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## A NEW GENUS OF PTEROLICHID FEATHER MITES (ACARI) FROM NEW WORLD PARROTS (PSITTACIDAE)<sup>1</sup>

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*Abstract.* *Avenzoariurus hyperschizus*, n. gen., n. sp., is described from the Hawk-headed Parrot, *Deroptyus accipitrinus* (L.), in Brazil.

Similar modifications of the legs and idiosomata are common among diverse taxa of feather mites, especially in males. Modifications include enlarged legs (1 or more pairs), broadened or elongated idiosomata, and narrow to wide hysterosomata with or without terminal lobes and/or specialized setae. Trouessart (1885b, p. 75), in his essay on parallel classification, said that similar forms occur in all major taxa of feather mites: he correctly predicted that an unknown form would be discovered that would complete his system of classification. Since Trouessart, the many taxa that have been described in the 3 feather-mite superfamilies (sensu Gaud & Atyeo 1978) reinforce this phenomenon of convergence of form.

Most of the feather-mite genera associated with parrots are in the family Pterolichidae, which comprises 45 named and about 28 undescribed genera. The parrot feather mites are assigned to 2 groups of genera within the nominate subfamily. The 1st group includes *Graliobba* Hull and other genera from Ciconiiformes, Falconiformes, and Gruiformes, and *Rhytidelasma* Gaud from parrots. The 2nd group is restricted to the order Psittaciformes: taxa included are *Araichus* Gaud, *Aterolichus* Gaud, *Atopolichus* Gaud, *Ctenodiscopus* Gaud, *Distigmestixa* Atyeo, Gaud & Pérez, *Mesolichus* Trouessart, *Protolichus* Trouessart, and *Uropsittacolichus* Atyeo & Pérez. Similar modifications of the male hysterosomata occur in both groups.

In *Rhytidelasma*, the male opisthosomata may terminate in variously shaped terminal lamellae (similar to *Proctophyllades* Robin) or, if the opisthosoma is wide, in narrow membranes. Most males have the opisthosoma narrowing posteriorly from legs IV: lamellae may be triangular or rounded, ap-

proximate or distant, parallel or apically converging (see Gaud 1980 and Trouessart 1885a for figures). Parallel-sided opisthosomata are found in *R. tritruentris* (Trouessart), **new combination** [= *Pterolichus* (*Pseudallopites*) *tritruentris*]. In this and related undescribed species the opisthosoma is broad, truncated, and slightly bilobed, and each "lobe" bears a narrow membrane originating near setae *d* 5 and terminating near the midline.

The idiosomal configurations of *Protolichus* and males of related genera are more varied than in *Rhytidelasma*. The *Protolichus*-complex males have the opisthosomata extended into terminal lobes; these lobes may be approximate to widely separated and usually some of the setae are branched and/or leaflike. Genera containing a small number of species display little variation in opisthosomal configuration. The 5 species of *Distigmestixa* have narrowed opisthosomata with the lobes secondarily fused (see Atyeo et al. 1984): *Aterolichus* and *Atopolichus*, each with 2 species, also have narrowed opisthosomata, but the lobes are evident and are separated by a small terminal cleft (Gaud 1980); and the 3 species of *Ctenodiscopus* have triangular lobes separated by a triangular terminal cleft (Gaud 1980). *Avalichus* from New World parrots and *Mesolichus* and *Protolichus* from Old and New World psittacines all contain many species. In these taxa there is a wide range of forms: the lobes, which are short, may be widely separated to approximate (see Favette & Trouessart 1904). The only taxa in which the terminal lobes are well developed and widely separated are *Uropsittacolichus* and *Avenzoariurus*, n. gen. *Uropsittacolichus* lobes end in large terminal membranes (i.e., lamellae), and *Avenzoariurus* lobes have extensive interlobar membranes (Fig. 1, 2).

Terminal lobes similar to those of *Avenzoariurus* are encountered in genera of the 3 superfamilies of feather mites: examples are the analoid genera *Bregetovia* Dubinin and *Avenzoaria* Oudemans associated with the Charadriiformes (see Dubinin 1956) and many genera of the pterolichoid family Gabuciniidae from numerous orders of birds (see Gaud & Atyeo 1975). Effective widths of the lobes

<sup>1</sup> Research supported by the National Science Foundation (DEB-7924299 & INT-8106019).

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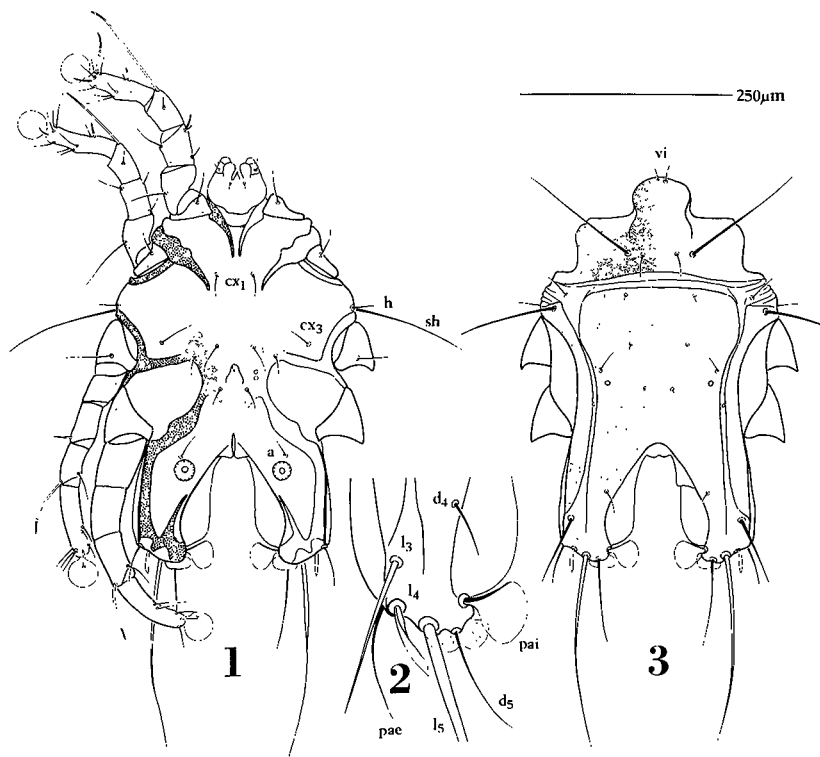


FIG. 1-3. *Avenzoariurus hyperschizus*, n. sp.: 1, ventral and 3, dorsal aspects of ♂; 2, dorsal aspect of lobe, 2× scale. Setae: *a*, anals; *cx* 1, 3, coxals; *d* 4-5, *l* 4-5, dorsal and lateral hysterosomals; *h*, humerals; *pae*, *pai*, external and internal postanals; *sh*, subhumeral; *vi*, internal verticals.

can be increased by mesal and/or lateral membranes and modified setae.

The 2 psittacine feather mites with well-developed lobes are found in different hemispheres and are associated with different hosts. The 2 species of *Uropsittacoliclus* are known only from *Opopsitta sclateri* and *Psittaculirostris* Gray & Gray in New Guinea and surrounding islands. *Avenzoariurus hyperschizus*, n. gen., n. sp., has been collected only from the New World *Derophtys accipitrinus* (L.) in Brazil.

In the descriptive section below, signatures for chaetotaxy follow Atyeo & Gaud (1966). Types will

be deposited in the American Museum of Natural History (AMNH), the University of Georgia (UGA), and the collection of J. Gaud, Nice, France (GAUD).

Family PTEROLICHTIDAE Trouessart & Mégnin

#### *Avenzoariurus* Atyeo, new genus

**Diagnosis.** Pterolichine mites with epimerites I free; 2 internal vertical setae; internal scapular setae midway between meson and corresponding external scapular setae; setae *so* thicker than setae *l* 1; *sh*; prodorsal, hysterosomal shields without ornamentation. Legs I, II subequal; tarsi I, II longer than corresponding tibiae; setae *ba*, solenidion  $\omega$  1 approximate; solenidion  $\sigma$  2 present; solenidion  $\omega$  I longer than  $\phi$  II; ambulacra

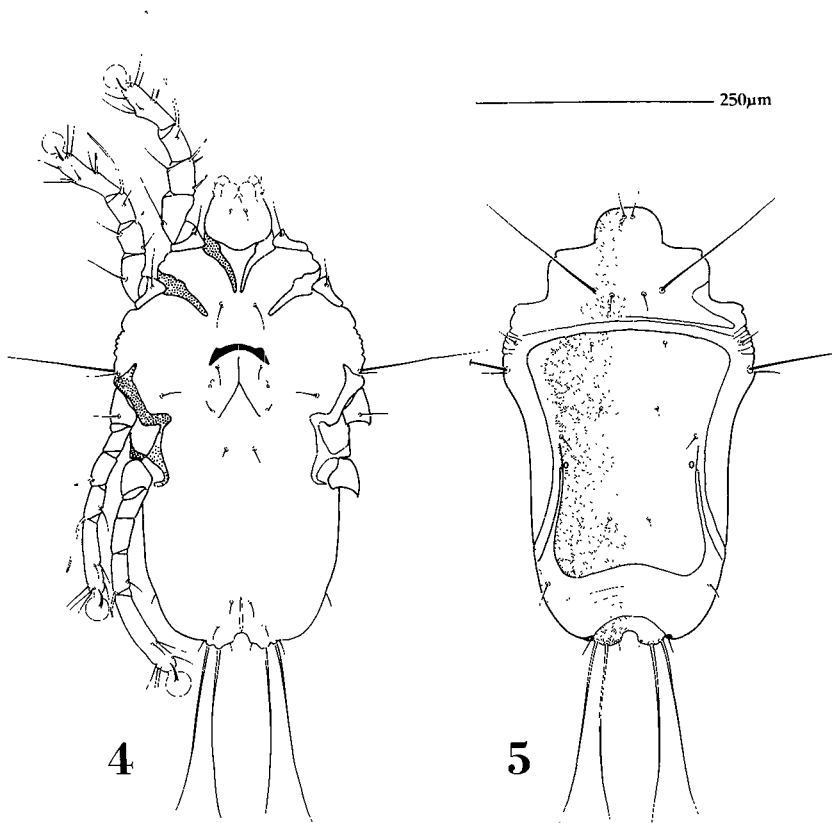


FIG. 4, 5. *Avenzoariurus hyperschizus*, n. sp.: 4, ventral and 5, dorsal aspects of ♂.

symmetrical. ♂ with full complement of idiosomal setae: idiosoma cleft; lobes with large interlobar membranes on mesal surfaces; setae posterior to *d* 3 on lobes; setae *l* 4 blade-like; setae *par* ovate; adanal discs with sclerotized corolla bearing dentations, surrounded by radiating striae; legs IV thicker than III. ♀ lacking setae *d* 4, all idiosomal setae simple.

*Type species.* *Avenzoariurus hyperschizus*, n. sp.

*Etymology.* *Avenzoaria* *laura* (Gr., tail) referring to the *Avenzoaria*-like opisthosoma of the male; masculine.

#### *Avenzoariurus hyperschizus* Atyeo, new species Figs. 1–5

♂ (*holotype*). Length, including gnathosoma + lobes, 617 µm; width at trochanters III, 330 µm. Prodersum differentially sclerotized, forming "pseudoshields" anterior and posterior to scapular setae. Dorsal hysterosoma with setae *d* 1–3 as microsetae; setae *d* 4 at midlength of lobes toward meson; setae *par* fan-shaped, inserted anteromesal to small caudal expansions of lobes. Venter with genital organ positioned between genital setae; genital discs; coxal setae III, IV associated with appropriate coxal fields; adanal discs; anal setae widely separated, positioned

at base of lobes; lobes with flanges on outer margins. Legs IV with diameter greater than legs III, with paraxial tarsal claw. Setal measurements: *scv:se*, 100  $\mu$ m; *scv:sa*, 55  $\mu$ m; *sa*, 29  $\mu$ m; *l* 1, 45  $\mu$ m; *sh*, 57  $\mu$ m; *l* 2, 29  $\mu$ m; *d* 4, 53  $\mu$ m.

$\sigma$ . Length, including gnathosoma, 617  $\mu$ m; width at trochanters III, 332  $\mu$ m. Prodorsum as in  $\delta$ . Hysterosoma with anterior hysterosomal pygidial shields; setae *d* 5, *l* 3 subequal, setae *d* 1-3, *par* as microsetae. Setal measurements: *scv:se*, 98  $\mu$ m; *scv:sa*, 45  $\mu$ m; *sa*, 35  $\mu$ m; *l* 1, 20  $\mu$ m; *l* 2, 24  $\mu$ m.

*Type data.* Fx *Deropryus accipitrinus fuscifrons* Hellmayr (Psittacidae):  $\delta$  holotype, 13 $\delta$ , 92 paratypes, BRAZIL: Pará, Rio Tapajós, 9.VII.1931 (A.M. Olalla) (AMNH bird no. 288252, Youngstown State University no. 2971); 5 $\delta$  paratypes, Pará, Rio Marjary off Rio Xingu (?Recreio), 9.IX.1931 (A.M. Olalla) (AMNH 429161, UGA 7588); 13 paratype as preceding except 13.IX.1931 (AMNH 429162, UGA 7590). Primary type deposited in AMNH, secondary types in AMNH, GACD, UGA.

*Remarks.* The interlobar membranes are usually distorted in microscope slide preparations such that the interlobar membranes appear notched as depicted on the right side of Fig. 2.

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SURVEILLANCE OF ARBOVIRUS ACTIVITY IN IOWA, USA, 1978-1980<sup>1</sup>Richard G. Andre,<sup>2</sup> Wayne A. Rowley,<sup>2</sup> Yau W. Wong,<sup>3,4</sup> and Don C. Dorsey<sup>1</sup>

**Abstract.** Considerable information pertaining to the epidemiology of mosquito-borne viruses in Iowa, USA, has been acquired during a continuing arbovirus surveillance program. Virus isolation results indicate that *Culex tarsalis* is the primary vector of St. Louis encephalitis (SLE) and western equine encephalomyelitis (WEE) viruses in Iowa, but that *Culex* spp. (*Cx pipiens*, *Cx restuans*, or *Cx salinarius*) may contribute to the amplification of SLE virus. Also, *Aedes trivittatus* may be important in the natural maintenance of WEE virus in Iowa. From 1978 through 1980, a total of 243 isolations of viruses such as Flanders and trivittatus were made from various species of mosquitoes in Iowa. Many of the wild-bird bloods tested had hemagglutination-inhibition (HI) antibodies (titer  $\geq 20$ ) to WEE virus, and a few had antibodies to SLE in Council Bluffs, where a human case occurred in 1980. Eighteen human cases of La Crosse encephalitis occurred in Iowa in 1978, and a 3-year-old girl who lived near the Iowa state line died from the effects of this virus. La Crosse virus was isolated from a pool of *Aedes triseriatus* collected in Dubuque, where a human case occurred in 1979 and a 2nd case occurred in 1980.

The arthropod-borne encephalitides are important causes of equine and human morbidity in the United States. Between 1975 and 1978, a total of 6970 human cases of arboviral encephalitis were reported, and 1000-4000 cases of equine encephalitis occurred annually (Monath 1979). Unfortunately, these numbers probably represent just a fraction of the true incidence of these diseases. Western equine encephalomyelitis (WEE), St. Louis encephalitis (SLE), and California encephalitis (CE) accounted for nearly all of the reported infections, but cases of eastern equine encephalitis and Venezuelan equine encephalomyelitis also were noted (Shope 1980). All these viruses are mosquito-borne, but the epidemiology of the diseases they cause may vary from state to state.

Considerable information pertaining to the epidemiology of mosquito-borne viruses in Iowa, USA, has been acquired during a continuing arbovirus surveillance program. Since the start of the

program in 1966, thousands of pools of mosquitoes have been tested for the presence of arboviruses, and hundreds of virus isolations have been made (Wong et al. 1970, 1971, 1973, 1978, Rowley et al. 1973, 1979, Dorsey et al. 1978). The viruses isolated have been identified as: Cache Valley (CV), Flanders (FLA), La Crosse (LAC), SLE, trivittatus (TVT), Turlock (TUR), and WEE. Both SLE and WEE antibodies frequently are detected among avian sera, and hundreds of equine cases of WEE have been diagnosed. Many laboratory-confirmed human cases of LAC, SLE, and WEE also have been reported (Dorsey et al. 1978).

Although SLE and WEE viruses have been detected in various species of mosquitoes collected in Iowa, *Culex tarsalis* Coquillett is the primary vector (Rowley et al. 1973, Wong et al. 1973, 1978, Dorsey et al. 1978). In addition, *Culex* spp. (*Cx. pipiens* L., *Cx. restuans* Theobald, and *Cx. salinarius* Coquillett) may contribute to the amplification of SLE and WEE viruses (Wong et al. 1978). More recent findings, however, indicate that *Aedes trivittatus* (Coquillett) also may play an important role in the natural cycle of WEE virus (Green et al. 1980, Richie & Rowley 1981; Andre et al. in prep.) The other arbovirus of public health significance in Iowa, LAC virus, has been isolated only from pools of *Aedes triseriatus* (Say).

## MATERIALS AND METHODS

*Collection of mosquitoes*

Adult mosquitoes were collected for virus isolation studies with battery-operated, CO<sub>2</sub>-baited CDC light traps. These traps were operated periodically from June through August during the 3-year study. Traps were set in or near 8 Iowa cities: Ames, Council Bluffs, Davenport, Des Moines, Dubuque, Iowa City, Sioux City, and Waterloo. Collection of mosquitoes and processing for subsequent virus isolation attempts were accomplished in accordance with standard techniques (Chamberlain & Sudia 1967).

*Collection of birds*

From 1978 through 1980, periodic collections of wild birds were made during the summer. Birds

<sup>1</sup> Journal Paper No. J-10361 of the Iowa Agriculture and Home Economics Experiment Station, Ames, Iowa 50011, USA. Project No. 2053.

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