

spider may not feed to any extent on pests such as the larvae of the sorghum webworm, and may not be sufficiently effective to prevent damage by the greenbug.

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## A NEW GENUS OF ALLODECTINE FEATHER MITES FROM HUMMINGBIRDS<sup>1</sup>

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## ABSTRACT

*Schizodectes*, new genus, with *Proctophyllodes* (*P.*) *fenestralis* Trouessart, 1885, as type species, is established and a new species, *S. hiterminalis* is described.

When the subfamily Alloodectinae was established (Park and Atyeo, 1971b), we were aware that Trouessart (1885) had described a bizarre species, *Proctophyllodes* (*P.*) *fenestralis*, from a South American hummingbird. The advisability of including this species in the original alloodectine paper was debated, but it was not until the recent discovery of a species related to *P. fenestralis* that we were sufficiently confident that both should be placed in the Alloodectinae.

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Except for the opisthosomata of the males, these two species are nearly identical to species of *Allodectes*. The specialized modifications of the male opisthosoma include widely separated terminal lobes, enlarged setae  $l_5$ , and the unique positioning of setae *pa*e, each inserted on a ventral protuberance which may extend into the terminal cleft. *Allodectes* males have the opisthosomata tapering behind legs IV, setae  $d_3$  enlarged, terminal lamellae small or rudimentary, and setae *pa*e laterally inserted. Further comparisons between the males of *Allodectes* and *Schizodectes*, new genus, must include the genital regions and associated setae.

Atyeo and Gaud (1971) recognized that the setae associated with the genital region and coxae IV were often difficult to homologize. The males of *Allodectes* and *Schizodectes* are good examples of two conditions in which the homologs can be determined. In the *Allodectes* males, the genital organ is situated approximately at the level of trochanters III, and immediately posterior to a transverse apodeme formed by the anterior epimerites of legs IV. The pair of setae anterior or lateral to the genital arch and the pair directly posterior are respectively,  $c_1$  and  $c_2$ . A third pair of setae inserted on or near the mesal terminations of the posterior epimerites of legs IV is of coxal origin and can be designated as  $cx_4$  or  $c_3$ . On the other hand, the genital organ in *Schizodectes* males is more posteriorly situated approximately at the level of the anterior articulations of legs IV and mesally to the posterior epimerites of legs IV. If chaetotaxal signatures were assigned according to the earlier system of Atyeo and Gaud (1966), the setae anterior to the genital arch would be  $c_1$ , those lateral  $c_2$ , and those posterior  $c_3$ . In comparing *Allodectes* and *Schizodectes* species, however, the setae directly posterior to the genital arch in both groups would be homologous structures, that is, setae  $c_2$ . The most anterior pairs in *Allodectes* and *Schizodectes* are obviously setae  $c_1$ , and the remaining pair must be setae  $cx_4$  or  $c_3$ —on the inner margins of coxae IV in *Allodectes* and on the anteromesal terminations of the posterior epimerites of legs IV in *Schizodectes*. The juxtapositioning of the genital setae, coxal setae  $cx_4$ , the genital organ and discs is explainable. In the *Allodectes-Schizodectes* complex it is possible to think that setae  $c_1$  and  $cx_4$  are relatively stable in position and that a structural unit composed of the genital organ, genital discs and setae  $c_2$  has varying positions. In *Allodectes* the unit is anteriorly situated between setae  $c_1$  and distant from setae  $cx_4$ ; in *Schizodectes* the unit is more posteriorly situated, distant from setae  $c_1$  and between the coxal setae of legs IV.

Before comparing the two species assigned to the genus *Schizodectes*, unique structures of *S. fenestralis* should be discussed. The males of this species have large posterolateral flanges, each of which represents an expansion of the lateral body wall and is bent sharply ventrad to cover the base of a lamella and the insertions of the anal and external postanal setae. One of our study specimens has a flange exposed so the structure could be easily examined. As illustrated in

figure 3, the posterior margin is cleft, the outer margin of the cleft has developed as a small hook, and a seta is dorsally inserted on the inner margin. This seta, the lateral member of the fourth row of dorsal hysterosomal setae ( $l_4$ ) now positioned away from the opisthosomal margin, tends to support the idea that the opisthosoma has been expanded laterally rather than developed as simple outgrowth from the body wall. It would appear that the flanges could serve as a pair of claspers to hold the tritonymph or adult female during copulation.

The males of *S. fenestralis* and *S. hiterminalis*, new species, appear similar in that both have large and widely separated terminal structures forming a large terminal cleft. However, in *S. fenestralis*, this appearance is due to the short lobes bearing large leaflike lamellae; in *S. hiterminalis*, the bilobed condition is not dependent on lamellar development but on the lengthening of structures bearing the posterior setae. The terminus of each has evolved toward the same type of functional unit, but through different types of modifications. In *S. fenestralis*, setae  $pa_1$  and  $d_5$  are inserted near the same level, and  $l_4$  and  $l_5$  are inserted at another level; these two levels are close together. In *S. hiterminalis*, there has been an increase in the distance between the two groups of setae as a result of an increase in the lobe length.

To broaden the concept of the subfamily Allodectinae and to include *Schizodectes*, the new definition would be: Proctophyllodid mites with well-developed dorsal and ventral shields, with setae  $sR$  on trochanters III long spiculiform (not hairlike). Idiosomal dorsum with all setae present except  $vi$ , rarely  $ve$ ; setae  $d_2, l_2, d_3, l_3, l_4$  in linear arrangement along margins of hysterosomal shield; male with one pair of long terminal setae ( $d_5$  in *Allodectes*,  $l_5$  in *Schizodectes*) and with metapodosomal shields present. Idiosomal venter with well-developed coxal shields; epimerites I parallel (not connected); female with large pregenital apodeme weakly connected to shortened epimerites of posterior legs. Legs with femorogenua articulation partially fused; legs IV slightly enlarged in males; with tarsi IV having hooklike dorsodistal extension in males; solenidia  $\sigma_1$  on genua I and III present;  $\sigma_1$  longer than  $\sigma_3$  on legs I; setae  $ba, s, p, q$  absent; setae  $wa, la, va$  approximate on tarsi I-II. Restricted to birds of the Trochilidae.

#### Family Proctophyllodidae

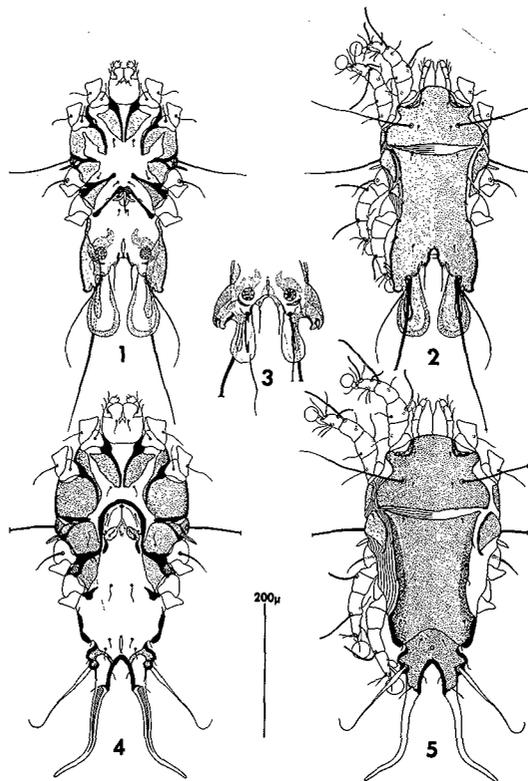
##### Subfamily Allodectinae

##### *Schizodectes*, new genus

Type species: *Proctophyllodes* (*P.*) *fenestralis* Trouessart, 1885.

Derivation: Contraction of *schizo*, cleave, split + *Allodectes*; masculine.

Diagnosis: Allodectine mites restricted to the Trochilidae. Males with gnathosoma and prosoma as in *Allodectes*; hysterosoma more or less parallel sided; terminus with broad cleft formed by lobar extensions or extensive lamellae; genital organ between anterior articulations of



FIGS. 1-5. *Schisodectes fenestratis* (Trouessart): ventral and dorsal aspects of male (1, 2), exposed opisthosomal flanges (3), ventral and dorsal aspects of female (4, 5).

legs IV; setae  $cx_4$  ( $=c_3$  of authors) lateral to genital organ and between levels of setae  $c_1$  and  $c_2$ ; setae  $pa_e$  inserted on ventral protuberances, often directed into terminal cleft; setae  $a$  posterolateral to adanal discs; setae  $d_5$  small,  $l_5$  greatly enlarged; adanal discs with several heavily sclerotized papilliform dentations. Female similar to *Allodectes*.

***Schizodectes fenestralis*** (Trouessart), new combination

Figs. 1-5

*Proctophyllodes* (*P.*) *fenestralis* Trouessart, 1885, Bull. Soc. Etud. Sci. Angers, 14:77-78.

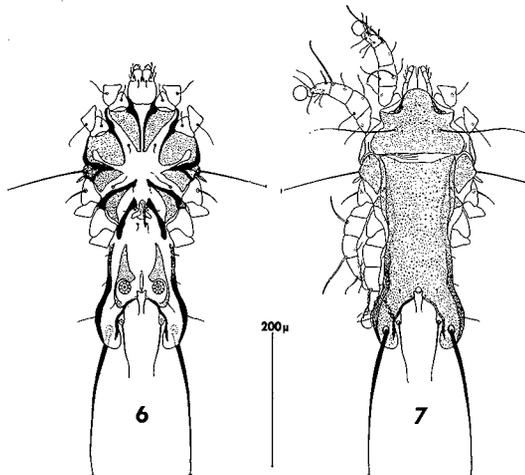
*Proctophyllodes fenestralis*, Poppe, 1888, Abh. Naturwiss. Ver. Bremen, 10:224.

*Alloptes fenestralis*, Canestrini and Kramer, 1899, Tierreich, 7:110; Vitzthum, 1922, Arch. Naturgeschichte, A, 88(5):53; Radford, 1953, Parasitol., 42(3, 4):213; Radford, 1958, Revt. brs. Entomol., 8:143; Atyeo and Braasch, 1966, Bull. Univ. Nebraska St. Mus., 5:313.

MALE (lectotype). Length,  $406\mu$  (including terminal lamellae); width,  $165\mu$ . Propodosomal shield  $90\mu$  in length,  $145\mu$  in width; without lacunae; external scapular setae separated by  $70\mu$ , internal scapular setae by  $45\mu$ . Scapular shields present. Hysterosomal shield  $280\mu$  in length,  $132\mu$  in width; without lacunae; with metapodosomal shields; terminal cleft  $119\mu$  in length. Ventral idiosoma with epimerites I free; coxal fields I-IV open; genital organ  $33\mu$  in length, extended to level of setae  $c_2$ ; adanal disc  $19\mu$  in diameter, separated center-to-center by  $65\mu$ , with seven papilliform dentations; anal shields weakly sclerotized, not extended rostrad to level of posterior articulations of legs IV. Setae:  $sh$ ,  $23\mu \times 3\mu$ , blade-like;  $d_5$ ,  $48\mu$  in length, simple;  $l_5$ , approximately  $320\mu$  in length;  $d_2$  and  $d_4$  in trapezoidal arrangement;  $d_4$  nearly at level of  $l_5$ ;  $sR$ ,  $43\mu \times 2\mu$ . Tarsi IV not extended to level of setae  $pa_e$ ; solenidion  $\phi$  on tibia IV shorter than  $\phi$  on tibia III;  $\sigma_1$  subequal to  $\phi$  on leg III.

FEMALE (paralectotype). Length,  $430\mu$  (excluding terminal appendages); width,  $210\mu$ . Propodosomal shield  $114\mu$  in length,  $172\mu$  in width; without lacunae; external scapular setae separated by  $90\mu$ , internal scapular setae by  $60\mu$ . Scapular shields present. Hysterosomal shield  $271\mu$  in length,  $145\mu$  in width; with lacunae; terminal cleft inverted V-shaped,  $45\mu$  in length; terminal lobes freely articulated to anterior opisthosoma; terminal appendages arising at apices of lobes. Ventral idiosoma with epimerites I free. Setae:  $sh$ ,  $26\mu \times 5\mu$ , blade-like;  $d_5$ ,  $26\mu$  in length;  $l_5$ ,  $156\mu$  in length;  $d_2$  and  $d_4$  in trapezoidal arrangement;  $pa_i$  inserted at level of midlength of terminal cleft;  $sR$ ,  $48\mu \times 3\mu$ ; solenidion  $\phi$  on tibia IV subequal to  $\phi$  on tibia III;  $\sigma_1$  slightly shorter than  $\phi$  on leg III.

TYPE DATA. From *Coeligena* ( $=$  *Helianthea*) *bonapartei* (Boissoneau), 1840: ♂ lectotype, 1 ♂, 2 ♀ paralectotypes, Nouvelle



FIGS. 6-7. *Schizodectes hiterminalis*, new species: ventral and dorsal aspects of male (6, 7).

Granada, no other data known. The types are deposited in the Trouessart Collection, Paris.

ADDITIONAL MATERIAL. From *C. bonapartei*: 7 ♂♂, 1 ♀, Bogotá Collection, Colombia, other data unknown.

REMARKS. The original assignment of this species to the subgenus *Proctophyllodes* is obvious from illustrations. The large terminal lamella-like extensions of the male are typical for many of the known species of *Proctophyllodes* in 1885. In Trouessart's slide, there appeared to be a thin layer of air trapped between the large posterior setae and the dorsal surfaces of the lamella-like extensions; this apparent aberration created a clear area or *fenestra*. When the specimens were remounted, the clear area was still present, but it could be seen that an area of each lamella-like extension immediately ventral to setae  $l_5$  was uniquely thinned and unpigmented thus creating a broad, shallow groove in which the proximal portion of these setae would lie. Although retained in *Alloptes*, the affinities of this species with *Pterodectes*

(*s. l.*) rather than with *Proctophylloides* or *Alloptes* was mentioned by Atyeo and Braasch (1966). Since 1966, the family Proctophylloidae (*s. l.*) has been reviewed and new subfamilies created, including Pterodectinae and Alloedectinae (Park and Atyeo, 1971a, 1971b).

HOST RANGES. For *C. bonapartei*: "Temperate zone of the western slopes of the Eastern Andes of Colombia" (Peters, 5:101).

### *Schizodectes hiterminalis*, new species

Figs. 6-7

MALE (holotype). Length, 432 $\mu$ ; width, 182 $\mu$ . Propodosomal shield 100 $\mu$  in length, 145 $\mu$  in width; with several lacunae; external scapular setae separated by 67 $\mu$ , internal scapular setae by 48 $\mu$ . Scapular shields present. Hysterosomal shield 290 $\mu$  in length, 140 $\mu$  in width; with lacunae; with metapodosomal shields; terminal cleft 87 $\mu$  in length. Ventral idiosoma with epimerites I free; coxal fields I-IV open; genital organ 40 $\mu$  in length, extended to level of setae  $c_3$ ; adanal discs 20 $\mu$  in diameter, separated center-to-center by 55 $\mu$ ; anal shields extended rostrad to level of posterior articulations of trochanters IV. Setae:  $sh$ , 23 $\mu \times 4\mu$ , bladelike;  $d_5$ , 30 $\mu$  in length, simple;  $l_5$ , approximately 355 $\mu$  in length;  $d_2$  and  $d_4$  in trapezoidal arrangement;  $d_4$  nearly at level of  $l_3$ ;  $sR$ , 44 $\mu \times 2\mu$ . Tarsi IV not extended to level of setae  $pa_2$ ; solenidion  $\phi$  on tibia IV shorter than  $\phi$  on tibia III;  $\sigma_1$  shorter than  $\phi$  on leg III.

FEMALE. Unknown.

TYPE DATA. From *Phaethornis superciliosus muelleri* Hellmayr, 1911:  $\delta$  holotype, Belém, Pará, Brazil, April 5-9, 1963, P. S. Humphrey. From *P. a. anthophilus* (Bourcier), 1843: 1  $\delta$  paratype, Petrólea, Norte del Santander, Colombia, July 19-29, 1943, M. A. Carriker, Jr. The holotype is deposited in the National Museum of Natural History; the paratype is deposited in the University of Georgia.

REMARKS. The name *hiterminalis* is given referring to the broad terminus of the male of this species (*hio*, broad + *terminalis*).

HOST RANGES. For *P. superciliosus muelleri*: "Northern Brazil south of the Amazon from the right bank of the Tapajóz to the vicinity of Belém (Peters, 5:10). For *P. a. anthophilus*: "Tropical zone of northern Colombia and western Venezuela" (Peters, 5:11).

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## NOTES ON THE BEHAVIOR AND ECOLOGY OF THE MANTISPID, *CLIMACIELLA BRUNNEA* *OCCIDENTALIS*<sup>1</sup>

S. W. T. BATRA<sup>2</sup>

### ABSTRACT

This usually rare mantispid was locally abundant during 1968 on thistles in Cache Valley, Utah, where it may mimic *Polistes fuscatus utahensis*. It ate various insects, thistle sap, and honey. Females lived as long as 43 days and laid up to 3,334 eggs. Courtship by the males includes an elaborate visual display and the production of a distinct odor. The agile larvae preferred *Bombus morrisoni* to other insects and spiders tested. Courtship, mating, oviposition and larval behavior are described.

Members of the Mantispidae are rarely encountered (Hungerford, 1936); however, adults of the species *Climaciella brunnea occidentalis* (Banks) were locally abundant during the summer of 1968 at Providence Canyon in Cache Valley, Cache Co., Utah. An unusual opportunity to observe the behavior of this species was thus provided. Although it was abundant in 1968 (about 30 individuals observed in the field and 20 collected between mid-June and mid-August), only five mantispids were seen during the same period in 1969 (at Providence and Green canyons).

An examination of specimens from Cache Valley in the entomological museum of Utah State University showed that relatively large collec-

<sup>1</sup> Neuroptera: Mantispidae. Received for publication July 23, 1971.

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