

Ent. mitt. Zoolog. Museum Hamburg, Bd. 4 (1970) Nr. 71

The feather mite genus *Monojoubertia* RADFORD, 1950 (Analgoidea: Proctophyllodidae)¹

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Abstract

The genus is redefined, the 12 included species are listed, and some species are illustrated; *Monojoubertia arachnotherae*, n. sp., is described from *Arachnothera magna* (Nectariniidae), Malaya.

The most useful of the earlier classifications of the Analgoidea was that of TROUSSERT and MÉGNIN which appeared in a number of papers from 1883 to 1885. During this period, the feather mites were considered as a subfamily of the Sarcoptidae and the suprageneric groups recognized for the subfamily Analgesinae were the Pterolicheae, Analgesae, Proctophyllodeae, and the Dermoglypheae (TROUSSERT and MÉGNIN, 1883; MÉGNIN and TROUSSERT, 1884). Considering only the Proctophyllodeae, TROUSSERT (1885) considered this monogeneric group as having males of variable form with the terminus bifid and an ensiform genital organ more or less thin or elongated, the females with bilobed terminus bearing gladiform or setiform appendages, and both sexes with unarmed anterior legs and with short subhumeral setae posterior to the long humeral setae. TROUSSERT considered the genus *Proctophyllodes* ROBIN, 1877, the only genus of the Proctophyllodeae, to be a homogeneous group that should be divided into subgenera, namely, *Alloptes* CANESTRINI, 1879, *Proctophyllodes* ROBIN, 1877, *Pterodectes* ROBIN, 1877 *Trouessartia* CANESTRINI, 1899 (= *Pterocolus* HALLER, 1878), and *Pterophagus* MÉGNIN, 1877. Currently the first four subgenera are the type genera of four subfamilies (three published, one in press) and *Pterophagus* is assigned to the family Dermoglyphidae.

TROUSSERT characterized the subgenus *Alloptes* as having males with the fourth pair of legs more developed than the others and with variable forms of the hysterosomae; the females were characterized as having bilobed termini bearing gladiform or simple setiform appendages [i.e., setae d_5 , l_5]. Thus to TROUSSERT, any species that could be assigned to the genus *Proctophyllodes* having males with hypertrophied legs IV was *ipso facto* assigned to the subgenus *Alloptes*. Of the many species described or reassigned to the subgenus *Alloptes* by TROUSSERT, approximately fourteen should be considered Proctophyllodinae rather than Alloptinae and more specifically, most should be assigned to or are closely related to the genus *Monojoubertia* RADFORD, 1950 (= *Joubertia* Oudemans, 1905).

In a series of papers being prepared by the University of Georgia research group, taxa related to *Monojoubertia* are being defined. The purpose of this paper is to restrict the genus, to list the species of the restricted taxon, and illustrate those species for which recent redescrptions

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The structures of the males which differ are those presumably modified for copulation, i. e., the development of the terminus and the enlargement of legs IV for grasping the immature and mature females. „Presumably“ is used because if the various shapes and sizes of the male opisthosomae confer adaptative advantages, it would seem logical that the associated females would have some type of reciprocal modifications — there are none, the females of the majority of the Proctophyllodinae species are similar and often indistinguishable. Regardless, the males and where possible the females of the species groups will be characterized in the appropriate sections.

Family Proctophyllodidae

Subfamily Proctophyllodinae

Genus *Monojoubertia* RADFORD

Joubertia OUDEMANS, 1905, Entomol. Ber., 1 (24): 239—240 (nom. praecoc.); DUBININ, 1951, Fauna S. S. S. R., 6 (5): 17, 69, 70; GAUD, 1953, Ann. Parasitol. hum. comp., 28 (3): 196.

Monojoubertia RADFORD, 1950, Un. int. Sci. biol., sec. C, (1): 141; GAUD, 1957, Bull. Soc. Sci. nat. Phys. Maroc, 37 (2): 108, 115; GAUD and MOUCHET, 1957, Ann. Parasitol. hum. comp., 32 (5, 6): 494; GAUD and TILL, 1961, Publ. So. Afr. Inst. Med. Res., 11 (L): 239, 248.

Type species: *Proctophyllodes* (P.) *microphyllus* ROBIN, 1877 (by original designation).

The variations of the diagnostic characters as discussed under the species groups are incorporated in the definition of the genus *Monojoubertia*. It is probable that it will be necessary to further restrict this definition and to reassign some of the species to new taxa.

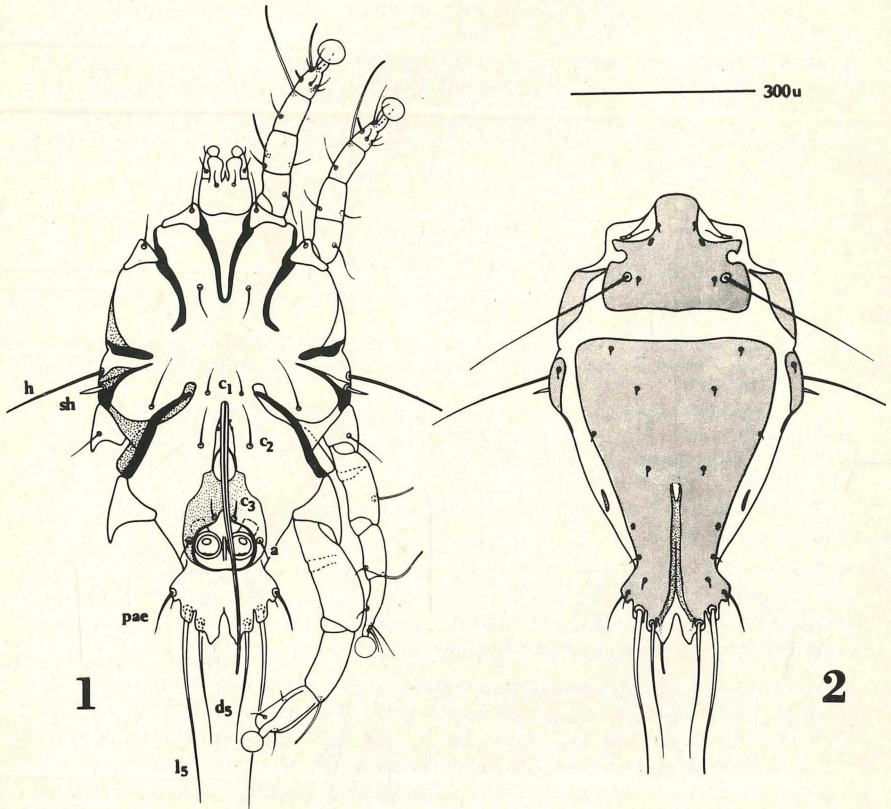
Diagnosis: Proctophyllodine mites with epimerites I U-shaped or parallel; full complement of idiosomal setae except **vi**, rarely **ve**. Males with legs IV than legs III (subequal in one species); genua and femora fused in legs III—IV; tarsi IV with setae **r**, **w**, **d** large, setae **e** and **f** reduced or absent, with or without dorsal and/or ventral carinae, with or without apicoventral claw; hysterosomal terminus broad when large lamellae present, narrow if small lamellae present; setae **d**₅ long and dorsal, or short and ventral or marginal. Females as in *Proctophyllodes* with terminus separated from anterior hysterosoma by suture and bearing two lobes and two gladiform appendages; pregenital apodeme independent of epimerites, extending to genital discs or beyond insertions of setae **c**₂. Presently known only from birds of the passeriform families Dicaeidae, Fringillidae, Emberizidae, Muscicapidae, Nectariniidae.

Group 1 — the fingillid or *microphylla* group

The males have epimerites I U-shaped, asymmetrical adanal discs, no pregenital apodeme, setae **c**₁₋₂ mesal to epimerites, setae **d**₅ long and inserted dorsally, tarsus IV with dorsal and ventral carinae, setae **e** and **f** absent or reduced. The females are similar to *Proctophyllodes* species with the pregenital apodeme not extending to the atrophied genital discs.

Monojoubertia microphylla (ROBIN)

Figs. 1—4



Figs. 1, 2. *Monojoubertia microphylla* (ROBIN): ventral and dorsal aspects of male. Setal designations: a, anal; c_{1-3} , centrals; d_5 , dorsal hysterosomal; h, humeral; l_5 , lateral hysterosomal; pae, external post-anal; sh, subhumeral.

Proctophyllodes (*Pterodectes*) *microphyllus* ROBIN, in ROBIN and MÉGNIN, 1877, J. Anat. Physiol., 13: 392 (nomen nudum).

Proctophyllodes (*Proctophyllodes*) *microphyllus* ROBIN, in ROBIN and MÉGNIN, 1877, J. Anat. Physiol., 13: 641-3.

Alloptes microphyllus: CANESTRINI, 1886, Prosp. Acarof. ital., 2: 290-2; BERLESE, 1897, A.M.S., suppl. 2, pp. 78, 79; CANESTRINI and KRAMER, 1899, Tierreich, 7: 109-110; BONNET and TIMON-DAVID, 1933, Ann. Parasitol. hum. comp., 11 (6): 446, fig. 4.

Alloptes palmatus CANESTRINI, 1879, Atti Soc. Veneto-Trent., 6: 41, pl. 4, fig. 1; BERLESE, 1884, A. M. S., fasc. 16, no. 7.

Proctophyllodes (*Alloptes*) *microphyllus*: TROUSSERT, 1885, Bull. Soc. Etud. sci. Angers, 14: 65.

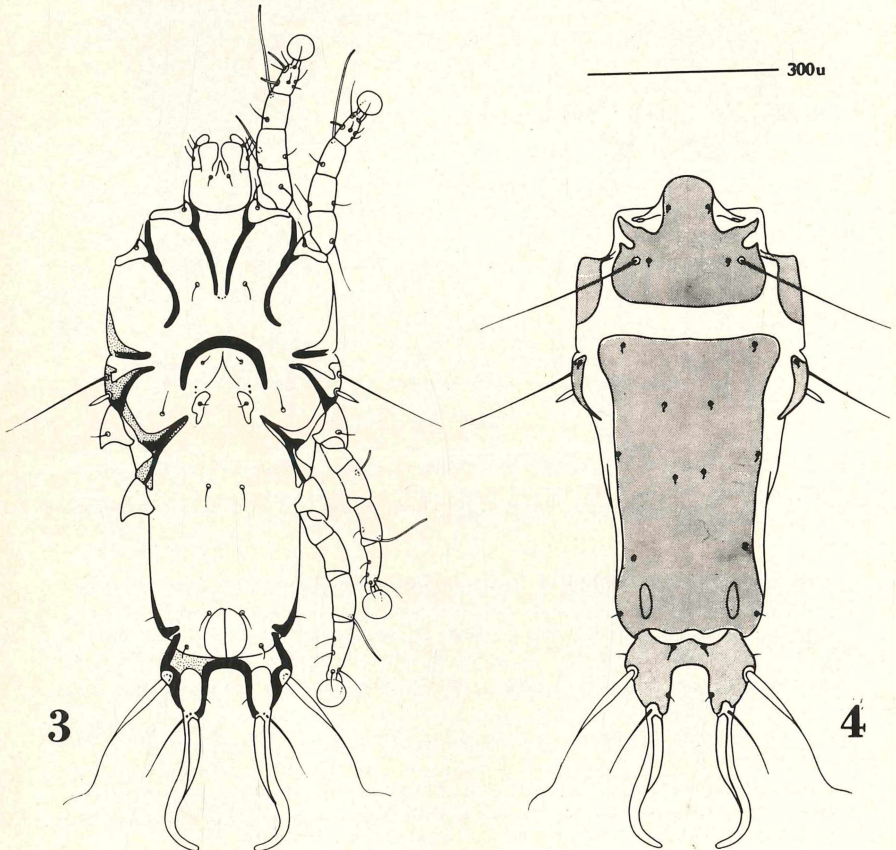
Pterodectes microphyllus: OUDEMANS, 1905, Entomol. Ber., 1 (24): 240.

Joubertia microphyllus: OUDEMANS, 1905, Entomol. Ber., 1 (24): 240; DUBININ, 1953, Fauna S. S. S. R., 6 (5): 72, fig. 54 (2).

Alloptes (Joubertia) microphyllus: GAUD and PETITOT, 1948, Ann. Parasitol. hum. comp., 23 (1, 2): 42.

Monojoubertia microphylla: RADFORD, 1953, Parasitol., 43 (3, 4): 214; GAUD, 1957, Bull. Soc. Sci. nat. Phys. Maroc, 37 (2): 115; RADFORD, 1958, Revta. brasil. Entomol., 8: 160; GAUD and TILL, 1961, Publ. So. Afr. Inst. Med. Res., 11 (L): 249, fig. 156; LICHARD, 1962, Biología, 17: 535; ČERNÝ, 1964, Čslka. parasitol., 11: 67.

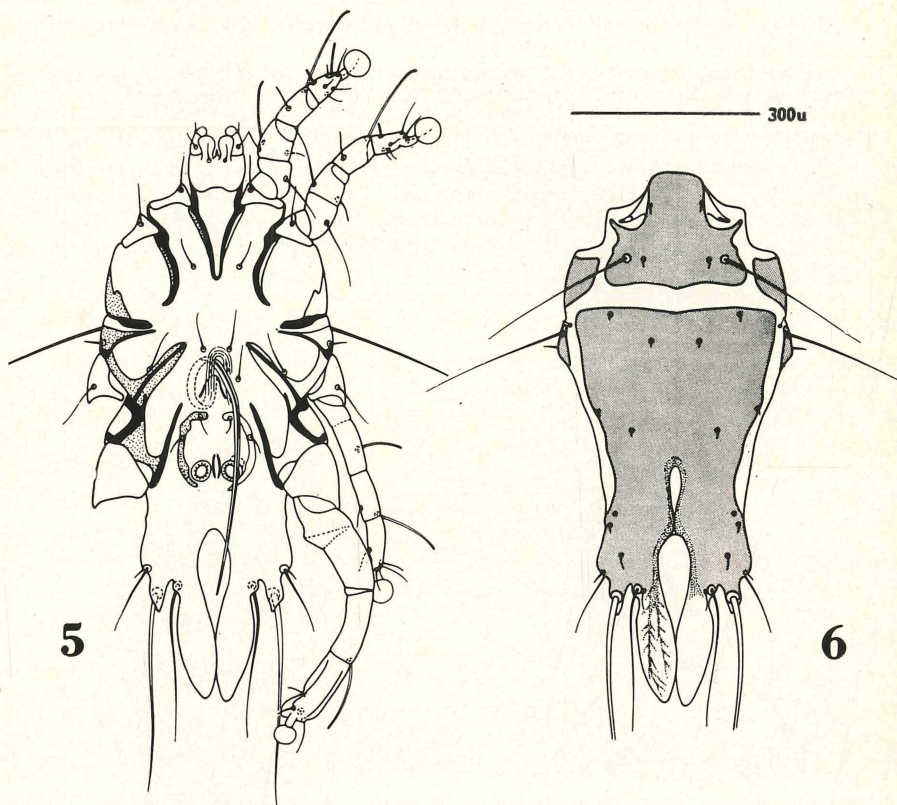
This species has been collected from *Fringilla coelebs* in various parts of Europe, *Emberiza cirlus* in Germany, and GAUD and PETITOT (1948) report collecting *Monojoubertia microphylla* from *Fringilla spodiogenys africana* in Morocco. About twenty specimens from the first two hosts are in the study collection.



Figs. 3, 4. *Monojoubertia microphylla* (ROBIN): ventral and dorsal aspects of female.

Monojoubertia hemiphylla (ROBIN)

Figs. 5, 6



Figs. 5, 6. *Monojoubertia hemiphylla* (ROBIN): ventral and dorsal aspects of male.

Proctophyllodes hemiphyllus ROBIN, in ROBIN and MÉGNIN, 1877, J. Anat. Physiol., 13: 392, 639—641.

Alloptes hemiphyllus: CANESTRINI, 1886, Prosp. Acarof. ital., 2: 292-3; BERLESE, 1897, A. M. S., suppl. 2, pp. 78, 79; CANESTRINI and KRAMER, 1899, Tierreich, 7: 109.

Alloptes (h)astatus BERLESE, 1884, A. M. S., fasc. 16, no. 8; BERLESE, 1897, A. M. S., suppl. 2, p. 190.

Proctophyllodes (Alloptes) hemiphyllus: TROUESSART, 1885, Bull. Soc. Etud. sci. Angers, 14: 64.

Joubertia hemiphyllus: DUBININ, 1951, Fauna S. S. S. R., 6 (5): 72, fig. 54 (1).

Monojoubertia hemiphylla: RADFORD, 1953, Parasitol., 43 (3, 4): 214; RADFORD, 1958, Revta. brasil. Entomol., 8: 160-1; LICHARD, 1962, Biología, 17: 535.

We have material from *Fringilla montifringilla* from Japan, Korea and England. This species has been reported from many localities in Europe

from the same host. We have not obtained *M. hemiphylla* from the type host, *Emberiza calandra*, but it is interesting to note that both *M. hemiphylla* and *M. microphylla* occur on species of *Fringilla* (Fringillidae) and *Emberiza* which are considered by some ornithologists to be a fringillids and by others to be an emberizids.

Group 2 — the dicaeid or *securigera* group

This group is typified by *Monojoubertia arachnotherae*, n. sp. (figs. 7—10). The males have epimerites I U-shaped but this appears to be the result of a secondary fusion of slightly divergent epimera and a weak transverse commissure; the femora and genua of the posterior two pairs of legs are fused, the adanal discs are symmetrical, small pregenital apodemes are present, setae c_{1-2} are inserted on sclerotizations associated with the epimerites, setae d_5 are very short and ventral or marginal in positions, tarsi IV either with large dorsal carinae and without apicoventral claw or vice versa, setae *e* and *f* reduced or absent. The females are similar to *Proctophyllodes* species except the pregenital apodeme is extended beyond the insertions of setae c_2 ; in *Proctophyllodes*, the apodeme does not extend to the genital discs.

Typically the *microphylla* and *securigera* groups have the second pair of central setae (c_2) lateral to the genital organ and have the subgenital setae (c_3) and anal setae (*a*) inserted on the subgenital (opistogastric) shield. Additionally, in both groups the male genital apparatus is situated between legs III and IV.

Monojoubertia arachnotherae, new species

Figs. 7—10

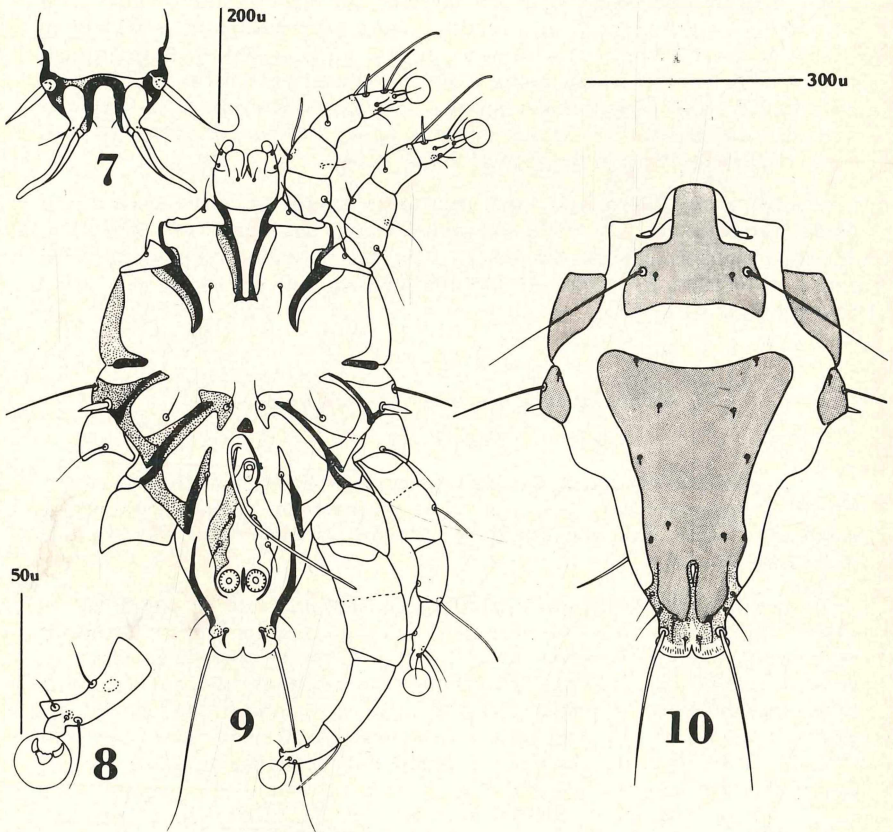
This species is related to the *Monojoubertia* species from the Dicaeidae, e.g., *M. securigera* (TROUSSERT), 1885. The arrangement of the genital organ, subgenital setae and subgenital shields are sufficient to differentiate *M. arachnotherae*.

Male (holotype). Length, including gnathosoma, 360 μ ; width 205 μ . Dorsal idiosoma with hysterosomal shield tapering to narrow terminus with small, rounded lamellae; setae l_5 long and posterolateral in position; setae d_5 short, spiculiform, ventrolateral in position. Ventral idiosoma with epimerites I U-shaped with conspicuous lateral surface fields; epimerites IIIa + IV and IVa anteromesally directed with terminal surface fields bearing setae c_{1-2} ; pregenital apodeme present; genital organ between legs III—IV and flagelliform, extending to lamellae; setae c_3 , *a* on long, divided subgenital shields. Legs IV much larger than III, both with genu and femur fused; tarsus IV with apicoventral claw.

Female (paratype). Length, including gnathosoma, excluding terminus, 354 μ ; length including terminus, 422 μ ; width 157 μ . Epimerites I as

in male except weakly connected. Terminus short; cleft U-shaped, $45 \mu \times 17 \mu$; setae l_5 broad, parallel-sided, with terminal filament; setae d_5 half length of terminal appendages. Pregenital apodeme independent of epimerites and extending beyond insertions of setae c_2 ; other features as in *Proctophyllodes* species.

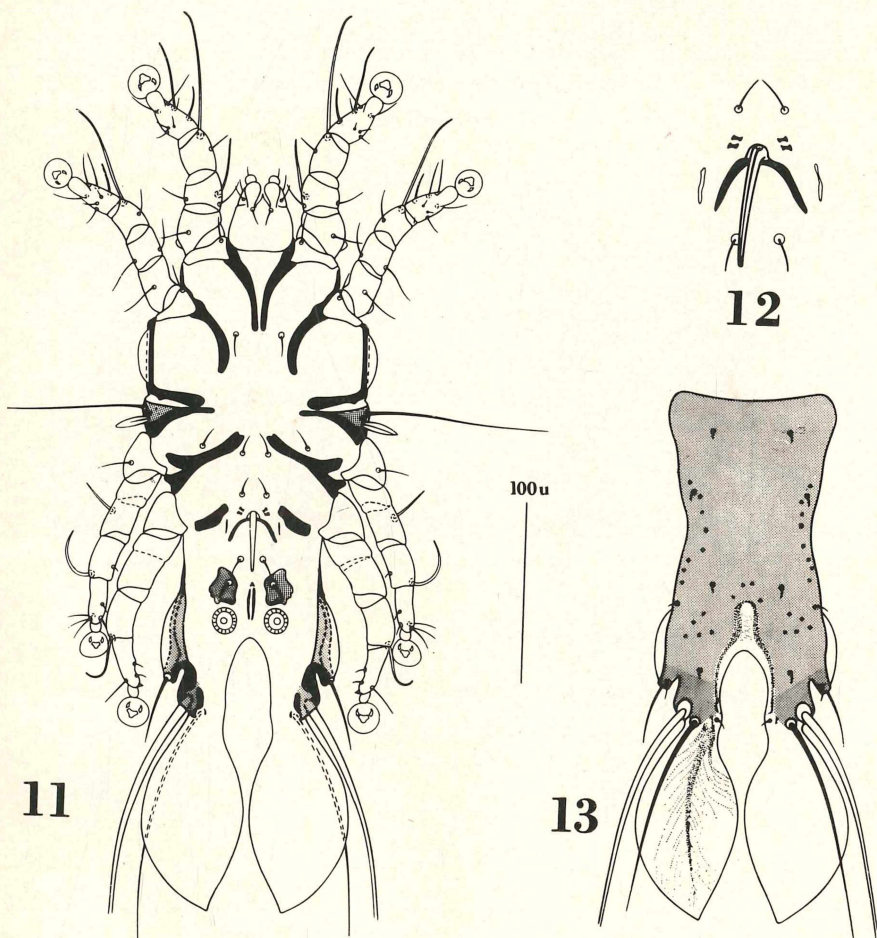
Type data. From *Arachnothera magna* (Nectariniidae): holotype ♂, 5 paratype ♀♀, Rantau Panjang, Selangor, Malaya, May 2, 1961 (from 2 birds). The holotype and four paratypes are deposited in the University of Georgia, one paratype is deposited in the Zoologisches Institut und Zoologisches Museum at Hamburg, Germany.



Figs. 7—10. *Monojoubertia arachnotherae*, n. sp.: ventral and dorsal aspects of male (9, 10), ventral terminus of female (7), enlargement of male tarsus IV (8).

Group 3 — the muscicapid or *latifoliata* group

This group of four species collected from one species of Muscicapidae in New Guiana are intermediate between *Proctophyllodes* and *Monojoubertia*. The anterior epimerites are not connected, but they closely parallel each other and occasionally an incomplete commissure can be detected which make the structures almost U-shaped. The articulations between the genua and femora of legs III are partially to completely fused and those of legs IV are fused; setae c_{1-2} are inserted off the epimerites and



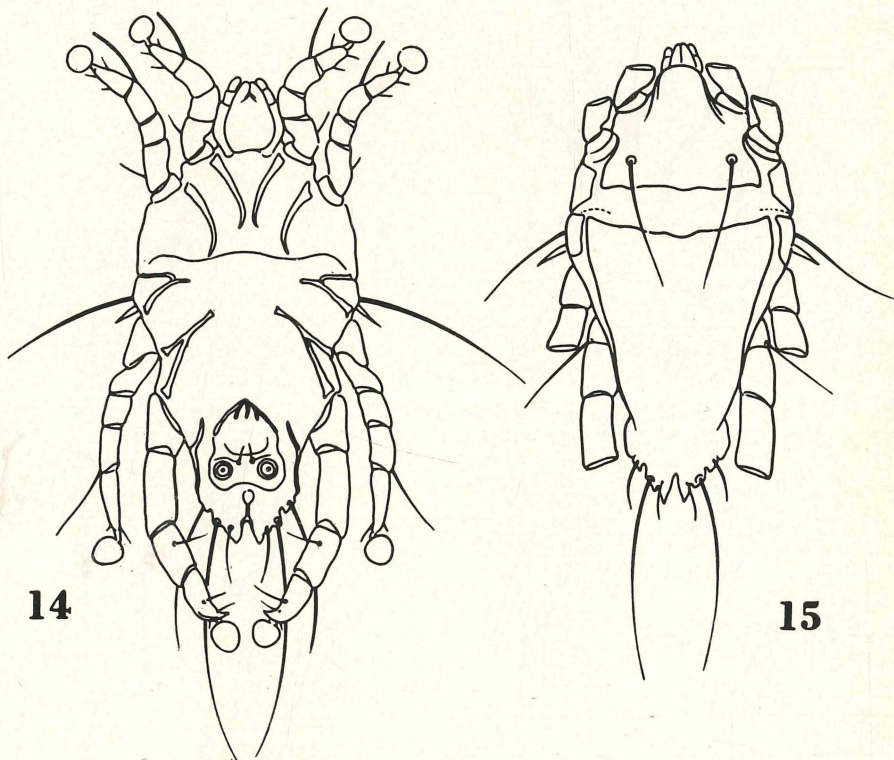
Figs. 11—13. *Monojoubertia trouessarti* ATYEO: ventral and dorsal aspects of male (11, 13), enlargement of genital region (12).

both are anterior to the genital arch; setae d_5 are long and dorsal in position, tarsus IV lacks carinae, but has a small apicoventral claw, setae e and f are wanting, the genital arch is between or behind legs IV, and only setae a are inserted on small shields. There is within this group a range of relative sizes of legs III and IV; legs IV may be noticeably hypertrophied or almost subequal to legs III, but in neither case do they extend a considerable distance beyond the insertions of setae d_5 and l_5 . Drawings of *M. trouessarti* ATYEO, 1967 (figs. 11—13) are included to illustrate the *latifoliata* group; the species is typical except that legs III and IV are nearly the same size.

Group 4 — species incertae sedis

Monojoubertia aphylla (TROUESSART)

Figs. 14, 15



Figs. 14, 15. *Monojoubertia aphylla* (BERLESE): ventral and dorsal aspects of male (modified from BERLESE).

Proctophyllodes (Alloptes) aphyllus TROUSSERT, 1885, Bull. Soc. Etud. sci. Angers, 14: 64-5.

Alloptes aphyllus: BERLESE, 1897, A. M. S., fasc. 82, no. 1; BERLESE, 1897, A. M. S., suppl. 2, 78, 79; CANESTRINI and KRAMER, 1899, Tierreich, 7: 109.

Monojoubertia aphyllus: RADFORD, 1953, Parasitol., 43 (3, 4): 213; RADFORD, 1958, Revta. brasil. Entomol., 8: 161.

The type specimens of TROUSSERT have never been located, his description of the species does not mention features necessary for recognition, and we have never been able to recollect the species from the reported host, *Pinicola* (= *Strobilophaga*) *enucleator*, northern Europe. We are including figures adapted from BERLESE (1897) which were originally made from TROUSSERT's material. In these figures epimerites I are divergent and we have added a small genital organ which we assume to be typical of the species but overlooked by BERLESE. DUBININ (1951) illustrated a species which he identified as *M. aphyllus*, but it is more closely related to *M modularis* (BERLESE), 1895.

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Jahr/Year: 1969

Band/Volume: [4](#)

Autor(en)/Author(s): Gaudant Jean, Atyeo Warren T.

Artikel/Article: [The feather mite genus *Monojoubertia* Radford, 1950 \(Analoidea: Proctophyllodidae\) 145-155](#)