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Contribution to the feather mites of Switzerland with descriptions of five new species (Acarina: Sarcoptiformes)

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Five new species of feather mites of different families are described from the birds of Switzerland: *Analloptes buettikeri* sp.n. (Xolalgidae) from the Osprey, *Pandion haliaetus*; *Mesalgoides pyrrhulinus* sp.n. (Psoroptoididae) from the Bullfinch, *Pyrrhula pyrrhula*; *Proctophyllodes fuchsi* sp.n. (Proctophyllodidae) from the Hawfinch, *Coccothraustes coccothraustes*; *Pseudolichus phasianus* sp.n. (Pterolichidae) from the Common Pheasant, *Phasianus colchicus*; *Petitota haenggii* sp.n. (Kramerellidae) from the Tengmalm's Owl, *Aegolius funereus*. Differential diagnoses of all new species are provided. An actual check-list of Swiss feather mite species and their hosts is included.

Keywords: Analgoidea, Pterolichoidea – *Analloptes*, *Mesalgoides*, *Proctophyllodes*, *Pseudolichus*, *Petitota* – Aves, descriptions

INTRODUCTION

The feather mites are a numerous group of highly specialized ectoparasitic sarcoptiform mites associated with species of almost all recent orders of birds. At present this group consists of more than 2000 species and almost 450 genera, which are classified into 32 families (GAUD & ATYEO, 1978, 1981). Owing to their high specialization and obligatory ectoparasitism, the majority of feather mite species (and also their higher taxa) demonstrate a high specificity in their range of host taxa. Therefore, species of feather mites are usually associated with one or more bird species of a certain genus or a few closely related genera.

The study of feather mites in Europe started earlier than similar investigations in other continents. Complete results of the world feather mite studies in the 19th century were given by CANESTRI & KRAMER (1899). The earliest results of feather mite studies specifically in Europe were given by VITZTHUM (1929). The greatest contribution to the understanding of the feather mite biology was made by DUBININ (1951, 1953, 1956) in the three-volume monograph dedicated to the feather mites of northern Eurasia. During the past fifty years, faunistic investigations of feather mites have been carried out in many European countries: Great Britain (HULL, 1934), Sweden (CERNY, 1965), Finland (MRČIAK & BRANDER, 1967), France (BONNET & TIMON-DAVID, 1932, 1933, 1934; GAUD, 1973), Germany (EICHLER, 1937, 1938, 1942; CERNY, 1980), Switzerland (CERNY, 1971), Poland (JABLONSKA, 1965, 1970), Hungary (BALAT & BREUER, 1955), Bulgaria (VASSILEV, 1957, 1959a, 1959b, 1960), Czechoslovakia (CERNY, 1961, 1964, 1977), Slovakia (LICHARD, 1962), and Romania (MACK-FIRA & CRISTEA, 1966a, 1966b, 1967, 1968a, 1968b). Despite a few misidentifications and taxonomic errors in the listed papers, the feather mites have been studied relatively well and the list of these mites now includes more than 500 species. However, the specific feather mite fauna of some European birds, especially passerines, has still not been studied adequately.

The first record of feather mites in Switzerland was given by CERNY (1971), who described two new species and compiled a checklist of 32 mite species recorded on 24 bird species, mainly passerines (Passeriformes). This paper describes five new feather mite species belonging to different families and found on five common European birds. Furthermore it gives the host association for all mite species recorded in Switzerland.

MATERIAL AND METHODS

The material used (about 1800 slides of feather mites) was collected in different seasons of 1965–1987 mainly by Prof. W. BÜTTIKER and Mr. W. FUCHS and was kindly loaned for this study by the Zoology Department of the Natural History Museum, Basel. Descriptions of new species are given according to standard schemes used for the respective mite taxa, the chaetotaxy nomenclature of idiosoma follows GRIFFITHS *et al.* (1990), and the leg chaetotaxy is that of ATYEO & GAUD (1966). All measurements are given in micrometers (μm). Owing to an extremely restricted number of specimens in some type series, a full set of standard measurements is given only for one holotype (male) and one paratype (female), while the range of idiosomal size (length, width) and some other special characters are displayed for all paratype specimens. Latin names of birds are given according to the checklist of VOOUS (1973, 1977). The holotypes of all new species are deposited in the Natural History Museum, Basel (Switzerland), paratypes in the same museum or in the Zoological Institute of the Russian Academy of Science (St. Petersburg, Russia). The detailed records are kept on diskette in the Zoology Department of the Natural History Museum, Basel and in the Centre Suisse de Cartographie de la Faune, Neuchâtel, Switzerland.

DESCRIPTIONS OF FIVE NEW SPECIES

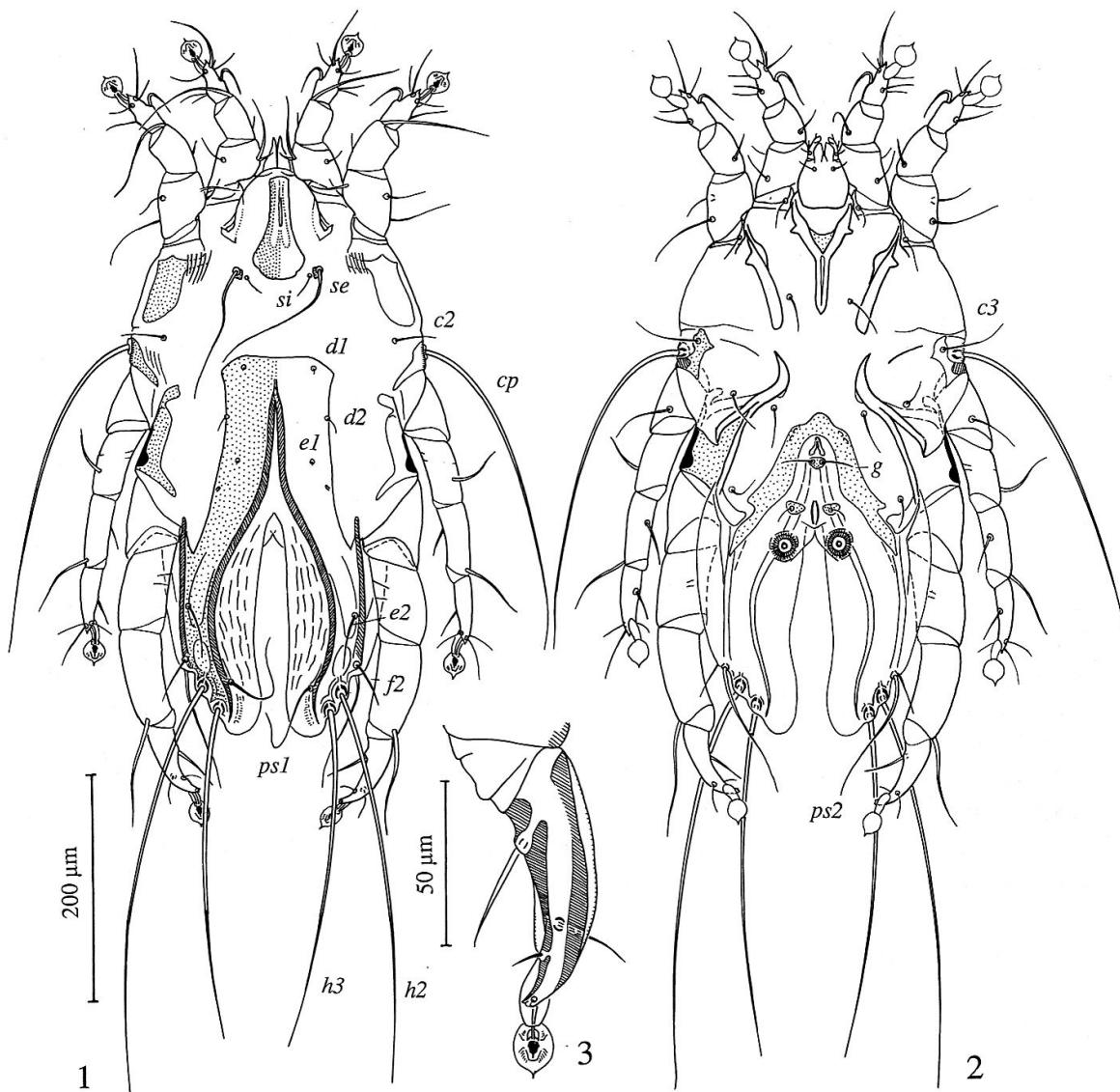
Analgoidea TROUSSERT & MEGNIN, 1884

Xolalgidae DUBININ, 1953

Analloptes buettikeri sp.n. (Figs 1–5)

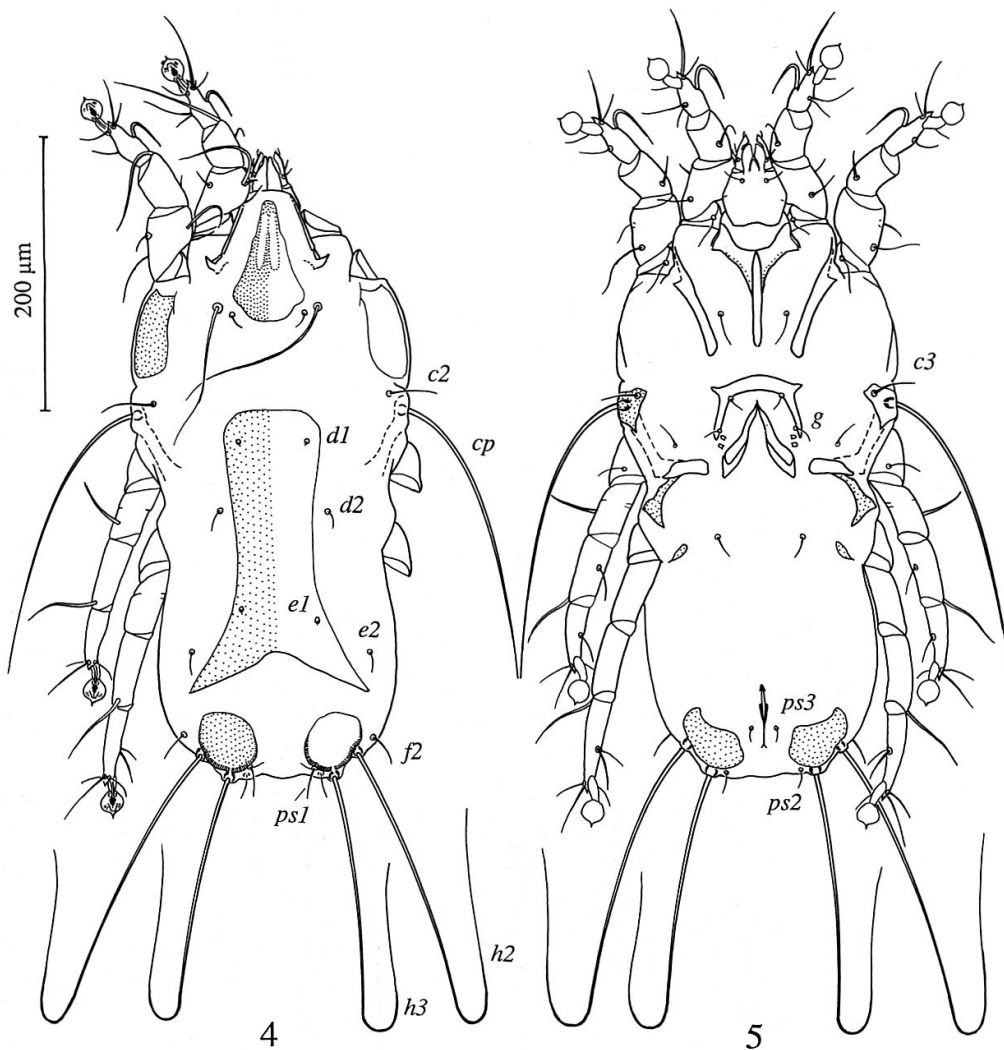
Material. Holotype ♂ (NHMB #698), paratypes 6 ♂♂, 6 ♀♀ from the Osprey *Pandion haliaetus* (Pandionidae), Wolfhalden, Appenzell 30.04.47.

Male (holotype). Length of idiosoma 488, width 239 (idiosomal size of paratypes 440–498 x 200–450). Prodorsal shield narrow, mace-shaped, enlarged in posterior part, length 84, width 50. Setae *se* disposed out of prodorsal shield, distance between them 72. Scapular shields developed on dorsal side only, not extending to ventral shield. Subhumeral setae *c3* hair-like, length about 70; humeral setae *cp* represented by macrochaetae, exceeding half the total body length. Hysteronotal shield not connected to lateral shields, length of hysteronotal shield from anterior margin to bases of setae *h3* 317, width at anterior margin 195. Dorsal setae *h1* absent. Posterior end of opisthosoma deeply bilobate, opisthosomal lobes long and slightly curved towards the medial line. Terminal cleft ovoid in shape, fused with long slit-like supranal concavity, anterior end of which extends to the level of trochanters III and almost divides hysteronotal shield along the median line (Fig. 1). Margin of



Figs 1–3. *Analloptes buettikeri* sp.n., male. 1 – dorsal view, 2 – ventral view, 3 – tarsus IV, dorsal view.

proper terminal cleft and lateral margins of opisthosomal lobes heavily sclerotized. Apical part of lobes carries 2 pairs of macrochaetae ($h2$, $h3$). Width of terminal cleft at widest point 103, distance between setae $h3$ 84. Setae $e2$ situated in the middle of lobes, setae $ps1$ positioned at level of setae $h2$. Margin of terminal cleft with wide entire interlobar membrane extending slightly beyond posterior apices of lobes. Dorsal surface of interlobar membrane with interrupted longitudinal striation. Incision in interlobar membrane wide and slit-like, length 194. Lateral membranes of lobes extending from their bases to setae $ps2$. Coxosternal skeleton of idiosoma is typical of the genus (Fig. 2). Genital apodems fused into big, arc-like structure. Genital arc length 19. Genital setae g close to one another, situated on small ovoid genital sclerite. Pseudanal setae $ps3$ situated on small oval adanal shields, distance between them less than between anal suckers. Legs IV hypertrophied, enlarged and thickened. Solenidion ϕ of tibiae III and IV slightly longer than respective tarsi. Legs IV extending by their tarsi beyond apices of opisthosomal lobes. Tarsus IV as in Fig. 3.



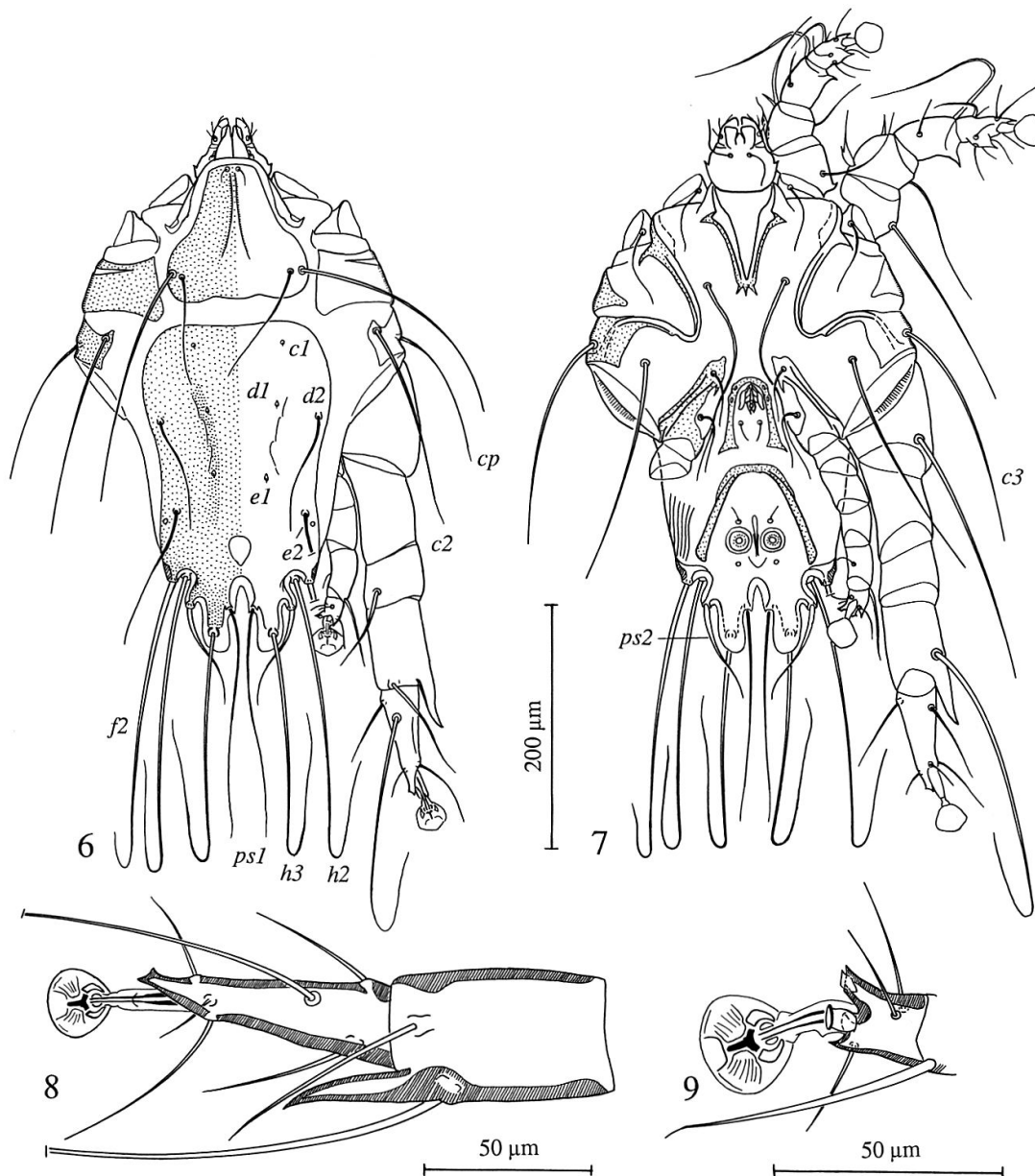
Figs 4–5. *Analloptes buettikeri* sp.n., female. 4 – dorsal view, 5 – ventral view.

Female (paratype). Length of idiosoma 425, width 192 (idiosomal size of other paratypes 405–425 x 170–195). Prodorsal shield pear-shaped, length 84, width 55, distance between setae *se* 72. Scapular shields developed on dorsal side only. Hysteronotal shield fish-tail-shaped, length 204, width 69 in anterior part, width 120 in posterior part, anterior margin convex, posterior margin with shallow triangular incision, depth 31 (Fig. 4). Setae *d2* and *e2* disposed out of hysteronotal shield. Setae *h1* absent. Setae *cp* represented by macrochaetae, setae *c3* hair-like, length about 38. Posterior end of opisthosoma with a pair of oval pygidial shields. These shields spread to ventral side of opisthosoma forming a pair of ventral opisthosomal shields (Fig. 5). Setae *ps1* situated on medioposterior margin of pygidial shields, separated by 38. Posterior margin of opisthosoma with two pairs of macrochaetae, *h2* and *h3*. Setae *ps2* disposed closer to one another than pair of setae *h3*. Epigynum as inverted U, with a pair of acute anterolateral processes, length 46, width 54. Genital suckers situated at level of posterior tips of epigynum.

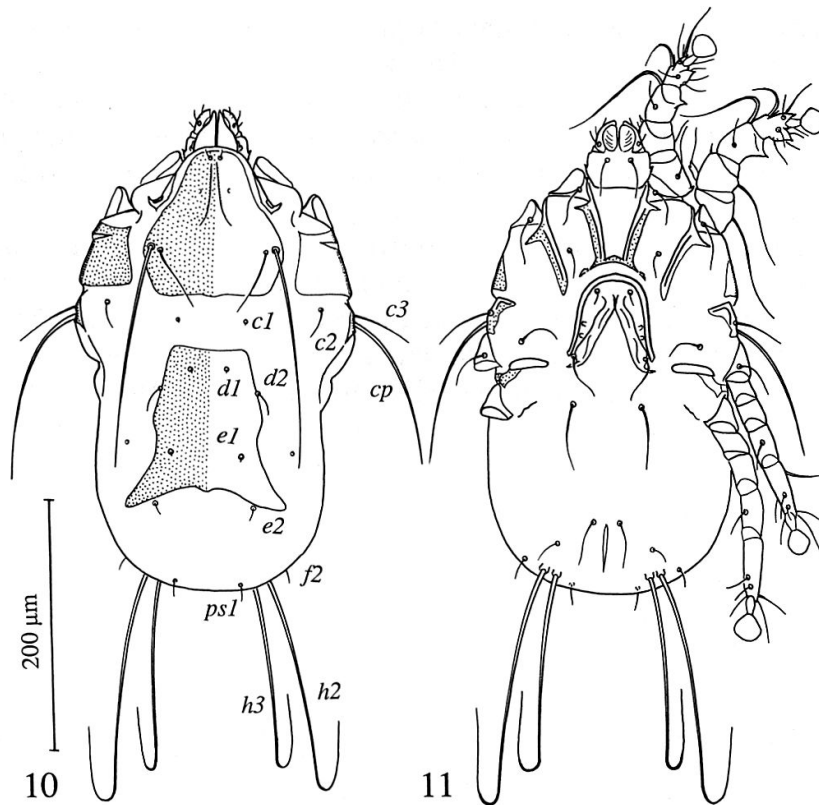
Differential diagnosis. The genus *Analloptes* TROUËSSART, 1885, includes 8 species (GAUD & ATYEO, 1981) associated with species of several orders of birds. The mites of the typical species group (3 species) are associated with Gruiformes

and Ciconiiformes, while another species group is distributed exclusively on the hornbills Bucerotidae (Coraciiformes). The new species *A. buettikeri* sp.n. was associated with a member of a new host order, the birds of prey (Falconiformes), but is most closely related to *A. megnini* TROUËSSART, 1885, belonging to the typical species group of the genus and associated with *Rallus aquaticus* (Gruiformes). Both sexes of *A. buettikeri* differ from *A. megnini* and also from other species of the genus by the absence of setae *hl*. Males of *A. buettikeri* are distinguished from *A. megnini* by the hysteronotal shield without a connection to lateral shields and by the narrow supranal concavity; females by the presence of paired pygidial shields, and by the positioning of setae *ps2* closer to one another than setae *h3*.

Etymology. The species name is dedicated to Prof. W. BÜTTIKER, the prominent entomologist and parasitologist.



Figs 6–9. *Mesalgoides pyrrhulinus* sp. n., male. 6 – dorsal view, 7 – ventral view, 8 – tarsus and tibia III, dorsal view, 9 – tarsus IV, dorsal view.



Figs 10–11. *Mesalgoides pyrrhulinus* sp. n., female. 10 – dorsal view, 11 – ventral view.

Psoroptoididae GAUD, 1958

Mesalgoides (s.str.) *pyrrhulinus* sp.n. (Figs 6–11)

Material. Holotype ♂ (NHMB # 3643), paratypes 10 ♂♂, 8 ♀♀ from the Bullfinch, *Pyrrhula pyrrhula* (Fringillidae) Rothenthurm 24.09.72, paratype 1 ♂ from the same host – Lauerz 28.09.72.

Male (holotype). Length of idiosoma 405, width of idiosoma 264 (idiosomal size of paratypes 390–420 x 250–290). Prodorsal shield pear-shaped, length 113, width 115, distance between setae *se* 103. Length of hysteronotal shield 273, width at anterior margin 156. Supranal concavity ovoid. Terminal cleft with ledge carrying setae *ps1*. Digit of opisthosomal lobe wide and short, terminal membrane on its tip widely rounded (Figs 6–7). Length of opisthosomal lobe from bottom of terminal cleft to apex of lobe (base of setae *h3*) 48, length of anterior part of cleft (bottom to setae *ps1*) 24, length of lobe digit 24, width of lobe at base (level of setae *ps2*) 40, width of lobar digit 24. Distance between setae: *ps2*–*ps2* 91, *ps1*–*ps1* 24, *h3*–*h3* 53, *g*–*g* 20, *g*–*ps3* 82, *ps3*–*ps3* 29. Epimeres I fused V-like, adanal apodems feebly fused at anterior tips. Length of lateral spur-like processus of tibia III 40, length of tarsus III 77 (Fig. 8). Legs IV extending by ambulacral disc to lobar apices (Fig. 9).

Female (paratype). Length of idiosoma 347, width of idiosoma 230 (idiosomal size of paratypes 345–375 x 230–245). Prodorsal shield as in male, 123 x 120, setae *se* separated by 109. Hysteronotal shield trapezoidal in form, with posterior angles acute, length 140, width 137 at posterior margin (Fig. 10). Dorsal setae *d1* equidistant from anterior margin of hysteronotal shield and level of setae *d2*. Distance between setae: *d1*–*d1* 34, *d2*–*d2* 89, *d1*–*d2* 20. Posterior tips of epimeres I convergent and connected by thin transversal sclerite. Epigynium as inverted U, 77

x 74 (Fig. 11). Legs IV extending by ambulacral disc beyond posterior margin of the body.

Differential diagnosis. The genus *Mesalgoides* GAUD & ATYEO, 1967, includes 17 species, which are distributed on passerines (Passeriformes) and woodpeckers (Piciformes). The majority of species are known from the tropics of the Old and New Worlds, with only 3 species recorded in Europe (CERNY, 1974). The new species is very similar to *M. megnini* (OUDEMANS, 1937). Males of *M. pyrrhulinus* differ from that species by having shorter opisthosomal lobe digits (about $\frac{1}{2}$ of total lobe length), and females are distinguished by the position of setae *dl* close to one another and anterior to the level of setae *d2*. In males of *M. megnini* the lobe digit is elongated (two times longer than wide), and is about $\frac{2}{3}$ of the total lobe length; in females setae *dl* are separated by 36–45 and disposed at the level of setae *d2*.

Etymology. The species name derives from the generic name of the host.

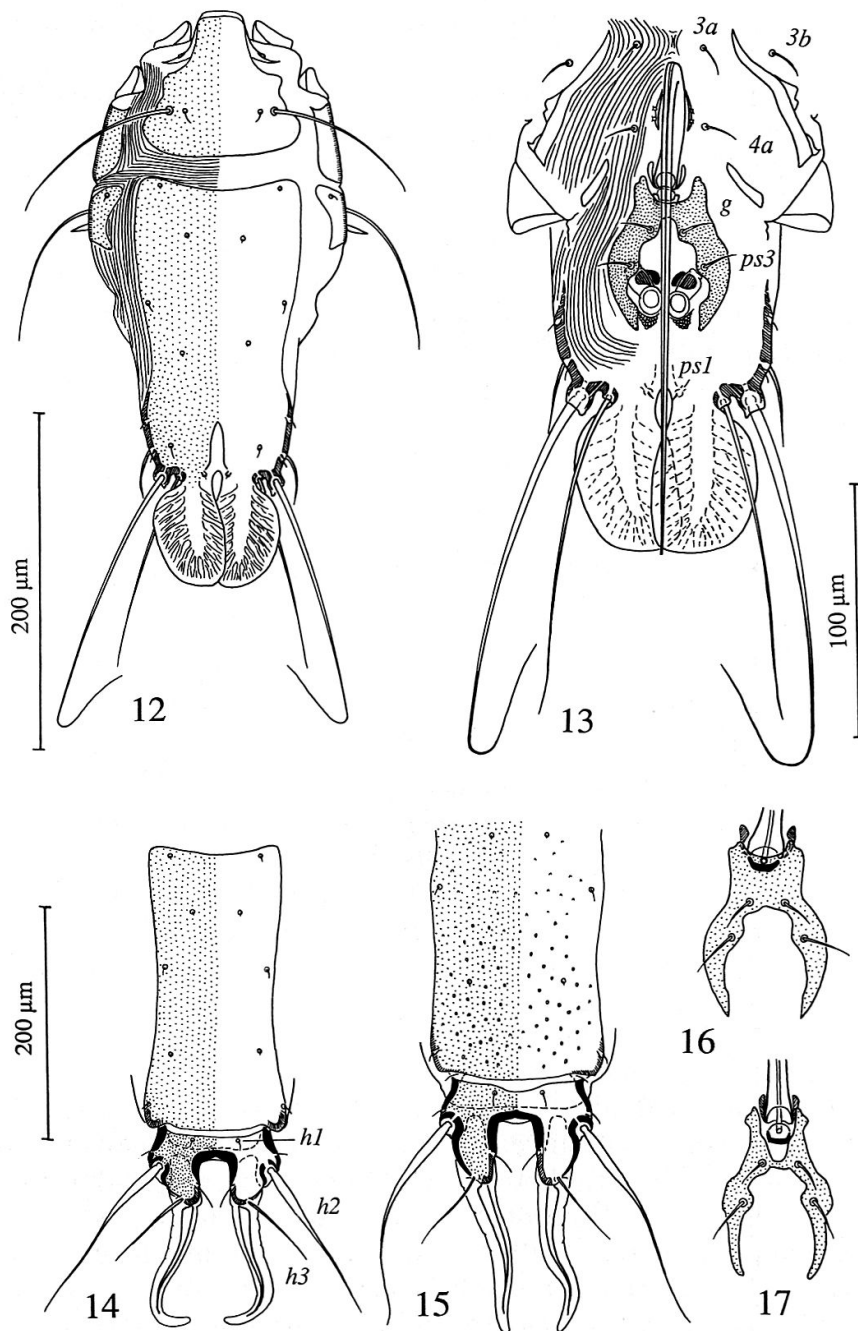
Proctophyllodidae MEGNIN & TROUËSSART, 1884

Proctophyllodes fuchsi sp. n. (Figs 12–14)

Material. Holotype ♂ (NHMB #1549) paratypes 7 ♂♂, 2 ♀♀ from the Hawfinch *Coccothraustes coccothraustes* (Fringillidae), Ibach 16.11.66, paratypes 8 ♀♀ from the same host, Ibach 10.11.67.

Male (holotype). Length of idiosoma excluding lamellae 273, width 137 (idiosomal size of paratypes 259–280 x 135–145). Prodorsal shield length 77, width 84, lateral margins entire, without lacunae. Distance between setae *se* 62. Humeral shields well developed, bearing setae *c2* at anteromedial angles. Subhumeral setae *c3* lanceolate, length 19.2, width 4.5. Hysteronotal shield length 173, width 85, anterior margin concave, without lacunae, without ventrolateral extensions, supranal concavity length 43 (Fig. 12). Lamellae ovoid, length 69, width 48 (in paratypes 63–77 x 43–48), internal margins slightly overlapping, with pennate venation on dorsal side. Epimeres I U-shaped, with thin connection, without lateral extensions. Epimeres without surface fields. Genital organ whip-like, organ reflexion at level of anterior articulation of legs III, tip extending to posterior margin of lamellae. Paragenital apodemes narrow, bearing both pairs of genital discs. Opisthogastric shield H-shaped, length 60, width 48 in posterior part, bearing two pairs of setae, anterior margin of the shield semicircular concave, posterior margin between setae *g* distinctly incised (Fig. 13). Distance from anterior ends of opisthogastric shield to setae *ps1* 89. Setae *g* and *4a* in trapezoidal arrangement, distance between setae: *g*–*g* 15, *g*–*ps3* 14, *ps3*–*ps3* 28. Anal suckers: length 22, width 9, with slightly asymmetrical apical ring, without indentation; posterior side of anal sucker pockets with small cellular sclerites. Reniform accessory glands present.

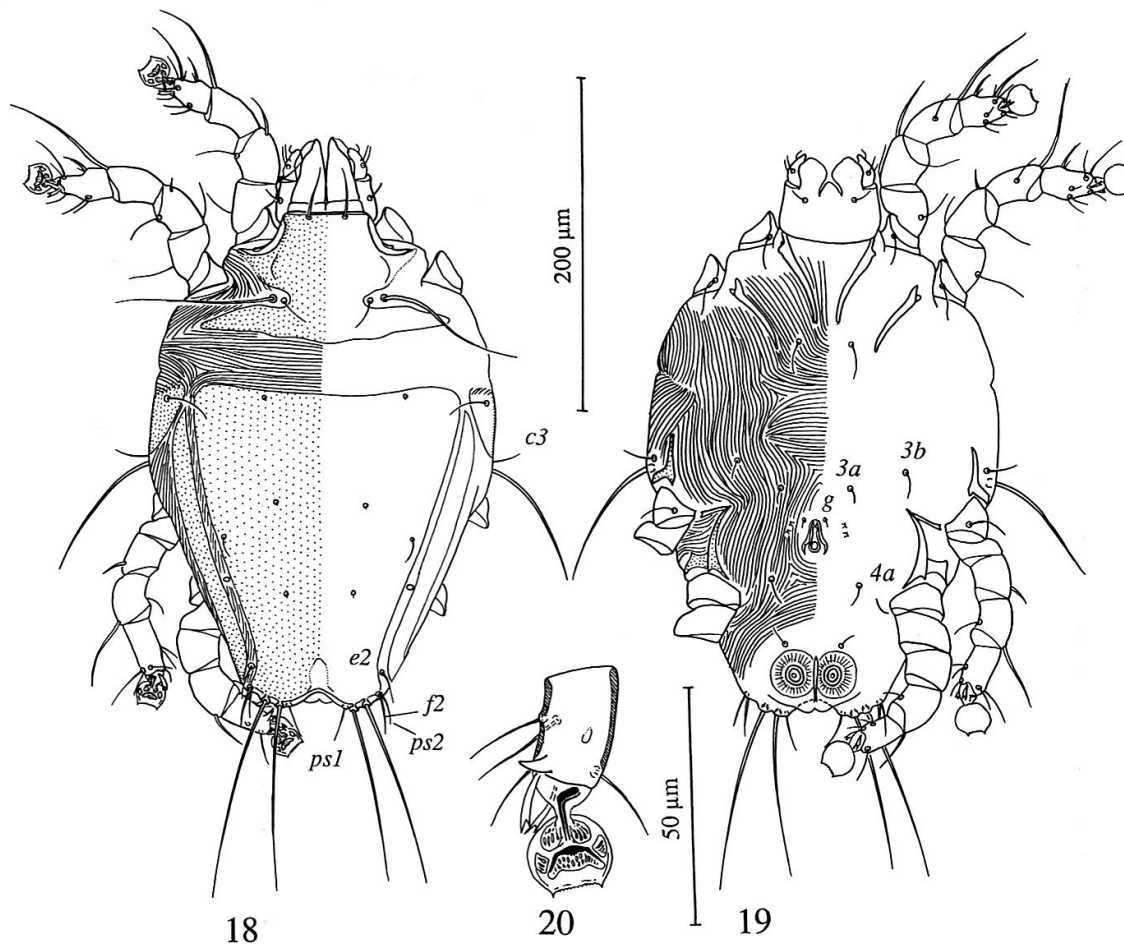
Female (paratype). Length of idiosoma excluding terminal appendages 430, width 173 (idiosomal size of other paratypes 390–432 x 151–173). Prodorsal shield length 105, width 120, lateral margins entire, without lacunae; distance between setae *se* 84. Humeral shields well developed, bearing setae *c2* at anteromedial angles. Subhumeral setae *c3* lanceolate, length 24, width 4.8. Hysterosoma with well developed opisthosomal lobes and terminal appendages; anterior hysteronotal shield length 224, width 115, with anterior margin shallow concave, without lacunae, or supranal concavity. Lobar region of opisthosoma distinctly separated from rest of hysterosoma by transversal furrow; length of lobar region 65, width at level of setae *h2* 108; setae *h1* inserted on anterior margin of lobar shield and separated by 33;



Figs 12–17. Mites of the genus *Proctophyllodes*. 12–14: *P. fuchsi* sp.n. 12 – male, dorsal view, 13 – male, ventral view of hysterosoma, 14 – female, hysteronotal shield. 15 – *P. glandarinus*, hysteronotal shield of female. 16 – *P. glandarinus*, opisthogastral shield of male. 17 – *P. simillimus*, opisthogastral shield of male.

lobes short, terminal cleft parallel-sided or slightly divergent posteriorly, 38 in length, 30 in width (in other paratypes 36–41 x 26–31); setae *h3* about $\frac{2}{3}$ length of terminal appendages (Fig. 14). Epimeres I U-shaped, with thin connection, without lateral extensions, epimeres without surface fields.

Differential diagnosis. The genus *Proctophyllodes* ROBIN, 1868, is the most numerous genus of feather mites and includes about 150 species. The recent revision subdivided this genus into 10 species groups based mainly on the structure of the genital apparatus in males (ATYEO & BRAASCH, 1966). The new species belongs



Figs 18–20. *Pseudolichus phasiani* sp.n., male. 18 – dorsal view, 19 – ventral view, 20 – tarsus IV, dorsal view.

to the species group “*glandarinus*”, which is characterized by a very long, whip-like aedeagus and H-shaped opisthogastric shield, and is most similar to such species as *P. glandarinus* (KOCH, 1841) from the Jay *Garrulus glandarius*, and *P. similimus* CERNY, 1971, from the Bullfinch, *Pyrrhula pyrrhula*. The males of *P. fuchsi* differ from *P. glandarinus* by the distinct incision in the posterior margin of the opisthogastric shield between setae *g* (Fig. 13), and by the shorter distance from the anterior end of this shield to setae *ps1* (88–93). Females differ from that species by the absence of any distinct lacunae in the anterior hysteronotal shield. In males of *P. glandarinus* the incision in the opisthogastric shield margin between setae *g* is commonly absent (Fig. 16) and the distance from the anterior end of this shield to setae *ps1* varies between 96 and 100; in females the caudal part of the anterior hysteronotal shield always has many small rounded lacunae (Fig. 15). The males of *P. fuchsi* are easily distinguished from *P. similimus* by the semicircular anterior margin of the opisthogastric shield, and females differ by the insertion of setae *hl* on the anterior margin of lobar shield. Males of *P. similimus* have a deep ovoid incision on the anterior margin of opisthogastric shield (Fig. 17) and females have setae *hl* on striated tegument between the anterior hysteronotal and lobar shields.

Etymology. The species is dedicated to Mr. W. FUCHS, the prominent Swiss ornithologist and conservationist who collected the majority of the feather mites studied in this collection.

Pterolichoidea GAUD & ATYEO, 1978

Pterolichidae TROUËSSART & MEGNIN, 1883

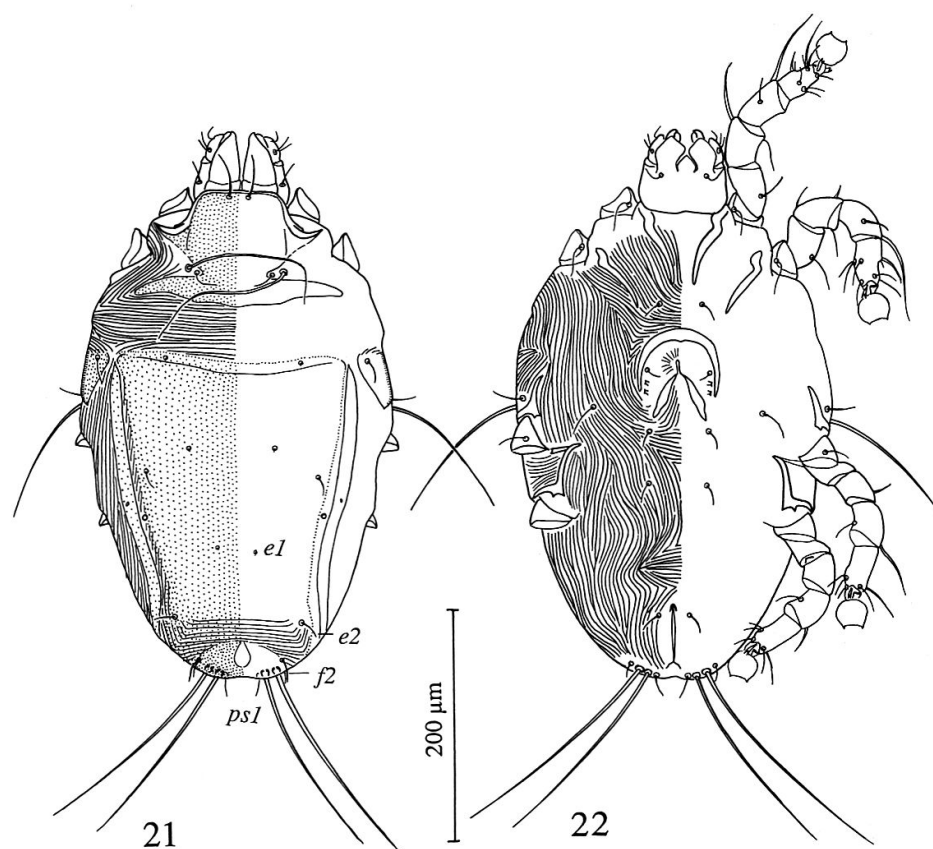
Pseudolichus phasiani sp.n. (Figs 18–22)

Material. Holotype ♂ (NHMB # 3756), paratypes 35 ♂♂, 50 ♀♀ from the Common Pheasant, *Phasianus colchicus* (Phasianidae), Königsdorf (Germany) 9.11.72.

Male (holotype). Idiosoma widely ovoid, length 303, width 207 (idiosomal size of paratypes 285–310 x 195–220). Prodorsal shield length 82, width 142, lateral margins with deep incision around setae *si* and *se*; distance between setae *se* 69. Length of subhumeral setae *c3* 26. Hysteronotal shield almost trapezoidal in form, length 185, width 158 at anterior part; anterior margin slightly concave; lateral margins almost straight in anterior part and shallowly concave at level of setae *e2* (Fig. 18). Hysteronotal shield separated from lateral shields by narrow bands of striated tegument. Opisthosoma with shallow terminal cleft, length about 7, with blunt, rounded opisthosomal lobes; distance between setae: *ps1-ps1* 31, *h2-h2* 60, *f2-f2* 74. Setae *h1* absent. Genital apparatus situated at level of posterior margin of trochanters III. Setae *g* positioned at level of genital arc apex (Fig. 19). Distances between genital and coxal setae: *3a-3b* 12, *3a-g* 19, *g-4a* 36. Adanal apodems absent. Length of setae: *ps1* 24, *ps2* 22. Length of tarsus I 24, tibia I 33, tarsus IV 26. Tarsus IV with straight ventral claw (Fig. 20).

Female (paratype). Idiosoma length 400, width 254 (idiosomal size of other paratypes 385–420 x 240–260). Prodorsal shield as in male, 91 x 173, distance between *se* 82. Length of setae *c3* 31. Hysteronotal shield with anterior margin slightly concave, extending to posterior end of the body, demarked into anterior part and pygidial part by band of transversal striation posterior to setae *e2* (Fig. 21); total length of hysteronotal shield from anterior margin to posterior end of body 259, width 180. Setae *h1* absent. Lateral shields separated from hysteronotal shield by narrow bands of striated tegument. Distance between setae: *f2-f2* 65, *e2-f2* 32, *h3-h3* 38, *ps1-ps1* 24. Epigynium horseshoe-shaped, 48 x 69 (Fig. 22). Legs IV extending by ambulacral disc beyond the posterior margin of opisthosoma. Tarsus IV length 46.

Differential diagnosis. The genus *Pseudolichus* GAUD & ATYEO, 1992, was established when the genus *Pterolichus* ROBIN, 1868, the basic genus of the family, was partly revised and some of its species were transferred into several new genera (GAUD & ATYEO, 1992). The new species *P. phasiani*, the second species of the genus, differs from *P. solutocurtus* by the absence of setae *h1* and by the position of lateral shields close to lateral margins of the hysteronotal shield in both sexes. Males of *P. phasiani* are also distinguished from *P. solutocurtus* by shallowly concave lateral margins on the hysteronotal shield, by a distinct terminal cleft, and by the absence of adanal apodems. Females of the new species differ by the long hysteronotal shield extending to the end of the body, and by the position of setae *f2* on the pygidial part of the shield far from setae *e2* (Fig. 21). In both sexes of *P. solutocurtus* setae *h1* are always present, and the width of striated tegument bands between lateral and hysteronotal shields is greater than the width of the lateral shields. In males, the lateral margins of the hysteronotal shield are strongly concave, the terminal cleft and opisthosomal lobes are almost indistinct, and the adanal apodems are well developed, with three teeth on their medial tips. In females, the



Figs 21–22. *Pseudolichus phasianii* sp.n., female. 21– dorsal view, 22 – ventral view.

hysteronotal shield is completely divided into anterior and pygidial parts by the wide zone of striated tegument, thus the anterior hysteronotal part does not extend even to setae *e1*; setae *f2* are positioned on striated tegument closely to setae *e2*.

Etymology. The species name derives from the generic name of the host.

Kramerellidae GAUD & MOUCHET, 1967

Petitota haenggii sp.n. (Figs 23–28)

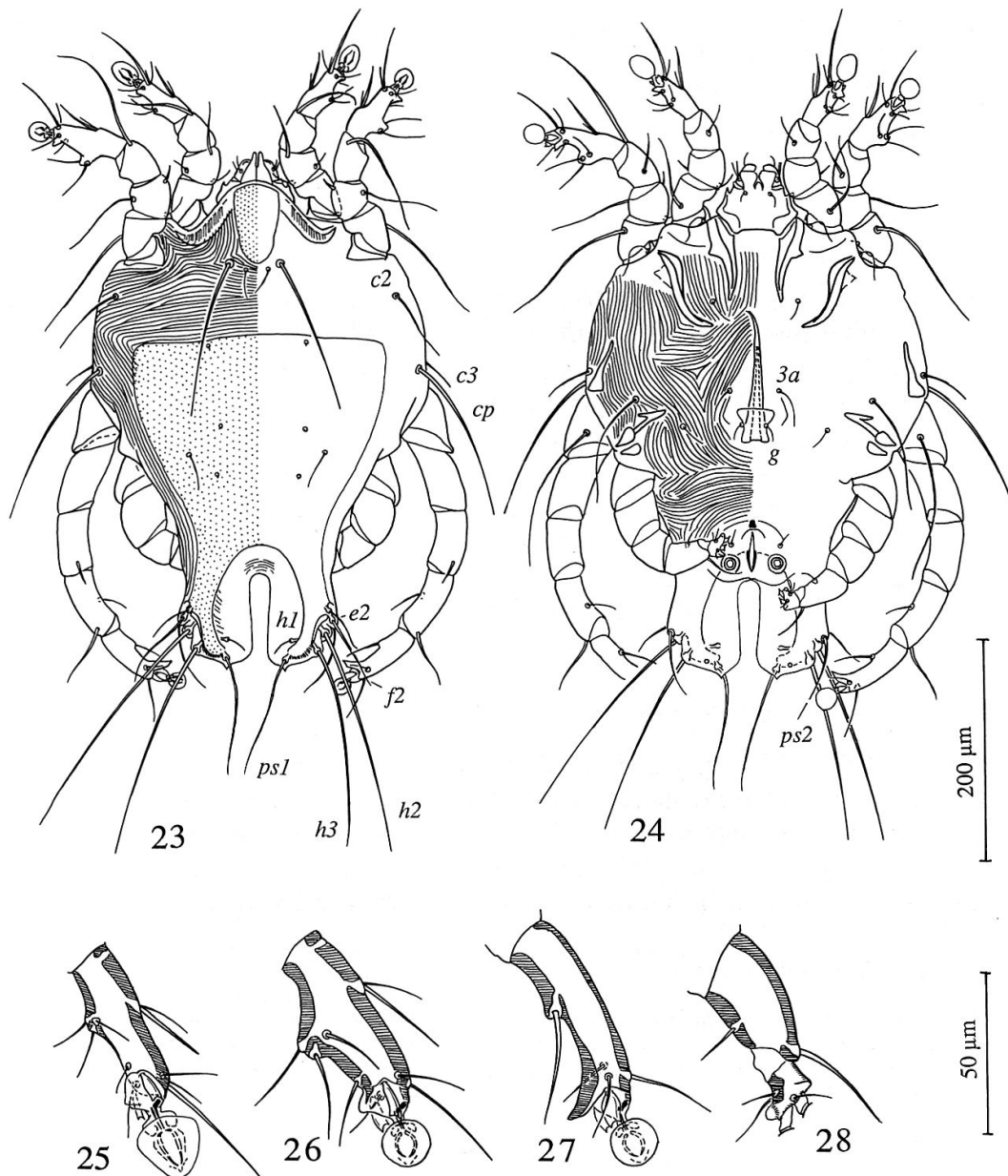
Material. Holotype ♂ (NHMB # 5407), paratypes 5 ♂♂ from the Tengmalm's Owl, *Aegolius funereus* (Strigidae), railway between St. Moritz and Chur 3.12.74.

Male (holotype). Length of idiosoma 416, width 288 (idiosomal size of paratypes 405–435 x 260–293). Prodorsal shield as small plate with parallel lateral margins and rounded posterior end, almost extending to level of scapular setae but not encompassing them. Distance between scapular setae *se* 43. Humeral shields not developed on dorsal side of idiosoma, scapular shields absent. Hysteronotal shield length 284 (from anterior margin to base of setae *ps1*), width 234, anterior margin almost straight. Terminal cleft ovoid in form, length 101, width 78 (96–105 x 75–89 in paratypes), with entire interlobar membrane extending onto apices of lobes (Fig. 23). Length of narrow triangular incision in interlobar membrane 77. Setae *c2*^{1/2} length of setae *cp*. Bases of epimeres I and II not connected by sclerotized bar. Base of genital apparatus situated at level of trochanters III. Genital apparatus as a long narrow cone with thin acute apex, length 115 (112–122 in paratypes), width 22 at base

Tab. 1. List of feather mites and their host species recorded in Switzerland

Analgidae	
<i>Analges (s.str.) bidentatus</i>	– <i>Prunella modularis</i>
<i>Analges (s.str.) corvinus</i>	– <i>Pica pica</i>
<i>Analges (s.str.) macropus</i>	– <i>Pyrrhula pyrrhula</i>
<i>Analges (s.str.) spiniger</i>	– <i>Phylloscopus trochilus</i>
	– <i>Phylloscopus sibilatrix</i>
	– <i>Sylvia atricapilla</i>
<i>Analges (s.str.) sturninus</i>	– <i>Sturnus vulgaris</i>
<i>Analges (s.str.) tridentulatus</i>	– <i>Alauda arvensis</i>
<i>Analges (Analgopsis) anthi</i>	– <i>Anthus spinoletta</i>
<i>Analges (Analgopsis) passerinus</i>	– <i>Fringilla coelebs</i>
	– <i>Fringilla montifringilla</i>
<i>Megninia gynglymura</i>	– <i>Phasianus colchicus</i>
<i>Metanalges (s.str.) grossus</i>	– <i>Gallinula chloropus</i>
<i>Metanalges (s.str.) rallorum</i>	– <i>Rallus aquaticus</i>
<i>Strelkoviacarus quadratus</i>	– <i>Sylvia atricapilla</i>
	– <i>Parus major</i>
	– <i>Parus caeruleus</i>
	– <i>Passer domesticus</i>
Xolagidae	
<i>Alloptes buettikeri</i>	– <i>Pandion haliaetus</i>
Psoroptoididae	
<i>Mesalgoides (s.str.) megnini</i>	– <i>Carduelis chloris</i>
<i>Mesalgoides (s.str.) pyrrhulinus</i>	– <i>Pyrrhula pyrrhula</i>
<i>Mesalgoides (Picalgoides) picimajoris</i>	– <i>Dendrocopos major</i>
	– <i>Picus viridis</i>
	– <i>Dryocopus martius</i>
Alloptidae	
<i>Alloptes oxylobus</i>	– <i>Larus ridibundus</i>
<i>Brephosceles anatina</i>	– <i>Anas platyrhynchos</i>
Avenzoariidae	
<i>Bonnetella fusca</i>	– <i>Pandion haliaetus</i>
Pteronyssidae	
<i>Parapteronyssus brevipes</i>	– <i>Dendrocopos major</i>
<i>Parapteronyssus robini</i>	– <i>Picus viridis</i>
<i>Pteronyssoides striatus</i>	– <i>Fringilla coelebs</i>
<i>Pteronyssoides parinus</i>	– <i>Parus caeruleus</i>
<i>Pteronyssus pici</i>	– <i>Dendrocopos major</i>
<i>Scutulanysus delichonum</i>	– <i>Delichon urbica</i>
<i>Scutulanysus hirundicola</i>	– <i>Hirundo rustica</i>
<i>Scutulanysus obscurus</i>	– <i>Delichon urbica</i>
	– <i>Hirundo rustica</i>
<i>Sturnotrogus truncatus</i>	– <i>Sturnus vulgaris</i>
Trouessartiidae	
<i>Trouessartia bifurcata</i>	– <i>Sylvia atricapilla</i>
<i>Trouessartia corvina</i>	– <i>Corvus corone</i>
<i>Trouessartia kratochvili</i>	– <i>Locustella luscinioides</i>
	– <i>Locustella naevia</i>
<i>Trouessartia microcaudata</i>	– <i>Hirundo rustica</i>
<i>Trouessartia rosterii</i>	– <i>Sturnus vulgaris</i>
<i>Trouessartia rubecula</i>	– <i>Erithacus rubecula</i>
<i>Trouessartia trouessarti</i>	– <i>Acrocephalus arundinaceus</i>
	– <i>Acrocephalus palustris</i>
	– <i>Acrocephalus scirpaceus</i>
Proctophyllodidae	
<i>Joubertophyllodes modularis</i>	– <i>Prunella modularis</i>
<i>Monojoubertia hemiphylla</i>	– <i>Fringilla montifringilla</i>
<i>Monojoubertia microphylla</i>	– <i>Fringilla coelebs</i>
<i>Alaudicola bilobata</i>	– <i>Alauda arvensis</i>
<i>Montesauria cylindrica</i>	– <i>Corvus corone</i>
<i>Proctophyllodes anthi</i>	– <i>Anthus trivialis</i>
	– <i>Anthus pratensis</i>
	– <i>Jynx torquilla</i>
<i>Proctophyllodes ateri</i>	– <i>Parus ater</i>
<i>Proctophyllodes buettikeri</i>	– <i>Pyrrhocorax graculus</i>
<i>Proctophyllodes caulifer</i>	– <i>Luscinia svecica</i>
<i>Proctophyllodes ciae</i>	– <i>Emberiza citrinella</i>
	– <i>Emberiza cia</i>

<i>Proctophyllodes clavatus</i>	– <i>Sylvia borin</i>
	– <i>Sylvia curruca</i>
<i>Proctophyllodes cotyledon</i>	– <i>Acrocephalus schoenobaenus</i>
<i>Proctophyllodes detruncatus</i>	– <i>Phoenicurus ochruros</i>
<i>Proctophyllodes doleophyes</i>	– <i>Corvus corone</i>
	– <i>Phylloscopus trochilus</i>
	– <i>Phylloscopus sibilatrix</i>
	– <i>Ficedula hypoleuca</i>
	– <i>Luscinia megarhynchos</i>
<i>Proctophyllodes emberizae</i>	– <i>Emberiza hortulana</i>
<i>Proctophyllodes euryurus</i>	– <i>Alauda arvensis</i>
<i>Proctophyllodes fuchsi</i>	– <i>Coccothraustes coccothraustes</i>
<i>Proctophyllodes glandarinus</i>	– <i>Garrulus glandarius</i>
<i>Proctophyllodes hipposideros</i>	– <i>Saxicola rubetra</i>
	– <i>Phoenicurus ochruros</i>
<i>Proctophyllodes leptocaulus</i>	– <i>Lanius collurio</i>
<i>Proctophyllodes megaphyllus</i>	– <i>Prunella modularis</i>
<i>Proctophyllodes motacillae</i>	– <i>Motacilla alba</i>
	– <i>Motacilla flava</i>
<i>Proctophyllodes musicus</i>	– <i>Turdus merula</i>
	– <i>Turdus philomelos</i>
	– <i>Turdus pilaris</i>
	– <i>Turdus torquatus</i>
<i>Proctophyllodes picae</i>	– <i>Pica pica</i>
<i>Proctophyllodes pinnatus</i>	– <i>Carduelis carduelis</i>
	– <i>Carduelis chloris</i>
	– <i>Carduelis cannabina</i>
	– <i>Serinus serinus</i>
<i>Proctophyllodes reguli</i>	– <i>Regulus ignicapillus</i>
<i>Proctophyllodes rubeculinus</i>	– <i>Erithacus rubecula</i>
<i>Proctophyllodes schoeniculi</i>	– <i>Emberiza schoeniclus</i>
<i>Proctophyllodes schwerinensis</i>	– <i>Anthus spinoletta</i>
<i>Proctophyllodes serini</i>	– <i>Serinus serinus</i>
<i>Proctophyllodes similimus</i>	– <i>Pyrrhula pyrrhula</i>
<i>Proctophyllodes spini</i>	– <i>Carduelis spinus</i>
<i>Proctophyllodes stylifer</i>	– <i>Parus major</i>
	– <i>Parus caeruleus</i>
	– <i>Parus palustris</i>
<i>Proctophyllodes sylviae</i>	– <i>Sylvia atricapilla</i>
<i>Proctophyllodes tenericaulus</i>	– <i>Turdus viscivorus</i>
<i>Proctophyllodes truncatus</i>	– <i>Passer domesticus</i>
	– <i>Passer montanus</i>
<i>Proctophyllodes vassilevi</i>	– <i>Acrocephalus scirpaceus</i>
	– <i>Acrocephalus palustris</i>
<i>Proctophyllodes vitzthumi</i>	– <i>Sitta europaea</i>
<i>Pterodectes rutilus</i>	– <i>Hirundo rustica</i>
Pterolichidae	
<i>Grallolichus dubinini</i>	– <i>Gallinula chloropus</i>
<i>Pseudolichus solutocurtus</i>	– <i>Perdix perdix</i>
<i>Pseudolichus phasiani</i>	– <i>Phasianus colchicus</i>
<i>Tetraolichus gaudi</i>	– <i>Tetrao tetrix</i>
<i>Xoloptes claudicans</i>	– <i>Coturnix coturnix</i>
Gabuciniidae	
<i>Gabucinia delibata</i>	– <i>Corvus corone</i>
<i>Hieracolichus nisi</i>	– <i>Accipiter nisus</i>
Falculiferidae	
<i>Falculifer rostratus</i>	– <i>Columba palumbus</i>
Eustathiidae	
<i>Chauliacea securigera</i>	– <i>Apus apus</i>
<i>Eustathia cultrifera</i>	– <i>Apus apus</i>
<i>Neochauliacia minuscula</i>	– <i>Apus apus</i>
Kramerellidae	
<i>Kramerella mrciaki</i>	– <i>Aegolius funereus</i>
<i>Petitota haenggii</i>	– <i>Aegolius funereus</i>
Ptiloxenidae	
<i>Ptiloxenus major</i>	– <i>Podiceps cristatus</i>
Freyanidae	
<i>Freyana anatina</i>	– <i>Anas platyrhynchos</i>
<i>Freyana nyrocae</i>	– <i>Aythya ferina</i>
	– <i>Aythya fuligula</i>
	– <i>Aythya marila</i>



Figs 23–28. *Petitota haenggii* sp.n. male. 23 – dorsal view, 24 – ventral view, 25–27 – tarsi I – III respectively, 28 – tibia and tarsus IV.

(Fig. 24). Ambulacra of tarsi I 1.5 times longer than ambulacra of tarsi II and III. Legs III extending by distal half of tarsus beyond apices of opisthosomal lobes. Tarsi IV with ambulacra reduced to small hemispheres, with two ventral setae (Figs 25–28). Female unknown.

Differential diagnosis. The genus *Petitota* GAUD & MOUCHET, 1959, included only two species as follows: *P. aluconis* (BUCHHOLZ, 1869) from the Eurasian Tawny Owl, *Strix aluco* and *P. bubonis* (ATYEO & PHILIPS, 1984) from the Great Horned Owl, *Bubo virginianus* (ATYEO & PHILIPS, 1984). The new species is most closely related to *P. aluconis*, but is easily distinguished by the longer genital apparatus, relatively shorter legs III, and ovoid terminal cleft. In males of *P. aluconis* the genital apparatus is about 75–80 in length, legs III extend beyond lobar apices by the tarsus and part of tibia, the length and width of terminal cleft are approximately equal.

Etymology. The species is dedicated to Dr. A. HÄNGGI, head of the Zoology Department, Natural History Museum, Basel.

TAXONOMICAL REMARKS

Mesalgoides (s.str.) *megnini* (OUDEMANS, 1937) comb. nov.

This species is the type species of the genus *Mesalgoides* GAUD & ATYEO, 1967. However, it was discovered and described for the first time by ROBIN & MEGNIN (1877) under the name "*Dermaleichus oscinum* KOCH, 1841" based on material from the Greenfinch, *Carduelis chloris*. Meanwhile, the true *D. oscinum* KOCH was described from the White Wagtail, *Motacilla alba* (Motacillidae), and actually belongs to the family Analgidae. This misidentification was repeated by the majority of subsequent authors. Under the name "*D. oscinum* KOCH" (sensu ROBIN & MEGNIN, non KOCH) this species was even declared (GAUD & ATYEO, 1967) as the type species of the genus *Mesalgoides*. Only OUDEMANS (1937) had recognized the error of ROBIN & MEGNIN and proposed the new name for this species – *Dimorphus megnini* (by original designation), but his paper has been missed by the majority of recent experts.

Proctophyllodes ciae BAUER, 1939

BAUER (1939) originally described this species from the Rock Bunting, *Emberiza cia*. However, this mite species was missed in the recent revision of the genus *Proctophyllodes* (ATYEO & BRAASCH, 1966). Therefore, it is quite probable that the records of *P. miliariae* GAUD, 1953, on such buntings as *E. citrinella*, *E. cia* and *E. hortulana* actually represent the records of *P. ciae* on these birds.

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ZUSAMMENFASSUNG

Folgende fünf Federmilbenarten, die auf Vögeln aus der Schweiz vorkommen, werden beschrieben: *Analloptes buettikeri* sp. n. (Xolalgidae) auf dem Fischadler *Pandion haliaetus*; *Mesalgoides pyrrhulinus* sp. n. (Psoroptoididae) auf dem Gimpel *Pyrrhula pyrrhula*; *Proctophyllodes fuchsi* sp. n. (Proctophylloidae) auf dem Kernbeisser *Coccothraustes coccothraustes*; *Pseudolichus phasiani* sp. n. (Pterolichidae) auf dem Fasan *Phasianus colchicus*; *Petitota haenggii* sp. n. (Kramerellidae) auf dem Raufusskauz *Aegolius funereus*. Die Arbeit enthält auch eine Liste der schweizerischen Federmilben mit ihren Wirtsarten.

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