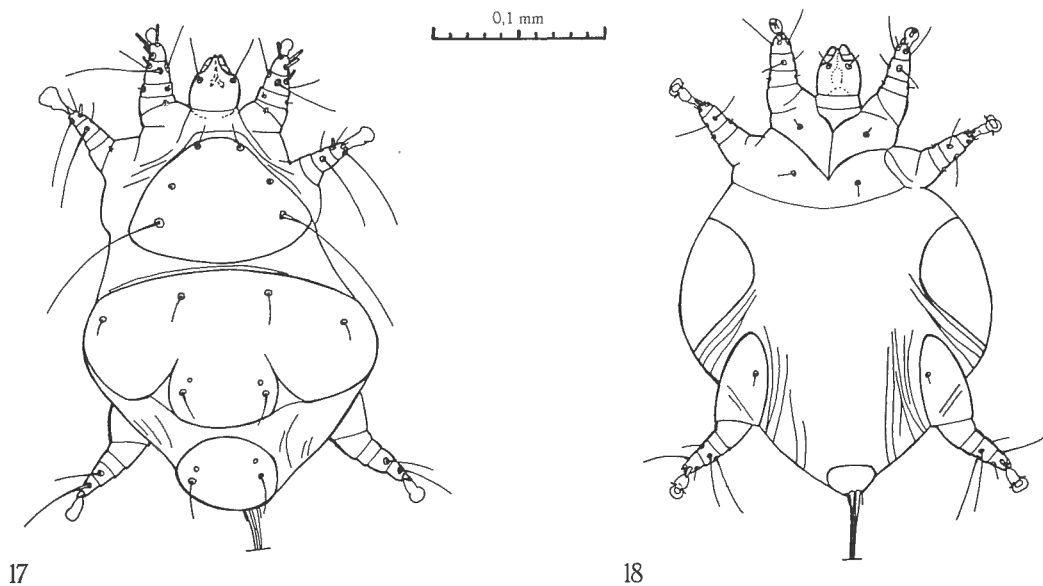


Fig. 17. *Regenpolipus namibius* n. gen., n. sp., larval female, dorsal aspect.

Fig. 18. *Regenpolipus namibius* n. gen., n. sp., larval female, ventral aspect.

Type data. All collected from Coleoptera : Carabidae, *Thermophilum (Anthia) decemguttatum* from S. Africa by F. Lukoschus. Holotype, male, Grootvlei, S. Africa ; 1 October 1980, by F. Lukoschus, FL 80 110-103. Paratypes 17 females, 3 larval females, 2 males. Holotype and paratypes FL 80 110-13, FL 80 1410 - 55, -133, -152, -173 in the Institut Royal des Sciences Naturelles de Belgique, Brussels. Paratypes FL 80 1410 - 20, -108, -153, -171, -174, -175 in the collections of F. Lukoschus, Katholieke Universiteit, Nijmegen, Netherlands, paratypes FL 80 1410 - 31, -121, -136, -168, -169, -172 in the South African Institute for Medical Research, Johannesburg, S. Africa and paratypes FL 80 1410 -43, -127, -141, -161, and -170 in the Acarology Collection, Biology Department, Adrian College, Adrian, Michigan. Paratype FL 110-13 was collected at Leliefontain, S. Africa, paratypes FL 80 1410-20, -31, -43, -55 and -121 were collected at Port Nolloth. The remaining paratypes were collected at Grootvlei.

DISCUSSION.

Slides loaned by Dr. Lukoschus indicated 3 host beetle species. Duplicates of these hosts from S. Africa and related beetles were examined. All *Regenpolipus namibius* are believed to have been associated with *Thermophilium (Anthia) decemguttatum*. Related species of possible *Regenpolipus* have been removed from *Anthia* spp. They are not described here because only three specimens (no males) have been found so far. Both *Eutarsopolipus lukoschusi* and *R. namibius*

were found on one slide from Dr. Lukoschus, most likely removed from the same insect host. Regenfuss (1972) removed both *Dorsipes cryptobius* and *Eutarsopolipus vernalis* from the host carabid beetle, *Pterostichus nigritus* (F.). It is likely that the two genera occupy different niches on the same beetle (Regenfuss, 1972).

Regenpolipus shares the following characteristics with *Dorsipes* and *Eutarsopolipus* which are also restricted to carabid beetle hosts : all stages with a reduced number of femoral II, III setae, tarsus II w solenidion present, adult females with 3 pairs of legs. Like some *Dorsipes*, *Regenpolipus* has plate F well developed in the adult female, setae v_2 microsetae and Sc_2 setae long in female stages and a single seta on coxal plate III. The dorsal aedeagus of *Regenpolipus* is somewhat similar in structure to the aedeagus of *Dorsipes*. However, male *Regenpolipus* have 3 pairs of legs while *Dorsipes* spp. have 4 pairs of legs. While *Dorsipes* and *Eutarsopolipus* have 1 - 3 femur I setae, *Regenpolipus* has no femur I seta. *Regenpolipus* has 4 genu I setae in contrast to 0 - 2 genu I setae in *Dorsipes* and *Eutarsopolipus*. In applying selected plesiomorphic (ancestral) characteristics utilized by Regenfuss (1973) to *Regenpolipus*, *Regenpolipus* is comparable to *Eutarsopolipus* and *Dorsipes* in number of plesiomorphic characters.

The genus is named in tribute to the late Dr. Hans Regenfuss of the Institut for Biologie I, Albert-Ludwigs, Universitat, Freiburg for his contributions to the knowledge of Podapolipidae in general and to those species associated with Carabidae in particular.

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Barry O'Connor and Mark O'Brien for making S. African beetles from the University of Michigan Museum collection available, Dr. T. L. Erwin of the National Museum of Natural History for the loan of specimens of beetles, Dr. R. Bruce Halliday of the C.S.I.R.O., Australia for providing *Tarsopolipus* sp. from S. African scarabs, Dr. Bruno Massa, Instituto di Zoologia, Palermo, Italy for providing specimens of *Scarabaeus semipunctatus* from which *Tarsopolipus corrugatus* Berlese 1911 were removed, and Dr. S. Krikken of Rijksmuseum van Natuurlijke Historie, Leiden for identification of beetles.

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