

DERMANYSSINE MITES FROM AUSTRALIAN BIRDS¹

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ABSTRACT

Liponyssoides lukoschusi sp. nov. is the first Australian representative of this widespread genus - hosts *Podargus strigoides* (Latham) (Podargidae) (Western Australia) and *Climacteris picumnus* Temminck (Certhiidae) (Queensland). *Dermanyssus hirundinis* (Hermann) is confirmed as a member of the Australian fauna - hosts *Meliphaga flavicollis* (Vieillot) (Meliphagidae) (Tasmania) and possibly *Hylochelidon ariel* (Gould) (Hirundinidae) (Western Australia).

INTRODUCTION

This contribution to the ectoparasites of Western Australia collected by Dr F.S. Lukoschus, Catholic University, Nijmegen, largely concerns a new species of *Liponyssoides* Hirst from a frogmouth. This bird is also host to other interesting mite parasites: *Oxleya* Domrow, 1965 (Epidermoptidae: Turbinoptinae), *Boydaia podargi* Fain & Lukoschus, 1979 (Ereynetidae: Speleognathinae) and *Caprimuldectes* Janssen Duijghuijsen, Lukoschus & Fain, 1979 (Hypoderidae).

In addition, the presence of *Dermanyssus hirundinis* (Hermann) on native Australian birds is confirmed. The only other dermanyssine known from Australia is *D. gallinae* (De Geer), a widespread pest of poultry, see Domrow (1963).

The term "holotrichous" refers to the setal condition in typical free-living dermanyssids (Evans & Till 1965, Evans 1969). Hosts are after Leach (1958). Depositories are abbreviated: WAM Western Australian Museum, Perth; FMNH Field Museum of Natural History, Chicago; QIMR Queensland Institute of Medical Research, Brisbane; CU Catholic University, Nijmegen.

1. Results of Western Australian Field Programme 1976-1977, Field Museum of Natural History, Chicago, and Western Australian Museum, Perth. Aided in part by Grant R 87-111 from Netherlands Organisation for Advancement of Pure Research (Z.W.O.), The Hague. Miss Cobie Rudd prepared the illustrations.

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Liponyssoides lukoschusi sp. nov.

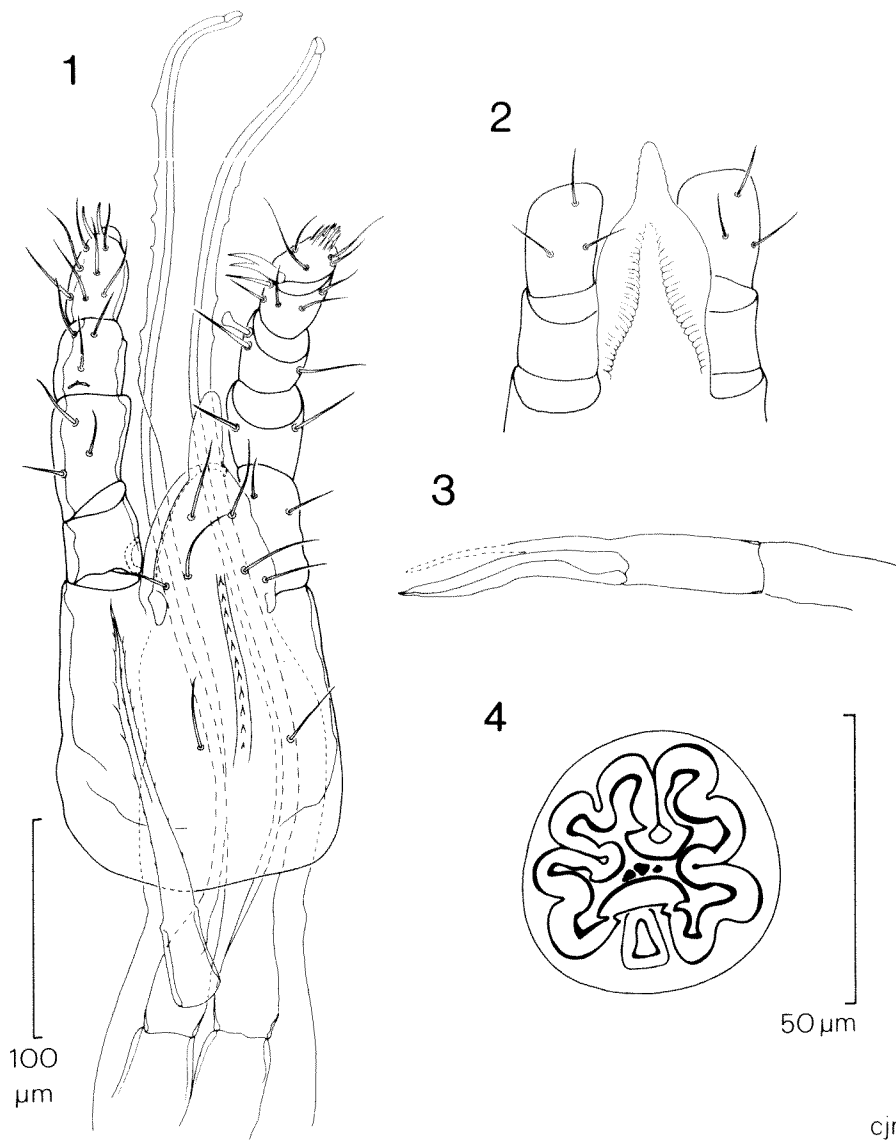
Traditionally, the Dermanyssinae comprised three genera: *Dermanyssus* De Geer, *Liponyssoides* Hirst and *Allodermanyssus* Ewing [see Strandtmann & Wharton (1958)], but more recent opinion on their inter-relationships has varied. Thus, Krantz (1959) sunk *Allodermanyssus* under *Dermanyssus*, since both included species with a fragmented dorsal shield; while Sheals (1962) and Moss (1967) indicated that *Allodermanyssus* was a synonym of *Liponyssoides*, on setal characteristics. The latter position is accepted below.

In this context, *Liponyssoides* includes eight valid species: *L. lukoschusi* (the new species); *L. muris* (Hirst) [= *L. murinus* (Oudemans), see Strandtmann (1963)] and *L. brasiliensis* (da Fonseca) [these two possibly conspecific, the former redescribed by Domrow (1963)]; *L. becki* (Allred) [reassigned by Nelson & Furman (1967)]; *L. intermedius* (Evans & Till) and *L. warnekei* Domrow [these two from swiftlets (Apodiformes: Apodidae)]; and *L. aegyptius* (Hirst) and *L. sanguineus* (Hirst) [these two originally in *Allodermanyssus*, and clarified by Costa (1961)].

The female of the new species closely resembles that of *L. muris*, except in the shape of the sternal shield and the position of setae st_3 (Hirst 1914), but the male is at once separable by the structure of the two enormous pores on the dorsal shield [cf. Fig. 4 below and Fig. 31 in Domrow (1963)], and the number of pairs of setae on the dorsal shield (28 vs 32).

The new species is named for Dr Lukoschus - the care with which he made his large collection from the Kimberley will be the more obvious when it is all in print. **Female (Figs 1-2, 5-6):** Capitulum as in *L. warnekei* Domrow, 1963, except as follows. Setae *c* exceeding opposite edge of deutosternum (but not quite as long as interval), a little longer than h_2 and a little shorter than $h_{1,3}$. Distinct, inwardly curved salivary stylets present (as they are in *L. warnekei*); epistome (when clearly seen) hyaline, broad in basal two-thirds, then strongly tapered, with drawn-out tip deflexed and exceeding bases of palpal genua; with elongate dendritic pattern basally. Inner face of palpal trochanter with crescentic basal apodeme, cf. *Eulaelaps* Berlese (Domrow 1960). Palpal setation holotrichous (as it is in *L. warnekei*): trochanter 2 (v_2 not unduly lengthened), femur 5, genu 6 (al_1 strongly clavate; dorsobasal pore present as it is in *L. warnekei*), tibia 14 (including two dorsodistal rods), tarsus with a few setae (plus terminal cluster of rods). All setae on capitulum simple, lacking minute barbules along their shaft. Chelicerae about 530 μ m long overall.

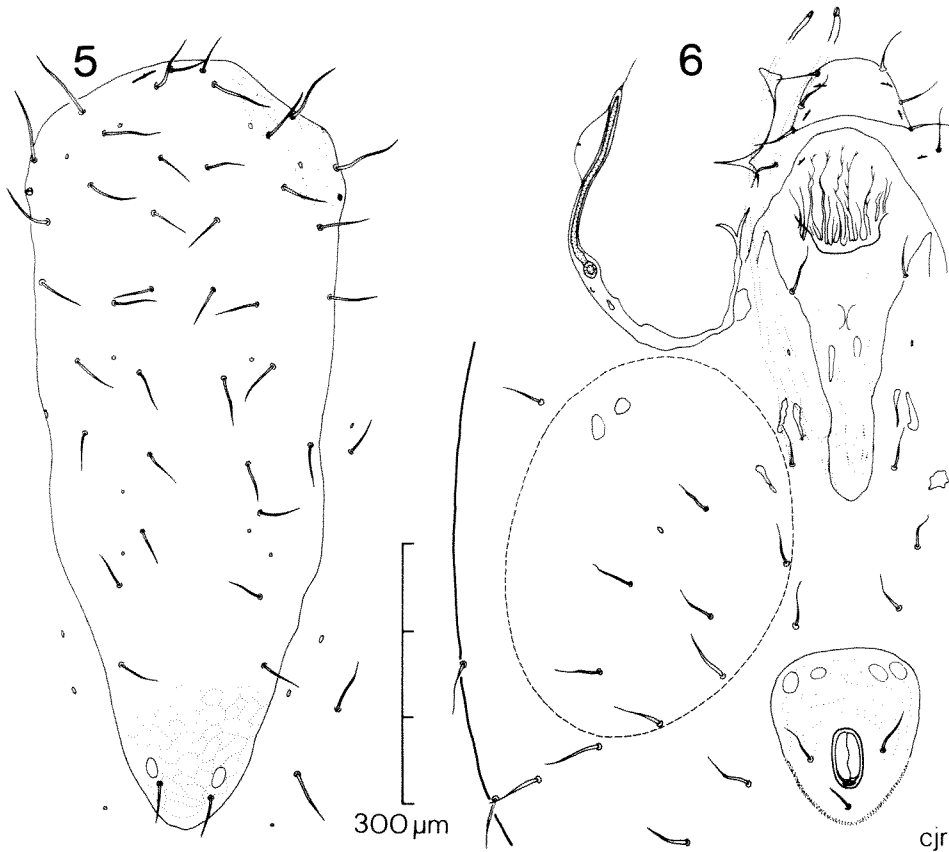
Idiosomatal measurements unavailable since all specimens were grossly engorged, and ruptured during mounting procedures. Dorsal shield entire, almost parallel-sided in anterior two-thirds, then tapered to rounded posterior margin; 800-900 μ m long, 350-390 μ m wide at humeri; with 20 pairs of setae (14 podonotal, six



Figs 1-4: *Liponyssoides lukoschusi* sp. nov. 1, Capitulum and tritosternum ♀ (ventral, but true right palp dorsal). 2, Epistome ♀ (dorsal). 3, Chelicera ♂ (ventroexternal). 4, Enormous pore on dorsal shield ♂.

opisthotal; z_6 absent on one side of one specimen, Z_1 occasionally absent on one or both sides); surface with reticulate pattern, paired muscle insertions and about seven pairs of pores (including an elongate pair vertically and a large pair humerally). Dorsal cuticle torn and not fully drawn, but with pair of large pores

posterolaterally as in ♂ (Fig. 7), several pairs of small pores following line of cuticular striae (of which one or more of four pairs shown posterolaterally in Fig. 5 may be usurped by shield), and many setae. Setae on dorsum with one to three minute barbules along their shaft, depending on their length.



Figs 5-6: *Liponyssoides lukoschusi* sp. nov., ♀ (most of cuticle omitted). 5, Dorsum. 6, Venter.

Tritosternal base unarmed; laciniae fused at least in basal half, lightly ciliated. Sternal shield $65\mu\text{m}$ long in midline, $120\mu\text{m}$ wide at setae st_2 ; virtually textureless; with setae st_{1-3} submarginal (lattermost in extreme posterior angles) and two pairs of pores. Setae mst and associated pores free in cuticle. Genital shield strongly tapered behind coxae IV, flanked by three pairs of irregular shieldlets; surface marked by muscle insertions and generally longitudinal reticulations; length $400-430\mu\text{m}$ (including operculum), width $120-130\mu\text{m}$ between setae g (associated pores free in cuti-

cle); weak genital apodemes present between coxae IV, supporting operculum whose rays arise from distinct convex line. Undifferentiated egg broadly ovate, textureless; 450-530 μ m long, 335-385 μ m wide. Anal shield 185-200 μ m long, 140-170 μ m wide; broadly rounded anterolaterally, usurping one ventral seta in one specimen; surface marked by muscle insertions and generally concentric reticulations; narrow cribrum present; anus set in smaller posterior half, flanked by setae *aa* and *pa* (latter the shortest). Two pairs of barely joined endopodal shields present. Two pairs of metapodal shields present. Ventral cuticle with numerous setae of increasing length posteriorly and some small paired pores. Setae on venter simple, except larger ones posterolaterally on cuticle, which bear one to three minute barbules along their shaft. Stigmata giving rise to peritremes that reach forward to level of middle of coxae II; peritrematal shields with distinct pores behind stigmata and on anterior expansion, fused posteriorly to exopodal shields IV.

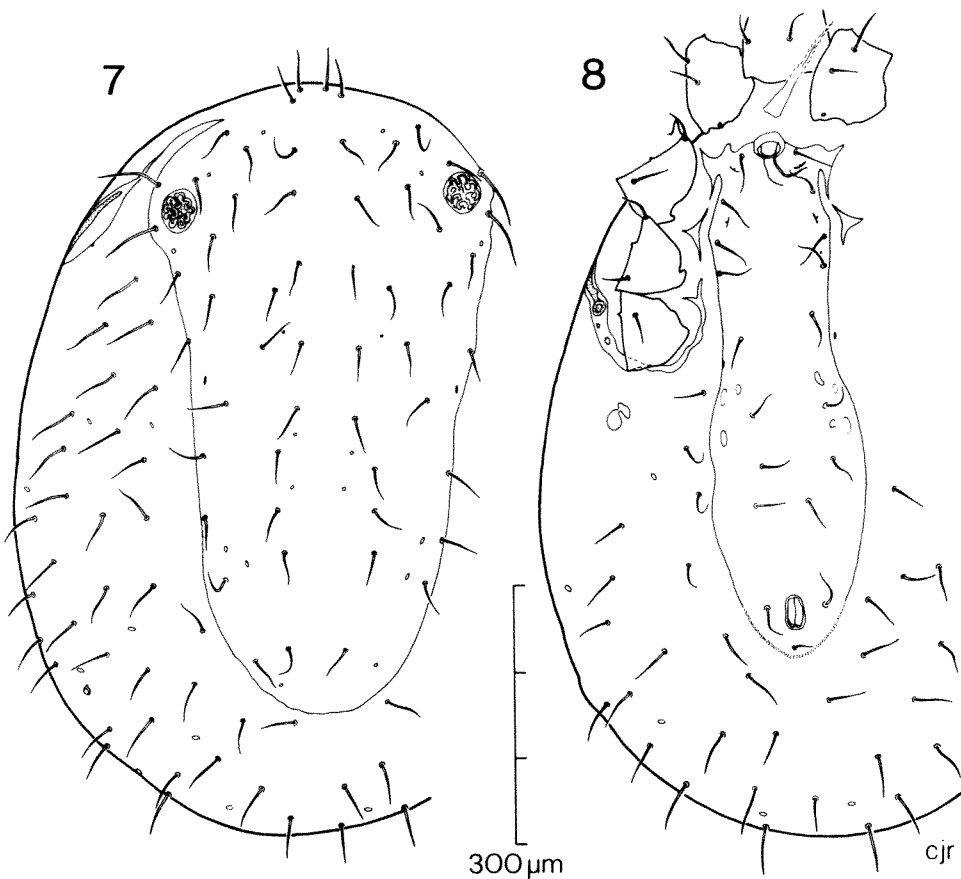
Legs with same setational formulae as in *L. warnekei* and *L. intermedius* (Evans & Till, 1964), i.e. holotrichous, except that genu-tibia III bear one additional seta (*pl*₂), being 2-4/2-2 and 2-3/2-2, respectively. Weaker setae simple, but stronger ones with one to three minute barbules along their shaft. No setae on femora-genua I-II unduly lengthened. Sensory islet on tarsus I dorsodistal, occupying 15% of length of segment. Coxa II with spinose process on anterodorsal margin. Ambulacra with two claws of medium strength. Legs and setation otherwise undistinguished.

Male (Figs 3-4, 7-8): Capitulum as in ♀, except for secondary sexual dimorphism of chelicerae, which are 220 μ m long overall. Basal segment, middle segment (details and length of reduced fixed digit not clear) and spermatodactyl (105 μ m long) of same proportions as in *L. warnekei*.

Idiosoma 880 μ m long, calculated to be 725 μ m wide (engorged, ruptured on one side). Dorsal shield entire, rounded humerally, then gently tapering to broadly rounded posterior margin; 735 μ m long, 405 μ m wide at humeri; probably normally with 28 pairs of setae (18 podonotal, 10 opisthonotal; *Z*₃ absent on one side); surface as in ♀, but with 11 pairs of pores (including an enormous pair humerally, **Figs 4, 7**). Dorsal cuticle with pair of large pores posterolaterally, several pairs of small pores and about 34 pairs of setae.

Tritosternum as in ♀. Holoventral shield 615 μ m long, 175 μ m wide behind coxae IV; with texture as in ♀; with setae *st*₁₋₃, *mst*, *g*, *v*₁₋₃, *aa* and *pa*, and four pairs of pores, present (metasternal pore absent on one side). Anterior pair of endopodal shields fused into sternal portion of holoventral shield, posterior pair free as in ♀. Incompletely divided metapodal shields present. Ventral cuticle with about 18 pairs of setae of increasing length posteriorly and four pairs of small pores. Stigmata and peritrematalia as in ♀.

Legs as in ♀, except that seta *pv*₂ on tarsi III-IV is modified as in *L. intermedius*.

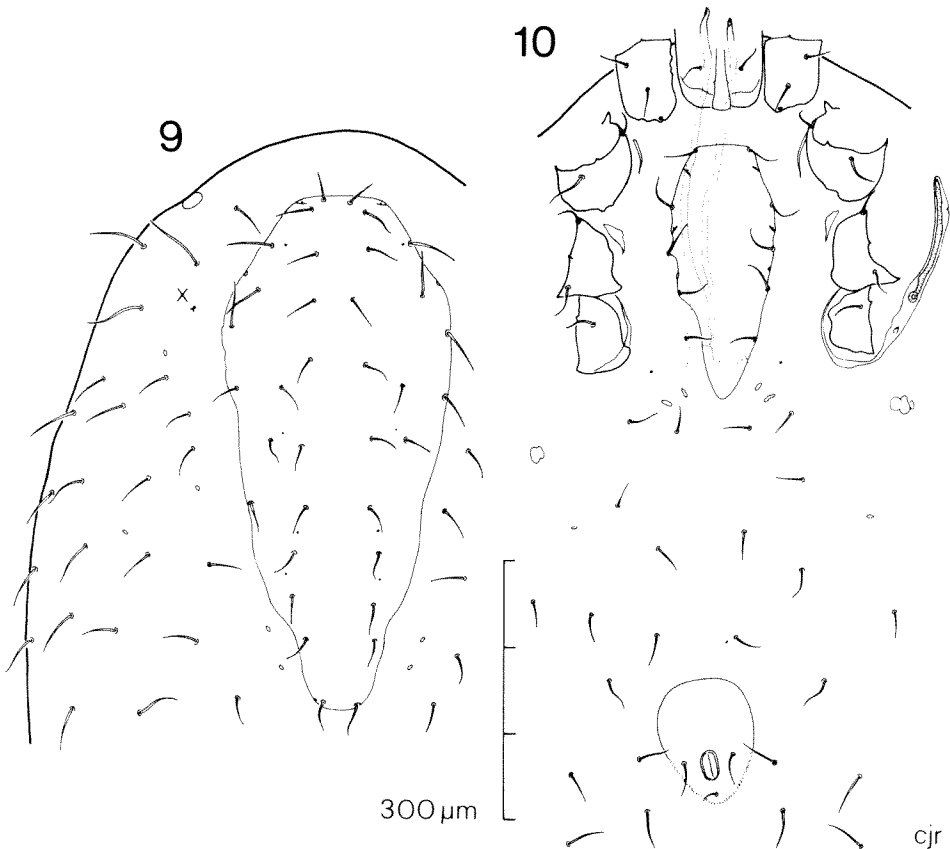


Figs 7-8: *Liponyssoides lukoschusi* sp. nov., ♂. 7, Dorsum. 8, Venter.

Deutonymph (Figs 9-10): Capitulum and legs (including chelicerae and seta pv_2 on pedal tarsi III-IV in premale) as in ♀.

Idiosomatal measurements unavailable since all specimens were grossly engorged, and ruptured during mounting procedures. Dorsal shield entire, 590-635 μ m long, 270-280 μ m wide (prefemale); 530-560 μ m long, 230-250 μ m wide (premale, as evidenced in smallest specimen by enormous humeral pores on enclosed adult); with 18 pairs of setae (12 podonotal, six opisthotal; j_4 absent on one side of one specimen; Z_1 occasionally absent on one side—as in Fig. 9— or both); surface with texture predicting that of ♀, and only six pairs of pores detected. Dorsal cuticle with two pairs of large pores (anterior pair on shield in adult, and marked “x” in Fig. 9; posterior pair on torn cuticle behind shield, and not drawn), several pairs of small pores (some of which, as in ♀, may be usurped by posterolateral portion of shield), and many setae.

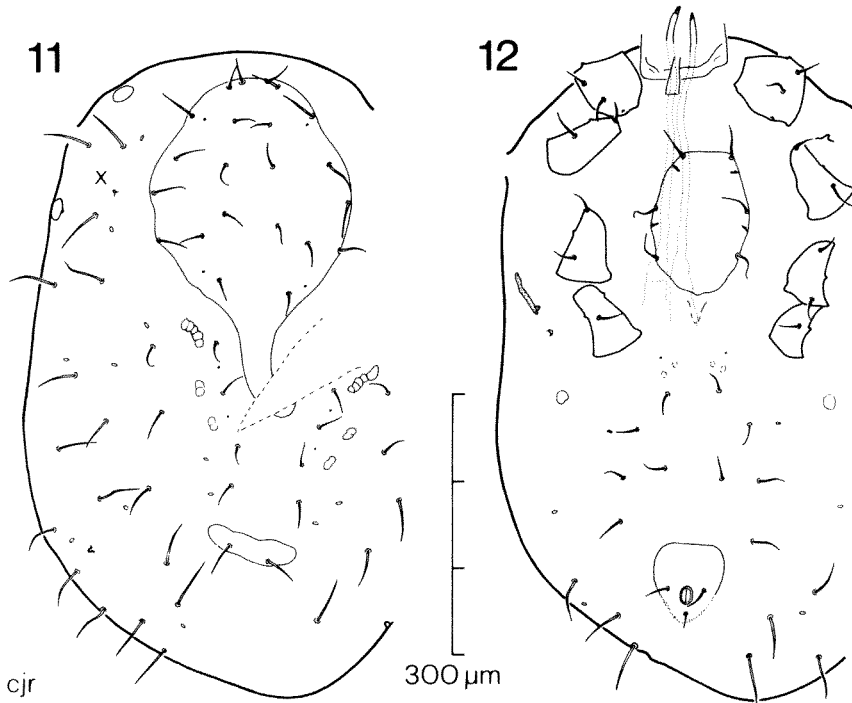
Tritosternum as in ♀. Sternal shield 285-310 μ m long, 115-120 μ m wide at setae st_2 (prefemale); 245-260 μ m long, 105-110 μ m wide (premale); with texture predicting that of ♀ (at least in posterior third); with setae st_{1-3} , mst and three pairs of pores submarginal (mst on isolated shieldlet on one side of premale); setae g usually free of shield, but one or occasionally both touching on margin; genital complex further represented by pair of pores and two pairs of shieldlets. Anal shield 135-145 μ m long, 100-105 μ m wide (prefemale), 120-125 μ m long, 90-95 μ m wide (premale); virtually textureless, except for narrow cribrum; otherwise as in ♀. Two pairs of endopodal shields present. Irregular metapodal shields present. Ventral cuticle with numerous setae of increasing length posteriorly and some small paired pores. Stigmata and peritrematalia predicting those of ♀, but with anteriormost shieldlet still free in dorsal cuticle (**Fig. 9**).



Figs 9-10: *Liponyssoides lukoschusi* sp. nov., dn (cuticle behind dorsal and anal shields omitted).
9, Dorsum. **10,** Venter.

Protonymph (Figs 11-12): Capitulum and legs predicting those of ♀, holotrichous (seta *al*, on palpal genu strongly clavate).

Idiosoma 715 μ m long, calculated to be 505 μ m wide (partly engorged). Podonotal shield 305-365 μ m long (including posteromedian extension reaching back to level of setae J_2), 205-230 μ m wide; podonotum holotrichous, with 11 pairs of setae on shield and five pairs on cuticle; surface of shield virtually textureless, and only two pairs of pores detected. Accepting that five pairs of setae shown posterolaterally in **Fig. 11** are from ventral series due to slight rotation of specimen, opisthonotum also holotrichous, with 14 pairs of setae, three pairs of mesonotal shieldlets and transverse pygidial shield (20-25 μ m long, 105-115 μ m wide) bearing setae J_5 . Dorsal cuticle also with two pairs of small pores (one each between setae J_{1-2} and J_{2-3}), two pairs of large pores (anterior pair on shield in adult, and marked "x" in **Fig. 11**), and about 10 pairs of small pores.



Figs 11-12: *Liponyssoides lukoschusi* sp. nov., pn. 11, Dorsum. 12, Venter.

Tritosternum as in ♀. Sternal shield 155-165µm long, 95-110µm wide; textureless, with setae st_{1-3} and two pairs of pores submarginal; posterior margin somewhat irregular. Genital complex represented only by two pores and two pairs of weak shieldlets. Anal shield 85-95µm long, 65-75µm wide; textureless, except for narrow cribrum; otherwise as in ♀. Subcircular metapodal shields present. Ventral cuticle with about 13 pairs of setae of increasing length posteriorly (including five pairs shown posterolaterally in Fig. 11) and three pairs of small pores. Stigmata provided with short peritremes; peritrematal shields represented by three elements: pore behind stigmata and two shieldlets (one lateral, with pore on dorsal margin; one dorsal).

Larva: Unknown.

Hosts and localities

On tawny frogmouth, *Podargus strigoides* (Latham) (Caprimulgiformes: Podargidae), Beagle Bay, W.A., 24, 26.VIII.1976 (holotype ♀, allotype ♂, 7 paratype ♀♀, 10 morphotype dn, 4 morphotype pn). In WAM (including holotype and allotype), FMNH, QIMR, CU.

On brown tree-creeper, *Climacteris picumnus* Temminck (Passeriformes: Certhiidae), Culgoa River, Q., 11.II.1969, B.C. Nelson (3 dn, 3 pn, not types). In QIMR.

Dermanyssus hirundinis (Hermann, 1804)

This species is widely distributed in the Holarctic on various birds, but, since its principal hosts [swallows (Passeriformes: Hirundinidae), see Evans & Till (1962) and Moss, Mitchell & Johnston (1970)] are so mobile, it may be regarded as normally resident in, rather than recently introduced to, Australia. The first specimen listed below was recognised after Domrow (1963) went to press, but it and the other two specimens now added have since been checked against the keys, descriptions and setational formulae of Evans & Till (1966) and Moss (1967, 1968, 1978), with which they agree.

In Australia, the outer parts of caves are used as nesting sites by the fairy martin, *Hylochelidon ariel* (Gould) (Hirundinidae), and this may *possibly* be the host of the Western Australian material now recorded.

Hosts and localities

On yellow-throated honeyeater, *Meliphaga flavicollis* (Vieillot) (Passeriformes: Meliphagidae), Cascades, Hobart, Tas., 15.I.1961, B.C. Mollison (1 ♀). In QIMR.

Free-living, Arramall Cave, Arrowsmith River, W.A., 3.XI.1973, J.W.J. Lowry (2 dn). In QIMR.

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