

A NEW SPECIES OF DEMODICID MITE (ACARI: PROSTIGMATA)
FROM WESTERN AUSTRALIA PARASITIC ON *MACROGLOSSUS*
MINIMUS (CHIROPTERA: PTEROPODIDAE)

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ABSTRACT

Demodex macroglossi sp. nov. from *Macroglossus minimus* is described and compared with the related species *D. carolliae* (Desch et al. 1971) from *Carollia perspicillata*. Specimens of *D. macroglossi* were found to reside in hair follicles of the eyelids and in a large dermal cyst on the neck. Two total-length size groups are recognized in nymphs representing possible sexual dimorphism.

This new species from a megachiropteran host most closely matching a demodicid from a microchiropteran reinforces the view that hair follicle-dwelling species of the Demodicidae are evolutionarily very conservative when compared with glandular invading species; thus, more precisely mirroring mammalian evolution.

INTRODUCTION

At present, demodicids are known from 11 mammalian orders including the Chiroptera (Nutting 1979). Within this order, six species of *Demodex* have been described from five host species of the suborder Microchiroptera, but none has been recorded from the Megachiroptera. The following report describes a new demodicid, *Demodex macroglossi* sp. nov. from the megachiropteran *Macroglossus minimus* Geoffrey, 1810 (Pteropodidae).

SYSTEMATICS

Demodex macroglossi sp. nov.

(All measurements below are in microns)

Holotype

Male; WAM 80-743; Plate I, 1.

Allotype

Female; WAM 80-744; Plate I, 2.

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Paratypes

Deposited in: Field Museum of Natural History, Chicago; U.S. National Museum of Natural History (Smithsonian Institution), Washington, D.C.; The Acarology Laboratory, Columbus, Ohio; Department of Zoology, University of Massachusetts, Amherst; Department of Aquatic Ecology, Catholic University, Nijmegen, The Netherlands.

Diagnosis

Demodex macroglossi is a medium-sized member of the genus; the longest adult specimen, a male, measured 189 μm . It is most similar to *D. carolliae* (Desch *et al.* 1971) of the Leaf-nosed Fruit Bat, *Carollia perspicillata*. Differences include:

- 1 *Demodex macroglossi* males longer ($175.7 \pm 5.6 \mu\text{m}$) than *D. carolliae* males ($128.5 \pm 2.6 \mu\text{m}$).
- 2 *Demodex macroglossi* males longer than females; *D. carolliae* females longer than males.
- 3 Immatures of *D. macroglossi* lack supracoxal spines; present in corresponding stages of *D. carolliae* as minute, peg-like spines.
- 4 Ventral scutes (= epimeral scutes) present in protonymph and nymph of *D. macroglossi*; absent in all immature stages of *D. carolliae*.

Description

Male (Plate I, 1): Mean body length 175 μm (167-189 μm) (N = 20) with opisthosoma comprising two-thirds of this value. Other measurements in Table 1.

Gnathosoma trapezoidal, length less than basal width. Subgnathosomal setae (pits) lateral to anterior region of horseshoe-shaped pharyngeal pump (Fig. 2). Supracoxal spines 0.8 μm diameter at base flaring to 2.4 μm distally (Fig. 3). They are spaced 11 μm apart and are partially embedded in the gnathosomal cuticle. Palpal tarsus with two 2-tined spines and one minute, single-tined spine.

Legs evenly spaced along podosoma; terminal segment with pair of claws. Claws bifid distally and with a large, posteriorly directed spur. Solenidion anterodorsal to dorsal claw of legs I and II; absent on legs III and IV. Coxal plates meet at midline.

Genital orifice a simple longitudinal slit 5-6 μm long at level of legs I (Fig. 1). Dorsal podosomal tubercles faint. Anterior pair oblong with posterior end angled toward midline; spaced 16-18 μm apart at level of legs I. Posterior pair figure 8-shaped; spaced 12 μm apart at level of between legs I and II. Spaced 1.5 μm apart from front to back. Aedeagus 18 μm long with



Plate I: Life stages of *Demodex macroglossi*. All X425. 1—Male (holotype). 2—Female (allotype). 3—Cvum. 4—Larva. 5—Protonymph. 6—Nymph.

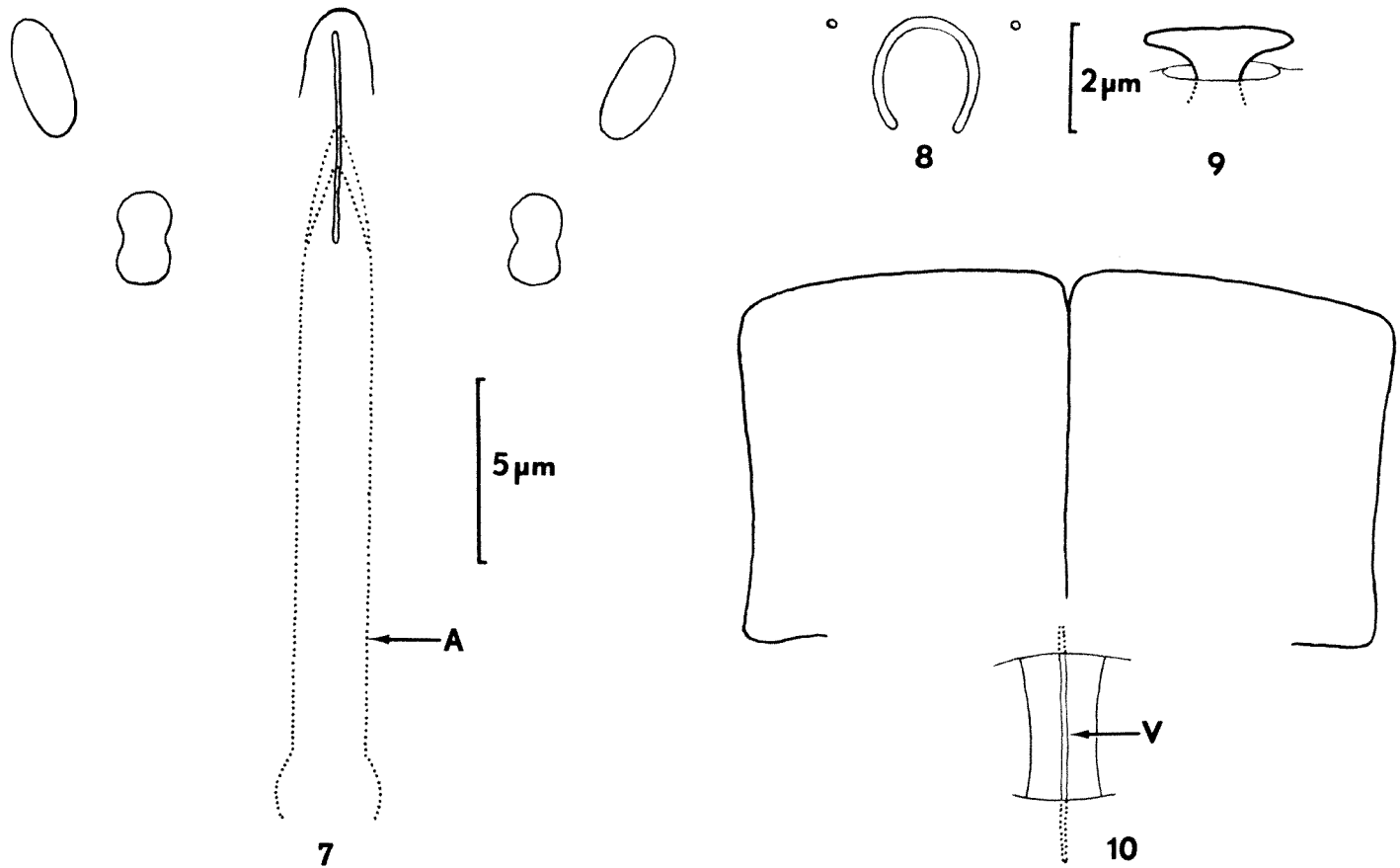


Fig. 1: Male genitalia and dorsal podosomal tubercles. A = aedeagus. Fig. 2: Pharyngeal bulb (pump) and lateral subgnathosomal setae (pits). Fig. 3: Left supracoxal spine. Fig. 4: Female external genitalia and coxal plates IV. V = vulva.

a narrow sheath. Posterior margin of dorsal podosomal shield at level of legs III.

Opisthosoma 108-125 μm long tapering to a blunt point. Transverse cuticular striations faint. Opisthosomal organ absent.

Female (Plate I, 2): Mean body length 141 μm (136-150 μm) (N = 20) with opisthosoma comprising nearly three-fifths of this value.

Gnathosoma and associated structures as in male but average width and length about 1 μm smaller. Supracoxal spines set 10 μm apart.

Legs and coxal plates as in male. Dorsal podosomal tubercles faint. Anterior pair as in male, 10 μm apart. Posterior small, round and 13 μm apart at level of legs II. Spaced 10 μm apart from front to back.

Vulva a simple longitudinal slit 4.4 μm long. Its anterior edge lies about 2 μm behind the posterior margin of coxal plate IV (Fig. 4).

Opisthosoma 76-89 μm long with round terminus. Transverse cuticular striations well-defined. Opisthosomal organ absent.

Ovum (Plate I, 3): Non-operculate, 48-54 μm long and broadly rounded at both ends. Anterior half with greatest width, 22-27 μm .

Larva (Plate I, 4): Spindle-shaped; 66-86 μm long with opisthosoma comprising just over one-half this value. Greatest width at legs III 21-29 μm .

Gnathosoma similar to adult but smaller and lacking subgnathosomal setae and supracoxal spines. Non-segmented legs positioned laterally projecting 4 μm from the body wall. Each leg with a large, short three-tined claw; tines spaced 3 μm apart. Ventral (sternal) scutes absent.

Protonymph (Plate I, 5): Spindle-shaped; 90-121 μm long with opisthosoma comprising two-thirds of this value. Greatest width at legs III 23-33 μm .

Gnathosoma and associated structures as in larva. Legs as in larva each with a pair of short trifold claws. Two pairs of ventral scutes at level of legs II and III; appear oval in ventral view and mamma-like in lateral view.

Nymph (Plate I, 6): Elongate, spindle-shaped; 114-156 μm with opisthosoma comprising two-thirds of this value. Greatest width at legs III 27-34 μm .

Gnathosoma and associated structures as in larva. Four leg pairs, each leg with a pair of short trifold claws. A pair of ventral scutes between each leg pair; anterior scute pair very small. Scutes shaped as in protonymph.

Host

Macroglossus minimus (Geoffrey, 1810) collected by F.S. Lukoschus at Camp Creek near Aluminium Camp on Mitchell Plateau (14°50'S, 125°49'E) on 19.X.1976. The holotype, allotype and all paratypes were taken from the

single host specimen; WAM M15725.

Locus on host: Over one thousand mites were expressed from a single papule on the neck region. Mites were also recovered from hair follicles of the eyelids. Tissue was not available for histological examination.

Population structure: Of the 839 mites examined 57.7 per cent were immatures; 95 ova and embryos (11.3%); 163 larvae (19.4%); 88 protonymphs (10.5%) and 139 nymphs (16.6%). In the adult group, females outnumber males nearly two to one.

Frequency distribution plots of nymphal length ($N = 83$) reveal two size groups; one peaking at $121 \mu\text{m}$ and the other at $143 \mu\text{m}$. This size distribution may indicate nymphal sexual dimorphism although no other morphological differences are distinguishable between nymphs.

TABLE 1

Means and standard deviations of 20 specimens of each stage and sex of *Demodex macroglossi*.
(All measurements in microns.)

		Male	Female
Gnathosoma	Length	13.3 ± 0.7	12.9 ± 0.6
	Width	18.4 ± 1.1	17.2 ± 0.9
Podosoma	Length	48.6 ± 0.9	46.4 ± 1.1
	Width	31.2 ± 1.8	28.0 ± 1.7
Opisthosoma	Length	113.8 ± 5.1	82.1 ± 3.2
	Width	29.5 ± 3.1	25.4 ± 3.2
Total length		<u>175.7 ± 5.6</u>	<u>141.4 ± 3.0</u>
Aedeagus		19.9 ± 1.2	
Vulva			4.4 ± 0.0
	Ovum		
Length	51.6 ± 1.6	74.1 ± 5.0	108.1 ± 8.9
Width	24.2 ± 1.4	24.3 ± 2.4	28.0 ± 2.8
			136.8 ± 14.9
			29.3 ± 2.5

DISCUSSION

Although all specimens of *D. macroglossi* examined in this study were obtained from a single papule on the neck of a *M. minimus*, additional mites were found infesting swollen hair follicles of the eyelids of this same host specimen (Lukoschus, pers. comm.). It is possible that follicles in other body regions are also inhabited by *D. macroglossi*, except the Meibomian glands which harbour another species of *Demodex* (Kniest & Lukoschus, in prep.). Of 12 host specimens surveyed for *D. macroglossi* by F.S. Lukoschus, only the above-mentioned individual proved positive.

The morphological similarities of *D. macroglossi* and *D. carolliae* (Desch *et al.* 1971) and their similar pathology and distribution on their distantly related hosts, *Macroglossus minimus* (Megachiroptera) and *C. perspicillata* (Microchiroptera), respectively, indicate the evolutionary conservative nature of these mites that utilise the host hair follicle as habitat.

The bimodal size distribution of nymphs noted in *D. macroglossi* is observed in one other demodicid, *Demodex marsupialis* (Nutting *et al.*, 1980). Total length is the only external morphological manifestation so far observed to indicate possible sexual dimorphism in the nymphs of these two species. Additional meristic data from other demodicids may reveal similar results.

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