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Contribution to the knowledge of *Euptyctima* (*Acari*: *Oribatida*)

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ABSTRACT. *Oribotritia rafalskii* from Algeria, *Phthiracarus rafalskii* from USA, *Plonaphacarus rafalskii* from India, *Hoplophthiracarus rafalskii* from New Caledonia, *Arphthicarus rafalskii* from Mexico and *Notophthiracarus rafalskii* from Madagascar, new to the science, are described. *Rafacarus rafalskii* NIEDBALA, 1981 is transferred to the genus *Steganacarus*.

Key words: acarology, taxonomy, *Oribatida*, *Euptyctima*, new species, new combination.

The paper includes descriptions of a few species named in honour of Prof. J. RAFALSKI. One species is transferred from *Atropacarus* (*Atropacarus*) to *Steganacarus* (*Steganacarus*). The species belong to different genera of the *Euphthiracaroidea* and *Phthiracaroidea* from the *Euptyctima* group and have been collected all over the world, in all the zoogeographical regions: Palearctic, Nearctic, Neotropical, Ethiopian, Oriental and Australian.

Abbreviations used:

DATE - Department of Animal Taxonomy and Ecology, Adam Mickiewicz University, Poznań;

HNHM - Zoological Department of the Hungarian Natural History Museum, Budapest;

MRAC - Musee Royale de l'Afrique Centrale, Tervuren;

ZMUT - Zoological Museum of the University of Turku.

All measurements are in μm.

Acknowledgements.

I wish to express my thanks to Prof. J. BALOGH, Budapest, Dr. V. BEHAN-PELLETIER, Ottawa, Dr. P.T. LEHTINEN, Turku, Dr. F. PUYLALERT, Tervuren for kindly letting me use the specimens from their collections in my studies.

Oribotritia rafalskii sp. nov.

(Figs 1-8)

MEASUREMENTS OF HOLOTYPE

Prodorsum: length 495, width 414, height 151, sensillus 141, setae: rostral 75.7, lamellar 111, interlamellar 45.4, exobothridial 55.7; notogaster: length 1012, height 727, setae: c_1 209, h_1 31,7, ps_1 44,4; genital and aggenital plates 247x103, anal and adanal plates 480x88,4.

DESCRIPTION

Large species, colour dark brown, tegument densely punctate.

Prodorsum with two pairs of lateral carinae, sensilli long, setiform, gradually tapering to the distal ends, setae simple, fine, interlamellar setae erect and curved posteriorly, le > ro > ex > in. Notogaster with 14 pairs of simple, flexible setae, unequal in length, setae c_1, c_2, cp, d_1, d_2, ps_2, ps_3 longer than other setae (c_1/c_1-d_1= 0,8), setae of row c remote from anterior margin, only vestigial setae f_1 and lyrifissures ia and ih visible.

Ventral region. Setae h of mentum considerably longer than distance between them, chaetotaxy and solenidiotaxy of palps: 0-3-0-2-9(1), epimeral chaetotaxy: 3-0-3-3, 8 pairs of genital, 2 pairs of aggenital, one pair of anal and 3 pairs of adanal setae present, lyrifissures iad located slightly anteriorly to ad_3 setae.

Legs. Chaetotaxy and solenidiotaxy (without tarsi): I: 1-4-5(2)-5(1), II: 1-4-4(1), 4(1), III: 3-2-3(1)-3(1), IV: 3-2-2(1)-3(1), femora I with distinct spines at anterior ends, all tarsi triheterodactylous.

Holotype and 12 paratypes (in DATE), Algeria, Chrea, 1650m, N slope, litter under *Taxus baccata* and *Ilex aquifolia*, 27 III 1985, leg. S. DE SMET.

COMPARISON

The new species is similar to *O. hauseri* MAHUNKA, 1982b from Greece but has longer sensilli and setae, especially prodorsal setae.

Phthiracarus rafalskii sp. nov.

(Figs 9-12)

MEASUREMENTS OF HOLOTYPE

Prodorsum: length 304, width 240, height 114, sensillus 73.4, setae: interlamellar 152, lamellar 70.8, rostral 53.1, exobothridial 73.4; notogaster: length 647, width 450, height 399, setae: c_1 96.1, h_1 and ps_1 68.3; genito-aggenital plate 151x106, ano-adanal plate 242x106.

DESCRIPTION

Colour light brown, integument finely porose.

Prodorsum. Regions: dorsal and laterals narrow, lateral carinae absent. Sensilli approximately long, narrow, swollen in proximal parts. Exobothridial setae longer than lamellar and rostral setae, comparative length: in>ex>le>ro.

Notogaster with 15 pairs of moderately short (c_1/c_1-d_1 = 0.72) setae. Setae c1 and c_1 slightly remote from anterior margin, setae c_3 positioned on the margin. Vestigial setae f_1 inserted posteriorly to h_1 setae. All four pairs of lyrifissures: ia, im, ip, ips present.

Ventral region. Setae h of mentum longer than distance between them. Genito-aggenital plate each with 9 setae, formula is 4+2: 3. Five pairs of well developed setae on ano-adanal plates, comparative length: $an=ad_3<ad_1=ad_2$.

Legs. Formula of setae and solenidia of "complete type". Setae d on femora I positioned distally. Setae a" on tarsus I, a" and ft" on tarsus II straight distally.

Holotype and 10 paratypes: USA, ORE. Benton Co. Marys Peak 1750' grass and *Sphagnum* under alder tree, 16 Feb. 1976 (courtesy Dr. BEHAN-PELLETIER, Biosystematics Research Institute, Ottawa). Holotype and 5 paratypes in Canadian Nat. Collection, Ottawa, 5 paratypes in DATE.

COMPARISON

The most distinctive character of the new species is the shape of the sensilla, swollen in proximal parts. Among the species with this feature: *Phthiracarus crassus* NIEDBAŁA, 1983 from Caucasus and Occidental Asia has shorter interlamellar setae, only 2 pairs of lyrifissures, setae c_1 and c_2 farthest from anterior margin of notogaster. *Phthiracarus incertus* NIEDBAŁA, 1983, Holarctic, has setae c_1 and c_2 farther from anterior margin of notogaster, vestigial setae f_1 anteriorly to h_1 setae, only 2 pairs of lyrifissures, setae h of mentum shorter than distance between them, setae ad_1 and ad_2 on ano-adanal plates vestigial. *Phthiracarus lentulus* (C.L.KOCH, 1841), Palearctic, has vestigial setae f_1 anteriorly to h_1 setae, setae h of mentum shorter than distance between them, setae ad_1 and ad_2 on ano-adanal plates vestigial; *Phthiracarus persimplex* MAHUNKA, 1982a from Far East has prominent dorsal carina of prodorsum, setae c_1 and c_2 farthest from anterior margin of notogaster, vestigial setae f_1 anteriorly to $h_1$setae, setae h of mentum shorter than distance between them, setae ad_1 and ad_2 on ano-adanal plates vestigial.

***Plonaphacarus rafalskii* sp. nov.**

(Figs 13-22)

MEASUREMENTS OF HOLOTYPE

Prodorsum: length 288, width 207, height 106, sensillus 81.0 setae: interlamellar 126, lamellar 45.5, rostral 32.9; notogaster: length 532, width 380, height 368, setae: c_1 126, h_1 114, ps_1 109; genito-aggenital plate 116x95.9, ano-adanal plate 212x95.9.

DESCRIPTION

Colour yellow, integument finely porose, posterior margin of notogaster slightly pitted.

Prodorsum. Surface of rostral setae region covered with small spines. Dorsal and lateral regions present. Lateral carinae very long reaching anterior end of rostrum. Posterior furrows distinct. Sensilli approximately long, with narrow pedicel and enlarged heads covered with small spines. Interlamellar setae long, erect, covered with small spines in distal halves, lamellar setae short but robust, rostral setae spiniform, exobothridial setae vestigial, comparative length: in>le>ro.

Notogaster with 15 pairs of stout, conical, moderately long (c_1/c_1-d_1 = 1.06) setae, sparsely covered with small spines. Setae c_1 and c_3 remote from anterior margin, setae c_2 positioned farther. Vestigial setae f_1 anteriorly to h_1 setae. Two pairs of lyrifissures ia and im present.

Ventral region. Setae h of mentum vestigial. Formula of genital setae 4+2: 3. Setae of ano-adanal plates smooth, ad_1 and ad_2 very long, bent distally, comparative length: $ad_1 = ad_2 > an > ad_3$.

Legs. Formula of setae and solenidia of "incomplete type". Setae a' on tarsi I absent. Setae d on femora I remote from distal ends. Setae a" on tarsi I and a" on tarsi II bent distally, setae ft" on tarsi II straight distally.

Holotype and 6 paratypes: India, west Bengal, Darjeeling, 12 km NW of Sukhiapokri, 2350 m, cloud forest with stones, 01.05.1979, leg. P.T. LEHTINEN (courtessy Dr. Pt. T. LEHTINEN, Zoological Museum, University of Turku). Holotype and 3 paratypes in ZMUT, 3 paratypes in DATE.

COMPARISON

This species can be distinguished from its congeners by anterior region of prodorsum covered with small spines, shape of sensilli, which are long with enlarged heads, nearly long lamellar setae, conical shape of gastronotal setae, setae ad_1 and ad2 long and bent distally.

Hoplophthiracarus rafalskii sp. nov.

(Figs 23-30)

Measurements of holotype: prodorsum: length 215, width 157, height 73.4, sensillus 78.4; setae: interlamellar 83.5, lamellar 15.2, rostral 37.9, exobothridial 10.1; notogaster: length 434, width 293, height 263, setae: c_1 101, cp 73.4, h_1 106, ps_1 104, ps_3 58.2; genito-aggenital plate 126x70.8, ano-adanal plate 167x91.1.

DESCRIPTION

Colour brown, integument weakly pitted.

Prodorsum without regions and posterior furrows. Lateral carinae reach sinus. Sensilli long, with narrow pedicels and narrow spindle-shaped heads covered with small spines. Interlamellar setae stout, erect, covered with small spines in distal

halves, lamellar and rostral setae smooth, spiniform, comparative length: in > ro > le > ex.

Notogaster with 15 pairs of robust setae covered with small spines in distal halves. Dorsal setae longer (c_1/c_1-d_1 = 0.91) than laterals. Setae c_1 and c_3 remote from anterior margin, setae c_2 considerably futher from margin. Vestigial setae f_1 posteriorly to h_1 setae. Two pairs of lyrifissures ia and im present.

Ventral region. Setae h of mentum equal to distance between them. Formula of genital setae is 4+4: 1. Ano-adanal plate each with 5 rough setae, setae ad_1 and ad_2 long, setae ad_3 minute, comparative length: ad_1 > ad_2 > an > ad_3.

Legs. Setal and solenidial chaetotaxy of "incomplete type". Setae a' of tarsi I are absent. Setae d on femora I short and situated on the distal ends of articles. Setae a" on tarsi I and II and setae ft"on tarsi II straight distally.

Holotype and 24 paratypes: New Caledonia, Mont Panie, 1300-1500 m, moss on trunks, 07-08. 10. 1977, leg. J. Balogh. Holotype and 11 paratypes in HMHM, 12 paratypes in DATE.

COMPARISON

This species is very similar to a Palaearctic species *H. vanderhammeni* NIEDBAŁA, 1991 and differs in the sensilli longer than height of prodorsum and length of setae h of mentum equal to their mutual distance.

***Steganacarus* (*Steganacarus*) *rafalskii* (NIEDBAŁA, 1981) n. comb.**

(Figs 31-34)

Rafacarus rafalskii NIEDBAŁA, 1981
Atropacarus (*Atropacarus*) *rafalskii*: NIEDBAŁA (1992)

To classify this species, in 1981 a new genus, *Rafacarus*, was introduced, mainly because this species showed the then unique number and arrangement of setae on the ano-adanal plates. However, assuming the concept of cladistic classification, this species was found (NIEDBAŁA 1986b) to belong to the genus *Atropacarus*, with the neotrichy of setae on the notogaster and ano-adanal plates. Only recently, the observation of the material collected from Serra do Maniguera has revealed that setae d on tibiae IV are long and independent of solenidia, which places *Rafacarus rafalskii* in the genus *Steganacarus*.

Measurements of specimen from Serra do Maniguera: prodorsum: length 303, width 212, height 121, sensillus 48.1, setae: interlamellar 43.0, lamellar 12.6, rostral 35.4; notogaster: length 555, width 374, height 328, setae: c_1 and ps_1 37.9, h_1 40.5; genito-aggenital plate 78.4x50.6, ano-adanal plate 106x58.2.

DIAGNOSIS

Colour yellow or light brown. Microsculpture consisting of deep pits. Body covered by strong cerotegument.Prodorsum with distinct regions and posterior fur-

rows, lateral carinae absent, sensilli club-like, heads covered with small spines, interlamellar setae erect, enlarged to distal ends and covered with small spines, lamellar setae needle-shaped, smooth, rostral setae spiniform, rough, exobothridial setae short or vestigial.

Notogaster with 17 pairs of thick, short (c_1/c_1-d_1 = 0.5) setae, ending in a tuft of spines, vestigial setae not visible, two pairs of lyrifissures ia and im present.

Ventral region. Setae h of mentum equal to the distance between them, formula of genital setae 4+3: 2, ano-adanal plates each with 7 setae, the smallest two, additional setae located anteriorly to seta ad_2, which is thick and sharply pointed distally, setae on proximal margin diminish anteriorly.

Leg chaetotaxy of "incomplete type". Setae a' on tarsi I and setae l' on genae IV absent.

Material examined - 13 specimens: Brazil, Serra do Maniguera, 2400 m, sphagnum bog, *Sphagnum* and moss, XI 1990, leg. J. BALOGH.

Arphthicarus rafalskii sp. nov.

(Figs 35-37)

Measurements of holotype: prodorsum: length 167, width 121, height 70.8, sensillus 58.2, setae: interlamellar 50.6, lamellar and exobothridial 12.6, rostral 37.9; notogaster: length 353, width 247, height 293, setae: c_1 58.2, h_1 55.7, ps_1 48.1, genito-aggenital plate 96.1x53.1, ano-adanal plate 129x58.2.

DESCRIPTION

Small species, colour yellow, microsculpture of integument finely punctate.

Prodorsum with weak regions and lateral carinae reaching the sinus. Sensilli fairly long with narrow pedicels and fusiform heads covered with small spines. Interlamellar setae stout, erect, covered with small spines in distal halves. Rostral setae spiniform, rough. Lamellar and exobothridial setae needle-shaped, smooth, comparative length: in > ro > le = ex.

Notogaster with 15 pairs of fairly short (c_1/c_1-d_1 = 0.77) setae, covered with small spines. Majority of setae bent anteriorly. Setae of row c remote from anterior margin, setae c_2 farther than c_1 and c_3 setae. Setae cp small. Vestigial setae f_1 situated on the level of h_1 setae. Two pairs of lyrifissures ia and im present.

Ventral region. 9 pairs of genital setae with formula 7: 2, 5 pairs of anal and adanal setae, comparative length: ad_2 > ad_1 > an > ad_3.

Legs. Chaetotaxy of setae of "incomplete type". Setae v' on femora I and l' on genae IV are absent. Setae a" on tarsi I and II and ft" on tarsi II straight distally.

Holotype and one paratype (in DATE): Mexico, coastal zone, Puerto Vallarta, Quimixto, waterfalls, litter from mixed forest near main cascade, 27 IX 1995, leg. W. NIEDBAŁA.

COMPARISON

The new species is similar to *Arphthicarus inelegans* (NIEDBAŁA, 1986a) and differs in the fusiform shape of heds of sensilli, spiniform setae c_3 and cp of notogaster and placement of genital setae g_6 anteriorly to g_5 setae.

Notophthiracarus rafalskii sp. nov.

(Figs 38-44)

Measurements of holotype: prodorsum: length 278, width 177, height 131, sensillus 101, setae: interlamellar 27.8, lamellar 22.8, rostral 12.6, exobothridial 32.6; notogaster: length 583, width 185, height 349, setae: c_1 30.4, h_1 and ps_1 35.4; genito-aggenital plate 126x106, ano-adanal plate 172x116.

DESCRIPTION

Colour yellow. Body surface covered with strong concavities except ano-adanal plates.

Prodorsum with powerful dorsal carina, lateral carinae absent. Regions weakly visible. Posterior furrows distinct. Sensilli long, gradually thickening, without well separated heads, covered with distinct spines in distal halves. Setae fine, spiniform, short, rostral setae remote from each other, comparative length: ex > in > le > ro.

Notogaster with 15 pairs of short (c_1/c_1-d_1 = 0.18), fine, spiniform setae. Setae c_1 situated on anterior margin, c_3 close, c_2 remote from margin. Vestigial setae f_1 and f_2 invisible. Two pairs of lyrifissures ia and im present.

Ventral region. Setae h of mentum longer than distance between them. Arrangement of genital setae is 5: 4. Ano-adanal plate each with 5 minute setae, setae ad_1 and ad_2 close to each other and close to paraxial margin of plate.

Legs. Leg chaetotaxy of "complete type". Setae d on femora I situated on distal ends of articles.

Holotype (in MRAC): Madagascar, Foulpointe, Berlese sample, 10.12.1993, coll. A. Pauly, no 178.022 (courtesy Dr. F. PUYLAERT, Musee Royale de l'Afrique Centrale, Tervuren).

COMPARISON

This species is similar to *A.(H.) multirugosus* (MAHUNKA, 1978), *A.(H.) pustulatus* (MAHUNKA, 1993) and *Kakophthiracarus mwali* (MAHUNKA, 1994). *A.(H.) multirugosus* has an anterior cowl of notogaster, some setae of notogaster flagelliform and different arrangement of c setae of notogaster. *A.(H.) pustulatus* has setae ad_2 and ad_3 of ano-adanal plate remote from paraxial margin. *K. mwali* has rostral setae close to each other and different arrangement of c setae of notogaster.

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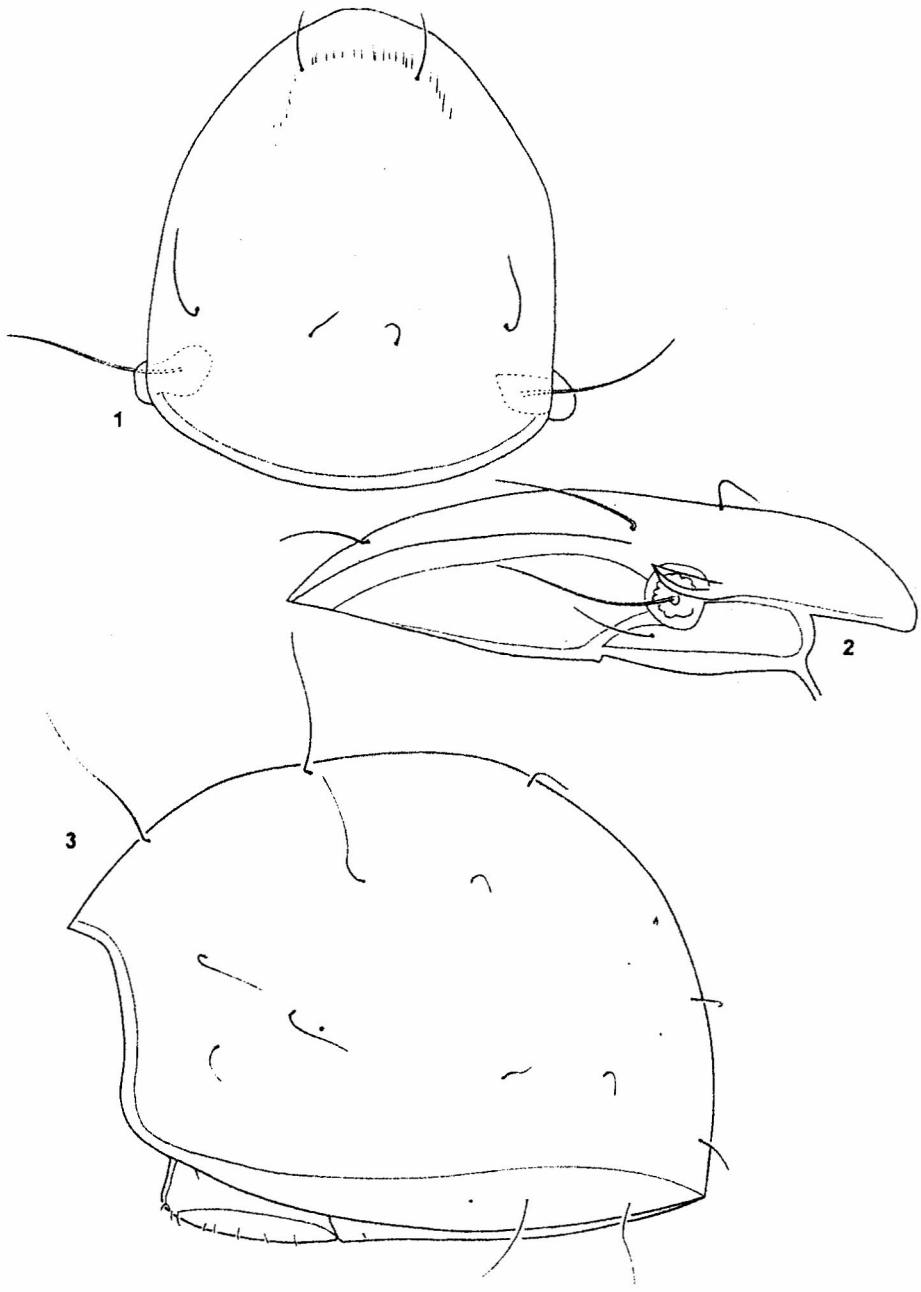
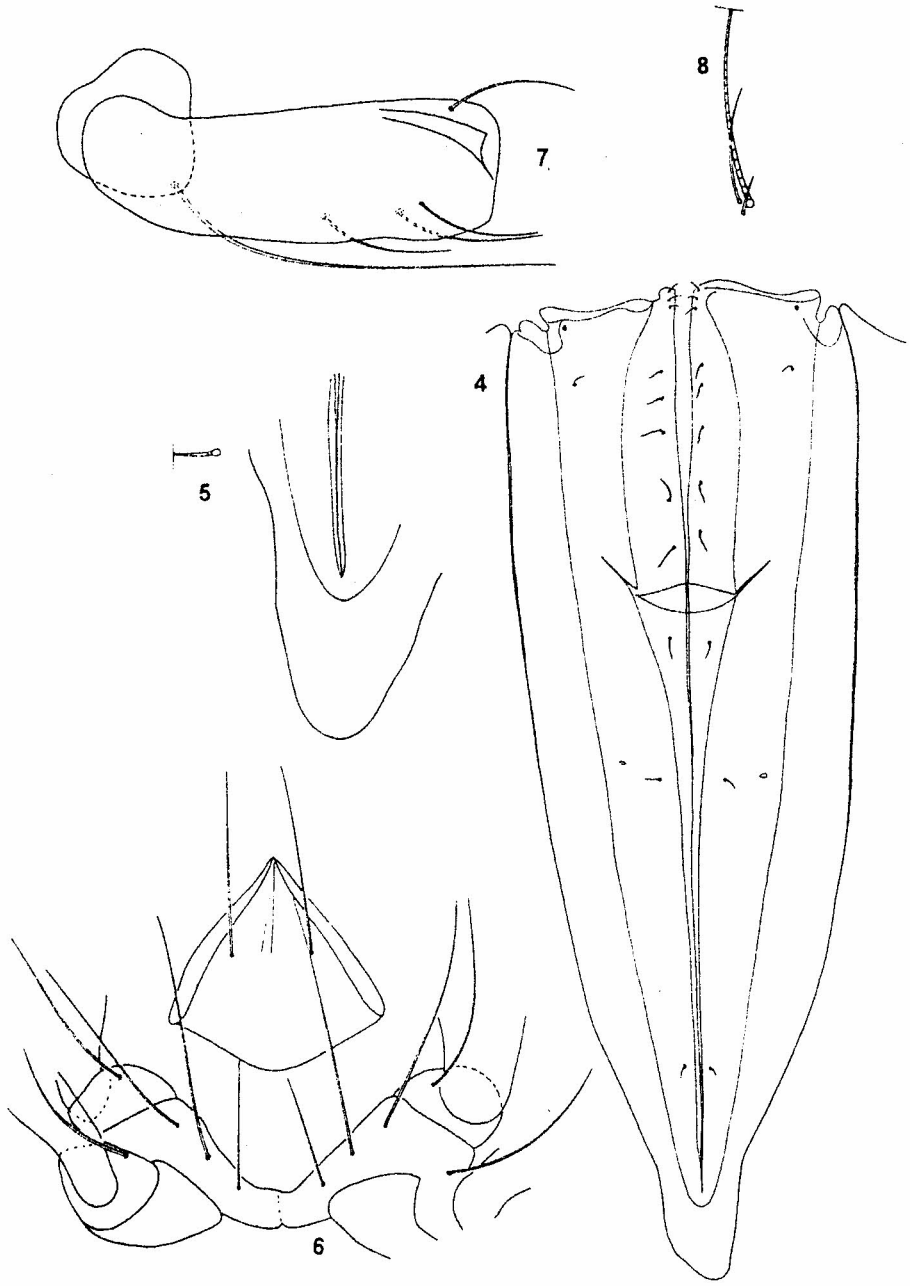
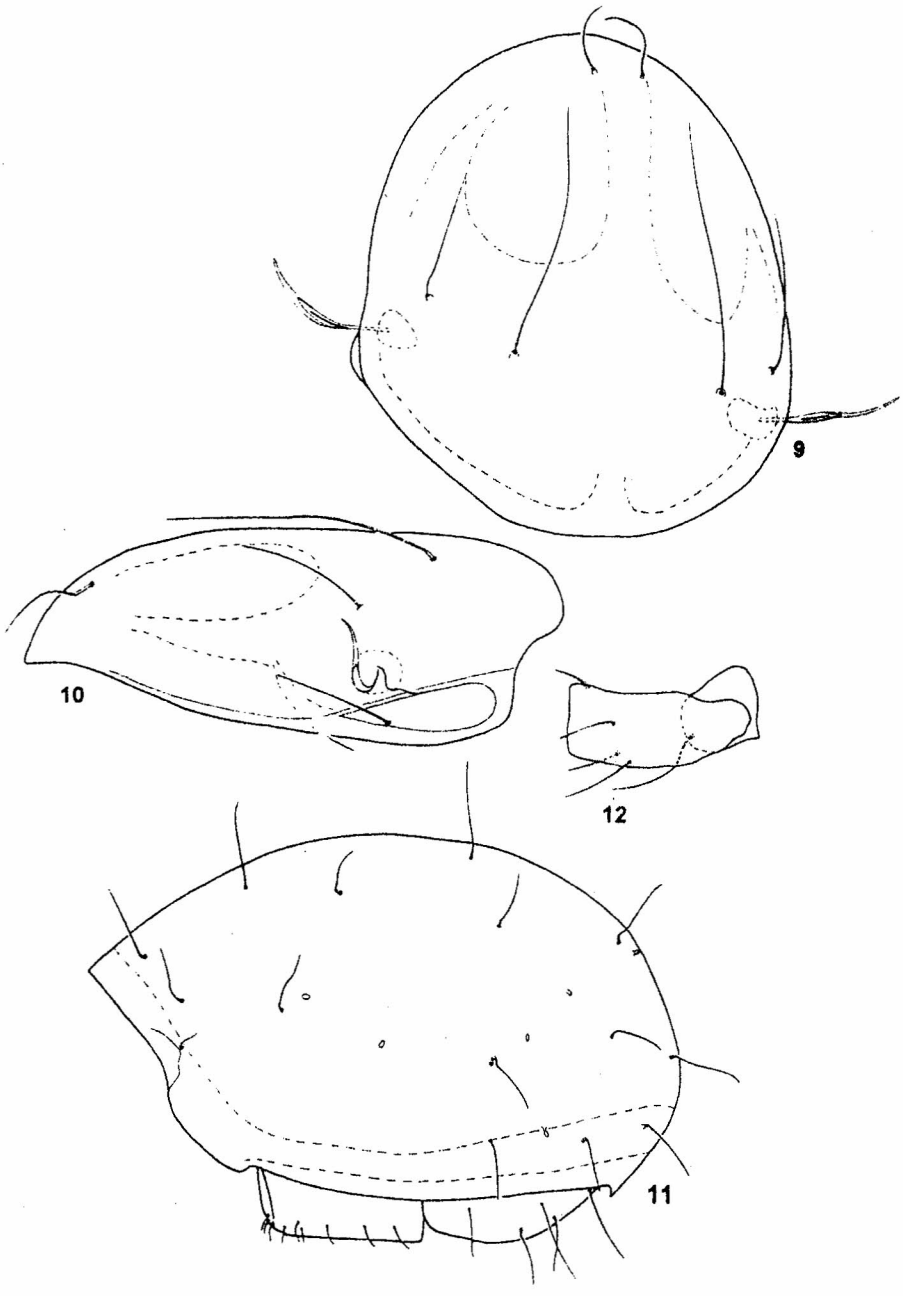


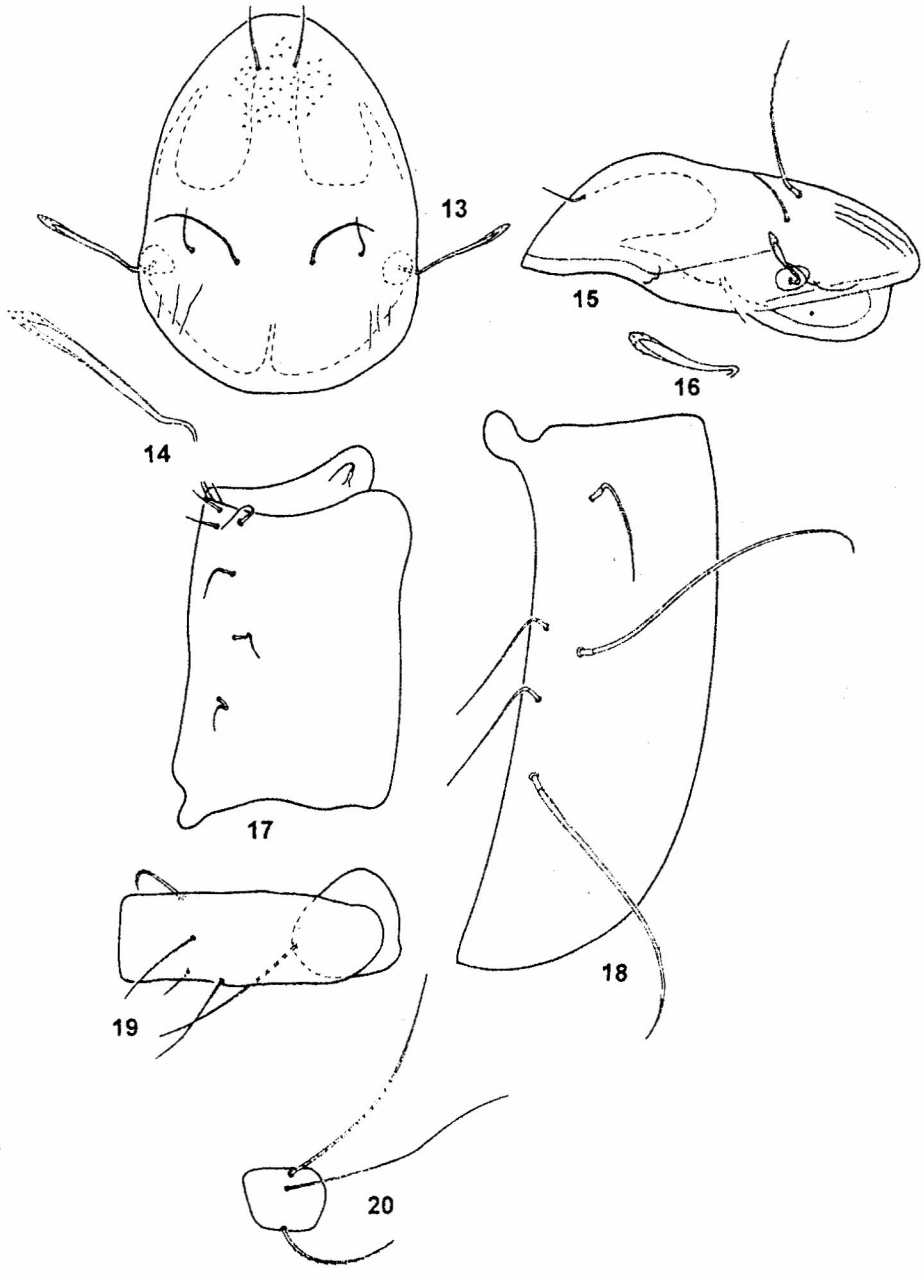
1-3. *Oribotritia rafalskii* sp. nov.: 1 – prodorsum, dorsal view, 2 – prodorsum, lateral view, 3 – notogaster, lateral view



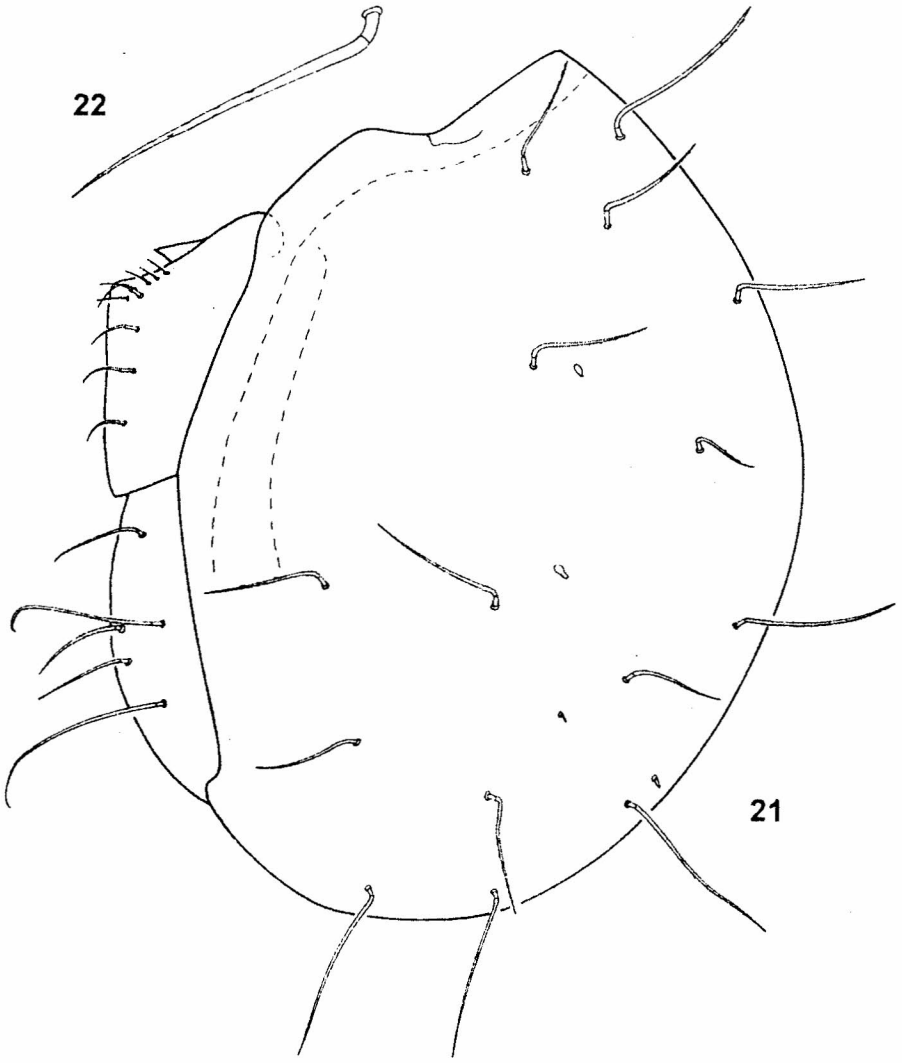
4-8. *Oribotritia rafalskii* sp. nov.: 4 – ventral view of body, 5 – posterior part of ventral shield, 6 – mentum and epimera I and II, 7 – trochanter and femur of leg I, 8 – relation of solenidion$_2$, famulus e and seta pl'



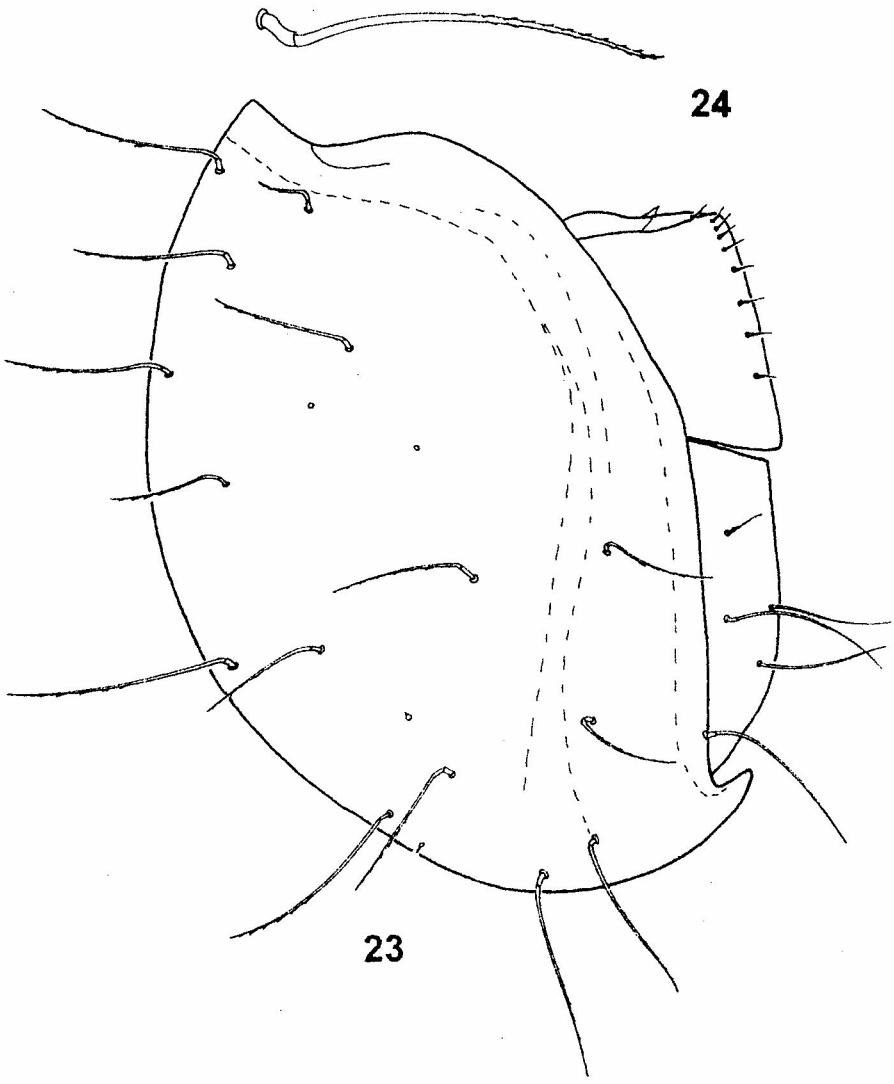
9-12. *Phthiracarus rafalskii* sp. nov.: 9 – prodorsum, dorsal view, 10 – prodorsum, lateral view, 11 – notogaster, lateral view, 12 – trochanter and femur od leg I



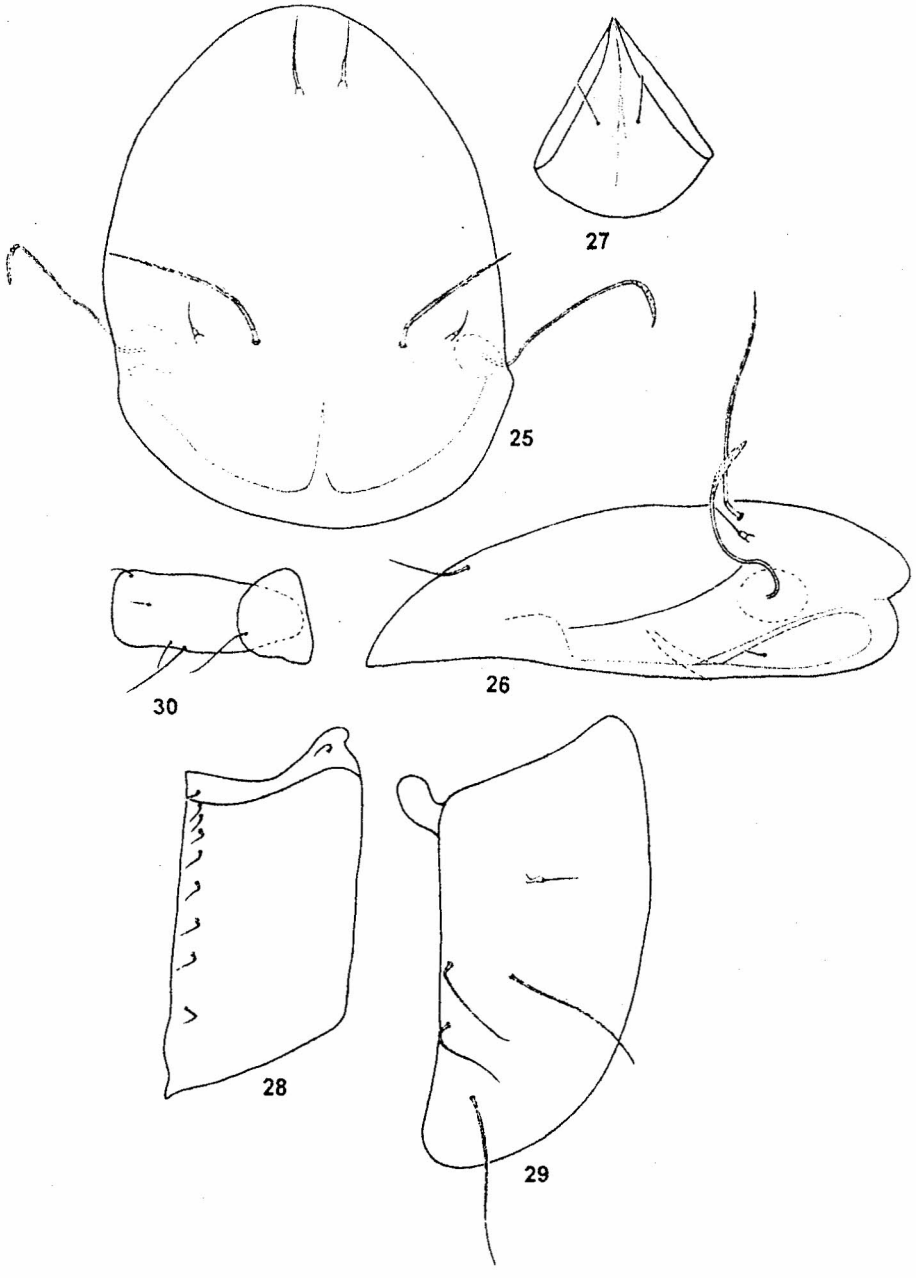
13-20. *Plonaphacarus rafalskii* sp. nov.: 13 – prodorsum, dorsal view, 14 – sensillus, dorsal view, 15 – prodorsum, lateral view, 16 – sensillus, lateral view, 17 – genito-aggenital plate, 18 – ano-adanal plate, 19 – trochanter and femur I, 20 – tibia IV



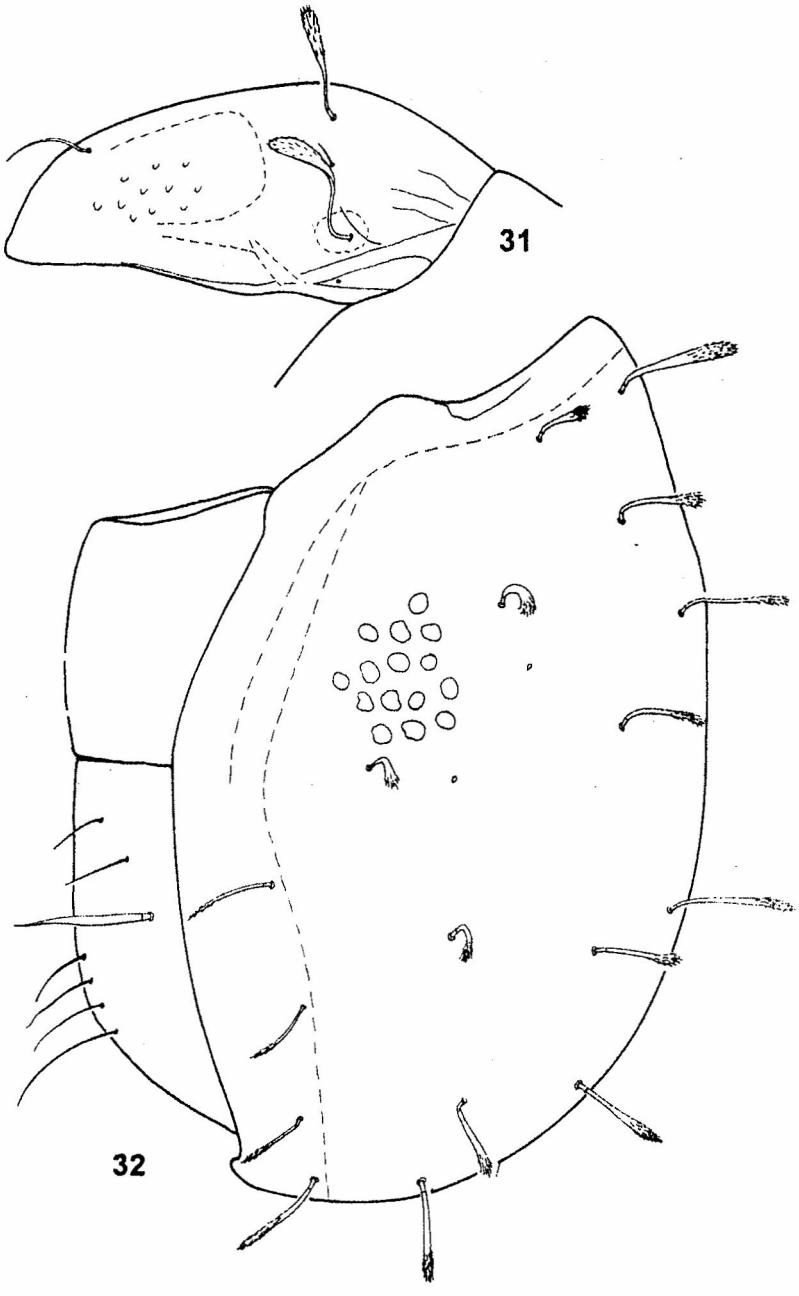
21, 22. *Plonaphacarus rafalskii* sp. nov.: 21 – notogaster, lateral view, 22 – h, seta



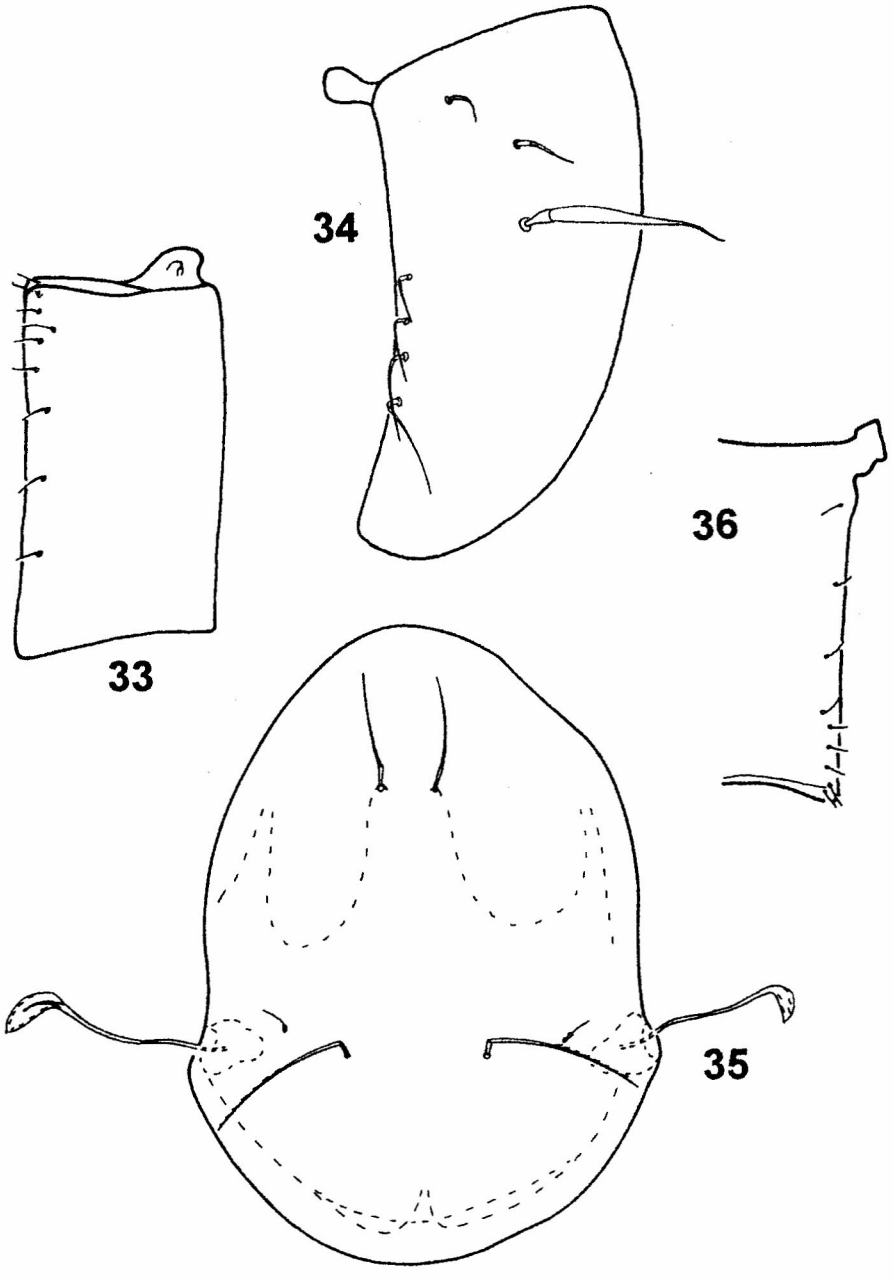
23, 24. *Hoplophthiracarus rafalskii* sp. nov.: 23 – notogaster, lateral view, 24 – h, seta



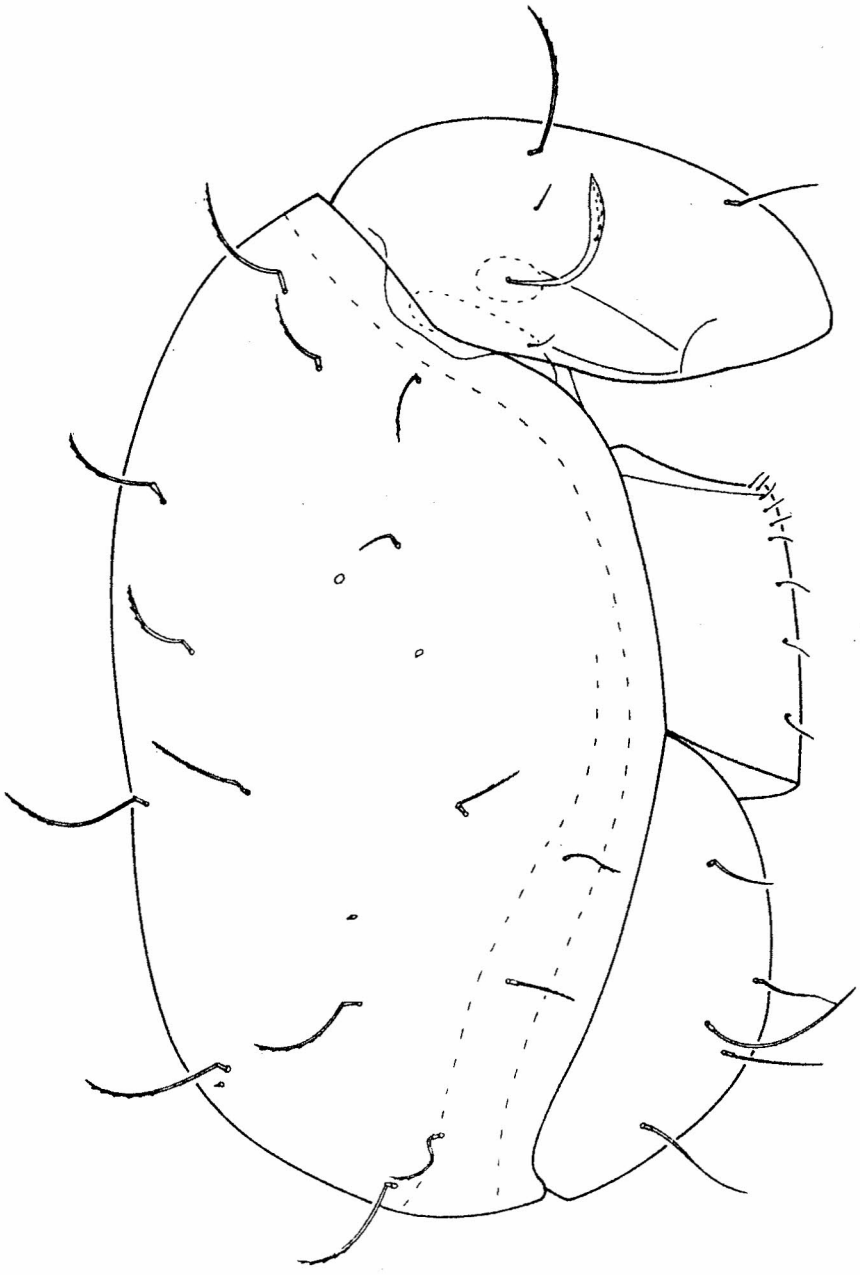
25-30. *Hoplophthiracarus rafalskii* sp. nov.: 25 – prodorsum, dorsal view, 26 – prodorsum, lateral view, 27 – mentum of infracapitulum, 28 – genito-aggenital plate, 29 – ano-adanal plate, 30 – trochanter and femur of leg I



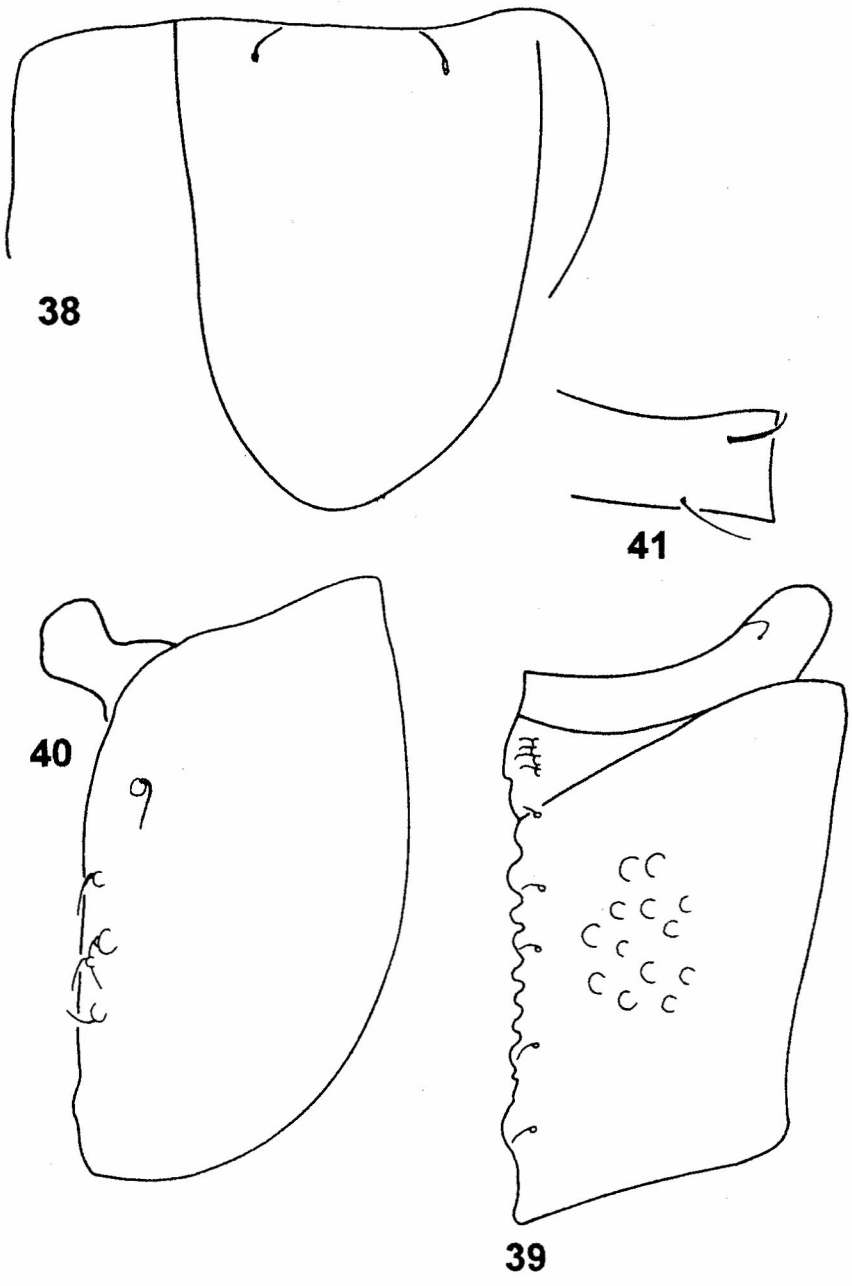
31-32. *Staganacarus* (*Staganacarus*) *rafalskii* (NIEDBAŁA, 1981): 31 – prodorsum, lateral view, 32 – notogaster, lateral view



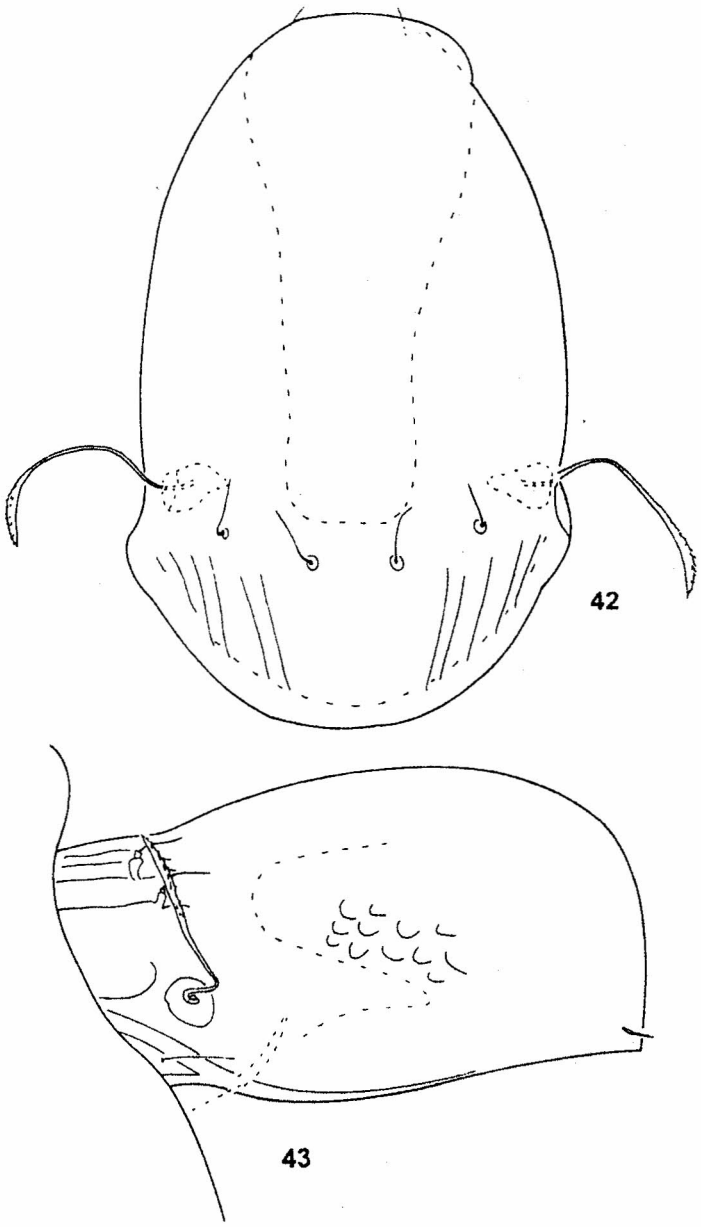
33-34. *Staganacarus* (*Staganacarus*) *rafalskii* (NIEDBALA, 1981): 33 – genito-aggenital plate, 34 – ano-adanal plate; 35, 36. *Arphthicarus rafalskii* sp. nov.: 35 – prodorsum, dorsal view, 36 – fragment of genito-aggenital plate



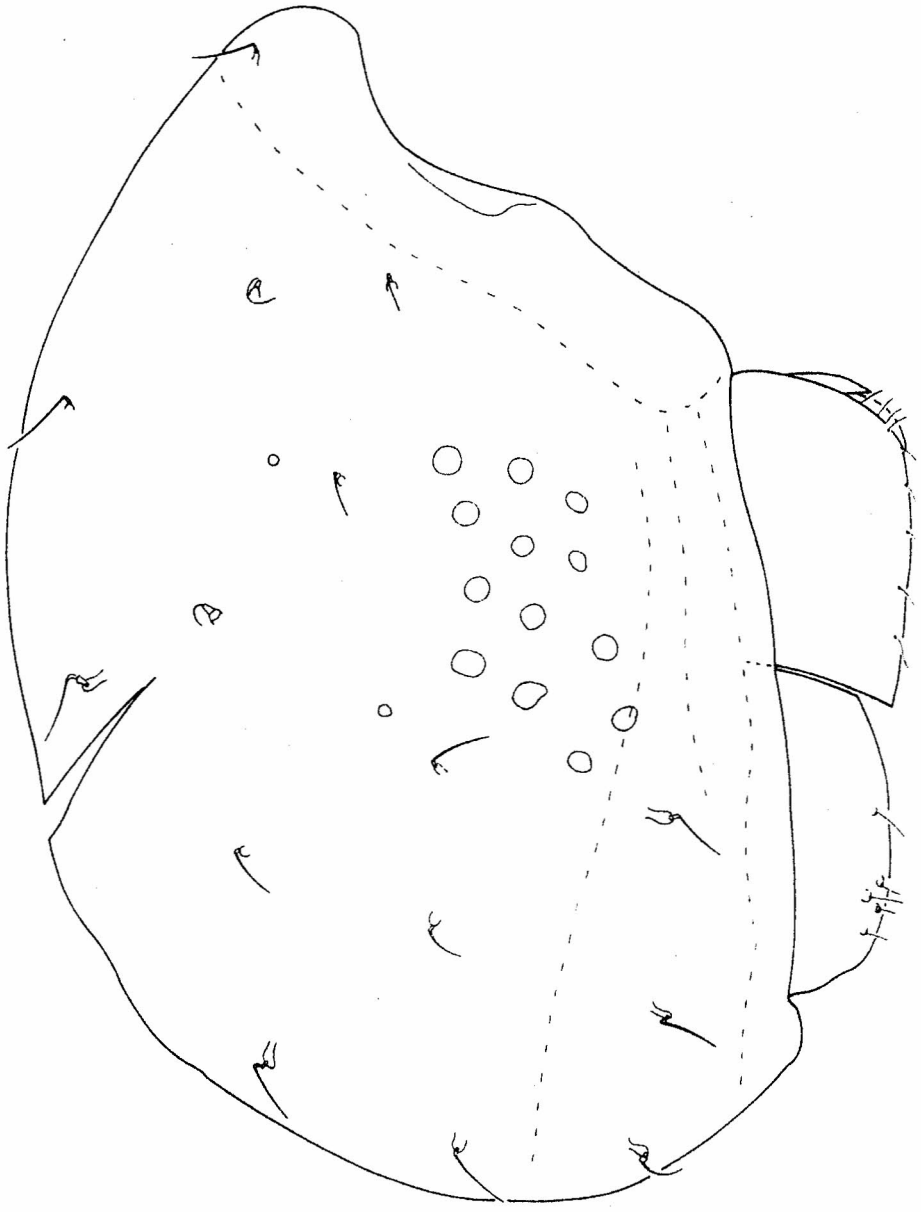
37. *Arphthicarus rafalskii* sp. nov. – lateral view of body



38-41. *Notophthiracarus rafalskii* sp. nov.: 38 – anterior part of rostrum, 39 – genito-aggenital plate, 40 – ano-adanal plate, 41 – femur of leg I, dorsal view



42, 43. *Notophthiracarus rafalskii* sp. nov.: 42 – prodorsum, dorsal view, 43 – prodorsum, lateral view



44. *Notophthiracarus rafalskii* sp. nov. – notogaster, lateral view