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**RADFORDIA (RADFORDIA) DALTONI SPEC. NOV. (ACARINA:
PROSTIGMATA: MYOBIIDAE) FROM PRAOMYS (MYOMYSCUS)
DALTONI (MAMMALIA: RODENTIA: MURIDAE)**

by

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and

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Scheperboer, G., F. S. Lukoschus & A. Fain: *Radfordia (Radfordia) daltoni* spec. nov. (Acarina : Prostigmata : Myobiidae) from *Praomys (Myomyscus) daltoni* (Mammalia : Rodentia : Muridae).

Zool. Med. Leiden 61 (30), 29-xii-1987: 431-442, figs. 1-10, tables 1-3. — ISSN 0024-0672.

Key words: Acarina; mites; taxonomy; Africa.

Radfordia (Radfordia) daltoni spec. nov. ex *Praomys (Myomyscus) daltoni* is illustrated, described in detail, and compared with the related species *Radfordia (R.) praomys* Zumpt & Coffee, 1977, ex *Praomys (Mastomys) natalensis* (A. Smith, 1834) from South Africa, and *Radfordia (R.) praomys trifurcata* Fain, 1973, from the same host species from Ivory Coast.

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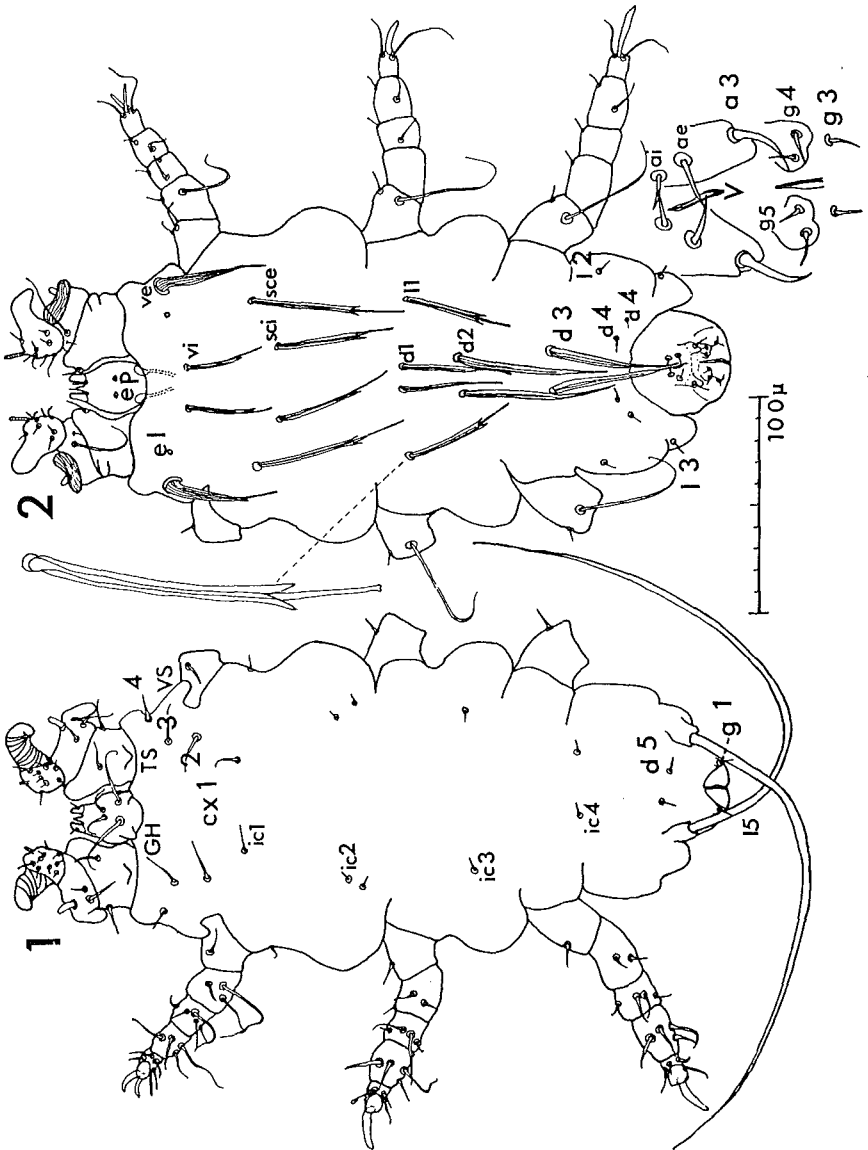
¹ Deceased on August 23, 1987.

INTRODUCTION

The co-evolution of mammals and host specific mites of the family Myobiidae has been discussed by Fain (1974, 1979) and Fain & Lukoschus (1976, 1977). Related species of Myobiidae from closely related host species do not show very distinct morphological differences, however, smaller modifications

of male genital region erect panmixis barriers, followed by deviating modifications of further characters.

We describe a new species of *Radfordia* (*Radfordia*) from *Praomys* (*Myo-*



Figs. 1-2. *Radfordia* (*Radfordia*) *daltoni* spec. nov., female holotype, 1) venter, 2) holotype dorsum.

myscus) *daltoni* (Thomas, 1892) that is compared with the closely related species *Radfordia* (*R.*) *praomys* Zumpt & Coffee, 1971, from the related host species *Praomys* (*Mastomys*) *natalensis* (Smith, 1834) and *Praomys* (*Praomys*) *morio* (Trouessart, 1881). Measurements are given in micrometers (μm) for the holotype, allotype, and paratypes (N = number of specimens examined, \bar{x} = mean and range).

DESCRIPTION OF SPECIES

Radfordia (**Radfordia**) **daltoni** spec. nov.

(figs. 1-10)

Deposition of types. — Holotype and allotype in U.S. National Museum of Natural History (Smithsonian Institution), Washington, D.C., U.S.A., type collection nr. 3978; paratypes in Field Museum of Natural History, Chicago, Illinois, U.S.A.; The South African Institute for Medical Research, Johannesburg; British Museum (Natural History), London, 1980.8.26.18-23; Zoologisches Museum, Hamburg; Institute of Parasitology, Prague; Muséum National d'Histoire Naturelle, Paris, 55F (12-15); Rijksmuseum van Natuurlijke Historie, Leiden; Institut de Medecine Tropicale Prince Leopold, Antwerp; Department of Aquatic Ecology, Catholic University, Nijmegen.

Female (holotype): Length including gnathosoma 333, \bar{x} ($N = 9$) 359 (333-370), width 170, \bar{x} 173 (161-182). Cuticle transversely striated with exception of lateral parts of coxal fields I and of genital region.

Venter (fig. 1): Present are in coxal fields I-IV 4-3-1-1 coxal setae, on opisthoventer the setae *d 5* and *l 5*. All innermost coxal setae (*ic 1* - *ic 4*) short. Measurements in table 1. Coxal field I with sclerotized, unstriated postero-lateral spurs (VS).

Dorsum (fig. 2): Setae *v i*, *v e* relatively narrow, with a partial central core and one barb; setae *sc i*, *sc e* and *l 1* with two lateral barbs and a blunt to spatulate tip; *d 1*, *d 4*, *l 2* and *l 3* setiform; *d 2* and *d 3* slightly expanded; setae *l 4* not observed.

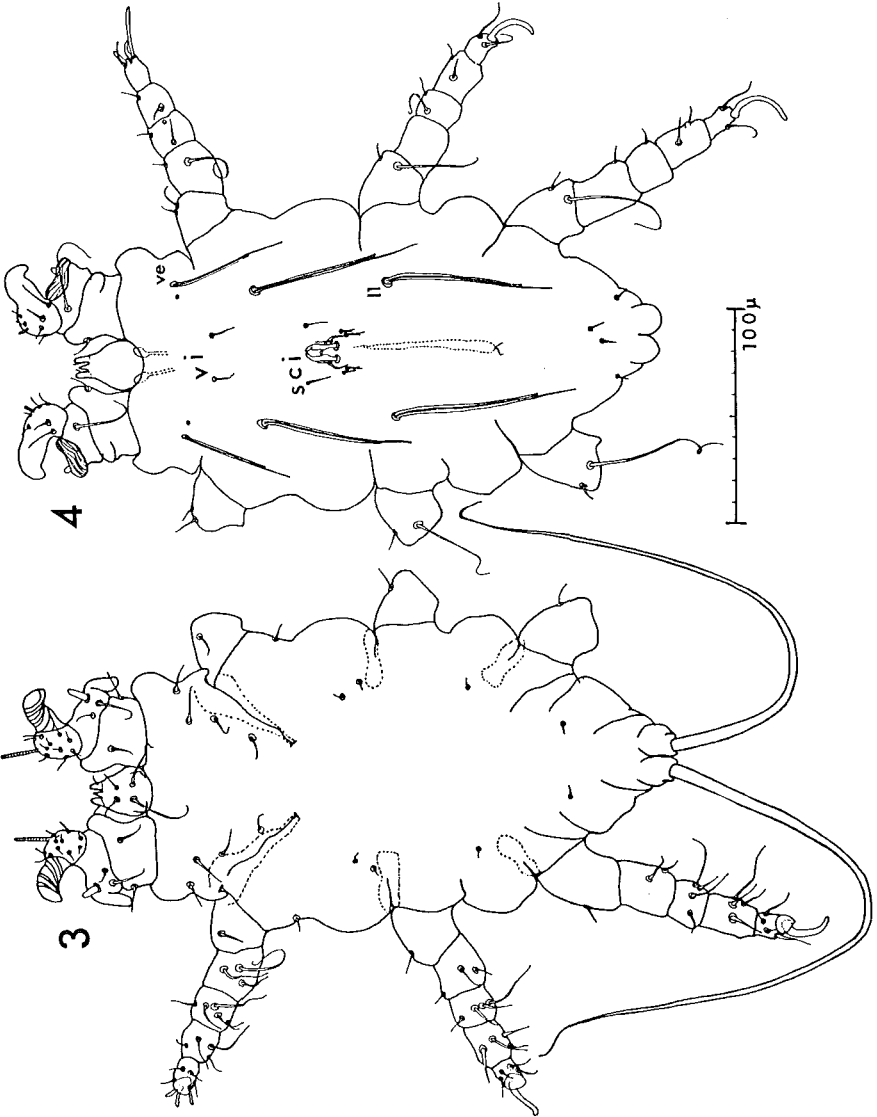
Supracoxal setae of legs I (*e 1*) between *v i* and *v e*. Genital region dorso-terminal, genital cone without cuticular pattern. Vulva (V) between relatively small vulvar valves, carrying setae *a i*, *a e* and small slightly curved *a 3* (genital hooks). Bursa copulatrix and duct to vulva not observed. Genital opening terminally with four pairs of genital setae (*g 2* absent). Gnathosoma sub-oval in shape, with small rounded latero-ventral spurs (*GH*) and the usual setation (*r a*, *r p*, *r d*) and supracoxal setae (*e p*). Palps two-segmented, each segment with one small seta. Legs with sub-genus' typical shape and setation (setae of

Table 1: Comparison of body and setal measurements between females of *Radfordia* (*Radfordia*) *daltoni* spec. nov., *R. (R.) praomys* Zumpt & Coffee, 1971, and *R. (R.) praomys trifurcata* Fain, 1973. Data from Zumpt & Coffee (1971) and Fain (1973).

	<i>daltoni</i>		<i>praomys</i>	<i>trifurcata</i>
	holotype	paratypes (N = 9)	3 paratypes	from description and figure
	\bar{x} min.-max.			
length	333	359 (333-370)	374 (364-382)	375
width	170	173 (164-182)	206 (200-216)	186
<i>cx I'</i>	(ic 1) 15	14 (12- 16)	16 (16- 17)	
<i>cx I''</i>	21	19 (17- 21)	23 (16- 17)	
<i>cx I'''</i>	21	20 (18- 21)	23 (23)	
<i>cx I''''</i>	12	13 (12- 15)	16 (16)	
<i>v i</i>	38	39 (26- 42)	46 (42- 50)	41
<i>v e</i>	60	57 (50- 62)	62 (60- 63)	75
<i>sc i</i>	60	59 (55- 65)	65 (65- 66)	69
<i>sc e</i>	74	74 (71- 79)	78 (77- 78)	90
<i>d 1</i>	51	47 (43- 50)	63 (61- 67)	69
<i>d 2</i>	79	79 (73- 83)	82 (79- 84)	96
<i>d 3</i>	65	68 (63- 71)	73 (60- 81)	95
<i>l 1</i>	57	59 (55- 63)	72 (68- 74)	72
<i>l 5</i>	273	280 (267-291)	297 (285-303)	
width				
<i>v i</i>	2	2 (2)	2 (2)	
<i>v e</i>	6	6 (6)	7 (7)	
<i>sc i</i>	2	2 (2)	2 (2- 3)	
<i>sc e</i>	2	2 (2)	2 (2)	
<i>d 1</i>	2	2 (2)	3 (2- 3)	
<i>d 2</i>	4	4 (4)	6 (5- 6)	above 7
<i>d 3</i>	5	4 (4- 5)	7 (6- 7)	above 8

fused segments tarsus – tibia – genu of legs I not counted): tarsi –, 7, 6, 6; tibiae –, 6, 6, 6; genua –, 7, 6, 5; femora 6, 5, 3, 3; trochanters 3, 3, 3, 3; claws 0, 2, 1, 1. Legs I with small trochanteral spurs (TS) on ventral side. Trochanters III and IV each with a setiform dorsal seta, shorter than length of legs.

Male (allotype): Length 267, ten paratypes \bar{x} 262 (248-263), width 142, in paratypes \bar{x} 141 (127-152). Venter (fig. 3) similar to female, with position of *l 5* and suppression of *d 5* like in other males of subgenus. Dorsum (fig. 4) with genital region between level of *sc e* and *l 1*. Setae *v i*, *sc i*, and opisthosomal setae short, setiform; setae *v e*, *sc e* and *l 1* with only one lateral barb. Genital



Figs. 3-4. *Radfordia (Radfordia) daltoni* spec. nov., male allotype, 3) venter, 4) allotype dorsum.

opening (fig. 10, *GO*) on a short, parallel-sided tubercle, with conical end between two pairs of semi-tubular genital setae, which probably serve to guide the aedeagus. Aedeagus linear, well sclerotized, directed anterad, 67 long. Setae *d1*, *d2* barbed, laterad of genital tubercle. Gnathosoma and legs similar to female, with exception of absence of trochanter I spurs, and strong, blunt

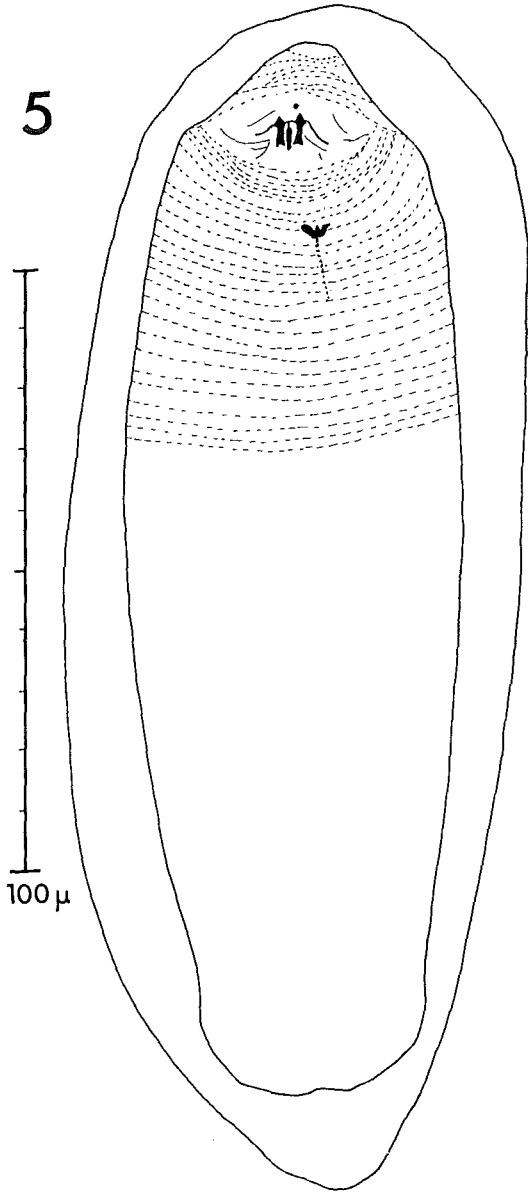


Fig. 5. *Radfordia (Radfordia) daltoni* spec. nov., prelarva.

shape of *md* setae on tarsi I and II (like in all males of genus). Measurements in table 2.

Development stages

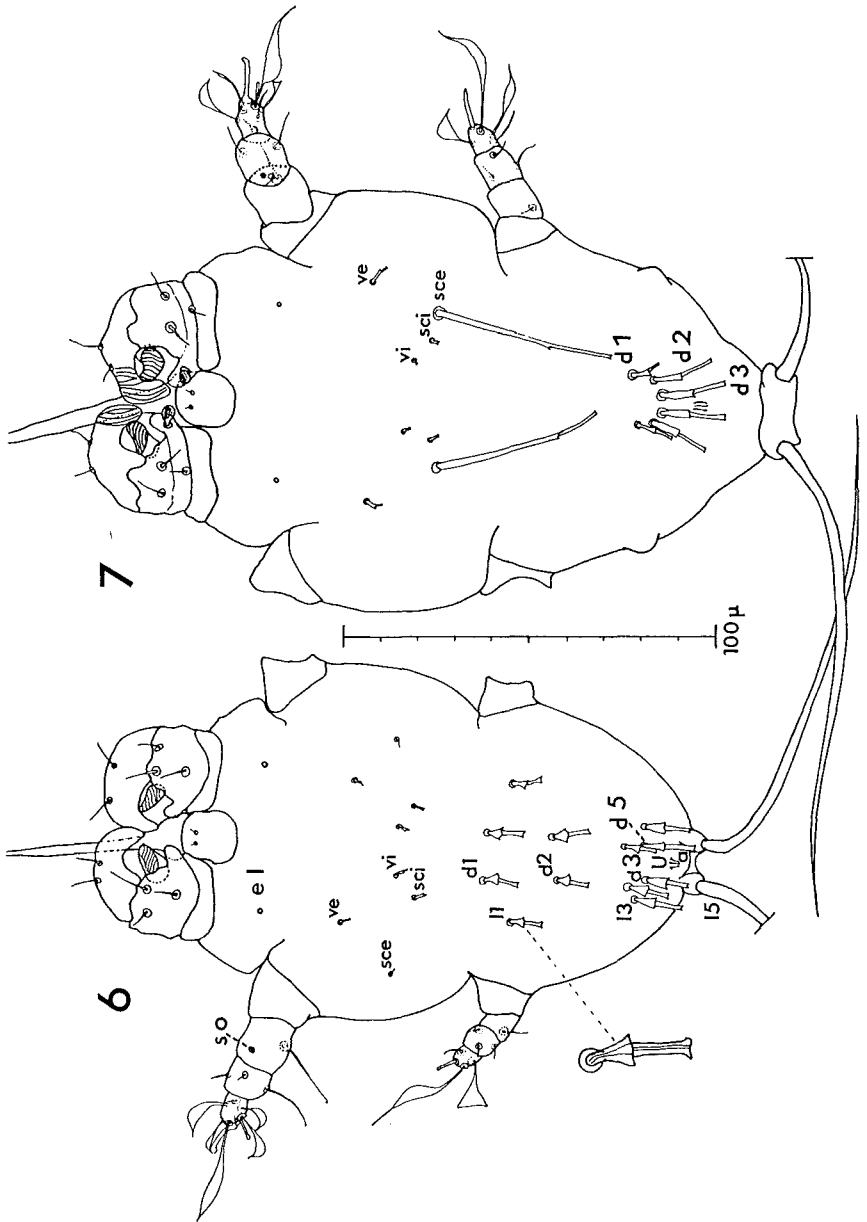
Eggs: 194 long, 66 wide, lice-like attached to hairs of host, chorion smooth.

Praelarva (fig. 5): Cryptostatic within the egg. Cuticle with transverse striations. Anteriorly are present dorsally two spearhead-shaped, strongly sclerotized structures, ventrally a funnel-shaped opening and associated sclerotized duct.

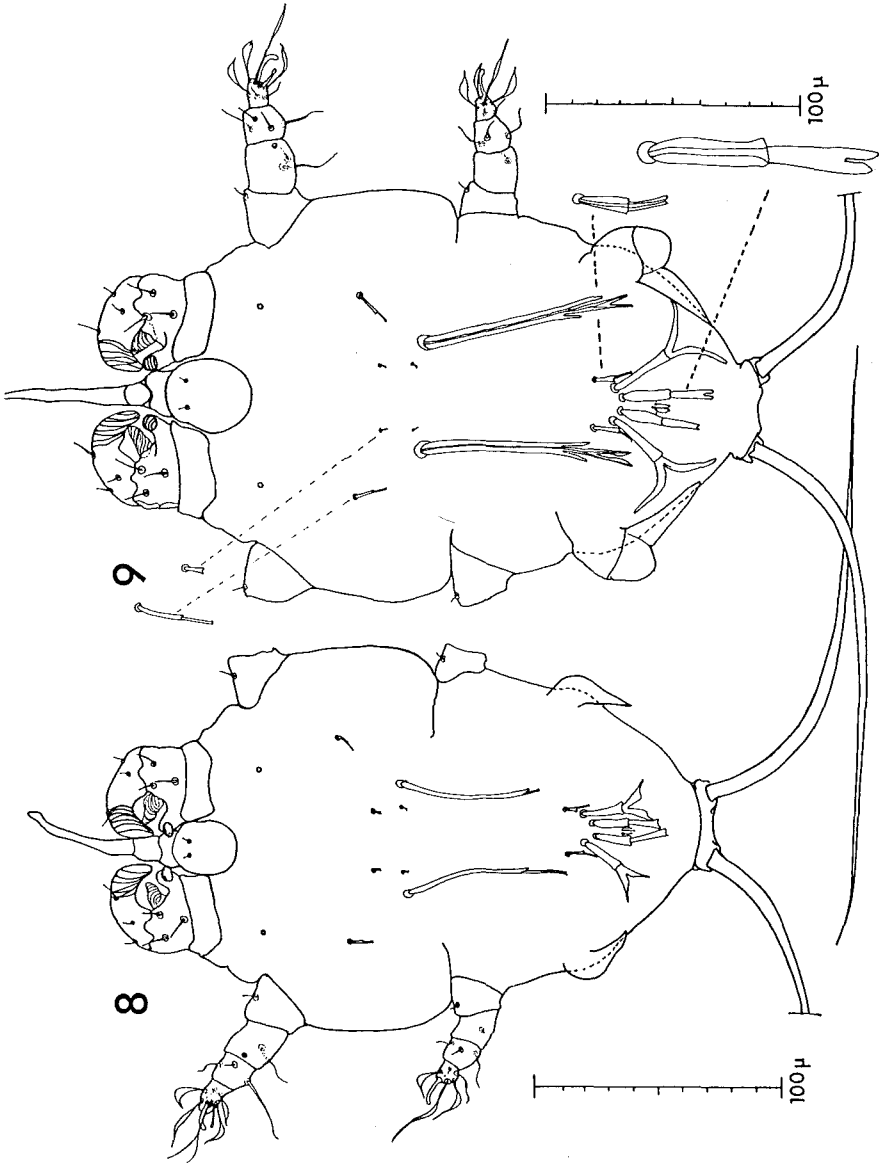
Larva (fig. 6): Length of four specimens \bar{x} 195 (161-222), width \bar{x} 108 (94-122). Present are setae *e I*, *v e*, *v i*, *sc e*, *sc i*, *d I*, 2, 3, 5, *l I*, 3, 5 and one pair of anals on dorsum; *ic I* ventrally. Vertical setae shifted backwards far behind level of legs II. Propodonotal setae short, setiform with blunt tip, partly with

Table 2: Comparison of body and setal measurements between males of *Radfordia* (*Radfordia*) *daltoni* spec. nov. and *R. (R.) praomys* Zumpt & Coffee, 1971, ex *Mastomys natalensis* and *Praomys morio*.

	<i>Radfordia (R.) daltoni</i>		<i>R. (R.) praomys</i>	
	allotype	10 paratypes	<i>Mastomys natalensis</i> 2 specimens	<i>Praomys morio</i> 2 specimens
length	267	262 (248-273)	285, 291	242, 255
width	142	141 (127-152)	164, 170	133, 145
<i>cx I</i>	11	12 (10- 12)	11, 13	13, 13
<i>cx I</i>	15	16 (15- 17)	16, 18	17, 17
<i>cx I</i>	15	16 (13- 18)	17, 20	17, 17
<i>v i</i>	12	12 (11- 12)	12, 13	11, 12
<i>v e</i>	59	57 (51- 60)	61, 68	56, 59
<i>sc i</i>	12	14 (10- 15)	18, 20	16, 16
<i>sc e</i>	81	80 (76- 82)	84, 89	81, 81
<i>d 1</i>	7	8 (7- 9)	6, 6	5, 5
<i>d 2</i>	10	10 (10- 12)	9, 9	6, 6
<i>l 1</i>	84	85 (79- 90)	92, 93	94, 95
<i>l 5</i>	285	271 (255-285)	291, 297	279, 291
width				
<i>sc e</i>	2	3 (2- 4)	2, 4	2, 2
<i>l 1</i>	3	3 (2- 4)	4, 4	4, 4



Figs. 6-7. *Radfordia (Radfordia) daltoni* spec. nov., 6) larva dorsum, 7) protonymph dorsum.



Figs. 8-9. *Radfordia (Radfordia) daltoni* spec. nov., 8) deutonymph, dorsum, 9) tritonymph, dorsum.

small barb. Hysteronotal setae with spatulate tips and short, triangular transparent broadening on basal part of seta, suggesting two-segmented shape of seta (see detail figure). Gnathosoma and legs I similar to those of other species of subgenus. Legs II, III four-segmented. Solenidion sigma (*so*) indicates fusion of genu and femur. Chaetotaxy legs II, III: tarsi 7-4, tibiae 3-3, genu-femora 1-1, trochanters 0-0. Strong claw on praetarsus II, small claw on III.

Protonymph (fig. 7): Length 185, width 106. By suppression of legs IV to the shape of small, rounded, lateral protuberances resembles larva; however, protonymph-typical setation of coxal fields I-IV is present: 2-1-1-0. Propodonal setae in same position as in larva; *sc e* stronger and typically prolonged. Setae *d 1-d 3* shifted to level of legs IV. Setae *d 4, d 5, l 1* and *l 3* suppressed.

Deutonymph (fig. 8): Length in nine specimens 207 (192-288), width 134 (127-170). General shape like protonymph, with legs IV. Chaetotaxy of legs II-IV: tarsi 7 - 5 - 0, tibiae 4 - 3 - 0, genu-femora 1 - 1 - 0, trochanters 1 - 1 - 0, coxal fields I-IV 2 - 1 - 1 - 1.

Tritonymph (fig. 9): Length of 15 specimens 274 (236-333), width 168 (145-206). General shape like deutonymph, with legs IV nude, three-segmented. Dorsal setae longer and more modified (see table 3). Added is a second pair of anal setae. Chaetotaxy of legs II-IV: tarsi 7 - 6 - 0, tibiae 5 - 3 - 0, genu-femora 2 - 1 - 0, trochanters 1 - 1 - 0, coxal fields I-IV 3 - 2 - 1 - 1. Measurements in table 3.

Host and locality. — *Praomys (Myomyscus) daltoni* (Thomas, 1892), Safari Lodge, Comoe N.P., Ivory Coast, 15-III-1979, 18-III-1979, leg. Christian F. Weisser, present depository unknown.

Comparison with related species. — *Radfordia (Radfordia) daltoni* spec. nov. is closely related to *R. (R.) praomys praomys* Zumpt & Coffee, 1971, and *R. (R.) praomys trifurcata* Fain, 1973. The setal measurements of the species

Table 3: Setal measurements of the immatures of *Radfordia (Radfordia) daltoni* spec. nov.

	larva	protonymph	deutonymph	tritonymph
N	1	1	9	15
<i>v e</i>	2	6	10 (6- 14)	17 (13- 21)
<i>sc e</i>	3	46	62 (54- 67)	97 (85-109)
<i>d 1</i>	9	10	12 (10- 13)	19 (17- 24)
<i>d 2</i>	9	16	28 (21- 35)	55 (49- 63)
<i>d 3</i>	8	18	28 (20- 30)	40 (37- 44)
<i>l 5</i>	145	134	189 (170-198)	209 (200-224)

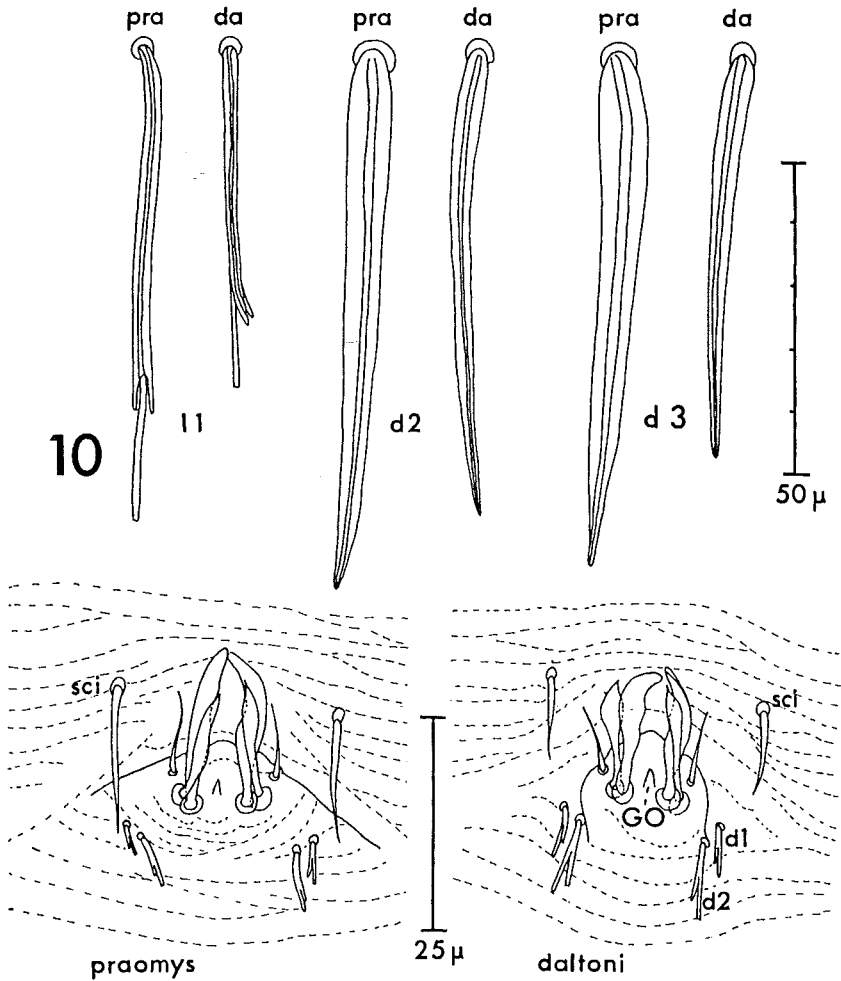


Fig. 10. Comparison between setae *l 1*, *d 2* and *d 3* of females, and the male genital regions of *Radfordia (Radfordia) daltoni* spec. nov. and *Radfordia (R.) praomys* Zumpt & Coffee (1971).

are compared in tables 1 and 2. In females only the length of *l 1* and the width of setae *d 2* and *d 3* are significantly different (comparison in fig. 10). Males can be separated by the shape of the genital cone and genital setae (fig. 10); significant differences in length of setae are present only in *d 1* and *d 2*. The current concept of *R. (R.) praomys praomys* parasitizing hosts of different genera (subgenera) of the *Praomys*(-group) should be re-examined. We may expect, that they will be parasitized rather by related (sub-)species.

In their study of *Radfordia (R.) petromyscus* Lukoschus et al. (1981) have

given some characters of *Radfordia* (*Radfordia*) species in tabulated form. According to them *R. (R.) praomys* is the only species of the subgenus *Radfordia* from Muridae hosts with the combination of coxal setae 4 - 3 - 1 - 1 with all innermost coxal setae short.

The observation of the nymphal stages with precession of the lateral setae, and suppression of *d* 5 after having been present in the larval stage, in the species and subspecies from *Praomys* hosts is unique in the subgenus *Radfordia*. Similar precession of setae, and of *d* 5 after presence in larval stage are present in all genera and species from Insectivorous hosts (exception *Suncomyobia* and *Nectogalobia* because of lacking larvae in collection).

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