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## FEATHER MITES (ACARINA) OF THE PARAKEET, *MELOPSITTACUS UNDULATUS* (SHAW) (AVES: PSITTACIDAE)

W. T. Atyeo and J. Gaud\*

Department of Entomology, University of Georgia, Athens, Georgia 30602

**ABSTRACT:** The parakeet (or budgerigar) has been transported to many regions of the world. Two species of feather mites, *Protolichus lunula* (Robin) (Pterolichoidea: Pterolichidae) and *Dubininia melopsittaci* n. sp. (Analgidae: Xolalgidae), are specific to this host; from distribution records, these ectoparasites probably have been distributed worldwide with their hosts.

Five species of birds have been introduced to many parts of the world: the domestic chicken (*Gallus gallus*, Phasianidae), the European house sparrow (*Passer domesticus*, Ploceidae), the starling (*Sturnus vulgaris*, Sturnidae), the rock dove (*Columba livia*, Columbidae), and the parakeet or budgerigar (*Melopsittacus undulatus*, Psittacidae). For each avian species, the feather mites occurring on the birds in their endemic regions have been transported with the host species. We would like to discuss the ectoparasitic feather mites associated with one of these birds, the parakeet of Australia.

Unlike the parrots of the New World, some of which harbor more than 15 species of feather mites (Pérez and Atyeo, 1984), and unlike the species of Africa with as many as 6 species (Gaud, 1980), and many parrots of Australia and surrounding islands with 3 or 4 species, *Melopsittacus undulatus* (Shaw) has 2 feather mite associates, *Protolichus lunula* (Robin) (Pterolichidae) and a new species of *Dubininia* Vasiljev (Xolalgidae). Both mite species have been collected in Australia (from caged and wild birds), Eurasia (Dubinin, 1956), southern Africa (Kaschula and Stephan, 1947), northern Africa, and the United States.

*Protolichus lunula* occurs on the exposed surfaces of the wing and tail feathers (Kaschula and Stephan, 1947; Dubinin, 1956) and *Dubininia melopsittaci* n. sp. occurs on the smaller feathers of the body (Kaschula and Stephan, 1947). We suspect that *Dubininia* may be on the plumulaceous barbs, the microhabitat of a similar taxon on New World parrots, *Fainalgae* Gaud and Berla (Pérez and Atyeo, 1984).

Feather mites are commensals and normally do not create problems for the host bird. Occa-

sionally heavy infestations cause host reactions, probably not from feeding activities, but because the mites move from the feather surfaces to the skin during overcrowding and the birds react to these irritants. Large infestations of *Megninia* Berlese (Analgidae) on chickens are known to cause weight losses and declines in egg production (pers. obs.). Heavy infestations of *Dubininia* on a parakeet may cause the bird to pull wing, tail, and body feathers; during the feather pulling, skin lesions caused by the bill may occur.

The limited feather mite fauna of the parakeet will be described and illustrations provided, so that determinations of these mites can be made quickly and accurately. The nomenclature for the chaetotaxy follows Atyeo and Gaud (1966).

### PTEROLICHOIDEA: PTEROLICHIDAE: PTEROLICHINAE *Protolichus lunula* (Robin)

*Protolichus lunula* Robin (in Robin and Mégnin). 1877: 411-414, pl. 23, figs. 1-3.

*Protolichus* (*Protolichus*) *lunula*: Mégnin and Trouessart, 1884: 261; Trouessart and Mégnin, 1885: 36; Canestrini and Kramer, 1899: 56; Favette and Trouessart, 1904: 141-142.

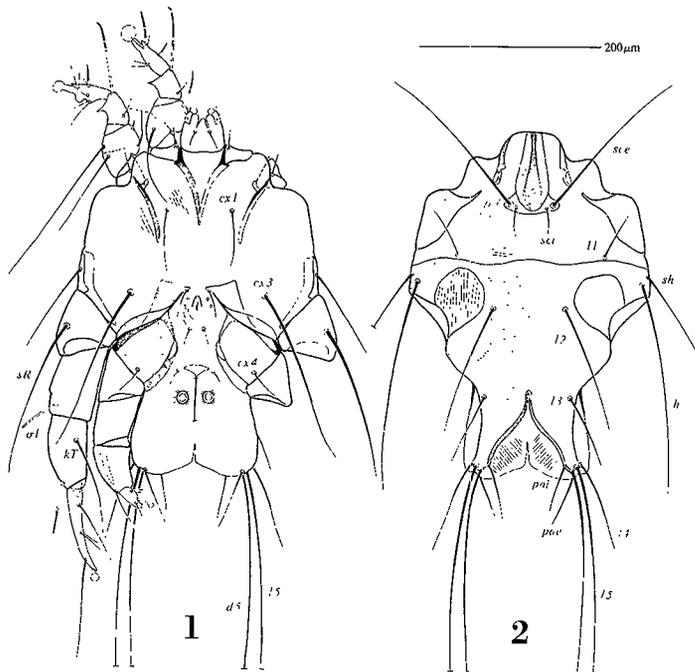
*Megninia lunula*: Kaschula and Stephan, 1947: 57, pl. II, figs. 4, 5.

*Protolichus lunula*: Dubinin, 1956: 316-321, figs. 133-136, 138-139, 151-155; Gaud and Till, 1961: 291; Gaud, 1980: 1.

The males of *Protolichus lunula* are the only mites from parrots having the tarsi of the first pair of legs bifurcated (see Favette and Trouessart, 1904 and Dubinin, 1956 for figures). In comparing this species with *Dubininia melopsittaci*, both sexes of *P. lunula* are strongly sclerotized with large hysterosomal shields extending posteriorly from setae *d* 1, the scapular setae are widely separated, all legs have 5 movable segments, the ambulacra are large with well-defined sclerites, and there are 2 vertical setae. The males of *P. lunula*, in addition to the modified tarsi I, have legs II much longer than legs I, legs III and IV subequal and not extending to the posterior margin of the idiosoma, have coxal fields I closed, and have 2 long paragenital apodemes extending from the genital region to the pos-

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\* Laboratoire de Parasitologie, Faculté de Médecine, 06034 Nice, France.



FIGURES 1, 2. *Dubininia melopsittaci* n. sp. Ventral and dorsal aspects of male. Setae: *cx* 1-4, coxae; *d* 1-5, 11-5, dorsal and lateral hysterosomals; *h*, humeralis; *KT*, posterior tibia; *pae*, *pai*, external and internal postanal; *sh*, subhumeral; *sce*, *sci*, *sct*, external and internal scapulars; *sR*, posterior trochanteral.

terolateral margins of the body. Females of this species can be distinguished from *D. melopsittaci* by features of the dorsal hysterosoma: small setae and a well-developed shield as compared to 2 pairs of long setae and absence of a shield (Fig. 4).

#### ANALGOIDEA: XOLALGIDAE: INGRASSIINAE

##### *Dubininia melopsittaci* n. sp.

(Figs. 1-4)

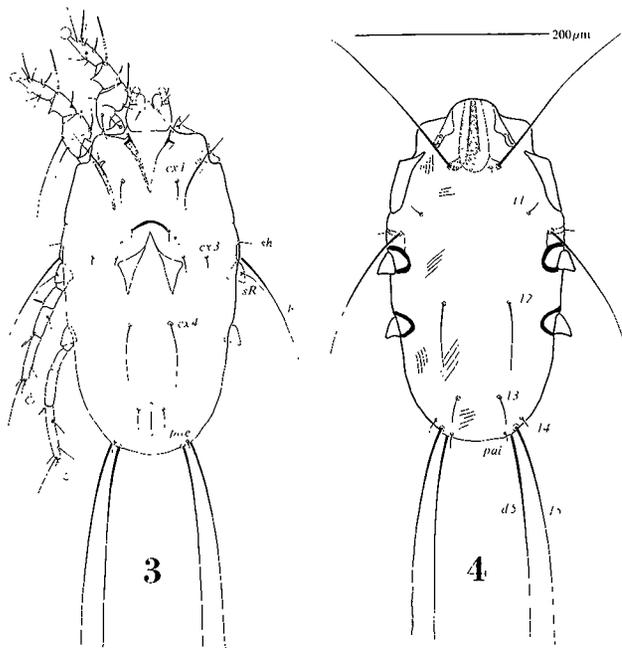
*Megninia* sp.; Kaschula and Stephan, 1947: 57, pl. IX (figs. 1-4), pl. X (figs. 1, 2).

Males within the genus *Dubininia* are distinguished in part by the configurations of the posterior idiosomata, the development of certain setae, and the type of ventral setae and apophyses of tarsi II. Of the named species of *Dubininia*, only male *D. melopsittaci* have setae of coxae I relatively short (not reaching the genital region), the ventral setae of tarsi II simple (not ex-

panded basally), and the ventral apophyses of tarsi II as simple, rounded crests. Females of *Dubininia* are very similar to each other, however, the development of tarsi II is the same as mentioned for the males, that is, species differences can be seen by comparing the ventral setae and apophyses.

The normal complement of dorsal hysterosomal setae is 10 pairs (*d* 1-5, *l* 1-5). For *Dubininia*, the dorsal hysterosoma bears 6 pairs of setae; by comparing this taxon with other members of the subfamily Ingrassiinae, it seems most likely that the dorsal setae of rows 1-4 (*d* 1-4) are lacking in all life stages.

Most feather mite females have the articulations between the coxae and trochanters of legs III and IV directed toward the venter. In *Dubininia* females, as in other Xolalgidae and in *Tilacarus* Gaud and Mouchet (Analgidae), this articulation is directed upward in such a fashion that the trochanters are seen on the dorso-lateral surfaces of the idiosoma (Figs. 3, 4).



FIGURES 3, 4. *Dubininia melopsittaci* n. sp. Ventral and dorsal aspects of female. Setae: *cx 1-4*, coxals; *d5*, *l 1-5*, dorsal and lateral hysterosomals; *h*, humerals; *pae*, *pai*, external and internal postanals; *sh*, subhumeral; *sR*, posterior trochanters.

**Male** (holotype): Length, from palp apices to setae *d 5*, 385  $\mu$ m; width at level of trochanters III, 250  $\mu$ m. Prodorsal shield encompassing scapular setae; internal scapulars approximate to external scapulars; distance between external scapulars, 43  $\mu$ m; length of internal scapulars, 33  $\mu$ m. Prodorsal shield and hysterosomal shield separated by wide band of striated conjunctiva bearing setae *l 1*. Dorsal hysterosoma with striated regions lateral to setae *l 2*, setae *h* extending to level of tibiae III apices, other setae as figured: lateral lobar membrane narrow, unornamented; interlobar membrane truncated posteriorly, bearing fine, parallel thickenings. Idiosomal venter with relatively fine setae (as compared to other named taxa); setae *cx I* not extending to genital regions, setae *cx III* extending to level of setae *kt III*. Tarsus II with ventral setae simple, with rounded ventral apophysis; tarsus III with setae *sR* extending to apex of tibia III; leg III measurements (measured from dorsal surface): trochanter, 71  $\mu$ m; fused

femur-genu, 59  $\mu$ m; tibia, 84  $\mu$ m; tarsus, 96  $\mu$ m. Setal measurements: *sh*, 125  $\mu$ m; *l 1*, 47  $\mu$ m; *l 2*, 133  $\mu$ m; *cx 1*, 74  $\mu$ m; solenidion sigma III, 43  $\mu$ m; *l 4*: *l 4*, 110  $\mu$ m.

**Female** (paratype): Length, including gnathosoma, 370  $\mu$ m; width at level of setae *h*, 185  $\mu$ m. Prodorsal shield similar to male; remainder of dorsal idiosoma striated. Setae less robust, usually shorter than homologues of male; measurements: *sh*, 22  $\mu$ m; *l 1*, 16  $\mu$ m; *l 2*, 71  $\mu$ m; *cx IV*, 63  $\mu$ m; *sR III*, 29  $\mu$ m; solenidion sigma III, 8  $\mu$ m. Legs III, IV slender. Subequal measurements for III: trochanter, 24  $\mu$ m; genu-femur, 25  $\mu$ m; tibia, 31  $\mu$ m; tarsus to level of setae *d*, 47  $\mu$ m; pretarsal stalk, 15.7  $\mu$ m; ambulacrum, 7.8  $\mu$ m.

**Diagnosis:** Among the described species of *Dubininia*, only *D. melopsittaci* has the anterior epimerites in a V configuration; other species have these structures Y-shaped.

**Specimens deposited:** The holotype and paratypes

are deposited in the Australian National Insect Collection, CSIRO, Canberra; paratypes are deposited in the Queensland Institute for Medical Research (Brisbane), University of Georgia, and the collection of J. Gaud.

*Type data:* From *Melopsittacus undulatus* (Shaw, 1805) (Psittacidae): Australia, Victoria, Werribee: male holotype, 5 male, 3 female paratypes, 1979, K. Harrigan (University of Georgia Accession Number = UGA 10.666); 12 males, 7 female paratypes, same data as holotype except collected 13 November 1979 (UGA 10.665); 3 male, 3 female paratypes, same data as holotype except collected February 1981 by J. H. Arundel (UGA 11,282).

*Other specimens:* From *Melopsittacus undulatus*: Tasmania, Launceston: 1 male, November 1978, R. W. Mason; Denmark, Copenhagen: 3 nymphs, 1980; England, London Zoo: 4 males, 2 females, 1956; French Morocco, Rabat: 7 males, 7 females, 1976 and 21 males, 6 females, 1960; Georgia, Atlanta: 12 males, 7 females, July 1984 (UGA 12.253).

*Site of infestation:* On body feathers and skin, primarily on back anterior to upper tail covers.

*Etymology:* The specific epithet is derived from the generic name of the host.

#### REMARKS

In our experience, unless a species has polymorphic males (i.e., homeo-, meso-, and heteromorphs), there is little variation among individual mites within study collections. Morphometric data from males of *D. melopsittaci* are variable. For 41 males, the mean length is 362.8  $\mu\text{m}$  with a standard error of 2.5  $\mu\text{m}$ , however, the range is 331.5–400.9  $\mu\text{m}$ : a small part of the variation could be attributable to distortion in specimen preparation, but it was noted that the larger specimens were more sclerotized than smaller specimens. Besides idiosomal lengths, other structures are variable, but there is a high correlation with size. Examples are: the ratio between total length and width of opisthosoma between setae *l4* is 3.85–4.06:1; the ratio between setae *l4* and tarsus III is 3.1–3.5:1; these ratios were chosen as being representative as these structures involved are seldom distorted during slide preparation.

In males the sclerotized connection between the dorsal hysterosomal shield and the scapular shields differs between specimens of different size classes. The larger and more sclerotized males had a distinct connection between these shields (as in Fig. 2); smaller males have a weak connection or an incomplete connection near setae

*l1* with 3 or 4 striae from the circular striated area being continuous with the transverse striae anterior to the hysterosomal shield.

#### ACKNOWLEDGMENTS

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