

ENTOMOLOGISCHE MITTEILUNGEN

aus dem

Zoologischen Museum Hamburg

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ISSN 0044-5223

Hamburg

10. Band

30. März 1991

Nr. 141/142

Two new species of the genus *Pygmephorus* from Alaskan small mammals (Acari: Heterostigmata)

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(With 18 figures)

A b s t r a c t

Two new pygmephorid mites, *Pygmephorus trisetosus* sp. n. and *Pygmephorus arcuatus* sp. n. associated with small mammals from Alaska are described. The former species is distinguished by the presence of three setae on femur IV, a unique feature for all heterostigmatic mites. *Pygmephorus arcuatus* sp. n. is characterized by the shape and size of its segmental crests and differentiated shape and size of claws on II and III pair of legs.

Keywords: Acari (Heterostigmata), Alaska, two new *Pygmephorus* taxa.

I n t r o d u c t i o n

The genus *Pygmephorus* sensu Kramer (1877) is represented in North America by 32 taxa, described or reported by Mahunka (1973, 1974, 1975), Rack (1975), Smiley (1978), Smiley & Whitaker (1979, 1984), Whitaker et al. (1982) and Kaliszewski & Rack (1985). Although the majority of the records originate from the United States, no data at the species level have been provided from Alaska. The only information available is that by Cross (1965) reporting unidentified Alaskan member(s) of the genus *Pygmephorus* collected at Point Barrow. However, that report may include mites of any related supraspecific taxa other than *Pygmephorus* s. str. (see a list of species, op. cit.: p. 158, 159).

A large collection of pygmephorid mites found phoretic on North American small mammals, birds or extracted from their nests is housed at the Zoological Institute and Zoological Museum, University of Hamburg. Our studies on that material revealed presence of two new species of *Pygmephorus* originating from Alaska. These taxa are described below. A review

of other members of the genus from that collection, will be published separately (Dastyh et al., in press). The **Pygmephorus** mites constitute a bulk of the examined material.

The terminology of structures and setal notation is adopted from Lindquist (1976, 1977, 1986). Observations and measurements (phase and interference contrast) were carried out in specimens mounted in Swan's and Berlese's medium. Trochanter, femur, genu, tibia, tarsus and tibiotarsus are abbreviated here as Tr, Fe, Ge, Ti, Ta, TiTa, respectively.

All measurements are given in micrometers (μm).

D e s c r i p t i o n s o f t h e s p e c i e s

Pygmephorus trisetosus sp n.

(Figs 1-10)

DIAGNOSIS. A medium sized species with moderately long, barbed idiosomal dorsal setae, except setae e and h2 which are short and smooth. Idiosomal ventral setae are relatively long and barbed, caudal setae ps1 and ps2 are short and smooth. Femur IV with three setae, two of them are blade-like.

DESCRIPTION OF ADULT FEMALE. The body length of the holotype is 308 μm (322, 385: in parentheses the measurements of paratypes are given), its width is 162 (154, 210). Idiosoma is finely punctated and covered with sparsely distributed, small and roundish cavities (Fig. 1).

GNATHOSOMA (Figs 1-4). Gnathosomal capsule is quadrangular in dorsal aspect (Fig. 3) but elongated and posteriorly incised as seen ventrally (Fig. 4). A short dorsomedian apodeme is present. Dorsum with two pairs of short cheliceral setae (ch1, ch2) which have 1-2 minute barbs. The setae ch1 are 1/4-1/3 longer than the setae ch2. A pair of rod-like, supracoxal setae pp are placed anteriolaterad of setae ch2. The setae pp are the shortest. Slightly thickened bases of the setae pp are posteriorly prolonged in an extremely thin canal situated in dorsal cuticle. Anteriomedialedly directed palpi have relatively wide bases. Genual setae are about 1/2 longer than the femoral ones and they both are smooth. From all gnathosomal setae, the genual setae are the longest. Palpi are terminated with small claws. Near tibiotarsal claw occurs a minute cylindrical capsule with a tiny rod inside. Ventral side of subcapitulum with a pair of short, smooth setae. Venter of palpal femorogenu with a striated solenidion and a small, non-striated cylindrically shaped dome-tipped structure with relatively thick wall (a setigenous accessory structure: Lindquist 1986). Cheliceral stylets are short. Setae ch1 are 8-10 long, setae ch2 = 6-7, setae pp = 3-4. The length of ventral subcapitular setae is 7-8, solenidion = 8-9, and its neighbouring cylindrical structure is 5 long. Femoral setae have 6-7 in length, genual setae are 10-12 long.

IDIOSOMAL DORSUM (Fig. 1). Prodorsal shield with drop-like stigmata. Setae v2 are formed as short spines with small, reduced barbs. Sensilla are

covered with several small and weakly defined teeth. Setae sc2 have relatively long and thin barbs. There are three pharyngeal pumps within propodosoma. Idiosomal setae are barbed, except setae e and h2 which are smooth. The setae e are relatively narrow and blade-like, the setae h2 are needle-like. Cupules ia, im and ih are distinct and located anteriolaterad of bases of setae d, f and h2, respectively.

The lengths of dorsal idiosomal setae are as follow. Setae v1 = 50 (47, 57), v2 = 19 (19, 20), sc1 = 22 (25, 23), sc2 = 70 (86, 90), c1 = 47 (55, 58), c2 = 66 (77, 90), d = 47 (55, 64), e = 17 (12, 25), f = 53 (60, 68), h1 = 66 (72, 79), h2 = 8 (8, 10). Distances between the setae: v1 = 22 (23, 28), v2 = 46 (52, 61), sc1 = 61 (67, 73), sc2 = 61 (66, 77), c1 = 61 (55, 73), c2 = 121 (132, 161), d = 79 (87, 112), e = 110 (117, 148), f = 86 (91, 123), h1 = 66 (65, 95), h2 = 78 (85, 100).

IDIOSOMAL VENTER (Fig. 2). Apodemes 3 and anterior part of poststernal apodeme are weakly sclerotized, other apodemes are well developed. Apodemes 5 are gently arched and almost perpendicular to the main body axis. All setae are relatively long and barbed, except caudal setae ps1 and ps2 which are short and smooth. The number of barbs on particular setae decreases posteriorly. Setae 1a are slightly slender than setae 1b. Seta 1c has thickened and barbed lateral edges and between them occurs thin chitinous membrane. Such a formation of setae 1c gives an impression of their bifurcation. Setae 2c are formed as long, barbed spines and they are slightly thicker than setae 2b. Distances between particular caudal setae ps1-3 are almost equal (Figs 2, 6) and they can vary slightly even in the same specimen. Distance between both setae ps1 is longer than that between setae ps1-ps2 and ps2-ps3.

The lengths of ventral idiosomal setae are as follow. Setae 1a = 42 (44, 52), 1b = 50 (53, 63), 1c = 24 (34, 37), 2a = 50 (52, 63), 2b = 58 (50, 67), 2c = 35 (39, 48), 3a = 44 (44, 62), 3b = 44 (46, 64), 3c = 51 (45, 66), 4a = 46 (47, 63), 4b = 50 (64, 79), 4c = 44 (46, 63). Caudal setae ps1 are 9 (9, 11) long, ps2 = 8 (8, 9), ps3 = 25 (25, 30). Distances between the setae: 1a = 28 (33, 36), 1b = 50 (52, 58), 1c = 71 (77, 92), 2a = 34 (39, 46), 2b = 66 (72, 85), 2c = 79 (85, 102), 4a = 28 (24, 33), 4b = 53 (57, 69), 4c = 92 (99, 123), ps1-ps1 = 11 (10, 17), ps2-ps2 = 24 (19, 23), ps3-ps3 = 40 (39, 55), ps1-ps2 = 7 (6, 8), ps2-ps3 = 9 (9, 11).

LEGS (Figs 7-10). The length of legs increases posteriorly. Tibiotarsus I is provided with enlarged and distinctly ribbed claw. Claws on legs II and III are relatively small, of similar size and with thickened bases. The ribbing on the claws is either difficult to discern or they are smooth. Claws IV are smooth and simple, i.e. without thickened bases. Empodia II and III are of moderate size, roundish and with delicate vertical striation at their apical parts. The stalks are short. Empodia on legs IV are distinctly smaller and smooth.

LEG I (Figs 5, 7). A number of setae on particular limbs (the setae formula): Tr (1), Fe (4), Ge (4), TiTa (18 + 2 omega + 2 phi). Tibiotarsus I elongated. Relatively long and thick modified subunguinal seta s is placed opposite to claw. The seta s has wide basis and is terminated with two

blunt teeth of slightly different size. Tips of the teeth have a few tiny ribs. Tarsal eupathidia (p' , p'' , tc' , tc'' , ft' , ft'') and tibial eupathidium (k'') are smooth, other setae are more or less barbed. Seta pl' is very long. Primiventral seta pv' and particularly unguinal seta u' are densely barbed. Unguinal seta u'' is lacking. Solenidia omega 1 and omega 2 are relatively long and the former one is distinctly thicker. Solenidia phi 1 and phi 2 are small and phi 1 is slightly shorter than phi 2. Their lengths are as follow: omega 1 = 10 (11, 11), omega 2 = 9 (10, 11), phi 1 = 5 (5, 6), phi 2 = 6 (5, 6). On tibiotarsal lateral wall, inside the limb, occurs roundish chitinous thickening (Fig. 5). The thickening is located near the bases of solenidia phi 1 and phi 2 and is well visible at their optical plane. Femoral seta $FeI\ d$ is short, smooth, membranous and terminates as slightly asymmetrical, sharp, flat and simple (not bidentated) spine. Seta $FeI\ l'$ is short and smooth. Other femoral setae and those on trochanter and genu are barbed.

LEG II (Fig. 8). The setae formula: Tr (1), Fe (3), Ge (3), Ti (4 + 1 phi), Ta (6 + 1 omega). Unguinal seta u'' is reduced (absent). All setae are more or less barbed. Seta $FeII\ l'$ is short, blunt and with 1-2 small barbs. Tibial solenidion phi is strongly reduced. It is minute, granular and its posterior part is prolonged in a thin canal within cuticle. The solenidion has 2-3 transversal striae and is placed posteriodorsally to seta $TiII\ d$. Tarsal solenidion omega is relatively large, cob-like and located on a small tubercle. It lies posteriodistally to seta $TaII\ tc'$. The solenidion phi is 1 (1, 2) long, its canal has 2 (2, 3) in length. The length of solenidion omega is 7 (9, 9). Tectal seta $TaII\ tc'$ is the thickest from all tarsal setae.

LEG III (Fig. 9). The setae formula: Tr (1), Fe (2), Ge (2), Ti (4 + 1 phi), Ta (6). Unguinal seta u'' is absent. All setae are barbed and relatively long, except seta $TaIII\ u'$ which is distinctly shorter and seta $TaIII\ pl''$, the latter one formed as short, smooth spine. Tibial solenidion phi is reduced to a short, thin canal within the cuticle and is located anteriodistally to seta $TiIII\ d$. Its lengths is 3 (4, 4). Tarsal solenidion omega is completely reduced (absent).

LEG IV (Fig. 10). The setae formula: Tr (1), Fe (3!), Ge (1), Ti (4 + phi), Ta (6). Unguinal seta u'' is absent. Trochanter with blade-like seta $TrIV\ v'$. Femur with three setae. Seta $FeIV\ d$ is long, setiform and barbed, seta $FeIV\ v'$ is blade-like, shorter and smooth. There is a unique additional seta on that limb, notified here as $FeIV\ n$ ("n" for neotaxy). It is similar in shape to $FeIV\ v'$ and either of equal length or the latter seta is slightly longer. The length of these both setae is 30-36. The seta $FeIV\ n$ is placed dorsoposteriorly to seta $FeIV\ v'$. Seta $TiIV\ v'$ is long, blade-like and smooth, seta $TaIV\ pl''$ is similar in shape but distinctly shorter. Other setae are setiform and barbed. Tibial solenidion phi is similarly formed and of the same size as that on leg III. Tarsal solenidion omega is lacking.

Males and larvae are unknown.

MATERIAL EXAMINED: 3 females.

TERRA TYPICA: 2 female from vole nest, Good News Bay, 15 Nov 1978, coll. G. E. Haas; 1 female **Sorex vagrans** (Baird, 1858), Scammon Bay, 13 Juni 1980, coll. G. E. Haas & S. Goodman.

TYPE REPOSITORIES. Holotype and one paratype are housed at the Zoological Institute and Zoological Museum, University of Hamburg; one paratype is deposited in the Canadian National Collection, Ottawa.

DERIVATIO NOMINIS. The species is named **trisetosus** (Lat.: **tres**, **tria** = three; **seta** = seta, bristle) to emphasize the unique presence of three setae on femur IV.

REMARKS. Ophisthosomal chaetotaxy, particularly the shape and size of tergal setae e and h2, places **Pygmephorus trisetosus** sp. n. near **P. spinosus** Kramer, 1877, **P. whitakeri** Mahunka, 1973, **P. scalopi** Mahunka, 1973 and **P. rackae** Smiley & Whitaker, 1979. The new species can be distinguished from these taxa by its small claw II and III which have hardly visible traces of ribbing (or they are even sometimes completely smooth) and relatively large modified subunguinal setae s on tibiotarsus I. The setae s is decidedly smaller and the claws II and III are much larger and distinctly ribbed in the above four taxa. Moreover, **P. trisetosus** sp. n. differs from **P. spinosus** by its two pairs of cheliceral setae (only one pair in the latter species), from **P. whitakeri** by its longer opisthosomal setae d, f and h1 and setae FeII v'' shaped setiform (the seta FeII v'' is spine-like in the latter taxon) and from **P. scalopi** by its shorter, smooth setae h2 and more anteriorly inserted setae FeII v''. The new species can be separated from **P. rackae** by its longer setae v1, more anteriorly inserted setae FeII v'', relatively longer opisthosomal ventral setae and differently inserted caudal setae. Moreover, **P. trisetosus** sp. n. can be readily distinguished from all known species of the genus by the presence of three setae on femur IV as compared to two setae occurring in other taxa. It should be stressed that the presence of this third seta, FeIV n, in the new species is simultaneously a unique character for all known heterostigmatic mites.

Pygmephorus arcuatus sp. n.

(Figs 11-18)

DIAGNOSIS. A large species with relatively short idiosomal setae which are rod-like on hysterosomal dorsum. The setae are covered with characteristically reduced small barbs. Segment D and EF with a pair of sclerotized bow-like crests. Sculpture of the body surface is distinctly marked.

DESCRIPTION OF ADULT FEMALE. The body is elongated, 546 long and 255 wide. Idiosoma is covered with small roundish cavities having up to 3.3 in diameter. The size of cavities diminishes posteriorly. They are the longest on propodosoma, on segment C and legs I and II. Surface between cavities is finely punctated.

GNATHOSOMA (Fig. 11, 13). Gnathosomal capsule is subquadrangular in shape, on its surface occur minute cavities. Dorsum have relatively long cheliceral setae ch1 (21 and 28 each), shorter setae ch2 (15) and blunt-tipped, smooth supracoxal setae pp (7). The setae ch1 and ch2 are covered with 1-6 minute barbs. Bases of the setae pp are prolonged in a relatively long (5) and thin canal in the cuticle. Venter of supracapitulum with a pair of smooth setae (11). Genual setae (23) are about 1/2 longer than femoral setae. Solenidion on palpal femorogenu is short (6) and weakly striated. The diameter of neighbouring non-striated cylindrical structure is 5.

IDIOSOMAL DORSUM (Fig. 11). Prodorsal shield has a pair of horn-like projections located anteriolaterad of stigmata. The stigmata are shaped as in Fig. 11. Setae v1 and v2 are short and narrow (39 and 34, respectively). The setae v1 are setiform, the setae v2 are slightly similar to blunt spines. Setae sc2 are rod-like, longer (73) and distinctly thicker than setae v1 and v2. Idiosomal setae are covered with small and characteristically shaped barbs. The barbs are short, teeth-like, with wide bases (Fig. 12) and they are better developed on dorsum than on venter. Sensilla (29) are relatively slender and covered with several tiny, elongated thickenings. There are three pharyngeal pumps within propodosoma.

Hysterosomal setae are similar in shape to setae sc2, except setae h2 which are slightly thinner and more bent. Setae e and f are aligned almost longitudinally, setae h2 are inserted anteriolaterad of setae h1. The lengths of setae are as follow: c1 = 53, c2 = 64, d = 63, e = 53, f = 69, h1 = 66, h2 = 30. Distance between particular setae: v1 = 40, v2 = 108, sc1 = 122, sc2 = 113, c1 = 113, c2 = 187, d = 196, e = 205, f = 192, h1 = 168, h2 = 149.

Segment D and EF with a pair of longitudinal, bow-like and sclerotized structures each. They are located mediad of particular segmental setae. The structures resemble flat crests/folds on tergal surface and they are distinctly longer on segment D. Porelike cupules ia and im are located anteriomedial of bases of setae d and e, respectively. A pair of identical structures is placed posteriomedial of cupules im and anteriorad of setae c1. A pair of slightly larger, roundish thickenings without any pore lies under the surface of segment EF, close to its median axis. Cupules ih are not discernible. On one side of segment D, posteriad of cupules ia, there are two aberrant structures resembling smooth, tiny setae (Fig. 11).

IDIOSOMAL VENTER (Fig. 13). Propodosomal apodemes are well developed, apodeme 2 is broken in its middle. Apodemes 3 and anterior part of post-sternal apodeme are very weakly sclerotized and almost not discernible. Apodemes 5 are weak and distinctly arched. Ventral setae are relatively short, thin and covered with strongly reduced, minute barbs. The only exception are setae 2c which are smooth. They are formed as short spines. Seta 1c is thin and divided along its main axis into two parts, but the parts are coalesced, including the seta tip. Cupules ips on pseudanal segment are not discernible. Caudal setae ps3 are rod-like and with distinct barbs and they are similar in shape to those on dorsum. The barbs on setae ps1 and ps2 are strongly reduced and difficult to discern. Distance between seta ps3 and ps2 is longer than that between ps1-ps2 and between

both setae ps1. The length of ventral idiosomal setae are as follow. Setae 1a = 39, 1b = 33, 1c = 37, 2a = 35, 2b = 33, 2c = 17, 3a = 35, 3b = 28, 3c = 41, 4a = 34, 4b = 44, 4c = 40, ps1 = 24, ps2 = 22, ps3 = 34.

Distances between particular setae: 1a = 44, 1b = 62, 1c = 149, 2a = 88, 2b = 117, 2c = 138, 3a = 62, 3b = 37, 3c = 160, 4a = 66, 4b = 37, 4c = 108, ps1 = 13, ps2 = 32, ps3 = 67, ps1-ps1 = 12, ps1-ps2 = 10, ps2-ps3 = 19.

LEGS (Figs 14-18). The length of legs increases posteriorly and they are distinctly sculptured. Tibiotarsus I with enlarged, blunt-tipped claw being transversely ribbed. Claws on leg II are large, distinctly ribbed and with thickened bases. Claws III are small, completely smooth and without thickened bases. They are slightly smaller than claws IV but of the same shape. Empodium on leg II and III is small, that one on leg IV is reduced to a tiny, corn-like process (Fig. 18: arrow). There are only 3-4 delicate vertical striae on empodium II and III, difficult to discern.

LEG I (Fig. 14, 15). The setae formula: Tr (1), Fe (4), Ge (4), TiTa (18 + 2 omega + 2 phi). Tibiotarsus I is slightly elongated. Modified subunguinal seta s is relatively long and with wide basis. The seta terminates with two blunt teeth of different size. The teeth are deprived of ribbing. Tarsal eupathidia (p', p'', tc', tc'', ft', ft'') are smooth, tibial eupathidium (k'') has several tiny barbs. Primiventral seta pv' and unguinal seta u' are densely barbed. Unguinal seta u'' is lacking. Tibiotarsal seta v'' is broken off and lost on both limbs in the examined specimen, thus its length and shape is unknown. The remaining tibiotarsal setae are more or less barbed. Solenidia omega are inserted close to each other and aligned transversely. Solenidion omega 1 (10 long) is thicker than the remaining solenidia. Solenidion omega 2 (11) is weakly striated and rod-like in shape. Solenidia phi are slightly smaller (phi 1 = 8, phi 2 = 7) and aligned transversely as well. No cuticular thickening occurs inside the tibiotarsus (optical plane of solenidia phi: Fig. 16). Genua setae Gel I' and Gel I'' are rod-like. Femoral seta Fel d and Fel I' are smooth, the former one is flattened, membranous and bidentated at its tip.

LEG II (Fig. 15). The setae formula: Tr (1), Fe (3), Ge (3), Ti (4 + 1 phi), Ta (6 + 1 omega). Unguinal seta u'' is lacking, all setae are more or less barbed. Femoral seta Fel I' is spine-like and with a few barbs. Seta Fel d is rod-like, seta Fel v'' is setiform. Genua setae are rod-like. Tibial solenidion phi is minute, granular and located posteriad of the base of seta TiII d. It is weakly striated (4-5 striae) and its posterior part (4 long) is formed as a thin canal inside cuticle. Aveoles of three tibial setae, except seta TiII d, are located on a common, small and sclerotized shield. Tarsal solenidion phi is aligned transversely with seta TaII pl''. The solenidion is placed on a small tubercle and its striation is almost non-discernible. Tarsal setae, except unguinal u', are densely barbed. However, seta TaII tc'' is broken off on both limbs and its shape and size is unknown.

LEG III (Fig. 17). The setae formula: Tr (1), Fe (2), Ge (2), Ti (4 + 1 phi), Ta (6). Unguinal seta u'' is absent. All setae are barbed. Setae FelII d, GelII I' and TiIII d are rod-like. Tectal setae (TaIII tc' and TaIII tc'') and

primiventral seta TaIII pl'' are densely barbed. Tibial solenidion phi is reduced to a minute opening in the cuticle which leads to a thin and short (3) canal. The solenidion lies anteriomedial of seta TiIII d and is difficult to discern. Tarsal solenidion omega is lacking. Tarsal seta TaIII pl'' is inserted aberrantly on one leg, i.e. very close to seta TaIII pv' and they both resemble one doubled seta.

LEG IV (Fig. 18). The setae formula: Tr (1) Fe (2), Ge (1), Ti (4 + 1 phi), Ta (6). Unguinal seta u'' is lacking. Seta FeIV v' and TaIV pl'' are short, smooth and blade-like, other setae are more or less barbed. Seta FeIV d is rod-like. Seta TiIV v' is formed as a long, strong spine covered with barbs. Tibial solenidion phi is placed mediad of seta TiIV d and is shaped identically as that on leg III. Tarsal solenidion omega is lacking.

Males and larvae are unknown.

MATERIAL EXAMINED: 1 female.

LOCUS TYPICUS: Alaska. From *Peromyscus sitkensis* Merriam, 1897, Baranof I., Sitka, 8.8 km N (Starrigavan Creek), 16 Juni 1979, coll. G. E. Haas.

TYPE REPOSITORY. Holotype is deposited in the collection of the Zoological Institute and Zoological Museum, University of Hamburg, Germany.

DERIVATIO NOMINIS: The specific name of this taxon (Lat.: **arcuatus** = bow-like, arched) is referring to the bow-like sclerotized crests formed on dorsum of segment D and EF.

REMARKS. We have decided to found a new taxon for that only available specimen due to its peculiarities which distinguish it well from all known members of the genus *Pygmephorus*. The new species is closely related to four taxa which form a natural (monophyletic) assemblage, termed here the "**forcipatus**"-complex. This group comprises *Pygmephorus forcipatus* Willmann, 1952, *P. horridus* Mahunka, 1973, *P. moreohorridus* Mahunka, 1975 and *P. mahunkai* Smiley & Whitaker, 1979. As synapomorphic characters for that species-complex one can recognize elongated segment D (and consequently, elongated body), presence of a pair of longitudinal, arched crests on segment D and EF (the crests on segment EF are usually considerably smaller) and a characteristic transformation (size-reduction) of barbs on idiosomal dorsal setae. Among other synapomorphies shared by these taxa are probably the bidentation of the setae FeI d tips and the distinct sculpturing of the body surface.

P. arcuatus sp. n. can be readily separated from related species chiefly by the shape and size of its segmental crests, claws II and III, hysterosomal setae e and h2 and tarsal setae TaIII pl''.

The crests in *P. arcuatus* sp. n. are distinctly shorter on segment D and longer on segment EF (Fig. 11) as compared to those in the remaining

taxa. The size and shape of claws II and III is differentiated in the new species. The claws II are large, strongly ribbed and with thickened bases (Fig. 15). The claws III are smaller, smooth and simple, i.e. without such thickenings (Fig. 17). The claws III in *P. arcuatus* sp. n. are similar to those on leg IV. The simple, non-ribbed claws should be recognized as a plesiomorphic condition. In the remaining taxa of the complex, claws II and III are identically formed, i.e. they are large, strongly ribbed and with thickened bases, resembling those in *P. spinosus*, a type-species of the genus. Hysterosomal setae e and h2 are longer and thicker in *P. arcuatus* sp. n. as compared to those in other *forcipatus*-taxa and its tarsal setae TaIII pl'' are setiform, long and barbed. The setae TaIII pl'' are blade-like, short and smooth in the remaining species. Such a formation of the above three pairs of setae in the new species is a plesiomorphic condition as well. Another character which easily separates *P. arcuatus* sp. n. is a lack of tibiotarsal thickening inside the limb, a feature which is well developed in other discussed taxa.

The above mentioned plesiomorphic characters of the new species and its only slightly elongated segment D, intermediate degree of reduction of barbs on hysterosomal setae, distinctly marked cupules ia and im, not much differentiated size of crests on segment D and EF and relatively well developed crests EF indicate a comparatively ancestral position of *P. arcuatus* sp. n. among other more derived members of the *forcipatus*-group.

One can not exclude that *P. soricis* Krczal, 1959 belongs to this complex as well, for that points out the presence of crests on segment D and EF in the species. The crests on segment D are there relatively short and resemble to some degree those in *P. arcuatus* sp. n. Interestingly, hysterosomal setae d and e are inserted slightly laterad of the crest edge, similarly as in the new species, and not mediad as in the remaining taxa. In *P. soricis*, segment D is shaped "normally", i.e. is not elongated. On the other hand, *P. soricis*, a highly derived taxon, differs from other members of the *forcipatus*-complex in several important aspects. Its body sculpturing (cavitation) is of slightly different type, barbs on setae are longer and although claws II and III are ribbed and with thickened bases, they are much smaller compared to those in the above group of species. Moreover, *P. soricis* is characterized by several autapomorphies. These include the bifurcation of hysterosomal setae e and h1, increasing size of caudal setae from ps3 to ps1 (where ps3 are the shortest), extreme thickness of some setae on leg II, reduction (absence) of chelicerai setae ch1 and transformation of supracoxal setae pp into short, granular structure. However, any assessment of phylogenetic relationships among taxa in the genus *Pygme-phorus* needs further studies as, up to now, we practically know nothing about that.

A c k k n o w l e d g e m e n t s

We are grateful to Prof. Dr. N. Wilson, the University of Northern Iowa, (Cedar Falls) for providing us with the material, and to Dr. D. Vinyard, the Zoological Institute and Zoological Museum (University of Hamburg) for corrections to the English manuscript.

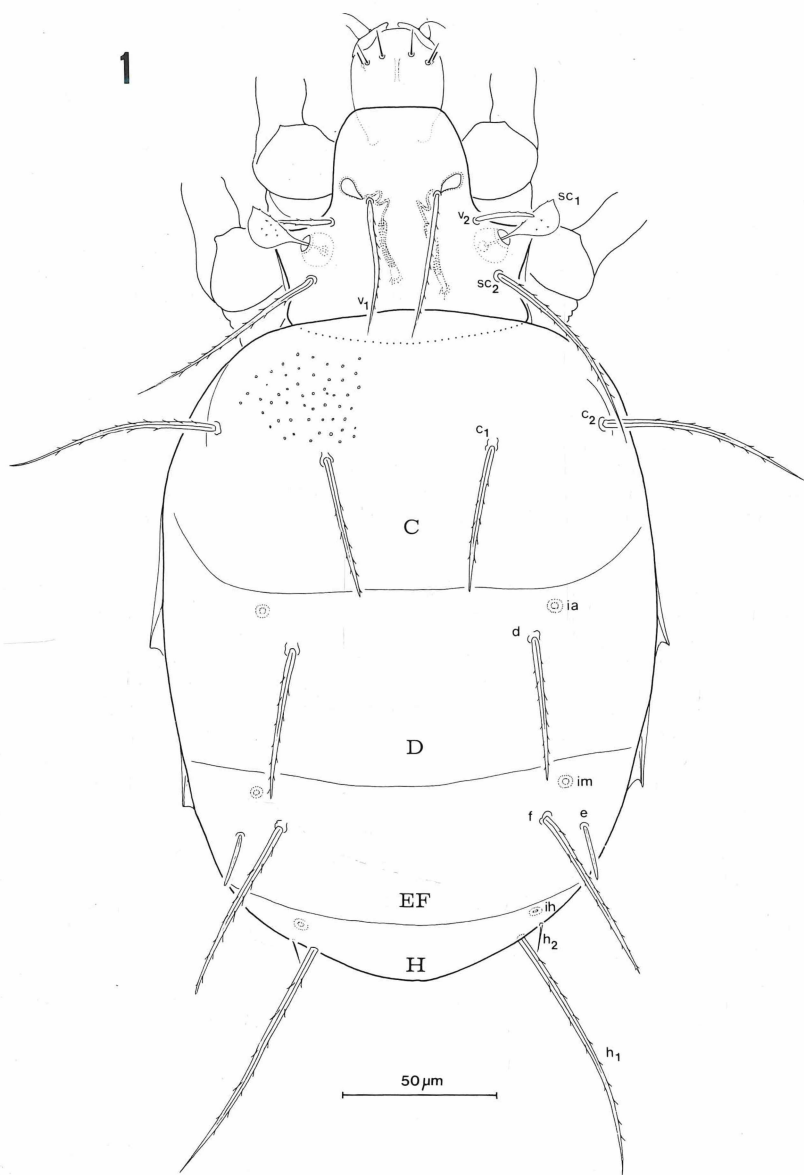


Fig. 1: *Pygmephorus trisetosus* sp. n.: habitus of female, dorsal view (holotype).

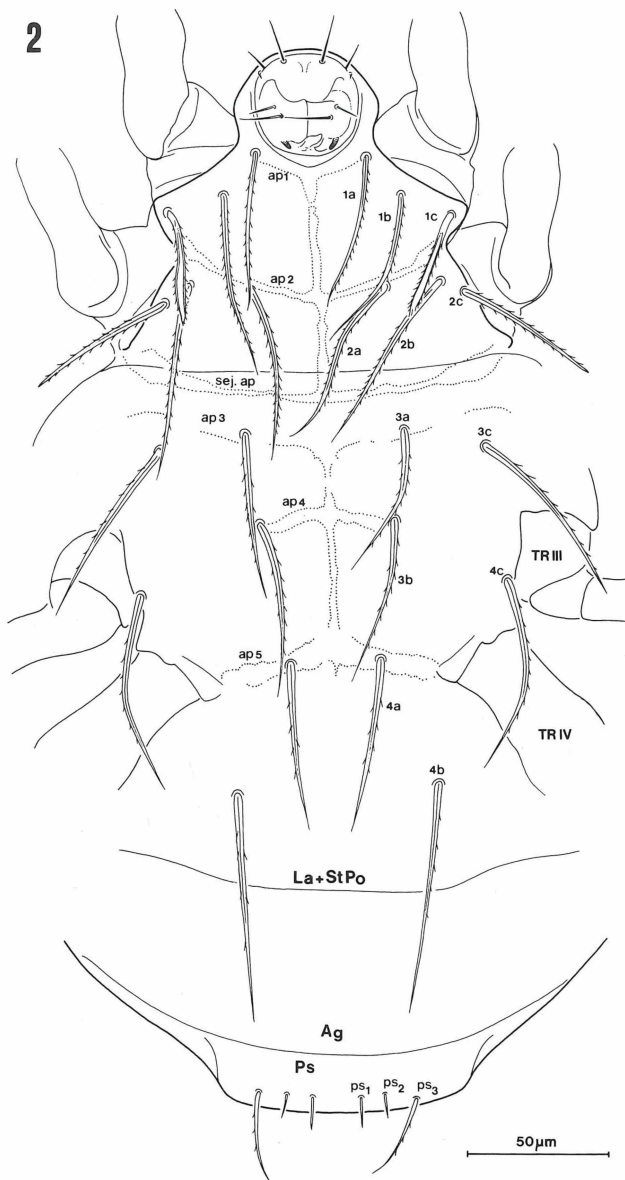
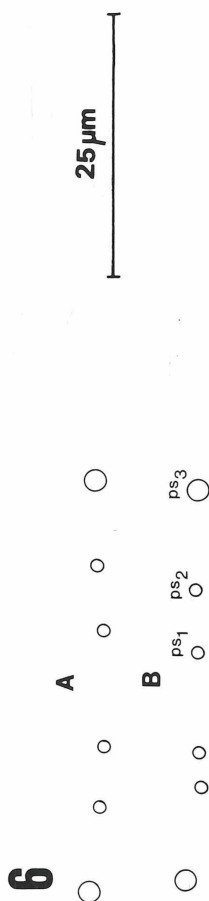
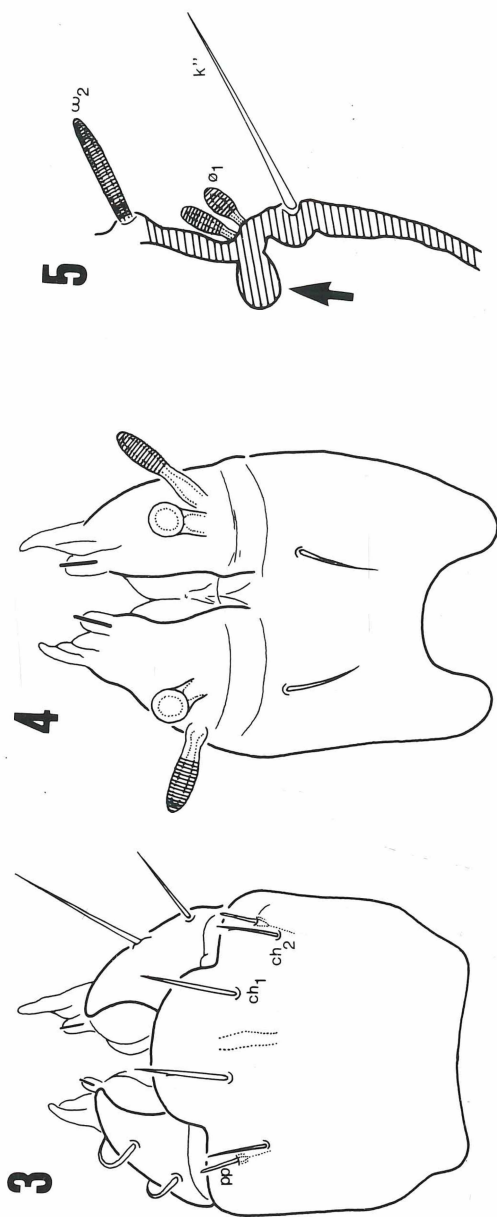
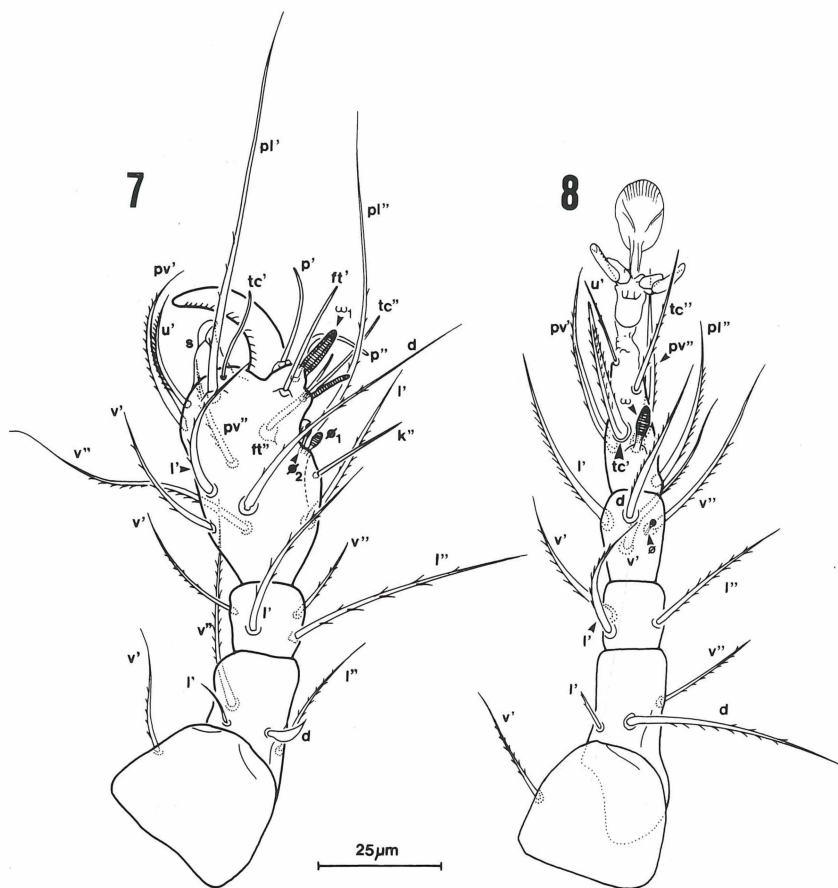


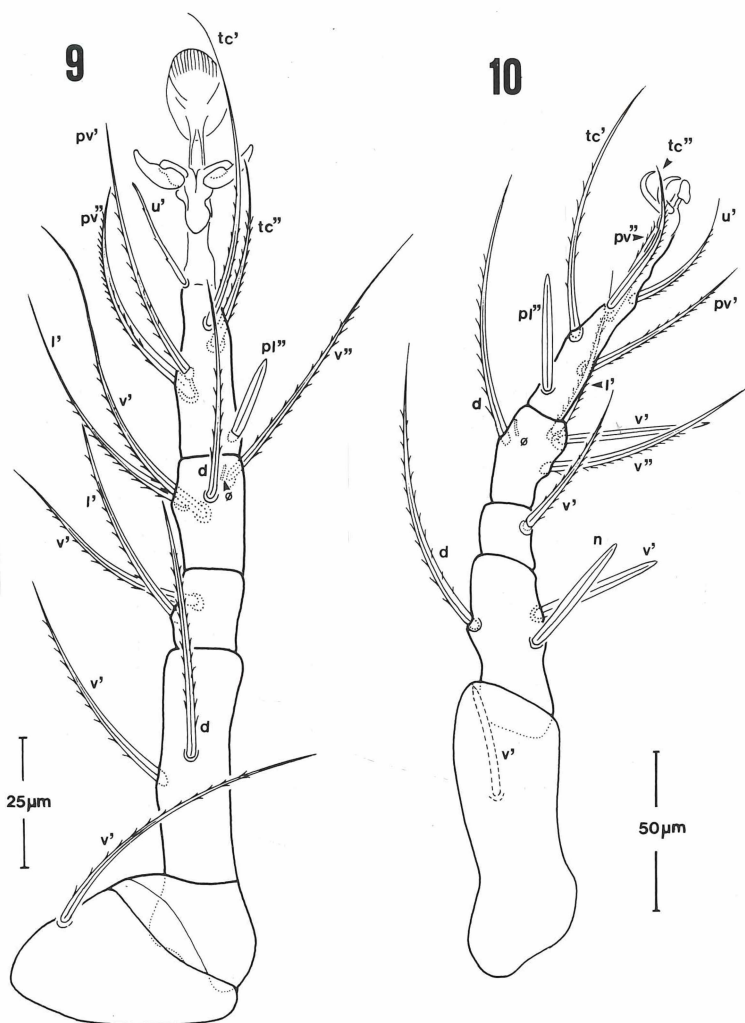
Fig. 2: **Pygmephorus trisetosus** sp. n.: habitus of female, ventral view (paratype).



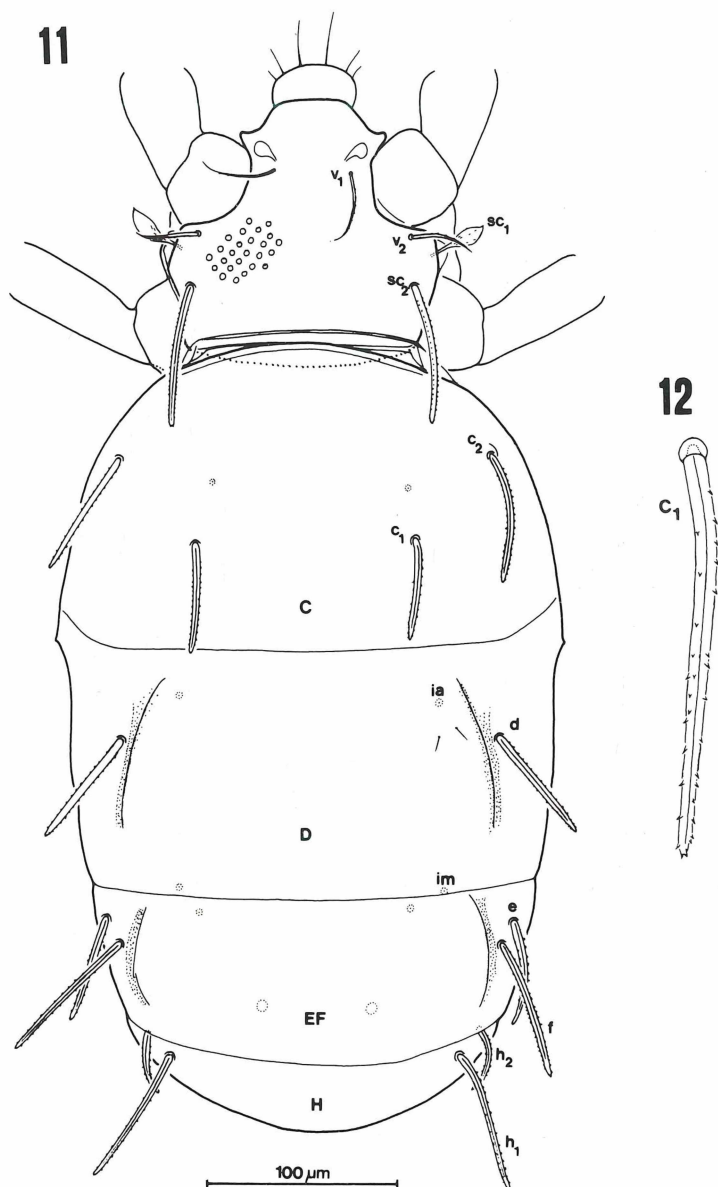
Figs 3-6: **Pygmephorus trisetosus** sp. n.: 3 = gnathosoma, dorsal view; 4 = gnathosoma, ventral view; 5 = thickening inside tibiotarsus I (arrow); 6 (A, B) = aveoles of caudal setae (Figs 3-5, 6B: paratypes; 6A: holotype).



Figs 7-8: **Pygmephorus trisetosus** sp. n.: 7 = leg I; 8 = leg II (Fig. 7: para-type; Fig. 8: holotype).



Figs 9-10: **Pygmephorus trisetosus** sp. n.: 9 = leg III; 10 = leg IV (para-
types).



Figs 11-12: *Pygmephorus arcuatus* sp. n.: 11 = habitus of female, dorsal view; 12 = seta c_2 .

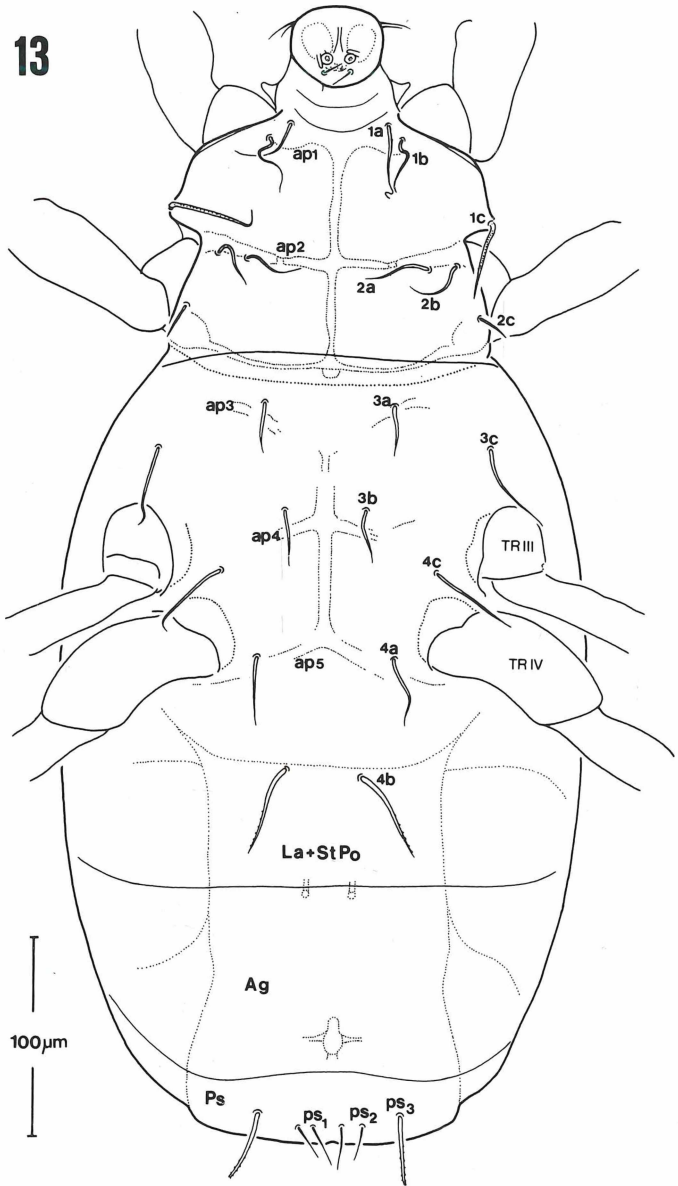
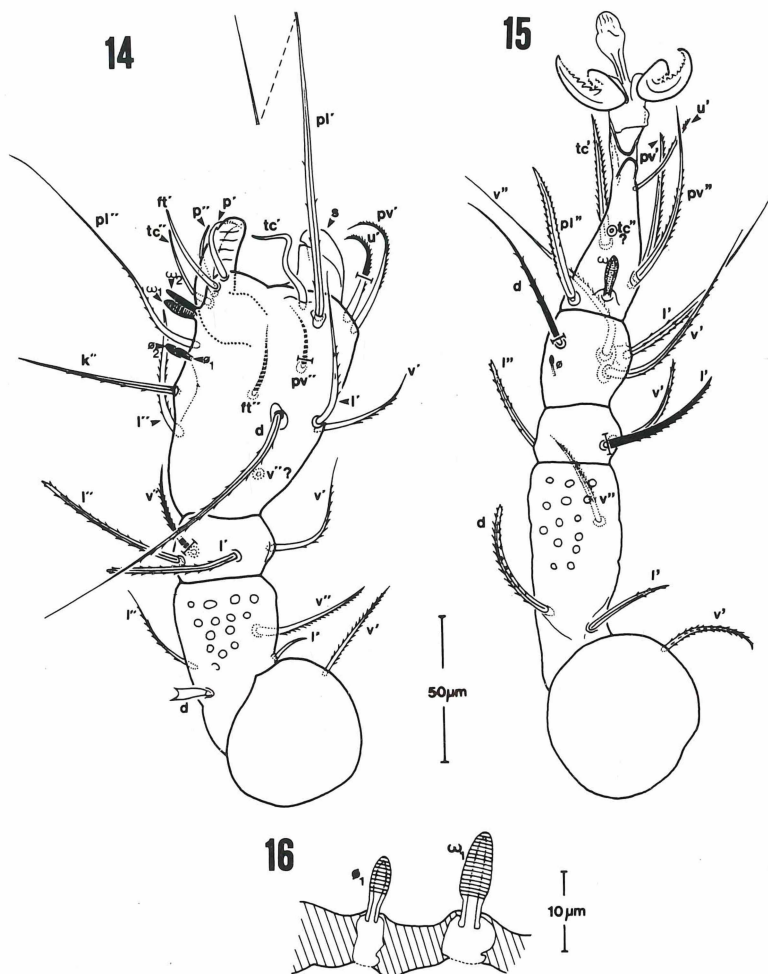
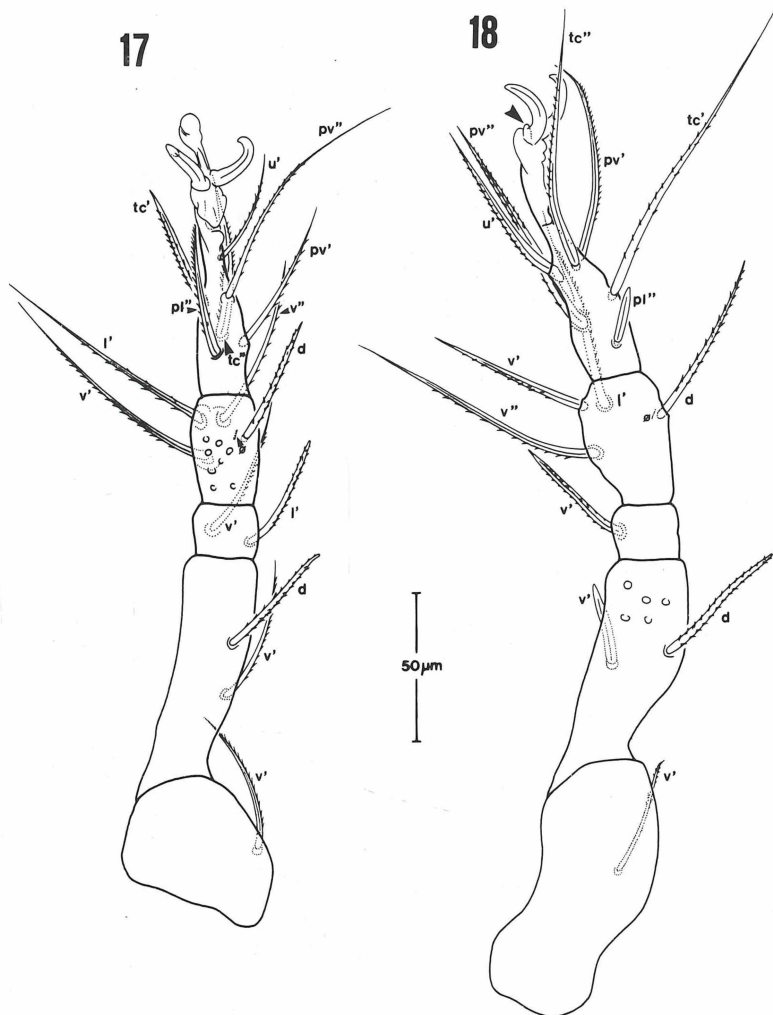


Fig. 13: *Pygmephorus arcuatus* sp. n.: habitus of female, ventral view.



Figs 14-16: **Pygmephorus arcuatus** sp. n.: 14 = leg I; 15 = leg II; 16 = fragment of tibiotarsus I (broken of setae on one leg are marked in black; those lost on both legs are indicated by "?").



Figs 17-18: **Pygmephorus arcuatus** sp. n.: 17 = leg III; 18 = leg IV.

Z u s a m m e n f a s s u n g

Zwei neue phoretische Milbenarten der Gattung **Pygmephorus** (Heterostigmata, Pygmephoridae) werden beschrieben. Sie wurden auf Kleinsäugetern in Alaska gefunden. **Pygmephorus trisetosus** sp. n. unterscheidet sich von allen bisher bekannten Arten dieser Gattung durch die ungewöhnliche Zahl von drei Borsten auf dem Femur IV. **Pygmephorus arcuatus** sp. n. ist charakterisiert durch das Vorhandensein bogenförmiger Verdickungen auf den jeweils dorsolateralen Seiten der Segmente D und EF sowie durch die unterschiedliche Größe und Gestalt der Krallen auf den Beinen II und III.

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Zeitschrift/Journal: [Entomologische Mitteilungen aus dem Zoologischen Museum Hamburg](#)

Jahr/Year: 1990

Band/Volume: [10](#)

Autor(en)/Author(s): Dastych Hieronymus, Rack Gisela

Artikel/Article: [Two new species of the genus Pygmephorus from Alaskan small mammals \(Acari: Heterostigmata\) 93-112](#)