

THE IDENTITY OF *PTEROLICHUS OBTUSUS* ROBIN, 1877 WITH DESCRIPTIONS OF NEW GENERA AND SPECIES OF FEATHER MITES (ACARINA, PTEROLICHIDAE) FROM THE GALLIFORMES (AVES).¹

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TAXONOMY
FEATHER
MITES

ABSTRACT : Several unnamed genera are confused under the name *Pterolichus* Robin. Four of these and their type species are (re)described : *Pterolichus* Robin, type species *P. obtusus* Robin from *Gallus gallus* (Phasianidae); *Pseudolichus* n. g., type species *Pterolichus solutocurtus* Dubinin from *Alectoris graeca* (Phasianidae); *Tetraolichus cupido* n. g., n. sp. from *Tympanuchus cupido* (Tetraonidae); and *Contolichus* n. g., type species *Pterolichus latus* Černý, from *Meleagris gallopavo* (Meleagrididae).

TAXONOMIE
SARCOPTIDES
PLUMICOLES

RÉSUMÉ : Sous le nom de *Pterolichus* ont été confondus jusqu'ici plusieurs genres d'acariens plumicoles parasites de Galliformes. Nous définissons ici quatre de ces genres : *Pterolichus* Robin, avec pour type *Pterolichus obtusus* Robin ex *Gallus gallus*; *Pseudolichus* n. g., avec pour type *Pterolichus solutocurtus* Dubinin, ex *Alectoris graeca*; *Tetraolichus* n. g., avec pour type *T. cupido* n. sp., ex *Tympanuchus cupido*; et *Contolichus* n. g., avec pour type *Pterolichus latus* Černý.

Since GAUD (1965) studied the feather mites of african Galliformes, we have been aware of the superabundance and heterogeneity of the species united under the generic names *Pterolichus* Robin and *Pseudalloptes* Trouessart (see DUBININ, 1956; GAUD, 1965 for examples). Establishing meaningful divisions in this disparate assemblage is the subject of an ongoing study; between named and new species, a series of new genera will eventually be recognized.

From the beginning, we have been faced with a major difficulty : *Pterolichus obtusus* is the type species for *Pterolichus*, but the identity of this species is uncertain. ROBIN (1877) described the

species with two varieties, one from *Perdix perdix* L. [*perdix grise* = partridge = *Perdix* (or *Starna*) *cinerea* Bonaparte = *Starna damascena* Gmelin] and *Alectoris rufa* L. (*perdix rouge* = red-legged partridge = *Perdix rubra* Temm.), and the other from *Gallus gallus* "domesticus" (poule ordinaire = domestic chicken), and many diverse phaesants of avaries. ROBIN obviously considered the two varieties as conspecific as he illustrated a male and female from the chicken to represent the species. Today we know that these two varieties are in fact two distinct species, each representing a different genus.

Later usage of the name *Pterolichus obtusus* has

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not clarified the question. MÉGNIN (1892) named ROBIN's variety (i.e., from chicken) as *Pterolichus obtusus* var. *galli* from various varieties of fowl and pheasants raised in captivity. However, he figured and described a species of Epidermoptidae (Analgoidea). The same figures, used by NEUMANN (1909), were identified as *Epidermoptes bilobatus*.

Most authors have listed *Alectoris rufa* (= *Perdix rubra*) as the type host of *P. obtusus* (e.g., CANESTRINI and KRAMER, 1899; TROUESSART, 1915; VITZTHUM, 1929), while on the other hand, most identifiable illustrations and photographs of *Pterolichus obtusus* represent the ROBIN's variety from chickens (e.g., HIRST, 1922, figs. 23, 24; VITZTHUM, 1929, figs. 105, 106; SUGIMOTO, 1940, Pl. IV, figs. D1-3; KASHULA and STEVENS, 1947, Pl. I, figs. 1-3).

Only BERLESE (1888) figured the proper variety from *Perdix* which he named *Pterolichus obtusus* var. *curtus*. DUBININ (1956) elevated the variety to species rank under the name *Pterolichus solutocurtus* (nom. nov. for *P. curtus* preocc.), thereby clarifying the status of one ROBIN's varieties. However, he added to the confusion of the identity of *P. obtusus* by giving a bewildering list of hosts for this species, namely the previously listed partridges, chickens and pheasants, and many new hosts, notably turkeys and many species of Tetraonidae. DUBININ stressed that *P. obtusus* was very variable (e.g., DUBININ, 1956, fig. 19); this variation was explained as changes necessary to correspond to specific conditions of new hosts as the mites transferred from host to host (DUBININ, 1956, p. 87). DUBININ's concept of *obtusus* differs markedly from that of ROBIN; we believe DUBININ's *obtusus* represents an unnamed species complex from the Tetraonidae.

In the veterinary literature after 1956, many authors have included figures which are recognizable as the *Pterolichus obtusus* from chickens. For examples, LALITHA and ALWAR (1960, fig. 3), India; ROVEDA and BOERO (1962, fig. 16), Argentina; MANUEL and SIORES (1967, figs. 1, 2), Philippines; and OBA *et al.* (1978, unnumbered figures), in industrial flocks in Brazil. Besides chickens, domesticated turkeys have been cited as hosts of *Pterolichus obtusus* (e.g., LALITHA and ALWAR, 1960; PUTATUNDA *et al.*, 1981).

To clarify this confused situation, to fix the identity of *Pterolichus obtusus*, to determine the host(s) of this species, and to define which other mites have been confused with *P. obtusus*, we have examined feather mites from numerous Galliformes:

1) Domestic chickens from Europe (France, Czechoslovakia, Poland), Africa (Morocco, Cameroon, Senegal, Ivory Coast), Asia (China, India, Vietnam, Philippines, Bali), Americas (Honduras, Puerto Rico, Venezuela), and Oceania (New Caledonia, Mariannas).

2) Museum skins of wild chickens from the regions of origin, Java (*Gallus gallus bankiva* Temminck), Assam (*G. g. murghi* Robinson and Kloss), and Laos (*G. g. jabouillei* Delacour & Kinnear).

3) Partridges: *Perdix perdix* (Belgium, France, Holland), *Alectoris rufa* (France), and *Alectoris barbara* (Reichenow) (Morocco).

4) Turkeys: domestic and wild *Meleagris gallopavo* (United States) and Museum study skins (Mexico); and *Agriocharis ocellata* (Cuvier), Study skins (Mexico).

5) Museum study skins of grouse: *Bonasa umbellus* (L.) (USA), *Canachites canadensis* (L.) (Alaska), *Falcapennis falcapennis* (Hartlaub) (USSR), *Lagopus leucurus* (Richardson) (USA), *Lyrurus miokosiewiczzi* (Taczanowski) (USSR), *Pedioectes phasianellus* (L.) (Canada), *Tetrastes bonasia* (L.) (USSR), and *Tympanuchus cupido* (L.) (USA).

In addition to *Pterygocrusolichus chanayi* (Trouessart), known from wild and domestic turkeys, we have encountered four species of Pterolichidae. These species have the same general appearance, but are not congeners:

1. A species normally associated with wild and domestic chickens — *Pterolichus obtusus* Robin (in part).

2. A species normally associated with species of the phasianid genera *Alectoris* and *Perdix* — *Pseudolichus solutocurtus* Dubinin, new genus, new combination (= *Pterolichus obtusus* Robin in part).

3. A species normally associated with wild and domestic turkeys — *Contolichus latus* (Černý), new genus, new combination.

4. One of a species complex associated with grouse and ptarmigan (Tetraonidae), which we will represent by *Tetraolichus cupido*, new genus, new species.

We will define these four pterolichine genera, three of which are monotypic, and (re)describe their type species. Signatures for idiosomal chaetotaxy follow GRIFFITHS *et al.* (1989), and measurements are in microns with the mean \pm standard error (if $N > 10$) followed in parentheses by the observed

limits (OL) and number of measurements (N). Tarsi are measured from the base to the most distal seta or solenidion. Abbreviations used for accession numbers of bird and mite collections and for repositories of types are : GAUD, collection of J. Gaud, Nice, France ; NMNH, U.S. National Museum of Natural History, Washington, D.C. ; NU, University of Nebraska, Lincoln, Nebraska ; UGA, University of Georgia, Athens, Georgia ; UNAM, Universidad Autónoma de México, Mexico City.

PTEROLICHOIDEA, PTEROLICHIDAE, PTEROLICHINAE

The genus *Pterolichus* has been divided into two subgenera, *Pterolichus* and *Pseudalloptes* Trouessart ; through time authors have recognized *Pseudalloptes* as a subgenus or a genus. The uncertain status reflects the tremendous diversity of species assigned to these two higher level taxa (see DUBININ, 1956 ; GAUD, 1965 for examples). These disparate species from the Galliformes are the subject of an ongoing study ; between named and new species, a series of new genera will eventually be recognized.

In the descriptions, we will be discussing, species with the same general idiosomal configuration. Thus, for some features, a general description will be appropriate for the four taxa.

The mites have quadrate gnathosomata, the idiosomata are without terminal clefts (males) or rounded posteriorly (females), dorsal shields are weakly sclerotized, and ventral shields are wanting. In males, the membranes surrounding the weakly sclerotized adanal discs may extend beyond the posterior idiosomal margin and appear as two thin, rounded lamellae.

The prodorsal shields are deeply incised at the level of the scapular setae, and these are inserted within the incisions, off the shield. The portion of the shield posterior to the scapular setae is narrow and extends laterally almost to the idiosomal margins (fig. 1).

The anterior margins of the hysterosomal shields are usually concave and setae *c1* are inserted off the

shield or on the extreme anterior margin. Small humeral shields and long, narrow lateral hysterosomal shields may be present. In males the hysterosomal shield extends to the terminus, but laterally, setae *d2* and the openings of the well-developed opisthonotal gland openings may be on or off the lateral shield margins. In females, the shield covers 1/2 to 3/4s the hysterosomal length and may or may not encompass the insertions of setae *d2* and *e1* ; a small terminal pygidial shield may be present.

All idiosomal setae are simple. The vertical setae are widely separated. The external scapular setae are long, extend far posterior of the anterior margin of the hysterosomal shield, and the internal scapulars are minute. Setae *c3* may be more than half the length of setae *cp*.

In some taxa, one or two pairs of dorsal idiosomal setae may be absent. If one pair is absent, how does one determine which is missing ? In the female (fig. 3), setae *h1* appear to be present and *f2* absent, and in the male (fig. 1) two setae which could represent *ps2* and *f2* are approximate as in most feather mite taxa. Thus, based on topography, a dilemma — *f2* appears to be absent in the female and *h1* absent in the male.

Fortunately, setae *h1* are part of the larval chaetome (GRIFFITHS *et al.*, 1989). In the current study, when one setal pair was absent in adults, the larva had *h1* absent, and it can be assumed that this

is the absent pair in later instars. When two setae were absent, we have examined the larvae and again found that *h1* were missing. The second absent pair is believed to be *f2* as these are normally posterodorsal, and the pair that is present are posteroventral which corresponds (topographically) to *ps2*. Based on the evidence, the two missing setal pairs are *h1* and *f2* (figs. 9, 10).

The anterior legs are subequal; tarsi I (measured either from the base to the apex or from base to solenidion omega 3) are shorter than tibiae I, the ventral setae of the femora and genua (*vF*, *mG*) are usually longer than the combined lengths of the two segments, solenidia $\sigma 1$ on legs I extend at least to solenidia φ ; solenidia φ of female tibiae IV are very short (about 1/4 segment length), and setae *d* of legs II-IV (*f* of male IV) are as long or longer than tarsi IV.

Males may have two *paranal apodemes*. These originate near the posterolateral opisthosoma and curve anteromesally (similar to parentheses) around the adanal discs and setae *ps3* (fig. 6).

KEY TO GENERA AND SPECIES (RE)DESCRIBED HEREIN

1. Male with legs IV wider than legs III, tarsus IV with subapical claw, 1 apicodorsal seta; female with hysterosomal shield encompassing only setae *d1* (figs. 6, 7) 2
Male with legs III, IV subequal; tarsus IV without subterminal claw, with 3 apicodorsal setae; female with hysterosomal shield encompassing setae *d1*, *d2* and *e1* (figs. 2, 3) *Pterolichus obtusus* Robin
2. Male lacking paranal apodemes; female with small pygidial shield 3
Male with mesally toothed paranal apodemes; female without pygidial shield (figs. 6, 7)
..... *Pseudolichus solutocurtus* (Dubinin)
3. Both sexes lacking setae *h1*; male with setae *3a*, *3b* in straight transverse line; female with setae *e1*, *e2*, *f2* in almost vertical lines (fig. 9)
..... *Tetralichus cupido*, n. g., n. sp.
Both sexes lacking setae *h1*, *f2*; male with setae *3a*, *3b*, *g* in diagonal lines; female with setae *e1*, *e2* in transverse line (figs. 11, 12)
..... *Contolichus latus* (Černý)

Pterolichus Robin

Pterolichus ROBIN, 1868 : 786, 1877 : 393; DUBININ, 1956 : 45-46 for synonymy; GAUD, 1965 : 26-27.

Type species : *Pterolichus obtusus* Robin, 1877 (first included species; subsequent designation, TROUËSSART, 1916 : 214).

DIAGNOSIS. *Pterolichine* mites with character states listed above; setae *h1* absent; setae cupules *ia*, *im* visible, positioned respectively on anterolateral margin of hysterosomal shield, in striated area approximate to opisthonotal gland openings; lateral elongated shields lacking on hysterosoma; level setae *d1* anterior to *d2*, in trapezoidal arrangement; level setae *e1* anterior to *e2*, in trapezoidal arrangement; setae *c3* > 80; setae *sR* extending beyond apex femora III; tibiae, femora I, II not expanded ventrally; pretarsi with evenly spaced dentations (fig. 1 insert). Male (figs. 1, 2) with legs III, IV subequal in length, diameter; leg IV extending beyond terminus by at least length of tarsus; solenidion φ of tibia IV about 1/4 length of tarsus IV noticeably longer than tibia IV, without subapical claw, with setae *d*, *e*, *f*, setiform; setae *f2* positioned posterolaterally; setae *3a*, *3b* in horizontal line; setae *g* flanking apex of elongated genital organ; paranal apodemes lacking. Females (figs. 3, 4) with hysterosomal shield large, encompassing 3 setal pairs; small pygidial shield bearing setae *f2* anterolaterally; pregenital sclerite extending to level of anterior genital discs; legs IV extending beyond terminus by 3/4 length of tarsi.

REMARKS. Of the many species described in *Pterolichus* and *Pseudolichus* (whether as genera or subgenera), only six have males with tarsi IV simple, that is, lacking a subapical claw and bearing 3 unmodified apicodorsal setae : *P. coleosoma* Gaud and Mouchet, *P. euryzonoides* Gaud, *P. euryzonus* Gaud and Mouchet, *P. obtusus* Robin (from chickens), *P. pterygopus* Gaud, and *P. stenochaetus* Gaud. The males of all species except *obtusus* have idiosomata with pronounced terminal clefts; eventually these will be reassigned to other genera.

Pterolichus obtusus Robin (Figures 1-4)

Pterolichus obtusus ROBIN (in part), 1877 : 394-396, pl. XXII, figs. 3-5; DUBININ, 1956 : 68 for synonymy.

MALE. Length, including gnathosoma, 361 ± 3 (OL = 316-378, N = 23); width, 193 ± 2 (OL =

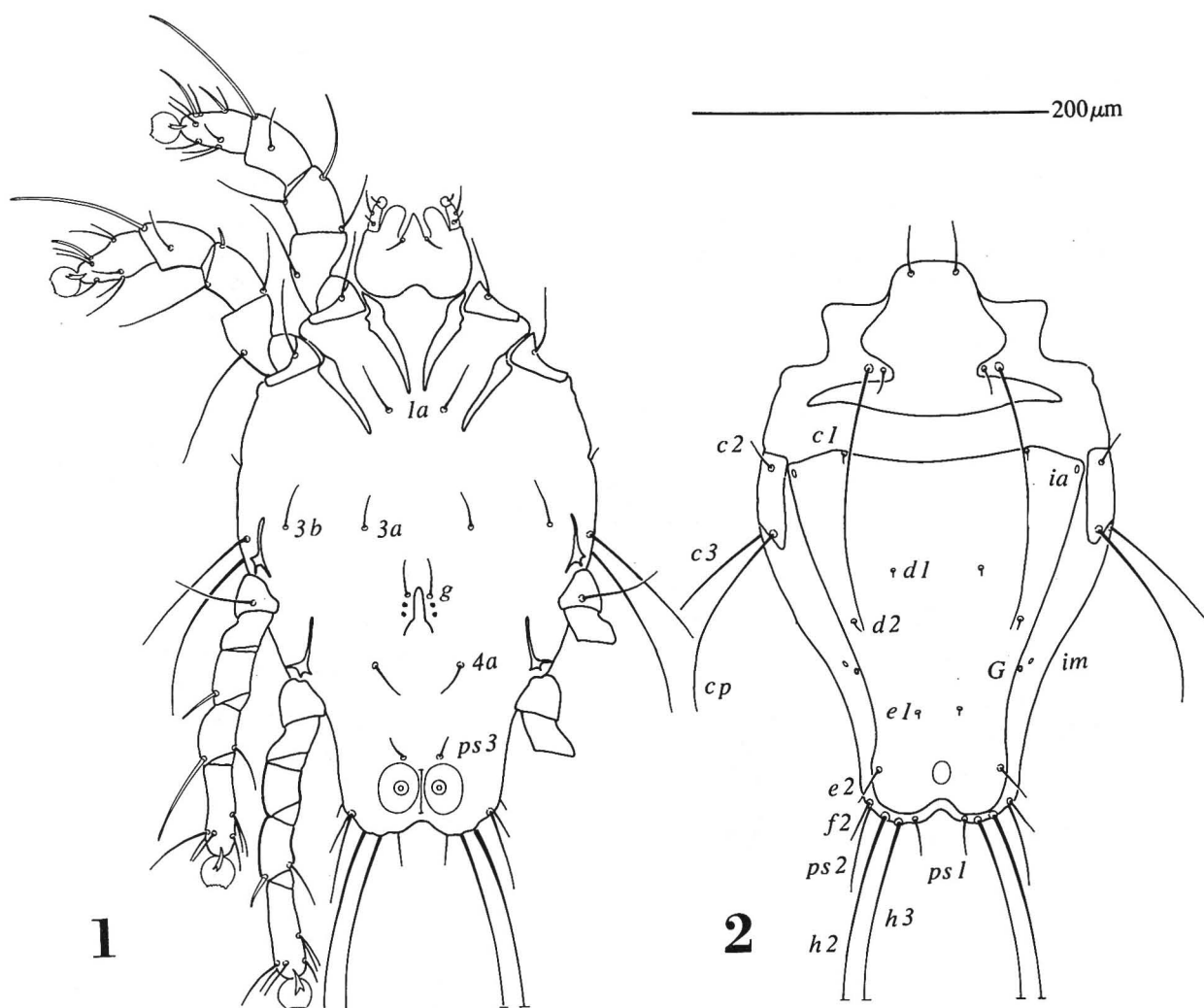


FIG. 1, 2 : *Pterolichus obtusus* Robin.

Ventral (1) and dorsal (2) aspects of male. Setal signatures follow GRIFFITHS *et al.* (1989). G = Opisthonotal gland opening.

170-208, N = 23). Prodorsum with shield posterior to scapular setae relatively narrow; *sce* : *sce*, $71.0 \pm$ (OL = 64.7-76.4 N = 23); *ps1* : *ps1*, 29.5 ± 0.5 (OL = 23.5-33.3, N = 23); *sh* > 90; tarsus I, 33.3-35.3; tibia I, 49.0-50.9; tarsus IV, 42.5 ± 0.7 (OL = 35.3-49.0, N = 23); *ps1* approximately 29.4; *ps2* approximately 52.9.

FEMALE. Length, including gnathosoma, 432 ± 2 (OL = 416-447, N = 17); width, 209 ± 2 (OL = 200-224, N = 16). Prodorsum similar to male; *sce* : *sce*, 79.8 ± 0.6 (OL = 74.5-84.3, N = 17); *h3* : *h3*,

40.4 ± 0.6 (OL = 37.2-45.1, N = 16); tarsus IV, 54.9 ± 0.8 (OL = 49.0-58.8, N = 17).

TYPE DATA. From the poule ordinaire (*Gallus gallus* "domesticus"), probably France. Location of types, unknown.

MATERIAL EXAMINED. From *Gallus gallus* "domesticus" : 5 ♂♂, 4 ♀♀, Ivory Coast, Indochina, New Caledonia, Saipan Island (4 collections). From *Gallus gallus bankiva* Temminck : 18 ♂♂, 11 ♀♀ Java, 1861-1928 (6 collections). From *Gallus gallus jabouillei* Delacour and Kinnear : 2 ♂♂, 2 ♀♀, Laos

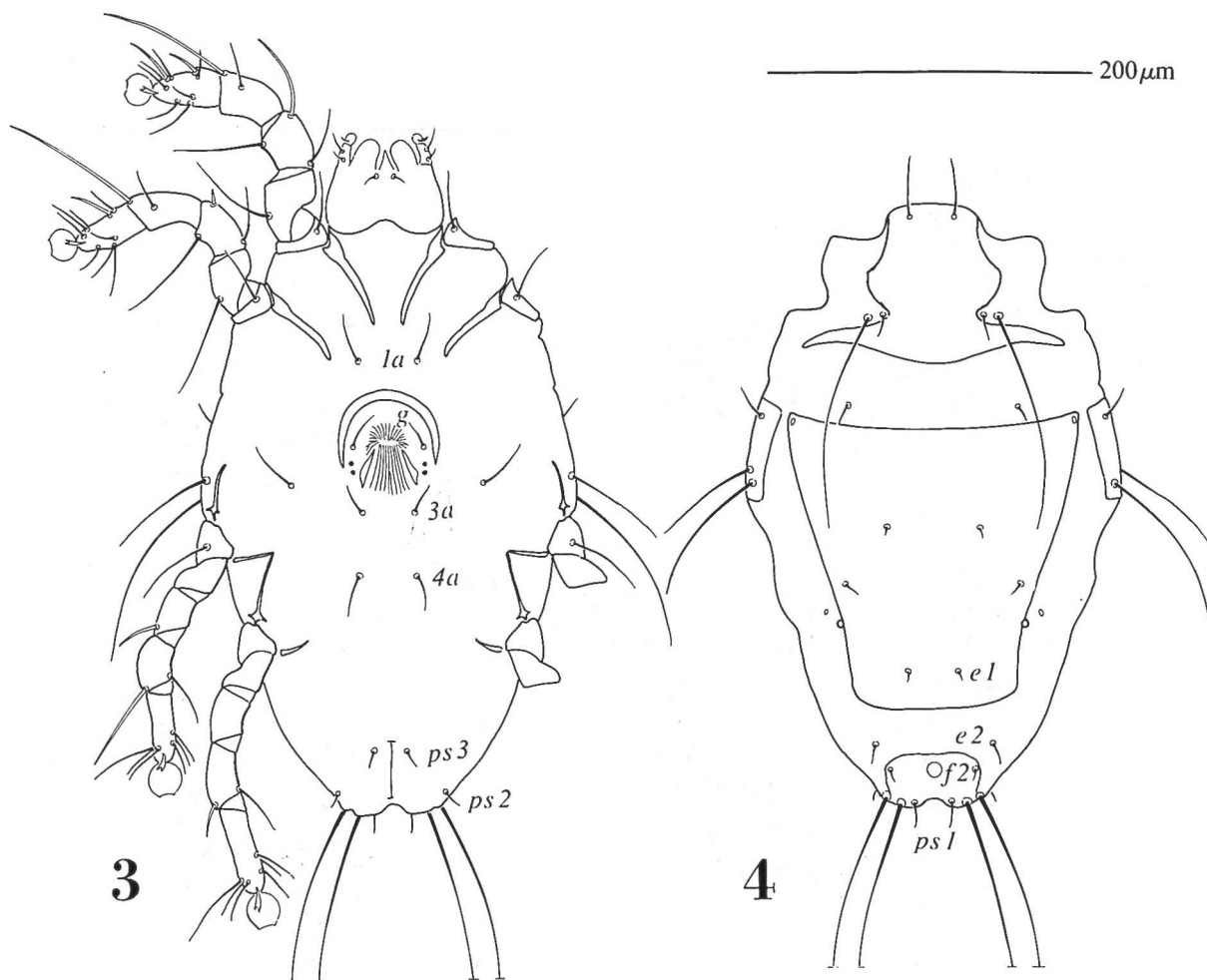


FIG. 3, 4 : *Pterolichus obtusus* Robin.
Ventral (3) and dorsal (4) aspects of female. Setal signatures follow GRIFFITHS *et al.* (1989).

(1 collection). From *Gallus gallus murghi* Robinson and Kloss : 4 ♂♂, 2 ♀♀, Assam (1 collection).

REMARKS. To eliminate the nomenclatural confusion, we should select a neotype *Pterolichus obtusus* Robin from chickens, specifically the form figured by Robin and the form we believe to be historically associated with *Gallus gallus*. But from what locality? In the discussion of his new species, ROBIN (1877) mentioned the movement of mites on newly killed chickens, therefore we can assume that the type series was collected in France, probably in Paris. Thus, it would be logical to select a neotype

from chickens collected in the environs of Paris. However, the common method of raising chickens in France has changed drastically since 1877, and now *P. obtusus* is a rarity not only in France, but in Europe. One of us (JG), with the able assistance of family and friends, has unsuccessfully searched for this species in France for four years. The rarity of *P. obtusus* from chickens must be true in Russia as DUBININ (1956) examined thousands of mites from many galliform species, including chickens, without discovering this species.

We should select a neotype, but fate is against us

- we have one poorly preserved specimen from Nice and other available specimens are not from Europe. We opt to redescribe *Pterolichus obtusus* knowing that of the four species in question, this is the only one recognizable from ROBIN's description and illustrations.

Currently, the species is known from wild and domestic chickens, namely, *Gallus gallus bankiva* from Java, *G. g. jabouilei* of Vietnam and Laos, *G. g. murghi* of Assam, and domestic chickens from France, Morocco, Ivory Coast, Cameroon, India, Bali, Philippine and Marianas Islands, and Puerto Rico. The species has also been collected from farms, avaries, and zoos from Phasianidae [*Syrmatiscus humiae* (Hume) and *Crossoptilon auritum* (Pallas)], Numidae [*Numida meleagris* (L.)], and Meleagrididae (*Meleagris gallopavo* L.).

The noted intraspecific variation relates to the two smaller males from *Gallus gallus jabouillei* collected from Laos. In general, these account for the lower limit of each measurement. The females from the same collection do not differ from those of other collections.

The immatures have small triangular pygidial shields; these are small in the larva and become increasing larger in the nymphal instar. Some setae of the immatures are different from the same setae in adults. In the larva, *c2* are short and spiculiform; and *c3* are short (about 12 μ m), expanded basally, and attenuated distally. In subsequent nymphal instars, *c3* becomes longer, reaching approximately 20 μ m in the tritonymph. In adults, *c3* are setiform and 90+ μ m in length.

Pseudolichus, new genus

Type-species : *Pterolichus* (*P.*) *solutocurtus* Dubinin.

Etymology : The specific epithet refers to the marked similarity of this taxon to *Pterolichus* (*s.s.*), masculine.

DIAGNOSIS. Pterolichine mites with character states listed in general description; all idiosomal setae present; cupules *ia*, *im* not visible; rather broad lateral elongated shields on hysterosoma; setae *d1*, *d2* in transverse line; setae *c3* approxima-

tely 55-60; setae *sR* extending beyond apex femora III; tibiae, femora I, II not expanded ventrally; pretarsi with evenly spaced dentations. Male (figs. 5, 6) with legs III, IV subequal in length; leg IV with greater diameter than III, extending beyond terminus by 1/2 length of tarsus; IV with subapical claw, setae *d*, *e*, not apparent; solenidion ϕ of tibia IV about 1/4-1/2 length of tarsus; setae *e1*, *e2* in trapezoidal arrangement; setae *3a*, *3b*, *g* in diagonal line with *g* anterior to genital organ apex; paranal apodemes present, with irregular teeth on anteromesal terminations. Female (figs. 7, 8) with about 2/3 hysterosoma covered by shield which encompasses setae *d1*; setae *e1*, *e2* in transverse row; pygidial shield absent; pregenital sclerite extending to level genital setae; legs IV extending to terminus.

Pseudolichus solutocurtus Dubinin, new comb.

(Figs. 5-8)

Pterolichus obtusus (in part) ROBIN, 1877 : 394-397.

Pterolichus obtusus var. *curtus* BERLESE, 1988 : fasc. 50, n° 7.

Pterolichus (*P.*) *solutocurtus* DUBININ, 1956 : 88-92, figs. 20, 21, synonymy included.

MALE. Length, including gnathosoma, 300 ± 4 (OL = 278-316, N = 13); width, 172 ± 2 (OL = 162 -). Prodorsum with shield posterior to scapular setae relatively narrow; *sce* : *sce*, 57.8 ± 0.6 (OL = 59.4 - 60.8, N = 13); *ps1* : *ps1*, 27.9 ± 0.3 (OL = 25.4 - 29.4, N = 12); *sh*, 55.0 - 60.0; tarsus I, 19.6 - 21.6; tibia I, 29.4 - 33.3; tarsus IV, 17 ± 0.3 (OL = 15.7 - 18.6, N = 11); *ps1*, approximately 37.2; *ps2*, approximately 31.0.

FEMALE. Length, including gnathosoma, 428 ± 6 (OL = 409-470, N = 12); width, 207 ± 4 (OL = 193 - 234, N = 12). Prodorsum similar to male; *sce* : *sce*, 72.8 ± 1.3 (OL = 68.6-82.3, N = 12); *h3* : *h3*, 31.6 ± 0.6 (OL = 29.4 - 37.2, N = 12); tarsus IV, 44.1 ± 1.0 (OL = 37.2 - 49.0, N = 11).

TYPE DATA. From *Alectoris graeca* Meisner (= *Coturnicis saxatilis*), probably from northern Italy. Location of *curtus* types unknown (see CASTAGNOLI and PEGAZZANO, 1985.).

MATERIAL EXAMINED. From *Alectoris rufa* (L.) (Phasianidae) : 4 ♂♂, 8 ♀♀, England, France. From

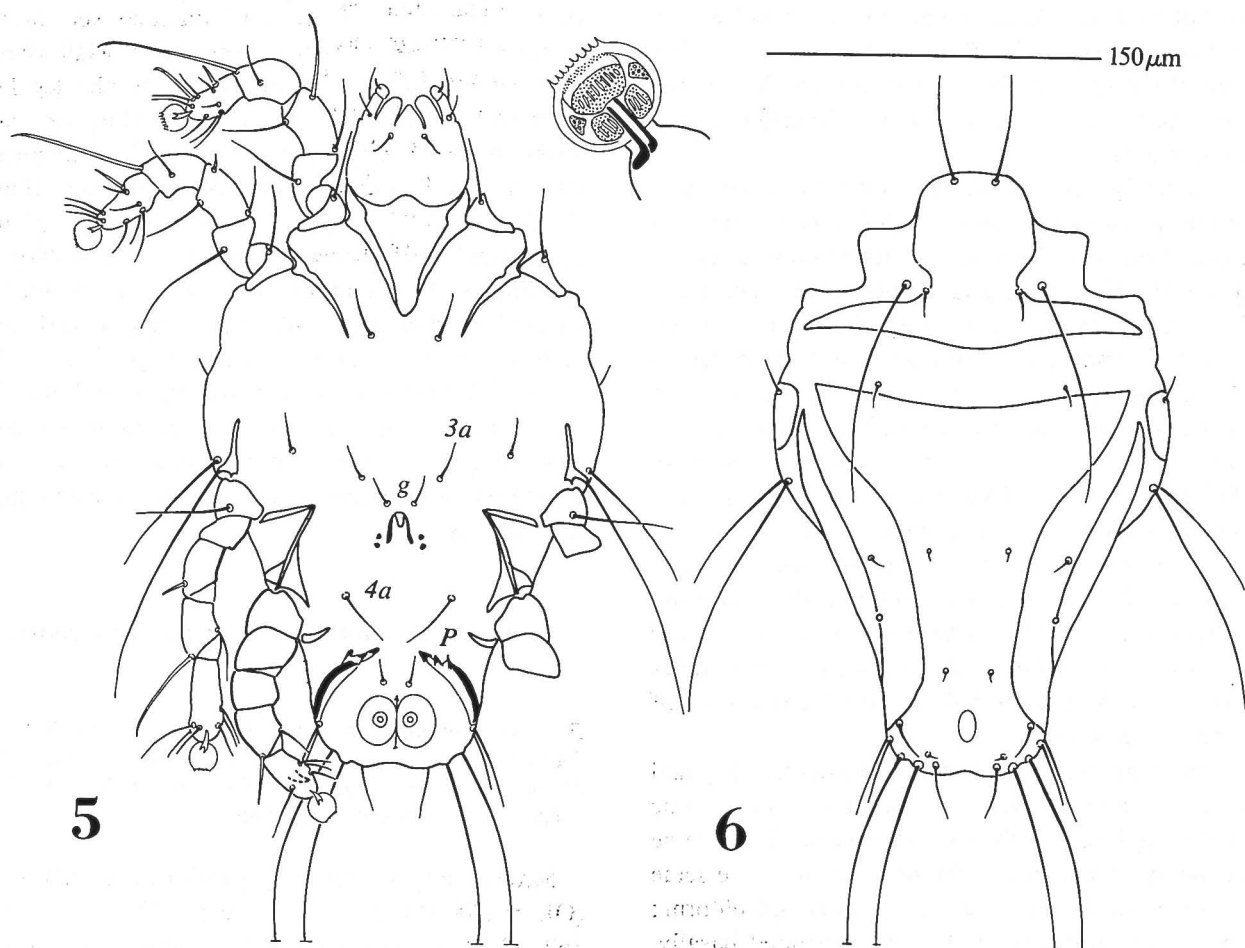


FIG. 5, 6 : *Pseudolichus solutocurtus* (Dubinin).

Ventral (5) and dorsal (6) aspects of male. Setal signatures follow GRIFFITHS *et al.* (1989). Insert = pretarsus I, size approximately 2 × indicated scale.

Perdix perdix (L.) (Phasianidae); 14 ♂♂, 12 ♀♀, TNN, 1 L, from France, England, Hungary, Holland.

REMARKS. The descriptions by BERLESE (1988) and DUBININ (1956) contain questionable information and serve as partial bases for the taxonomic confusion associated with the four taxa under consideration in this paper. BERLESE (1888) originally described the variety *curtus* from *Alectoris graeca* (= *Coturnicis saxatilis*), probably from northern Italy. He illustrated the male dorsum with a pair of extremely long setae apparently originating on the propodosoma (probably a mistake for *cp* as these are not shown in the ventral aspect) and

the female dorsum with a large hysterosomal shield and a small pygidial shield with a small rectangular shield between the two. DUBININ's (1956) redescription, based on subspecies of *A. graeca* and *Perdix perdix*, included BERLESE's illustration of the male dorsum (DUBININ, fig. 20B) and apparently a redrawn female dorsum to which he added three pairs of setae on the hysterosomal shield and one pair anterolateral to the small rectangular shield (DUBININ, 1956, fig. 21B). We believe the male represents *solutocurtus* as the paranal apodemes are present and tarsus IV has a subapical hook. However, we believe that the females described by

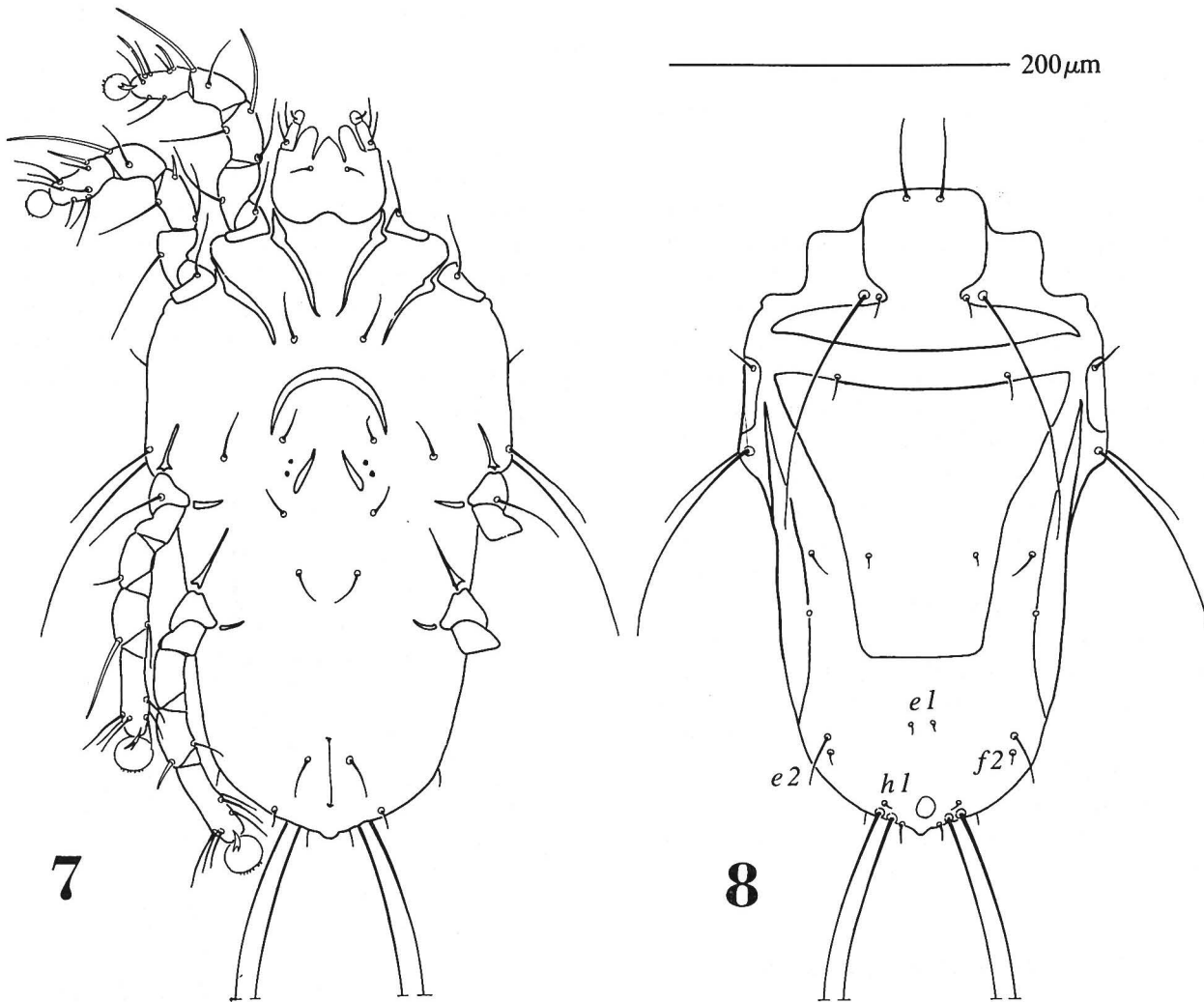


FIG. 7, 8 : *Pseudolichus solutocurtus* (Dubinin).
Ventral (7) and dorsal (8) aspects of female. Setal signatures follow GRIFFITHS *et al.* (1989).

BERLESE and DUBININ are not conspecific with the males because both authors illustrated 3 shields on the hysterosoma, and in the case of DUBININ, three pairs of setae on the large hysterosomal shield (DUBININ, 1956, fig. 21B). As far as we know, only *P. obtusus* females have large hysterosomal shields with 3 pairs of setae plus a pygidial shield. We are unsure as to the identity of BERLESE's and DUBI-

NIN's females as we know of no species with a small rectangular shield between the hysterosomal and pygidial shields and three pairs of setae on the hysterosomal shield.

The immatures of *Pseudolichus solutocurtus* lack pygidial shields, and setae *c3* and *cp* are long with proportions similar to the adults.

Tetraolichus, new genus

Type-species : *Tetraolichus cupido*, new species.

Etymology : Contraction of *tetrao* (L., grouse) and *Pterolichus*, masculine.

DIAGNOSIS. Pterolichine mites with character states listed in general description ; idiosoma similar to *solutocurtus* ; hysterosoma with setae *h1* absent, cupules *ia*, *im* not visible, lateral shields narrow ; setae *d1*, *d2* in transverse row ; setae *e1*, *e2* in trapezoidal arrangement ; setae *c3* approximately 30 ; setae *sR* extend beyond apex femora III ; tibiae, femora I, II not expanded ventrally ; pretarsi with evenly spaced dentations. Male legs III, IV subequal in length ; leg IV with greater diameter than III, extending beyond terminus by length of tarsus + 1/2 length of tibia ; tarsus IV with subapical claw, setae *d*, *e* not apparent ; solenidion ϕ of tibia IV about length of tarsus ; setae *3a*, *3b* in transverse row, *g* anterolateral to genital organ apex ; paranal apodemes absent. Female (fig. 9) with about 3/4 hysterosoma covered by shield bearing setae *d1* ; setae *e1*, *e2*, *f2*, *ps1* form curved vertical rows ; pygidial shield small ; pregenital sclerite extending to level genital discs ; legs IV extending beyond terminus by 1/2 tarsal length.

Tetraolichus cupido, new species

(Fig. 9)

MALE. Length, including gnathosoma, 278 ± 3 (OL = 254-301, N = 14) ; width, $170 \pm$ (OL = 167-176, N = 14). Prodorsum with shield posterior to scapular setae relatively narrow ; *sce* : *sce*, 62.7 ± 0.9 (OL = 58.8-68.6, N = 13) ; *ps1* : *ps1*, 28.4 ± 0.6 (OL = 25.4-31.4, N = 12) ; *sh* > 25 ; tarsus I, 19.6-21.6 ; tibia I, 29.4-33.3 ; tarsus IV, 20.0 ± 0.6 (OL = 17.6-23.5, N = 11) ; *ps1* approximately 22.0 ; *ps2*, approximately 22.0.

FEMALE. Length, including gnathosma, 399 (OL = 378-416, N = 9) ; width, 201 ± 2 (OL = 196-210, N = 11). Prodorsum similar to male ; *sce* : *sce*,

80.4 ± 0.6 (OL = 72.5-86.2, N = 12) ; *h3* : *h3*, 30.7 ± 0.6 (OL = 27.4-33.3, N = 11) ; tarsus IV, 44.9 (OL = 41.2-49.0, N = 9).

ETYMOLOGY. Named for host (*L. cupido*, god of love).

TYPE DATA. From *Tympanuchus cupido* (L.) (Tetraonidae) : ♀ holotype, 4 ♂♂, 4 ♀♀ paratypes, Eagle Lake, Colorado Co., Texas, 16 April 1946, collector unknown (NU 1069) ; 3 ♂, 6 ♀♀ paratypes, same data except 11 May 1946 (NU 1070) ; 1 ♂, 1 ♀ paratypes, same data except 1 February 1941, collector : WARDELL (NU 1071) ; 5 ♂♂, 1 ♀ paratypes, 4 TNN, Tivoli, Refugio Co., Texas, 19 March, 1940, collector unknown (NU 1072. Holotype deposited in NMNH, paratypes in Gaud, NMNH, UNAM, UGA.

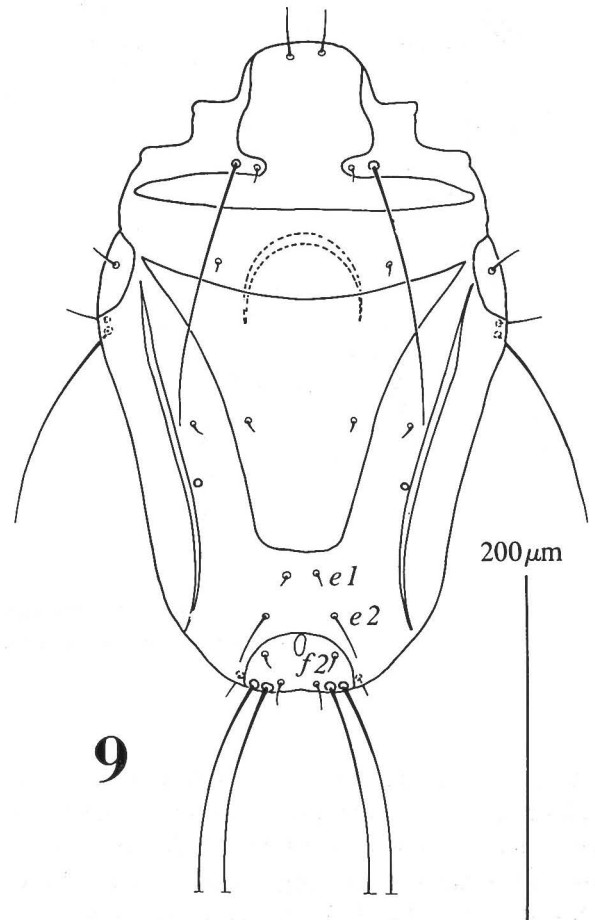


FIG. 9 : *Tetraolichus cupido*, n. g., n. sp.
Dorsal aspect of female. Setal signatures follow GRIFFITHS *et al.* (1989).

REMARKS. This species may be conspecific with *Pterolichus gaudi* Černý, a species based on three males and one female from *Lyrurus tetrax* (L.), Switzerland, and one of the hosts included in the redescription of *Pterolichus obtusus* by DUBININ (1956). Our males compare favorably with ČERNÝ's (1971) description of *P. gaudi*, but our females are much smaller, total length 399 (378-416) and width 201 (196-210) as compared with 454 × 244. We believe there is a large species complex associated with the Tetraonidae, so until the complex is revised, we prefer to recognize two species, *gaudi* and *cupido*.

In our collections, we have specimens from various species of Tetraonidae and all males lack

paranal apodemes and all females have the hysterosomal setae arranged as in figure 9, a configuration figured by ČERNÝ, but not illustrated by DUBININ for any *Pterolichus* species.

Adult and nymphs have setae *f2* positioned anterior to the insertions of setae *h3*, topographically equivalent to setae *h1*.

Contolichus, new genus

Type-species : *Pterolichus latus* Černý.

Etymology : Contraction of *kontos* (Gr., shortened) and *Pterolichus*, masculine, to refer to the very short idiosomata.

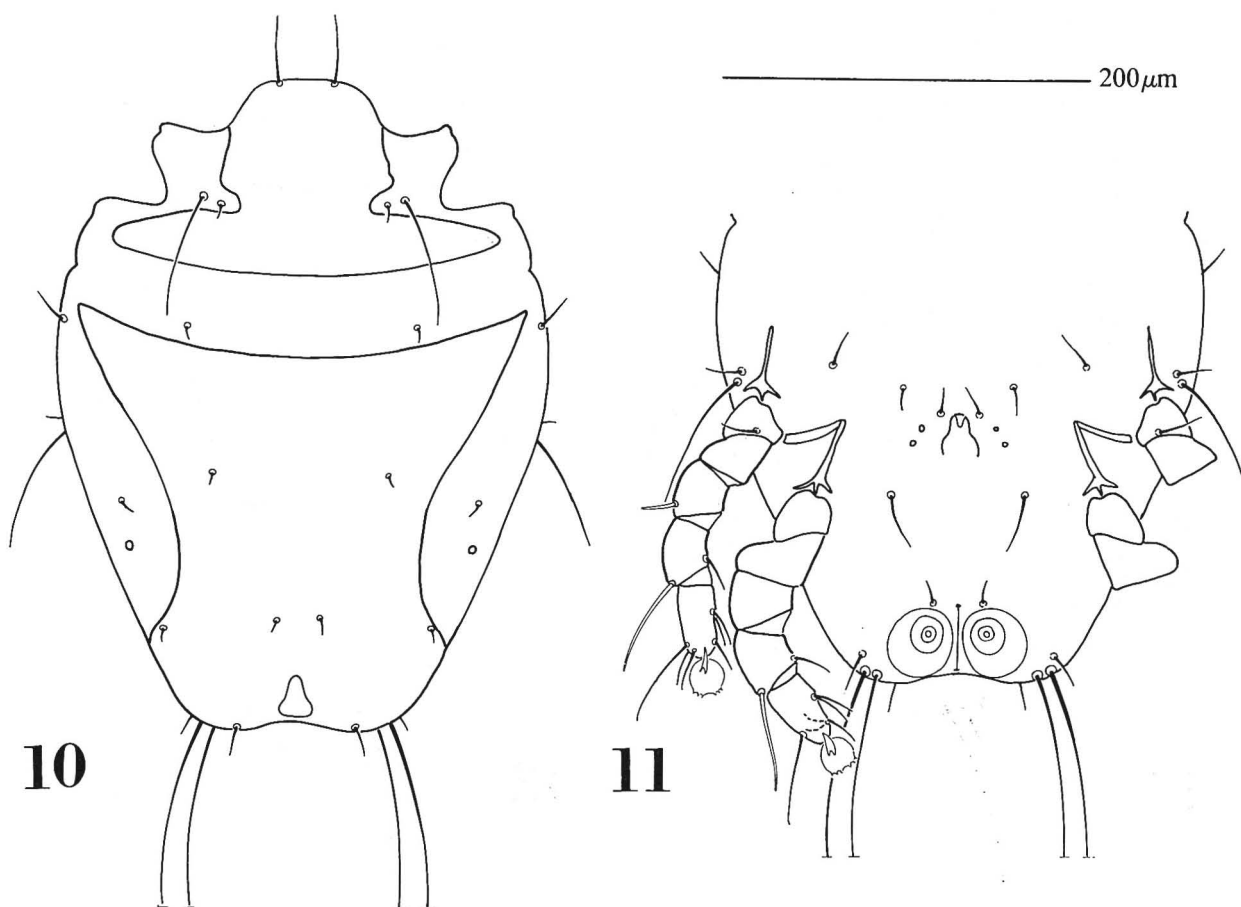


FIG. 10, 11 : *Contolichus latus* (Černý).
Ventral (11) and dorsal (10) aspects of male.

DIAGNOSIS. Pterolichine mites with character states listed in general description; idiosoma broad; hysterosoma with setae *h1*, *f2* absent, cupules *ia*, *im* not visible, lateral shields absent; setae *d1*, *d2*, and *e1*, *e2* in transverse rows; setae *c3* approximately 25; setae *sR* not extending to apex femora III; tibia, femora I, II expanded ventrally; pretarsi with dentations divided into right, left groups (fig. 10,

insert). Male (figs. 10, 11) with legs III, IV subequal in length; leg IV with greater diameter than III, extending beyond terminus by 1/2 length of tarsus; tarsus IV with subapical claw, setae *d*, *e* not apparent; solenidion ϕ of tibia IV about length of tarsus; setae *3a*, *3b*, *g* in diagonal line with *g* anterolateral to genital organ apex; paranal apodemes absent. Female (figs. 12, 13) with about 1/2

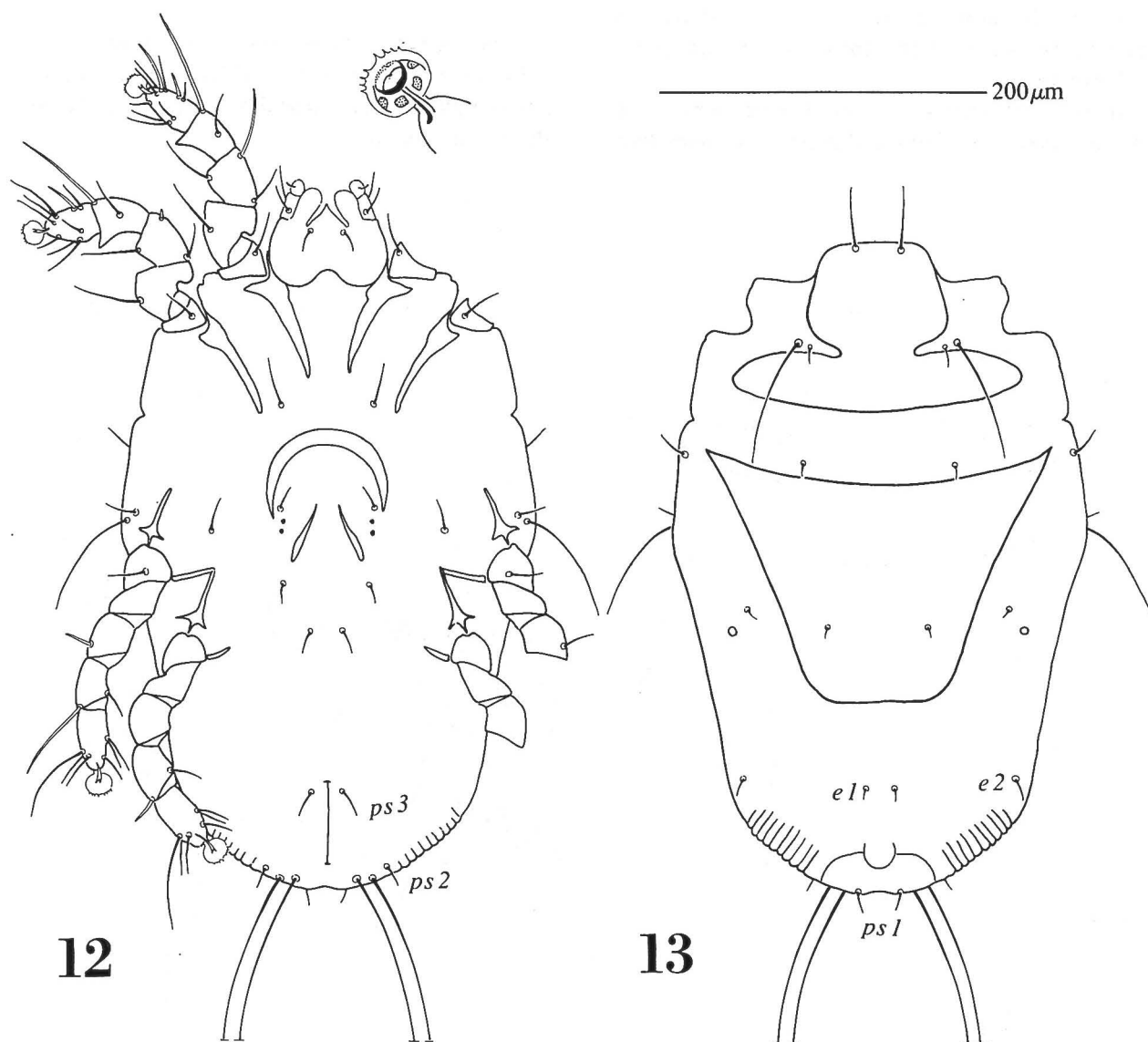


FIG. 12, 13 : *Contolichus latus* (Černý).

Ventral (12) and dorsal (13) aspects of female. Setal signatures follow GRIFFITHS *et al.* (1989). Insert = pretarsus I, size approximately 2.5 × indicated scale.

hysterosoma covered by shield which encompasses setae *dl*; pygidial shield small; pregenital sclerite extending to level genital setae; legs IV not extending to terminus.

Contolichus latus (Černý), new comb.
(Figs. 10-13)

Pterolichus (*Pseudalloptes*) *latus* ČERNÝ, 1970 : 235-237, figs. 2, 3.

MALE. Length, including gnathosoma, 298 (OL = 293-312, N = 4); width, 206 (OL = 208, N = 4). Prodorsum with shield posterior to scapular setae relatively broad; *sce* : *sce*, 82.6 (OL = 80.4-84.3, N = 4); *ps1* : *ps1*, 50.5 (OL = 47.0-54.9, N = 4); *sh* about 25; tarsus I, 17.6 (N = 1); tibia I, 29.4 (N = 1); tarsus IV, 18.9 (OL = 17.6-19.6, N = 4); *ps1*, approximately 11.8; *ps2*, approximately 19.6.

FEMALE. Length, including gnathosoma, 449 ± 4 (OL = 416-470, N = 18); width, 269 ± 2 (OL = 254-285, N = 16). Prodorsum similar to male; *sce* : *sce*, 104.0 ± 1.0 (OL = 96.0-113.7, N = 18); *h3* : *h3*, 38.2 ± 0.4 (OL = 35.3-41.2, N = 18); tarsus IV, 29.9 ± 0.4 (OL = 27.4-33.3, N = 16).

MATERIAL EXAMINED. From *Meleagris gallopavo* (Meleagrididae) : 4 ♂♂, 18 ♀♀, 2 PNN, 8 LL, Monroe Co., Alabama, 18 December 1984, commercial rearing operation, collector unknown (UGA 12654-7). From *Agriocharis ocellata* (Cuvier) (Meleagrididae) : 2 ♂♂, Estado de Campeche, Mexico, 26 December 1900, NELSON and GOLDMANN (NMNH 167705, NU 11604).

REMARKS. ČERNÝ's (1971) type series was collected in Cuba; he reported that the species is found on the wings of turkeys. ČERNÝ's measurements of one male and one female are within the observed limits of the North American material. We can add that the immatures have broad idiosoma striae and setae *c3* and *cp* are similar to those of the females.

Two pterolichid species are typically associated with the two species of Meleagrididae, this new species and *Pterygocrusolichus chanayi* (Trouessart) (see DUBININ, 1956, p. 110 for figures). The latter species is common on wild turkeys and the pen-

raised turkeys from which we collected *Contolichus latus*. Although *C. latus* has been found on domestic chickens, there are no records of *P. chanayi* from non-turkey hosts.

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