Acta zoologica cracoviensia, **44**(3): 285-367, Kraków, 28 Sep., 2001

Ptyctimous mites (Acari, Oribatida) from Florida*

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Received: 5 May, 2001

Accepted for publication:10 Aug., 2001

NIEDBAŁA W. 2001. Ptyctimous mites (Acari, Oribatida) from Florida. *Acta zoologica cracoviensia*, **44**(3): 285-367.

Abstract. Ptyctimous mites from Florida are represented by 38 species (plus one nom. dubium), including 15 Phthiracaroidea, 19 Euphthiracaroidea, 3 Mesoplophoroidea and 1 Protoplophoroidea. Fourteen names are synonymized. Keys for determination of genera, subgenera and species are supplied. The Florida fauna of ptyctimous mites is harmonic. Phthiracaroidea and Euphthiracaroidea are represented by both phylogenetically primitive and derived, even in the respect of the proportion of the representing species. Certain specificity of the Florida fauna is indicated by the absence of some genera of southern origin: *Arphthicarus, Austrophthiracarus* and *Notophthiracarus*, *Austrotritia* and some subgenera of northern origin: *Steganacarus (Steganacarus)* and *Atropacarus (Atropacarus)*. Ptyctimous mites of Florida belong to rather widespread species and the majority of these are Nearctic elements. Half the species, proportionally representing Phthiracaroidea and Euphthiracaroidea, are distributed along the whole peninsula showing no regional or habitat preferences. These are Nearctic and widespread species. The other half reveals preference toward northern or southern parts of Florida. Nearctic elements dominate in the group of nine northern species. Florida is probably the southern limit of the range of Holarctic and Nearctic species. In the northern part of Florida Phthiracaroidea and Euphthiracaroidea are represented by a proportionally similar number of species. A similar number of species (10) occurs only in the southern part of Florida, which is probably the northern limit of their range. These are mainly Euphthiracaroidea, mostly of the Central American origin.

Key words: Oribatida, Acari, taxonomy, new species, distribution, Florida.

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*The paper has been prepared thanks to the financial support by the U.S.-Poland Maria Skłodowska-Curie Fund. II, no 301.

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I. INTRODUCTION

Ptyctimous moss mites (Acari, Oribatida) are characterised by the ability to fold the aspidosoma under the opisthosoma to protect their appendages (= ptychoidy). This feature was acquired independently in to two separate cohorts of primitive moss mites. The superfamilies Protoplophoroidea, ptychoid only in the adult stage and Mesoplophoroidea, ptyctimous in all ontogenetic stages, belong to Enarthronota, whereas the superfamilies Euphthiracaroidea and Phthiracaroidea (together known as Euptyctima), ptychoid only in the adult stage, belong to Mixonomata. So, ptychoidy is a convergent feature. The Euptyctima are macrophytophagous and feed on dead organic matter of plant origin; the majority of them are xylophagous. Living in litter and dead leaves they burrow irregular galleries and cavities in decayed wood (immature stages in particular), and take part in mechanical fragmentation of organic matter.

This paper is part of a larger work devoted to ptyctimous mites of the Nearctic Region. As the study not yet complete, it is difficult to give a detailed analysis of ptyctimous mites of Florida against a background of the whole Nearctic fauna. The main aim of this work is presentation of the status of the ptyctimous mites of Florida, to revise the systematics of these mites, summarize knowledge of their distribution, and make preliminary hypotheses about their origin.

The first species of ptychoid mites from Florida was discovered by EWING (1909a). It was the common *Rhysotritia ardua* described under the name of *Phthiracarus americanus*. Subsequent species *Phthiracarus curtulus* and subspecies *Hoplophthiracarus histricinus nitidior* were described from Florida in 1923 by BERLESE.

In 1933, JACOT published a large work containing descriptions of 14 species and subspecies of ptyctimous mites from Florida, including: *Aedoplophora major* (Protoplophoridae), *Hoplophthiracarus histricinum*, *Hoplophthiracarus robustior*, *Hoplophthiracarus grossmani*, *Phthiracarus sphaerulum*, *Phthiracarus prior*, *Hoplophorella cucullata cuculloides*, *Hoplophorella cucullata floridae*, *Hoplophorella varians*, *Hoplophorella cucullata floridae* x *varians* (Phthiracaroidea), *Pseudotritia ardua*, *Pseudotritia ardua sinensis*, *Oribotritia glabrata*, *Oribotritia carolinae* (Euphthiracaroidea).

One of those, namely *Prototritia major* (JACOT, 1933) was not among the material I studied, probably because did not include samples from the southern site of Key Largo, where the species was found.

Hoplophthiracarus grossmani may be a synonym of *H. histricinus*. Unfortunately, this cannot be proven on the basis of the poor type material, so the species has been recognised as a nomen dubium.

Hoplophthiracarus histricinus nitidior and *Hoplophthiracarus robustior* have been recognised as synonyms of *H. histricinus*, *P. sphaerulum* as a synonym of *P. globosus*, *P. prior* as a synonym of *Phthiracarus longulus*, *H. cucullatus cuculloides* as a synonym of *A.* (*H.*) *cucullatus*, and *H. cucullata floridae* as a synonym of *H. hamatus* (NIEDBAŁA 2002).

The species *Hoplophorella varians* belongs at present to the genus *Protophthiracarus*.

The identity of the so-called hybrid *Hoplophorella cucullata floridae* x *varians* described (but not drawn) by JACOT is uncertain. The similarity of genitoaggenital and anoadanal plates indicates that it may be *Protophthiracarus varians*.

P. ardua sinensis has been synonymized with *R. ardua* (MARSHALL et al. 1987).

The species *Oribata glabrata* SAY, 1821 was redescribed by JACOT (1933) without a known type as *Oribotritia glabrata*. The species he described and illustrated is probably equivalent to the newly described *Mesotritia jacoti* sp. nov. On the basis of the description of *Oribata glabrata* SAY, 1821, it is difficult to conclude whether it is a ptyctimous mite. Moreover, *O. carolinae* sensu JACOT (1933) is a new species, which I have classified in the genus *Indotritia* and named *I. jacoti* sp. nov.

Prior to this study 11 species were known from Florida. In terms of contemporary systematics these are:

Prototritia major (JACOT, 1933), *Phthiracarus globosus* (C. L. KOCH, 1841), *Phthiracarus longulus* (C. L. KOCH, 1841), *Hoplophthiracarus histricinus* (BERLESE, 1923), *Hoplophthiracarus grossmani* (JACOT, 1933 nom. dubium), *Protophthiracarus varians* (JACOT, 1933), *Atropacarus (Hoplophorella) cucullatus* (EWING, 1909), *Atropacarus (Hoplophorella) hamatus* (EWING, 1909), *Rhysotritia ardua* (C. L. KOCH, 1841), *Mesotritia jacoti sp. nov.* (= *O. glabrata* sensu JACOT (1933)) and *Indotritia jacoti* sp. nov. (= *O. carolinae* sensu JACOT (1933)).

The summaries of the published distribution records can be found in MARSHALL et al. 1997.

A c k n o w l e d g e m e n t s. I wish to express my thanks to the researchers who helped me obtain the type species and comparative material. I am particularly grateful to the Doctors: A. S. BAKER from BMHN, V. BEHAN-PELLETIER from BRS, H. A. DENMARK and W.C. WELBOURN from FSCA, D. G. FURTH and G. F. HEVEL from USNM, A. B. JOHNSTON from MCZ, T. KRONESTADT from SMNH, P. P. PARILLO and D. SUMMERS from FMHD.

I thank to Dr. R.A. NORTON, State University of New York for his critical reading of the manuscript.

II. THE AREA AND MATERIAL OF STUDY

The largest part of the material studied comes from samples obtained in 1998 from the Florida Department of Agriculture and Consumer Services, Gainesville, courtesy of Dr. W. C. WELBOURN. Another part comes from samples kept at the Canadian National Collection, from where I sorted the material during my stay at 1997 at the Biosystematics Research Institute, Ottawa and sorted in 1999 from samples housed in The Field Museum, Chicago. In total I had at my disposal samples from 104 localities scattered over 23 counties of Florida. The greatest number of localities at which the samples were collected was in Allachua (24) and Higlands (16), other counties were represented by single localities (see the map).

Ptyctimous mites from Florida are represented by 38 species (plus one nom. dubium), including: 15 Phthiracaroidea, 19 Euphthiracaroidea, 3 Mesoplophoroidea and 1 Protoplophoroidea. Six species are newly discovered and some others are new distributional records.

E x p l a n a t i o n s a n d a b b r e v i a t i o n s:

The type material is deposited in the DATE (Department of Animal Taxonomy and Ecology, Adam Mickiewicz University, Poznań, Poland).

In chaetome (setation) of Phthiracaroidea legs the number of solenidia is given in parenthesis and follows after the number of simple setae; chaetome complete or normal is: I: 1-4-2(2)-5(1)-17(3)-1, II: 1-3-2(1)-3(1)-12(2)-1, III: 2-2-1(1)-2(1)-10(0)-1, IV: 2-2-2(0)-2(1)-10(0)-1; if only one seta is absent chaetome is reduced or incomplete.

All measurements are given in micrometers.

BMNH – Department of Entomology, British Museum (Natural History), London

BRI – Biosystematics Research Institute, Ottawa

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

FMHD – The Field Museum, Chicago
FSCA – Florida State Collection of Arthropods, Gainesville
MCZ – Museum of Comparative Zoology, Harvard University, Cambridge
SMNH – Swedish Museum of Natural History, Stockholm
USNM – United States National Museum of Natural History, Washington

III. LIST OF SPECIES

Protoplophoroidea EWING, 1917

Protoplophoridae EWING, 1917

Prototritia BERLESE, 1916

major (JACOT, 1933); Endemic

Mesoplophoroidea EWING, 1917

Mesoplophoridae EWING, 1917

Archoplophora v.d. HAMMEN, 1959

rostralis (WILLMANN, 1930); Semicosmopolitan

Mesoplophora BERLESE, 1904

Mesoplophora (*Parplophora*); NIEDBAŁA, 1984
abscondita NIEDBAŁA, 1988 Nearctic
pertenuis sp. nov. Nearctic

Euphthiracaroidea JACOT, 1930

Oribotritiidae GRANDJEAN, 1954

Oribotritia JACOT, 1924

banksi (OUDEMANS, 1916); Nearctic
magna (EWING, 1907); Nearctic

Mesotritia FORSSLUND, 1963

flagelliformis (EWING, 1909); Holarctic
jacoti sp. nov. Endemic
nuda (BERLESE, 1887); Holarctic

Indotritia JACOT, 1929

bellingeri NIEDBAŁA and SCHATZ, 1996; Central America and Florida
jacoti sp. nov.; Nearctic
krakatauensis (SELLNICK, 1923); Pantropical
retusa NIEDBAŁA et SCHATZ, 1996; Central America and Florida

Euphthiracaridae JACOT, 1930

Euphthiracarus EWING, 1917

cribarius (BERLESE, 1904); Holarctic

depressculus JACOT, 1924; Nearctic
fulvus (EWING, 1909); Nearctic
fusulus sp. nov.; Nearctic
pulchrus JACOT, 1930; Nearctic

Rhysotritia MARKEL et MEYER, 1959

ardua (C. L. KOCH, 1841); Semicosmopolitan
curticephala JACOT, 1938; Semicosmopolitan
dikra NIEDBAŁA et SCHATZ, 1996; Central America and Florida
dixa NIEDBAŁA et SCHATZ, 1996; Central America and Florida

Microtritia MARKEL, 1964

simplex (JACOT, 1930); Nearctic

Phthiracaroidea PERTY, 1841

Phthiracaridae PERTY, 1841

Phthiracarus PERTY, 1841

brevisetae JACOT, 1930; Nearctic
curtulus BERLESE, 1923; Endemic
globosus (C. L. KOCH, 1841); Holarctic
longulus (C. L. KOCH, 1841); Holarctic
pusillus sp. nov.; Endemic
pygmaeus BALOGH, 1958; Pantropical

Steganacaridae NIEDBAŁA, 1986

Plonaphacarus NIEDBAŁA, 1986

kugohi (AOKI, 1959); Semicosmopolitan

Hoplophthiracarus JACOT, 1933

grossmani JACOT, 1933 nom. dubium
histricinus (BERLESE, 1908); Nearctic
illinoisensis (EWING, 1909); Holarctic

Steganacarus EWING, 1917

Steganacarus (*Rhacaplacarus*) NIEDBAŁA, 1986
thoreaui JACOT, 1930; Nearctic

Protophthiracarus BALOGH, 1972

evergladensis sp. nov.; Endemic
varians (JACOT, 1933); Nearctic

Atropacarus EWING, 1917

Atropacarus (*Hoplophorella*) NIEDBAŁA, 1986
cucullatus (EWING, 1909); Semicosmopolitan
hamatus (EWING, 1909); Pantropical
vitrinus (BERLESE, 1913); Pantropical

IV. DESCRIPTIONS, REDESCRIPTIONS AND DIAGNOSES OF SPECIES

Protoplophoroidea EWING, 1917

D i a g n o s i s: minute, weakly pigmented species, „notogaster" comprised of four shields; the anterior is the largest – the unpaired pronotaspis, the posterior, also unpaired pygidium, and lateral paired pseudaspis.

Protoplophoridae EWING, 1917

Prototritia BERLESE, 1910

Aedoplophora GRANDJEAN, 1932

D i a g n o s i s: "Notogastral" setae simple, thin; anal plates essentially longer than wide, shorter than genital plates, ten pairs of anal and adanal setae.

Prototritia major (JACOT, 1933)

Aedoplophora major JACOT, 1933

(Figs 1-3)

D i a g n o s i s: Prodorsum with lateral carinae very long, reaching end of rostrum; sensilli with flattened and rounded head and covered densely with thin spines, rostral setae as long as interlamellar setae. „Notogaster" with setae of similar length. Formula of anal and adanal setae 3: 7.

Localities in Florida: Key Largo (JACOT 1933).

D i s t r i b u t i o n: Endemic species.

Mesoplophoroidea EWING, 1917

D i a g n o s i s: „Notogaster"* of adults represents joined CDE segments with 8 pairs of setae, segments FHP joined with adanal segments; genital and anal plates separated, adoral setae and rutellum of Hypo-Eniochthonius type; anarthric; 7-10 pairs of „ventral" setae, 2-4 pairs of anal setae, 7-9 pairs of genital setae present; famuli of tarsi I bifurcated.

Mesoplophoridae EWING, 1917

type genus: *Mesoplophora* BERLESE, 1904

D i a g n o s i s: Adults with transverse suture separating genital plates in two parts, anterior with 1-2 pairs of setae, posterior with 5-8 pairs of setae; tibiae IV with 1-2 setae.

Archoplophora HAMMEN, 1959

type-species: *Phthiracarulus rostralis* WILLMANN, 1930

D i a g n o s i s: Setae smooth, sensilli without head, spinose, exobothridial setae smaller than diameter of bothridia; genital plates quadrate, anal and genital plates almost touching, adanal plates distinct, „ventral" plates with 9 pairs of setae, 3 pairs of anal setae, 3 pairs of adanal setae, 9 pairs of genital setae with formula: 8+1.

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* This is not a "notogaster" in the true sense, since it only represents segments C, D, E.

Archoplophora rostralis (WILLMANN, 1930)

Phthiracarulus rostralis WILLMANN, 1930
Phthiracarulus laevis JACOT, 1938
Archoplophora laevis: MARSHALL et al. 1987
Archoplophora villosa AOKI, 1980
Archoplophora rostralis: NIEDBAŁA 1984

(Figs 4-7)

M a t e r i a l e x a m i n e d: 3 microscope slides with syntypes of *Phthiracarulus laevis* from USA: Connecticut: Bethany (courtesy A. B. JOHNSTON from MCZ).

D i a g n o s i s: Prodorsum with pointed rostrum; sensilli thick but without head, with several thin spines; setae fine, interlamellar setae slightly longer than other setae, Notogaster with 8 pairs of of setae of unequal length, setae c_3 fine, situated near anterior border, setae *cp* the longest, setae c_1-$_2$ remote from anterior border, setae e_1 and e_2 thick; 5 posterior pairs of ventral setae thicker than 4 anterior pairs; formula of genital setae: 8+ 1.

Localities in the Nearctic Region: Canada: Manitoba, Ontario; USA: Connecticut, Minnesota (MARSHALL et al. 1987).

Localities in Florida: Everglades N.P., Ex: Pineland humus tullgren, X 1987, leg. M. PAOLETTI – (2 sp.)

D i s t r i b u t i o n: Semicosmopolitan.

Mesoplophora BERLESE, 1904

type-species: *Mesoplophora michaeliana* BERLESE, 1904

D i a g n o s i s: Distance between genital and adanal plates equal to half the length of anal plates, adanal plates fused indistinguishably, 9-10 pairs of „ventral" setae, 2-4 pairs of anal setae, 7 pairs of genital setae, formula 6+1 or 5+2; setation of palps: 0-2-0-3-12+1.

***Mesoplophora* (*Palplophora*)** BERLESE, 1904

type species: *Mesoplophora pulchra* SELLNICK, 1928

D i a g n o s i s: Three or four pairs of anal setae present.

Mesoplophora* (*Parplophora*) *abscondita NIEDBAŁA, 1988

(Figs 8-11)

D i a g n o s i s: Prodorsum laterally with striation between lamellar and rostral setae, short lateral carinae between rostral setae and end of rostrum, sensilli long with narrow, fusiform, brown head, setae smooth, interlamellar the longest, lamellar and rostral setae thicker than interlamellar, exobothridial setae fine, shorter than diameter of bothridia. Surface of notogaster with fine mosaic pattern, 8 pairs of setae, setae c_1, c_3 and d_1 fine, setae e_1 and e_2 thickest and rough, setae c_3 near anterior border. Ventral region with 10 pairs of unequal setae, three posterior pairs thickest and rough, formula of genital setae: 5-2, 3 pairs of anal setae present.

R e m a r k. Probably the specimens of *Mesoplophora pulchra* SELLNICK, 1928, recorded from the USA (MARSHALL et al. 1987) belong to this species. *M (P.) abscondita* has sensilli with brown head, shorter exobothridial setae, interlamellar setae situated slightly anterior to bothridia, another arrangement of ventral setae, posterior ventral setae short and rough.

Localities in the Nearctic Region: USA: Mississippi (NIEDBAŁA 1988); sub *M. pulchra*: USA: Michigan (WALLWORK 1958, 1959, 1960).

Localities in Florida: Highlands Co., 7 mi SE Lake Placid, Parker Is. Baygall; 5.I.1975, subcortical litter, passalid log; leg. W. SUTER. – (6 sp.)

D i s t r i b u t i o n: Nearctic.

Mesoplophora* (*Parplophora*) *pertenuis sp. nov.

(Figs 12-14)

Measurements of holotype: prodorsum: length 182, height 96.1, width 175, sensillus 55.7, setae: *in* 60.7, *le* 55.7, *ro* 53.1, *ex* 30.4; notogaster: length 228, height 190, width 139, setae 35.4; genitoaggenital plates 50.6x30.4, anoadanal plates 50.6x27.8. Distance between genital and anoadanal plates 25.3.

D e s c r i p t i o n: Small species, colour light yellow.

Prodorsum with long lateral carinae, sensilli long, with 6 branches in distal half, setae fine, smooth, interlamellar the longest, exobothridial setae long, considerably longer than diameter of bothridia.

Notogaster with fine, smooth setae; setae c_1 and c_2 remote from anterior border; setae c_3 far from border.

Ventral region with 9 pairs of setae, one pair longer than others. Formula of genital setae: 5-2. Anal plates with 3 setae each.

Holotype: Texas, , Uvalde Co., Garner St. Pk., Con Can Rio Frio Area; 6.VII.1972, oak stub nest w/dung pellets; leg. W. SUTER

Etymology. The specific epithet *pertenuis* is latin for „very fine", „very small" and alludes to the size of individuals of the species.

Comparison. This species is very characteristic and can be distinguished from its congeners by the shape of sensilli, branched like a tree and the exobothridial setae longer than diameter of bothridia.

Localities: Florida, Levy Co., Cedar Key, Cedar Key Scrub, BERLESE of leaf litter, 27 XI 1988, leg. P. SKELLEY – (9 sp.)

D i s t r i b u t i o n: Nearctic (NIEDBAŁA 2002).

Euphthiracaroidea JACOT, 1930

D i a g n o s i s. Body considerably compressed laterally. Anogenital region narrow, V-shaped.

Oribotritiidae GRANDJEAN, 1954

type genus: *Oribotritia* JACOT, 1924

Oribotritiidae: MAHUNKA 1990

D i a g n o s i s: Bothridia without tracheoles or brachytracheae; ventral region divided by genitoaggenital and/or anoadanal sutures, or fusion of genital and aggenital as well anal and adanal plates only partial, interlocking triangle absent, transverse cleft (*trv*) only exceptionally absent.

Oribotritia JACOT, 1924

type species: *Hoplophora decumana* Auct. non C. L. KOCH, 1836

Oribotritia: MAHUNKA 1990

D i a g n o s i s: Surface of body finely punctate or porose. Prodorsum without median carina and with one or two pairs of lateral carinae, bothridial squamae situated above the bothridia,

posterior median apodeme absent, sensilli setiform, interlamellar and rostral setae in median position, lamellar setae situated near bothridia. Notogaster with 14 pairs of setae, setae ps_1 dorsal to setae ps_{2-3}; one pair of lateral opisthosomal gland and five pairs of lyrifissures *ia, im, ip ips, ih* present. Ventral region, genitoaggenital and anoadanal sutures well developed, oblique anogenital cleft visible, infracapitulum of stenarthric type, normal formula of epimera: 3-0-2-2, genital plates with narrowed, free extension anteriorly, palps 5-segmented with setal formula: 0-(2-4)-0-(2-3)-9 and one solenidion on tarsi. Leg trochanters I and II with one seta, trochanters III and IV with 3 setae, femora I with anterodorsal hooked spine, neotrichy on tarsi I and II, solenidia present on genua IV, setae *d* on tibiae IV reduced and coupled with solenidia, tarsi heterotridactylous.

Oribotritia banksi (OUDEMANS, 1916)

Tritia banksi OUDEMANS, 1916
Tritia glabrata sensu BANKS 1895
Oribotritia banksi: MARSHALL et al. 1987

(Figs 15-24)

M a t e r i a l e x a m i n e d: microscope slide labelled: „*Oribotritia banksi* (OUDMS) 1916 Cotypes 26B64a Sea Cliff Long Id. N.Y. *Tritia glabrata* BANKS 1895a Coll. By N. BANKS" (courtesy Dr. A. B. JOHNSTON from MCZ).

Measurements: cotype I: prodorsum: length 590, height 152, sensillus 43.0, setae: *ro* 101, *le* 285, *in* 106; seta c_1 of notogaster 121, distance between c_1 and d_1 = 0.53; cotype II: prodorsum: length 677, sensillus 106; notogaster: length 1116, ps_3 114; genital and aggenital plates 242x131; anal and adanal plates 505x55.5. Measurements of figured specimen from North Carolina: prodorsum: length 621, height 165, width 456, sensillus 43.0, setae: *in* 101, *le* 91.1, *ro* 101, *ex* 95.9; notogaster: length 1023, height 846, width 911, setae: c_1 101, h_1 55.7, ps_1 35.4, distance between c_1-d_1 0.77; genital and aggenital plates 234x146, anal and adanal plates 507x114. Measurement of figured specimen from Virginia: prodorsum: length 510, height 162, width 404, setae: *in* 101, *le* 75.7, *ro* 106, *ex* 85.8; notogaster: length 909, height 626, seta c_1 136. Measurements of figured specimen from Georgia: prodorsum: length 298, width 223, sensillus 65.8, setae: *in* 45.6, *le* 55.6, *ro* 60.7.

D i a g n o s i s. Large species, brown, setae fine. Prodorsum with one pair of long, narrow lateral carinae, sensilli short and rigid, exobothridial setae long, longer than sensilli. Notogaster with relatively short setae, c_1 c_1-d_1, setae of row *c* considerably remote from anterior border, setae ps_3 and ps_4 shorter, thicker, not attenuate like other setae. Ventral region, genital plates each with 8 setae, 3 longer in progenital position, aggenital plates each with 2 or 3 setae, anal plates without setae, adanal plates with 3 pairs of setae.

Localities in the Nearctic Region: USA: Connecticut (Hall 1912); New York (JACOT 1930), Virginia (JACOT 1930).

Localities in Florida: Nassau Co., St. Mary's River State Forest, E. Boulogne St., BERLESE of leaf litter, 18 III 1997, leg. P. SKELLEY – (12 sp.); Leon Co., Tall Timbers Research Station, No. T5-10 plot, 12 VIII 1968, leg. W. W. BAKER – (1 sp.)

D i s t r i b u t i o n: Nearctic.

Oribotritia magna (EWING, 1907)

Phthiracarus magnus EWING, 1907
Oribotritia magna: MARSHALL et al. 1987

(Figs 25-30)

M a t e r i a l e x a m i n e d: syntype in microscope slide labelled: „*Phthiracarus magnus* EWING syntype R. NORTON 7/79 USNMNH loan 2011593 Pine, Ind., May 30, '07 by myself under old waste lumber M. inb H. E.EWING" (courtesy Dr. G. F. HEVEL from USNM).

Measurement of syntype: prodorsum: length 530; notogaster: length 1111, height 707, seta c_1 152. Measurement of figured specimen from Florida: prodorsum: length 571, width 480. Height 187, sensillus 85.8, setae *in* 85.8, *le*, *ex*, *ro* 111; notogaster: length 1060, width 909, height 808, setae c_1 212, h_1 101, ps_1 111; genital and aggenital plates 237x192, anal and adanal plates 515x182.

R e d e s c r i p t i o n: Large, brown species.

Prodorsum with lateral carinae consisting of three lines, two upper longer, lower short, sensilli setiform, short, rigid, obtuse, setae *le*, *ro*, *ex* similar in length simple, setae *in* shorter, bent backwards.

Notogaster with fine, attenuate setae, setae of row *c* remote from anterior border, setae c_3 shortest.

Ventral region: setation of palps: 0-3-0-3-9 and one solenidion, genital plates each with 9 setae, distance between setae in progenital and genital position is great, 2 pairs of aggenital setae present, number of anal and adanal setae is equal: 3 pairs, lyrifissures *iad* positioned on the level of ad_3 setae. Legs. Femora of legs I without spine, leg chaetome and solenidiotaxy (without tarsi): I : 1-4-5(2)-5(1), II: 1-4-4(1)-5(1), III: 3-2-3(1)-3(1), IV: 3-2-2(1)-3(1).

Localities in the Nearctic Region: USA: Indiana (EWING 1907, 1909a).

Localities in Florida: Alachua Co., Gainesville, Regrown Oak forest, 1 V – 14 VIII 1987, leg. HYM. – (2 sp.); Marion Co., Silver Springs, 2 mi E of Silver Springs on Rt 40, 24 VII 1993, leg. A. A. ZAKHAROV, L. R. DAVIS, Jr. – (21 sp.); Duval Co., Baldwin, 17 X 1993, leg. L. R. DAVIS, Jr. – (1 sp.); Alachua Co., Gainesville, Doyle O'Conner Building grounds; 1911 SW 34th St., leaf litter, 3 IX 1992, leg. P. E. SKELLEY – (4 sp.); Alachua Co., Rt 441 at Sante Fe River, leaf litter at edge of cypress backwater, 1 X 1992, leg. P. SKELLEY – (6 sp.).

D i s t r i b u t i o n: Nearctic.

Mesotritia FORSSLUND, 1963

type species: *Mesotritia testacea* FORSSLUND, 1963

Mesotritia: MAHUNKA 1990

D i a g n o s i s. Surface of body finely punctate or porose. Prodorsum without median carina, lateral carinae present, posterior median apodeme present, bothridial squamae situated below the bothridia, rostral setae arising medially from rostrum, lamellar and interlamellar setae arising laterally. Notogaster with 14 pairs of setae, terminal sinus or fissure on posterior part. Ventral region, genitoaggenital and anoadanal sutures well developed, anogenital cleft absent, genital setae never situated anteriorily of *kag* tectum of genitoaggenital plates. Legs heterotridactylous, neotrichy on tarsi I and II, famuli bifurcate, solenidia of tarsi II without coupled setae, genua IV without solenidia, setae *d* on tibiae IV long, not coupled with solenidia.

Mesotritia flagelliformis (EWING, 1909)

Phthiracarus flagelliformis EWING, 1909

Mesotritia (*Entomotritia*) *flagelliformis*: MARSHALL et al. 1987

Mesotritia testacea FORSSLUND, 1963 syn. nov.

Mesotritia (*Mesotritia*) *testacea*: MARKEL 1964

(Figs 31-39)

M a t e r i a l e x a m i n e d: microscope slide with one specimen labelled: „*Phthiracarus flagelliformis* EWING Autotype Pine, Ind., May 30.07. By H. E. E. Under old pieces of wood Bal. H. E. EWING" (courtesy Dr. G. F. HEVEL from USNM). I designate this specimens as a neotype. Two paratypes of *M. testacea*: one microscope slide with paratype I and 5 microscope slides with paratype II fragmented as follows: 1. aspis+genitoanal, 2. leg I, 3. leg II, 4. legs II and IV, 5. subcapitulum+chelicerae. All slides labelled: „*Mesotritia testacea* FORSSL. Vb Degerfors Vindeln 4.6.1961 Mt.907" (courtesy Dr. T. KRONESTEDT from SMNH). I have also examined two paratypes

in alcohol labelled „*Mesotritia testacea* FORSSL. Paratypes, 1964.7.13.49+50 Dir. Aludalen, 1961 Coll.+det. K. H. FORSSLUND" (courtesy Dr. A.S. BAKER from BMNH).

Measurements of neotype of *M. flagelliformis*: prodorsum: length 338, height 131, sensillus 55.7, setae: *in* 43.0, *ro* 81.0; notogaster: length 679, height 465, seta c_1, c_1/c_1-d_1 = 0.36. Measurements of paratype of *M. testacea*: prodorsum: length 323, width 237, height 116, sensillus 63.2, setae: *in* 43.0, *le* 93.6, *ro* 88.5, *ex* 63.2; notogaster: length 602, width 393, height 444, setae: c_1 63.2, c_1/c_1-d_1 = 0.44, h_1 and ps_1 50.6; genital and aggenital plates 151x75.7; anal and adanal plates 278x50.5. Measurements of figured specimen from North Carolina: prodorsum: length 318, width 232, height 116, sensillus 53.1, setae: *in* 37.9, *le* 86.0, *ro* 75.9, *ex* 43.0; notogaster: length 628, width 406, height 437, setae: c_1 55.7, c_1/c_1-d_1 = 0.37, h_1 and ps_1 40.5; genital and aggenital plates 141x75.7; anal and adanal plates 298x70.7.

D i a g n o s i s a n d a d d i t i o n a l d e s c r i p t i o n: Colour light brown to dark brown. Prodorsum with one pair of long, simple lateral carinae, sensilli fusiform rough, setae attenuate, interlamellar the shortest, rostral setae slightly anteriorly of lamellar setae. Notogaster with fine, filiform setae, $c_1 < c_1$-d_1, setae of row *c* remote from anterior borter, setae c_1 more than other setae. Ventral region: setation of palps 2-2-8 and one solenidion, genital plates each with 6 setae, aggenital plates with 2, rarely 3 pairs of setae, anal plates with one pair of setae, adanal plates with 3 pairs of setae, setae ad_1 the longest and remote far from ad_2 setae, more than distance between ad_2-ad_3, lyrifissures *iad* located laterally between anal and ad_3 setae. Legs setation and solenidiotaxy (without tarsi I and II): I: 1-3-4(2)-5(1), II: 1-4-4(1)-4(1), III: 2-3-2(1)-2(1)-11, IV: 2-3-2(0)-2(1)-10.

Comparison: The fundamental difference between *M. flagelliformis* and *M. nuda* is the number of anal setae, two pairs in *M. nuda* and one pair in *M. flagelliformis*.

Locality in the Nearctic Region: Illinois (EWING, 1909a)

Localities in Florida: Walton Co., Defuniak Springs, Elgin AFB S of Defuniak Springs, BERLESE near beech trees, 20 XII 1999, leg. R. TURNBOW, P. SKELLEY – (1 sp.); Walton Co., Defuniak Springs, Elgin AFB S of Defuniak Springs, BERLESE near beech trees, 20 XII 1998, leg. R. TURNBOW, P. SKELLEY – (4 sp.); Alachua Co., Gainesville, San Felasco Hammock State Preserve; 0.5 mi from entrance, BERLESE of sifted litter from turkey oak sample, 14 I 1999, leg. G. FORTIER, P. SKELLEY – (3 sp.); BAKER Co., Olustee, 15 X 1993, leg. L. R. DAVIS, Jr. – (28 sp.); Putnam Co., Ordway Nature Preserve, 1.3 mi from main entrance, 28 XI 1993, leg. L. R. DAVIS, Jr. – (3 sp.); Duval Co., Baldwin, 17 X 1993, leg. L. R. DAVIS, Jr. – (14 sp.); Lafayette Co., Suwannee River, Junction of 27 and Rt 349 1.2 mi W of Suwannee River, 11 X 1993, leg. L. R. DAVIS, Jr. – (17 sp.); Union Co., Lake Butler, 22 X 1993, leg. L. R. DAVIS, Jr. – (1 sp.); Alachua Co., Rt 441 at Sante Fe River, leaf litter at edge of cypress backwater, 1 X 1992, leg. P. SKELLEY – (2 sp.).

D i s t r i b u t i o n: Holarctic.

Mesotritia jacoti sp. nov.

Oribotritia glabrata sensu JACOT 1933 ?

(Figs 40-43)

Measurements of holotype: prodorsum: length 434, width 323, height 146, sensillus 58.2, setae: *in* 143, *le* 125, *ro* 147, *ex* 101; notogaster: length 970, width 677, height 727, setae: c_1 152, h_1 55.7, ps_1 101; genital and aggenital plates 278x75.7; anal and adanal plates 555x45.4.

D e s c r i p t i o n. Relatively large species, dark brown.

Prodorsum with one pair of long, simple lateral carinae. Sensilli with short, narrow pedicel and fusiform head. Setae rather rigid, attenuate, rostral setae located between interlamellar and lamellar setae, exobothridial setae longer than sensilli.

Notogaster with short ($c_1 < c_1$-d_1), flexible setae, setae of row c remote from anterior border, setae c_1 more than other setae.

Ventral region: Genital plates with 7 pairs of setae (only in holotype on left side 6 setae), 2 pairs of aggenital setae. Anal plates each with 2 setae, adanal plates each with 3 setae setae ad_1 robust and longest, setae ad_2 nearer setae ad_1 than ad_3.

Legs setation and solenidiotaxy identical to that of *M. nuda.*

Holotype: Florida, Lee Co., Sannibel Isl., 6 mi E of Sannibel Isl. on Samelin Rd, 12 III 1993, leg. L. R. DAVIS, Jr; 2 paratypes: Florida, Marion Co., Ocala National Forest, Big Scrub Recreational Area, 24 VII 1993, leg. L. R. DAVIS, Jr.

Comparison: *Mesotritia jacoti* is similar to *M. nuda* (BERLESE) in the number of anal and adanal setae, but differs in that rostral setae are situated between interlamellar and lamellar setae, longer exobothridial setae, longer interlamellar setae, location of adanal setae ad_2 nearer ad_1 than ad_3.

R e m a r k. JACOT (1933) redescribed *Oribotritia glabrata* SAY, 1821, without referring to the type. Actually it has not been established which species is *O. glabrata* SAY, and JACOT's description and drawing (despite some drawbacks like the lack of ad_3 setae) correspond to the above described new species and therefore this species is named in honour of the memory of this excellent American acarologist.

Localities in Florida: sub *O. glabrata*: Gainesville, Edgar, Green Cove Springs, Bradenton, Cortez, White City (JACOT 1933).

Putnam Co., Ordway Nature Preserve, One Shot Pond, 26 X 1993, leg. L. R. DAVIS, Jr. – (2 sp.); Alachua Co., Arredondo, SW of Gainesville, leaf litter at the base of a pine tree, 3 XI 1993, leg. L. R. DAVIS, Jr. – (5 sp.); Putnam Co., Ordway Nature Preserve, 0.5 mi from main entrance, 20 XI 1993, leg. L. R. DAVIS, Jr. – (5 sp.); Lee Co., Sannibel Island, 6 mi E of Sannibel Island on Samenlin Rd, 12 III 1993, leg. L. R. DAVIS, Jr. – (1 sp.); St. Johns Co., S Ponta Verde Recreational Area, Route A1A, 27 XI 1993, leg. L. R. DAVIS, Jr. – (1 sp.); Marion Co., Ocala National Forest, Big Scrub Recreational Area, 29 VII 1993, leg. L. R. DAVIS, Jr. – (2 sp.); Alachua Co., Gainesville, SW 20th Ave and I-75, 5 XI 1993, leg. L. R. DAVIS, Jr. – (5 sp.); Monroe Co., Dry Tortugas National Park, Loggerhead Key, litter of *Cordia sebastena*, 11 I 1962, leg. H. A. DENMARK – (24 sp.); Nassau Co., Fort Clinch State Park, leaf litter, 5 V 1988, leg. P. SKELLEY – (2 sp.); Putnam Co., Ordway Nature Preserve, Blue Pond, base of pine tree, 4 XII 1955, leg. L. R. DAVIS, Jr. – (3 sp.); Highlands Co., Sebastian, Sand pine litter, 16 IV 1962, leg. M. H. MUMA – (1 sp.); Seminole Co., Oviedo, 5.5 mi N of Oviedo, Sand pine litter, 15 XI 1961, leg. M. H. MUMA – (6 sp.); Seminole Co., Oviedo, 4 mi E, Pine litter, 18 IV 1962, leg. M.H. MUMA – (1 sp.); Marion Co., Ocala National Forest, Salt Springs, in oak litter, 8 X 1963, leg. H. A. DENMARK. – (4 sp.)

D i s t r i b u t i o n: Endemic.

Mesotritia nuda (BERLESE, 1887)

Tritia nuda BERLESE, 1887
Oribotritia nuda: HAMMEN 1959
Mesotritia piffli MARKEL, 1964: NIEDBAŁA 1993
Mesotritia (Entomotritia) piffli: MARKEL 1964
Mesotritia elastica SERGIENKO, 1988: NIEDBAŁA 1993
Oribotritia brachytrix WALKER, 1965 syn. nov.
Mesotritia brachytrix: MARSHALL et al. 1987

(Figs 44-50)

This species has been recently redescribed on the basis of the type material by MAHUNKA (1994) and NIEDBAŁA (1993).

Holotype of *O. brachytrix* fragmented on two microscope slides labelled "*Oribotritia brachytrix* WALKER 2969 Fort Hays Studies: 1964" (courtesy Dr. G.F. HEVEL from USNM). One paratype fragmented on two microscope slides labelled "*Oribotritia brachytrix* WALKER Fort Hays Studies: 1964 0.2 mi. From E.S.E. entrance Samuel P. Taylor St. Pk., Marin Co., Calif. 14 March 1957 N.A. WALKER moderate dry decayed coast redwood log Euparol (302c) (courtesy Dr. A.S. BAKER from BMNH).

Measurements of holotype of *O. brachytrix*: prodorsum: length 379, width 293, sensillus 60.7, setae: *in* 43.0, *le* 78.4, *ro* 68.3; of paratype of *O. brachytrix*: prodorsum: sensillus 63.2, setae: *ro* 101, *ex* 40.5; notogaster: setae c_1 50.6, c_1/c_1-d_1 = 0.34; genital and aggenital plates 172x55.5; anal and adanal plates 328x45.4. Measurements of figured specimens from Utah: prodorsum: length 379, width 242, height 141, sensillus 63.2, setae: *in* 53.1, *le* 104, *ro* 126, *ex* 53.1; notogaster: length 778, width 444, height 495, setae: c_1 70.8, c_1/c_1-d_1 = 0.44, h_1 40.5, ps_1 55.7; genital and aggenital plates 185x48.1; anal and adanal plates 430x35.4.

D i a g n o s i s a n d a d d i t i o n a l d e s c r i p t i o n. Colour light brown or yellow. Prodorsum with one pair of long, simple lateral carinae, sensilli narrow, spindle shaped with several strong spines, setae smooth, long, filiform, interlamellar setae the shortest, rostral setae located anteriorly of lamellar setae. Notogaster with filiform, rather short (c_1<c_1-d_1) setae, setae of row c remote from anterior margin, setae c1 more than other setae. Ventral region; setation of palps: 2-2-8 and one solenidion, setae h of mentum considerably longer than distance between them, genital plates with 6, rarely 5 or 7 pairs setae, aggenital plates with 2, rarely with 3 pairs of setae; anal plates with 2 pairs (not noticed by WALKER 1965 for. *O. brachytrix*), adanal plates with 3 pairs of setae, lyrifissures *iad* slightly ventrad of an_2. Legs setation and solenidiotaxy (without tarsi): I: 1-3-4(2)-5(1), II: 1-3 or 4(1)-4(1), III: 2-3-2 or 3(1)-2(1), IV: 2-3-2(0)-2(1).

Citations: sub *Mesotritia nuda*: BALOGH et MAHUNKA 1983, NIEDBAŁA 1993, MAHUNKA 1994, MAHUNKA et MAHUNKA-PAPP 1995.

Localities in the Nearctic Region: sub *O. brachytrix*: USA: California (WALKER 1965).

Localities in Florida: Highlands Co., Archbold Biol. Sta.; 30.XII.1973, palmetto stem litter, leg. W. SUTER – (1 sp.); Highlands Co., SE Lk. Placid, Parker Isl. Baygall; 28.XII.1973, floor litter between Osmunda hummocks, leg. W. SUTER – (1 sp.); Highlands Co., SE Lk. Placid, Parker Isl. Baygall; 31.XII.1973, bay buttress, vine entwinned w/ferns, leg. W. SUTER – (1 sp.); Marion Co., Ocala National Forest, S.R 40 West, 4.3 mi. from S.R.19; 26.XI.1972, leg. R. KAPLAN. – (1 sp.); Alachua Co., Paynes Prairie State Preserve, Gate 1; 0.25 mi down Chacala Trail, sifted litter at base of old live oak, 12 I 1999 – (1 sp.); Putnam Co., Ordway Nature Preserve, litter along and beneath pine log, 7 I 1999, leg. L. R. DAVIS, Jr. – (5 sp.); Lake Co, Aster, On litter of hickory and sweet gum, 8 X 1963, leg. H. A. DENMARK – (1 sp.)

D i s t r i b u t i o n: Holarctic.

Indotritia JACOT, 1929

type species: *Tritia krakatauensis* SELLNICK, 1924

Indotritia: MAHUNKA 1990

D i a g n o s i s: Surface of body punctated or porose. Bothridial squamae of prodorsum situated above the bothridium, lamellar setae arising posteriorly, rostral setae in normal position, posterior median apodeme absent. Notogaster with 14 pairs of setae and with terminal sinus, one pair of openings of lateral opisthosomal glands and five pairs of lyrifissures: *ia*, *im*, *ip*, *ips*, *ih* present. Ventral region, genitoaggenital suture incomplete, these plates are fused anteriorly, internal transverse apodeme present, anogenital cleft present, but mostly short, genital plates with an extension anteriorly, palps 5-segmented, but genua and femora immovably hinged, palpal setal formula: 0-2-0-2-9+1. Legs heterotridactylous, with normal setation, solenidia on tarsi II with coupled setae, solenidia on genua IV present, setae d on tibia IV reduced and coupled with the solenidia.

Indotritia bellingeri NIEDBAŁA et SCHATZ, 1996

(Figs 51-56)

D i a g n o s i s. Prodorsum with two pairs well developed lateral carinae, dorsal longer and thicker than ventral, sensilli long, thin, smooth, tapering gradually, setae relatively short short, comparative length: *le*>*in*>*ro*>*ex*, interlamellar and rostral setae erect. Notogaster with short (c_1<c_1-d_1), rough setae except c_3 longer setae, setae c_1 and c_2 remote from anterior border, setae

c_3 near border. Ventral region, 9 pairs of genital, 2 pairs of aggenital setae, 2 pairs of anal and 2 pairs of adanal setae present, lyrifissures iad located on the level of ad_2 setae. Legs setation and solenidiotaxy (without tarsi): I: 1-3-5(2)-5(1), II: 1-4-4(1)-3(1), III: 3-2-3(1)-3(1), IV: 3-2-2(1)-3(1).

Localities in Florida: Monroe Co., Big Pine Key, Watson Hammock; 4.VIII.1971, hardwood litter, leg. S. PECK. – (6 sp.).

D i s t r i b u t i o n: Central America and Florida.

Indotritia jacoti sp. nov.

?*Oribotritia carolinae* sensu JACOT 1933
non *Oribotritia carolinae* JACOT, 1930

(Figs 57-61)

Measurements of holotype: prodorsum: length 303, width 242, height 111, sensillus 101, setae: *in* 48.1, *le* 83.5, ro 45.5, *ex* 15.2; notogaster: length 535, width 404, height 409, setae: c_1 55.7, c_3 114, h_1 60,7, ps_1 70.8; genital and aggenital plates 147x96.1; anal and adanal plates 258x75.9.

D e s c r i p t i o n. Colour yellow.

Prodorsum with lateral carinae consisting of three lines, sensilli long, filiform, attenuate, interlamellar and rostral setae erect, smaller than lamellar setae.

Notogaster with fairly short ($c_1 < c_1$-d_1), rigid setae, except long and smooth c_3 setae, setae c_1 and c_2 considerably remote from anterior border, setae c_3 near the border.

Ventral region: Setae *h* of mentum considerably longer than distance between them; furrows *trv* very short, furrows between genital and aggenital plates very long; 9 pairs of genital setae, 2 pairs of aggenital setae; 1 pair of minute anal setae, 2 pairs of adanal setae present, setae ad_1 shorter than setae ad_2, lyrifissures *iad* situated laterally of ad_2 setae.

Legs setation 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 with distinct narrow distal spine.

Holotype and 4 paratypes: USA, Illinois, Union Co., Shawnee N.F., Little Grand Canyon, 160 m. mixed hardwood forest, 37°41' N, 89°24' W, 15 X 1995, berl., log and leaf litter, leg. M. THAYER.

Comparison. This species has the very characteristic features: only one pair of anal and 2 pairs of adanal setae.

R e m a r k. It is highly probable that *Oribotritia carolinae* sensu JACOT (1933) represents this species and therefore this species is named in honour of the memory of this renowned American acarologist.

Localities in Florida: sub *O. carolinae* ? White City, Fort Lauderdale (JACOT 1933)

D i s t r i b u t i o n: Nearctic.

Indotritia krakatauensis (SELLNICK, 1923)

Tritia krakatauensis SELLNICK, 1923
Indotritia acanthophora MARKEL, 1964: NIEDBAŁA et SCHATZ 1996
Indotritia sellnicki AOKI, 1965: NIEDBAŁA et SCHATZ 1996

(Figs 62-65)

D i a g n o s i s. Prodorsum with two pairs well developed lateral carinae, dorsal longer and thicker than ventral, sensilli long, thin, smooth, tapering gradually; setae short, fine, interlamellar setae bent distally backwards, exobothridial setae vestigial. Notogaster with short ($c_1 < c_1$-d_1), stout setae. Ventral region, 9 pairs of genital, 2 pairs (rarely 3 or even 4 pairs) of aggenital, 2 pairs of anal and 2 pairs of adanal setae present, lyrifissures *iad* located anteriodorsally of ad_2 setae.

Localities in Florida: Monroe Co., Big Pine Key, Watson Hammock; 4.VIII.1971, hardwood litter, leg. S. PECK – (5 sp.); Monroe Co., Dry Tortugas National Park, Loggerhead Key, soil from *Amaryllis* roots, 9 I

1962, leg. H. A. DENMARK – (3 sp.); Monroe Co., Dry Tortugas National Park, Loggerhead Key, litter of *Cordia sebastena*, 11 I 1962, leg. H. A. DENMARK – (3 sp.); Monroe Co., Dry Tortugas National Park, Loggerhead Key, in litter of *Casurina* sp., 12 I 1962, leg. H. A. DENMARK – (2 sp.); Monroe Co., Dry Tortugas National Park, Loggerhead Key, beating dead limbs near ground level of *Suriana maritina*, 12 I , leg. H. A. DENMARK – (5 sp.)

D i s t r i b u t i o n: Pantropical.

Indotritia retusa NIEDBAŁA et SCHATZ, 1996

(Figs 66-71)

D i a g n o s i s. Prodorsum with single pair of strong lateral carinae, sensilli fairly short, rigid, smooth and blunt distally, setae short, rigid, rough, interlamellar setae erect, *in>le>ro>ex*. Notogaster with short (c_1/c_1-d_1 = 0.25), rigid, rough except longer and smooth c_3 setae, setae c_1 and c_2 considerably remote from anterior border, setae c_3 naer border. Ventral region, genitoaggenital plates with 9 pairs setae, 5 in progenital position; 2 pairs of aggenital setae; anal plates with one pairs of setae, adanal setae with 3 pairs of setae, lyrifissures *iad* located between setae ad_2 and ad_3.

Localities in Florida: Monroe Co., Dry Tortugas National Park, Loggerhead Key, in litter of *Hibiscus tiliaceus* L., 12 I 1962, leg. H. A. DENMARK – (7 sp.)

D i s t r i b u t i o n: Central America and Florida.

Euphthiracaridae JACOT, 1930

type genus: *Euphthiracarus* EWING, 1917

Euphthiracaridae: MAHUNKA 1990

D i a g n o s i s. Bothridia with brachytracheae or tracheoles; anogenital region with fused plates, anogenital cleft only exceptionally present, interlocking triangle present, palps 3 segmented.

Euphthiracarus EWING, 1917

type species: *Phthiracarus flavus* EWING 1908

Euphthiracarus: MAHUNKA 1990

D i a g n o s i s. Prodorsum without median carina, one or two pairs of lateral carinae present, bothridial squamae situated below the bothridia, posterior median apodeme present, prodorsal setae in median position. Notogaster (with 14 pairs of setae), covered with slightly punctulate cuticle or strong sculpture and with a terminal fissure, one pair of openings of lateral opisthosomal glands and 5 pairs of lyrifissures: *ia, im, ip, ips, ih* present. Ventral region with two: median and posterior interlocking triangles, anogenital cleft absent, palps with formula: 2-2-8(1). Legs, trochanters III and IV with 2 setae, genua IV with solenidia, famuli situated far from the solenidia, solenidia $_1$ and $_2$ on tarsi II without coupled setae, setae *d* on tarsi IV comparatively long and not coupled with the solenidia, tarsi mono or tridactylous

Euphthiracarus cribarius (BERLESE, 1904)

Phthiracarus cribarius BERLESE, 1904

Euphthiracarus (Euphthiracarus) cribarius: MARKEL 1964

(Figs 72-84)

D i a g n o s i s. Surface of body strongly puncturated. Prodorsum with two pairs of lateral carinae; sensilli setiform with tiny spines in distal half, setae (except exobothridial) almost perpendicular to the surface, rostral setae curved, long, almost parallel to rostrum distally. Notogastral se-

tae robust, not very long ($c_1 < c_1 - d_1$), vestigial setae f_1 at the same level as h_1 setae. Ventral region, formula of epimeres: 1-0-2-2, 9 pairs of genital setae, 2 pairs of aggenital setae present, setae ag_2 longer and thicken than ag_1 setae, 3 pairs of anal and 3 pairs of adanal setae present, an_1 and an_2 long, smooth and flagellate, others shorter, robust, covered with tiny barbs. Legs setation and solenidiotaxy: I: 1-3-5(2)-5(1)-17(3), II: 1-3-4(1)-5(1)-13(2), III: 2-2-3(1-2(1)-12, IV: 2-1-2(1)-2(1)-10, tarsi heterotridactylous.

R e m a r k. The types of these species were examined and the species was redescribed (NIEDBAŁA 1993).

Citations: HAMMEN 1959, BALOGH et MAHUNKA 1983, MARSHALL et al. 1987, NIEDBAŁA 1993, MAHUNKA et MAHUNKA-PAPP 1995.

Localities in the Nearctic Region: Virginia (SENGBUSCH 1957)

Localities in Florida: Nassau Co., St. Mary's River State Forest, E. Boulogne St., BERLESE of leaf litter, 18 III 1997, leg. P. SKELLEY – (3 sp.)

D i s t r i b u t i o n: Holarctic.

Euphthiracarus depressculus JACOT, 1924

Euphthiracarus depressculus: MARSHALL et al. 1987

(Figs 85-91)

M a t e r i a l e x a m i n e d: paratypes in microscope slides labelled: „3 *Euphthiracarus depressculum* JACOT 174h Paratypes Evfield Gorge N.Y. under old boards April 5/17 A. P. JACOT", „ 176 w II 3" (courtesy Dr. A. B. JOHNSTON from MCZ).

Measurements of paratype I: prodorsum: length 293, width 232, sensillus 116, setae: *in* 164, *le* 131, *ro* 119; paratype II: prodorsum: length 303, height 141, setae: *in* 147, *le* 104, *ro* 78.4; notogaster: length 596, height 399, setae: c_1 70.8, $c_1/c_1\text{-}d_1 = 0.44$, h_1 111, ps_1 116 paratype III: genitoaggenital plate: 215x88.5; anoadanal plate 266x53.1.

D i a g n o s i s a n d a d d i t i o n a l d e s c r i p t i o n. Colour yellow, surface of body covered with small concavities. Prodorsum with two pairs of lateral carinae, sensilli with long pedicel and swollen, fusiform head, almost smooth, setae (except exobothridial) almost perpendicular to the surface, interlamellar and lamellar covered with small spines, rostral setae rough, mutual distance between lamellar setae smaller than between rostral setae. Notogastral setae robust, not very long ($c_1 < c_1 - d_1$), setae of row *c* remote from anterior border, setae c_1 more than setae c_2 and c_3. Ventral region, 9 pairs of genital setae with formula 5: 4, 2 pairs of aggenital present, ag_2 setae longer and thicker than ag_1, 3 pairs of anal and 3 pairs of adanal setae present. Tarsi of legs heterotridactylous.

Localities in the Nearctic Region: Connecticut (JACOT 1938), New York (JACOT 1924, 1930, 1938).

Localities in Florida: Highlands Co., SE Lake Placid Parker Isl. Baygall; 31.XII.1973, stage III log litter; leg. W. SUTER – (28 sp.); Lee Co., SE Sanibel Isl.; 31.XII.1973, litter at shelly shore causeway, leg. W. SUTER – (3 sp.); Alachua Co., Gainesville, San Felasco Hammock St. Preserve in stream ca. 0.25 mi along path from entrance, BERLESE of sphagnum from slow moving stream, 14 I 1999, leg. G. FORTIER – (2 sp.); Alachua Co., Gainesville, San Felasco Hammock State Preserve; 0.5 mi from entrance, BERLESE of sparse liverwort in low, damp area, 14 I 1999, leg. G. FORTIER, P. SKELLEY – (1 sp.); Nassau Co., St. Mary's River State Forest, E. Boulogne St., BERLESE of leaf litter, 18 III 1997, leg. P. SKELLEY – (4 sp.); Hamilton Co., Jennings, Pine Woods, pine buttress/bush, leg. W. SUTER – (2 sp.); Okeechobee Co., 2 mi S of Okeechobee, Lake Okeechobee (NE shore), water hyacinth, leg. W. SUTER – (1 sp.).

D i s t r i b u t i o n: Nearctic.

Euphthiracarus fulvus (EWING, 1909)

Phthiracarus fulvus EWING, 1909

Euphthiracarus fulvum JACOT 1930

(Figs 92-98)

M a t e r i a l e x a m i n e d: microscope slide with type of *P. fulvus* labelled: „*Phthiracarus fulvus* n. sp. TYPE Mahomet III Apr. 17; 08 by myself in moss B.257 M.ingl.j.tac.Apr. 18;08 H. E.EWING" (courtesy Dr. G. F. HEVEL from USNM).

Measurements of type: prodorsum: length 317, sensillus 70,8, seta: *in* 187, *le* 109, ro 86.0, *ex* 17.7; notogaster: length 520, height 368. Measurements of figured specimen from Vermont: prodorsum: length 313, width 222, height 141, sensillus 75.9, setae: *in* 152, *le* 139, *ro* 114, *ex* 27.8; notogaster: length 621, width 394, height 389, c_1 101, c_2 152, *cp* 139, $h_1$126, ps_1 109; genitoaggenital plate 263x95.9, anoadanal plate 257x80.8.

D i a g n o s i s a n d a d d i t i o n a l d e s c r i p t i o n. Colour yellow, surface of body punctated, only near the borders of the notogaster slightly rough. Prodorsum with two pairs of lateral carinae, upper long, strong, lower shorter and weak, sensilli with long pedicel and swollen, fusiform head, almost smooth, setae (except exobothridial) almost perpendicular to the surface, interlamellar and lamellar covered with small spines, rostral setae rough, mutual distance between lamellar setae greater than between rostral setae. Notogastral setae robust, not very long ($c_1 < c_1 - d_1$), setae c_2 and *cp* longer than other. Ventral region, 9 pairs of genital setae with formula 5: 4 (not all genital setae of type are visible), 2 pairs of aggenital setae present, ag_2 setae longer and thicker than ag_1, 3 pairs of anal and 3 pairs of adanal setae present. Legs setation and solenidiotaxy (without tarsi): I: 1-3-5(2)-5(1), II: 1-4-3(1)-5(1), III: 2-2-2(1-2(1), IV: 2-1-1(1)-2(1), tarsi heterotridactylous.

Citations: *Euphthiracarus fulvus*: EWING 1917, JACOT 1924, MARSHALL et al. 1987, MAHUNKA 1995.

Localities in the Nearctic Region: USA: Illinois (EWING 1909)

Localities in Florida: Leon Co., Tall Timbers Research Station, Woodyard hammock (3), BERLESE funneled, 14 VI 1968, leg. W. WHITCOLM – (1 sp.); Dade Co., Homestead, Bauer Hammock, BERLESE of leaf litter, leg. MATHEWS, LOTT, and WATTS, 20 XI 1988 – (2 sp.).

D i s t r i b u t i o n: Nearctic.

Euphthiracarus fusulus sp. nov.

(Figs 99-101)

Measurements of holotype: prodorsum: length 240, width 162, height 93.6, sensillus 86.0, setae: *in* 101, *le* 50.6, *ro* 55.7, *ex* 30.4; notogaster: length 424, width 263, height 278, setae: c_1 50.6, h_1 58.2, ps_1 50.6; genitoaggenital plate 156x60.6; anoadanal plates 187x40.4.

D e s c r i p t i o n. Colour yellow, surface of body punctated.

Prodorsum with single pair of lateral carinae; sensilli very long with elongate spindle-shaped head covered with small spines, setae (except exobothridial) erect, covered with small spines.

Notogaster with relatively short ($c_1 < c_1$-d_1), rigid setae covered with small spines, setae of row *c* remote from anterior border, setae c_1 slightly more than setae c_2 and c_3.

Ventral region, setae *h* of mentum considerably longer than distance between them, 9 pairs of genital setae with formula: 7: 2, 2 pairs of aggenital setae present, ag_2 setae slightly longer and thicker than ag_1,

Legs setation and solenidiotaxy (without tarsi): I: 1-3-5(2)-5(1), II: 1-4-3(1)-5(1), III: 2-2-2(1-2(1), IV: 2-1-1(1)-2(1), tarsi heterotridactulous.

Holotype and 7 paratypes: Florida, Highlands Co., SE Lk. Placid, Parker Isl. Baygall; 31.XII.1973, bay buttress, vine entwinned w/ferns; leg. W. SUTER.

Comparison. This species is distinguishable by the elongate, spindle-shaped head of prodorsal sensilli and by one pair of lateral carinae of prodorsum.

Etymology. The specific epithet *fusulus* is Latin for „a spindle" and alludes to the shape of head of prodorsal sensilli.

Localities in Florida: Union Co., Lake Butler, 22 X 1993, leg. L. R. DAVIS, Jr. – (1 sp.); Highlands Co., SE Lk. Placid, Parker Isl. Baygall; 28.XII.1973, *Osmunda rhizome* crowns; leg. W. SUTER – (25 sp.); Highlands Co., 4 mi E Venus, Fisheating Ck., Big Cypress Swamp; 30.XII.1973, litter u. water hyacinth; leg. W. SUTER – (1 sp.); Highlands Co., 7 mi SE Lake Placid, Parker Is. Baygall; 5.I.1975, subcortical litter, passalid log, leg. W. SUTER – (23 sp.); Highlands Co., SE Lk. Placid, Parker Isl. Baygall; 28.XII.1973, floor litter between *Osmunda* hummocks; leg. W. SUTER – (6 sp.); Highlands Co., SE Lk. Placid, Parker Isl. Baygall; 28.XII.1973, floor pockets at log; leg. W. SUTER – (3 sp.)

Localities in the Nearctic Region: other states in US (NIEDBAŁA 2002).

D i s t r i b u t i o n: Nearctic.

Euphthiracarus pulchrus JACOT, 1930

Euphthiracarus flavum pulchrum JACOT, 1930

Euphthiracarus pulchrus: MARSHALL et al. 1987

(Figs 105-108)

M a t e r i a l e x a m i n e d: holotype in microscope slide labelled: „*1 Euphthiracarus pulchrum* sp. n. Holotype 2613 h1 Type Sandy Hook Conn. Hemlock gorge leaf mould June 21/26 Coll. A. P. JACOT" (courtesy Dr. A. B. JOHNSTON from MCZ).

Measurements of holotype: prodorsum: length 333, height 136, sensillus 86.0, setae: *in* 152, *le* 114, *ro* 91.1, *ex* 40.5; notogaster: length 647, height 393, setae: c_1 134, c_1/c_1-d_1 = 0.76, h_1 119, ps_1 91.1. Measurements of figured specimen from Mississippi: prodorsum: length 303, width 202, height 111, sensillus 101, setae: *in* 116, *le* 88.5, *ro* 98.7, *ex* 58.2; notogaster: length 571, width 368, height 387, setae; c_1 101, c_1/c_1-d_1 = 0.71, h_1 and ps_1 114; genitoaggenital plate 237x95.9; anoadanal plate 247x80.8.

D i a g n o s i s a n d a d d i t i o n a l d e s c r i p t i o n. Colour yellow, surface of body, especially of notogaster ornamented by kind of mosaic or compact concavities. Prodorsum with two pairs of lateral carinae, sensilli without head but covered in distal half with dense spines, interlamelar and lamellar setae erect covered with small spines in distal half, rostral setae procumbent, rough. Notogaster with medium length of setae (c_1 <c_1-d_1), setae c_1 and c_2 remote from anterior border more than setae c_3. Ventral region, genitoaggenital plates with 9 pairs of setae with formula 6: 3, 2 pairs of aggenital setae present, setae ag_2 longer and thicker than ag_1 setae.

Locality in the Nearctic Region: USA: Connecticut (JACOT 1930, 1939).

Localities in Florida: Leon Co., Tall Timbers Research Station, Woodyard hammock (4), BERLESE funneled, 14 VI 1968, leg. W. WHITCOLM – (1 sp.).

D i s t r i b u t i o n: Nearctic.

Rhysotritia MARKEL et MEYER, 1959

type species: *Hoplophora ardua* C. L. KOCH, 1841

Rhysotritia: MAHUNKA 1990

D i a g n o s i s. Prodorsum without median carina, but with one or two pairs of lateral carinae, bothridial squamae situated above the bothridia, posterior median apodeme present, setae in median (paraxial) position. Notogaster with 14 pairs of setae, setae ps_1 situated above the ps_{2-3} setae, one pair of openings of lateral opisthosomal glands, five pairs of lyrifissures *ia, im, ip, ih, ips* and two pairs of vestigial setae f present; terminal sinus at the posterior end. Ventral region, genitoaggenital and anoadanal plates completely fused, anogenital cleft absent, one interlocking triangle

present, palps 3-segmented, with formula: 2-2-8(1). Legs, trochanters I and II bearing one setae and III and IV with 2 setae, genua IV without solenidia, setae *d* on tibia IV comparatively long and not coupled with solenidia, solenidia of tarsi II without coupled setae, tarsi mono, bi or heterotridactylous.

Rhysotritia ardua (C. L. KOCH, 1841)

Hoplophora ardua C. L. KOCH, 1841

Phthiracarus americanus EWING, 1909

Pseudotritia ardua: HAMMEN 1959

(Figs 109-117)

M a t e r i a l e x a m i n e d: one microscope slide with cotype labelled: „*Phthiracarus americana* n. sp. Cotype Am. Mus. Nat. Hist. Dept. Invert. Zool. No. 24111 Columbia Mo., by C.R. Crosby In trash. M. in bal., Jun 1908 Ac. 4939 H. E.EWING" (courtesy Dr. G.F. HEVEL from USNM).

Measurements of *P. americana*: prodorsum: length 298, height 95.9, sensillus 85.8, *in* 111, *le* 65.6, *ro* 50.5; notogaster: length 628, height 380, c_1 50.5, c_1/c_1-d_1 = 0.42, h_1 80.8, ps_1 75.7; length of genitoaggenital plate 212; length of anoadanal plate 263.

D i a g n o s i s. Colour brown, surface of body punctate. Prodorsum with one pair of lateral carinae, sensilli with distinctly dilated head covered with spines, setae robust, erect, covered with small spines in distal half (except minute exobothridial setae). Notogastral setae fairly short ($c_1 < c_1$-d_1) covered with small spines in distal half. Ventral region, setae *h* of mentum longer than distance between them, 9 pairs of minute genital and 2 pairs of aggenital setae present, located longitudinally, 3 pairs of anal setae, an_1 and an_2 robust, smooth, an_3 minute, 3 pairs of robust adanal setae covered with small spines in distal half, lyrifissures *iad* located between ad_3 and an_3 setae. Legs setation and solenidiotaxy: I: 1-3-3(2)-4(1)-17(3), II: 1-3-3(1)-4(1)-13(2), III: 2-2-2(1-3(1)-11, IV: 2-1-2-2(1)-10, tarsi I bidactylous, tarsi II-IV heterotridactylous.

Citations: MARKEL 1964, BALOGH et MAHUNKA 1983, MARSHALL et al. 1987

Localities in the Nearctic Region: sub *R. ardua*: Canada and USA, many localities (MARSHALL et al. 1987).

Localities in Florida: sub *P. americanus*: USA: Florida (EWING 1909); sub *Pseudotritia ardua sinensis*: Milton, Madison, Perry, Mayo, Welborn, Gainesville, Pikoson Springs, Micanopy, Green Cove Springs, St. Augustine, Palatka, Crescent City, Eustis, Mulberry, Vero Beach, White City, Villa Tasso (JACOT 1933).

Allachua Co., Gainesville, park-forest near Campus, litter under palms, 7 V 1979, leg. W. WEINER – (3 sp.); Highlands Co., 4 mi W Venus, Fisheating Ck., Big Cypress Swamp; 30.XII.1973, cypress stub buttress, leg. W. SUTER – (1 sp.); Highlands Co., 7 mi SE Lake Placid, Parker Is. Baygall; 5.I.1975, subcortical litter, passalid log, leg. W. SUTER – (1 sp.); Highlands Co., SE Lk. Placid, Parker Isl. Baygall; 28.XII.1973, floor litter between *Osmunda* hummocks, leg. W. SUTER – (1 sp.); Alachua Co., Gainesville, San Felasco Hammock St. Preserve in stream ca. 0.25 mi along path from entrance, BERLESE of sphagnum from slow moving stream, 14 I 1999, leg. G. FORTIER – (1 sp.); Nassau Co., St. Mary's River State Forest, 1.5 mi E Boulogne, BERLESE of sifted mixed forest litter, 24 III 1998, leg. W. C. WELBOURN – (9 sp.); Putnam Co., Florahome, 2.5 mi NE of Etoniah Creek Wildlife Management Area, BERLESE of sphagnum from Tupelo/Pine flatwoods, 30 XII 1998, leg. G. FORTIER – (38 sp.); Walton Co., Defuniak Springs, Elgin AFB S of Defuniak Springs, BERLESE near beech trees, 20 XII 1998, leg. R. TURNBOW, P. SKELLEY – (1 sp.); Alachua Co., Gainesville, Gainesville Regional Airport; field W of Gun Club, BERLESE of sphagnum, 30 XII 1998, leg. G. FORTIER – (12 sp.); Alachua Co., Paynes Prairie State Preserve, dry stream bed near the visitor center, BERLESE of mixed litter, 17 XI 1998, – (1 sp.); Alachua Co, Paynes Prairie State Preserve, Gate 1; 0.25 mi down Chacala Trail, sifted litter at base of old live oak, 12 I 1999, – (54 sp.); Baker Co., Olustee, 15 X 1993, leg. L. R. DAVIS, Jr. – (2 sp.); Duval Co., Baldwin, 17 X 1993, leg. L. R. DAVIS, Jr. – (2 sp.); Nassau Co., St. Mary's River State Forest, E. Boulogne St., BERLESE of leaf litter, 18 III 1997, leg. P. SKELLEY – (24 sp.); Alachua Co., Sante Fe River at Rt. 441, leaf litter BERLESE debris near river and cypress, 24 X 1990, leg. P. SKELLEY – (28 sp.); Gilchrist Co., Trenton, 8 mi NE Trenton; off dirt road S from Rt. 232, BERLESE sample, 10 IV 1994, leg. L. R. DAVIS, Jr. – (4 sp.); Alachua Co., Rt 441 at Sante Fe River, leaf litter at edge of cypress backwater, 1 X 1992, leg. P. SKELLEY – (4 sp.); Lake Co., Aster, on litter of hickory and sweet gum, 8 X 1963, leg. H. A. DENMARK – (2 sp.)

D i s t r i b u t i o n: Semicosmopolitan.

Rhysotritia curticephala JACOT, 1938

Pseudotritia ardua curticephala JACOT, 1938

Rhysotritia lucida NIEDBAŁA, 1998 syn. nov.

Rhysotritia curticephala: MARSHALL et al. 1987

(Figs 118-122)

M a t e r i a l e x a m i n e d: microscope slides with cotypes labelled: „A. P.JACOT Coll. 40 – *Pseudotritia ardua curticephala* subsp. nov. Cotypes 3239h1 from well-decayed fallen hamlock bole with a little lichen, " way up Sage's Ravine Riga Mt. Nur. Conn. Dried Aug. 17/32" (courtesy Dr. A. B. JOHNSTON from MCZ).

Measurements cotype of *P. ardua curticephala*: prodorsum: length 228, height 91.1, sensillus 40.5, setae: *in* 63.2, *le* 30.4, *ro* 25.3; notogaster: length 429, height 268, setae: c_1 58.2, c_1/c_1-d_1 = 0,6, h_1 58.2, ps_1 45.5. Measurements of figured specimens from Florida: prodorsum: length 207, height 81.0, sensillus 50.6, setae: *in* 91.1, *le* 73.4, *ro* 45.5, *ex* 10.1; notogaster: length 389, height 288.

D i a g n o s i s. Colour yellow, integument punctate. Prodorsum with one pair of simple lateral carinae, sensilli with almost globular or fusiform head, covered with small spines; interlamellar, lamellar and rostral setae erect, slender, covered with small spines in distal half, exobothridial setae minute, *in*>*le*>*ro*>*ex*. Notogastral setae simple, slender, covered with small spines in distal half. Ventral region, 9 pairs of genital and 2 pairs of aggenital setae present. Legs setation end solenidiotaxy (without tarsi): I: 1-3-4(2)-5(1), II: 1-3-3(1)-4(1), III: 2-2-2(1)-3(1), IV: 2-1-1-2(1), all tarsi monodactylous.

R e m a r k. Only after the analysis of the cotypes of *R. curticephala* was it evident that the recently described species *R. lucida* NIEDBAŁA, 1998 is the synonym of this species.

Localities in the Nearctic Region: USA: Connecticut, New York (JACOT 1938)

Localities in Florida: Okeechobee Co., 2 mi S of Okeechobee, Lake Okeechobee (NE shore), water hyacinth, leg. W. SUTER – (1sp.); FMHD#82-725 – 2; Hamilton Co., Jennings, Piney Woods, pine buttress/bush, leg. W. SUTER – (24 sp.); Monroe Co., Big Pine Key, Watson Hammock; 4.VIII.1971, hardwood litter leg. S. PECK – (1 sp.); Highlands Co., Archbold Biol. Sta.; 30.XII.1973, palmetto log litter w/moss & lichens; leg. W. SUTER – (8 sp.); Marion Co., Ocala National Forest, S.R 40 West, 4.3 mi. from S.R.19; 26.XI.1972; R. KAPLAN. – (2 sp.); Alachua Co., Gainesville, Doyle O'Conner Building grounds; 1911 SW 34th St., sand and leaf litter; living grapevine trunk, 15 II 1999, leg. T. E. CRONIN – (4 sp.); Walton Co., Defuniak Springs, Elgin AFB S of Defuniak Springs, BERLESE near beech trees, 20 XII 1999, leg. R. TURNBOW and P. SKELLEY – (3 sp.); Walton Co., Defuniak Springs, Elgin AFBS of Defuniak Springs, BERLESE near beech trees, 20 XII 1998, leg. R. TURNBOW, P. SKELLEY- (5 sp.); Alachua Co., Gainesville, San Felasco Hammock State Preserve; 0.5 mi from entrance, BERLESE of sifted litter from turkey oak sample, 14 I 1999, leg. G. FORTIER, P. SKELLEY – (17 sp.); Alachua Co., Paynes Prairie State Preserve, dry stream bed near the visitor center, BERLESE of mixed litter, 17 XI 1998, – (1 sp.); Alachua Co., Paynes Prairie State Preserve, 0.25 mi from Gate 15, BERLESE of mainly holly litter (*Ilex opaca*), 22 XII 1998, – (1 sp.); Alachua Co., Paynes Prairie State Preserve, Gate 1; 0.25 mi down Chacala Trail, jct. of frond and trunk of sabal palmetto, 12 I 1999, – (2 sp.); Alachua Co., Paynes Prairie State Preserve, Gate 1; 0.25 mi down Chacala Trail, sifted litter at base of old live oak, 12 I 1999, – (5 sp.); Putnam Co., Ordway Nature Preserve, litter along and beneath pine log, 7 I 1999, leg. L. R. DAVIS, Jr. – (36 sp.); Putnam Co., Ordway Nature Preserve, One Shot Pond, 26 X 1993, leg. L. R. DAVIS, Jr. – (18 sp.); Baker Co., ca. 5 km E MacClenny, 24 X 1993, leg. L. R. DAVIS, Jr. – (6 sp.); Alachua Co., Arredondo, SW of Gainesville, leaf litter at the base of a pine tree, 3 XI 1993, leg. L. R. DAVIS, Jr. – (23 sp.); Putnam Co., Ordway Nature Preserve, 5 mi from main entrance, 20 XI 1993, leg. L. R. DAVIS, Jr. – (1 sp.); Union Co., Lake Bulter, 5 mi NW of Lake Bulter, 22 X 1993, leg. L. R. DAVIS, Jr. – (7 sp.); Baker Co., Olustee, 15 X 1993, leg. L. R. DAVIS, Jr. – (12 sp.); St. Johns Co., S Ponta Verde Recreational Area, Route A1A, 27 XI 1993, leg. L. R. DAVIS, Jr. – (4 sp.); Putnam Co., Ordway Nature Preserve, 1.3 mi from main entrance, 28 XI 1993, leg. L. R. DAVIS, Jr. – (26 sp.); Duval Co., Baldwin, 17 X 1993, leg. L. R. DAVIS, Jr. – (8 sp.); Columbia Co., Lake City, 4 mi S of Lake City along Rt. 41/441, 7 XI 1993, leg. L. R. DAVIS, Jr. – (8 sp.); Marion Co., Ocala National Forest, Big Scrub Recreational Area, 29 VII 1993, leg. L. R. DAVIS, Jr.- (2 sp.); Alachua Co., Gaines-

ville, SW 20th Ave and I-75, 5 XI 1993, leg. L. R. DAVIS, Jr. – (32 sp.); Lafayette Co., Suwannee River, Junction of 27 and Rt 349 1.2 mi W of Suwannee River, 11 X 1993, leg. L. R. DAVIS, Jr. – (12 sp.); Marion Co., Juniper Springs, *Pinus clausa* litter, 18 XI 1959, leg. H. A. DENMARK – (10 sp.); Alachua Co., Sante Fe River at Rt. 441, leaf litter BERLESE debris near river and cypress, 24 X 1990, leg. P. SKELLEY – (3 sp.); Highlands Co., Lake Placid, Archbold Biological Station, leaf litter, 7 VII 1988, leg. P. SKELLEY – (3 sp.); Levy Co., Archer, 3.8 mi SW of Archer, BERLESE of leaf litter, 23 VI 1987, leg. P. SKELLEY – (1 sp.); Duval Co., Jacksonville, University of Northern Florida Campus Wildlife Preserve, leaf litter under palmetto, 20 III 1988, leg. P. SKELLEY – (8 sp.); Levy Co., Archer, 3.8 mi SW of Archer, BERLESE of litter under rosemary, 27 II 1988, leg. P. SKELLEY – (5 sp.); Jackson Co., Florida Caverns State Park, leaf litter, 30 V 1988, leg. P. SKELLEY – (2 sp.); Nassau Co., Fort Clinch State Park, leaf litter, 5 V 1988, leg. P. SKELLEY – (1 sp.); Union Co., Lake Butler, 22 X 1993, leg. L. R. DAVIS, Jr. – (2 sp.); 55 ( ), 14020, Gilchrist, Trenton, 8 mi NE Trenton; off dirt road S from Rt. 232, BERLESE sample, 10 IV 1994, leg. L. R. DAVIS, Jr. – (4 sp.); Putnam Co., Ordway Nature Preserve, Blue Pond, base of pine tree, 4 XII 1955, leg. L. R. DAVIS, Jr. – (16 sp.); Duval Co., Baldwin, 5 km W of Baldwin on Rt. 90, 24 X 1993, leg. L. R. DAVIS, Jr. (3 sp.); Leon Co., Tall Timbers Research Station, woodyard hammock (4), BERLESE funneled, 14 VI 1968, leg. W. WHITCOLM – (3 sp.); Monroe Co., Key Largo, Key Largo, Pole 219, packrat nest debris, 22 III 1968, leg. R.E. WOODRUFF – (1 sp.); Leon Co., Tall Timbers Research Station, woodyard hammock (3), BERLESE funneled, 14 VI 1968, leg. W. WHITCOLM – (2 sp.); Alachua Co., Gainesville, Doyle O'Conner Building grounds; 1911 SW 34th St., leaf litter, 3 IX 1992, leg. P. E. SKELLEY – (8 sp.); Marion Co., Silver Springs, Rt 40; 2 mi E of Silver Springs, BERLESE of mixed litter, 24 VII 1998, leg. L. R. DAVIS, Jr., A. A. ZAKURADA – (1 sp.); Alachua Co., Archer, Litter from oak forest, 15 III 1998, leg. W.C. WELBOURN – (3 sp.) – (8 sp.); Alachua Co., O'Leno State Park, In litter of mixed hardwood, 28 IX 1963, leg. H. A. DENMARK – (2 sp.); Marion Co., Ocala National Forest, Juniper Springs, in *Pinus clausa* debris, 31 X 1960, leg. H. A. DENMARK – (11 sp.); Marion Co., Ocala National Forest, Juniper Springs #109 A&L, *Pinus clausa*, 21 XII 1959, leg. H. A. DENMARK, 109 AIL – (41 sp.); Leon Co., Natural Bridge Battlefield, 0.35 mi E of Natural Bridge Battlefield, sifted mixed litter, 28 I 1999, leg. W. C. WELBOURN – (17 sp.); Alachua Co., Gainesville, San Felasco Hammock State Preserve, BERLESE of mixed, pine, and oak litter; under *Pinus* log, 23 II 1999, leg. G. FORTIER, W. NIEDBAŁA, W.C. WELBOURN – (1 sp.); Charlotte Co., Punta Gorda, 5 mi E of Punta Gorda; Charlotte Ranchettes, sifted pine and palmetto litter, 15 II 1999, leg. W.C. WELBOURN – (3 sp.)

D i s t r i b u t i o n: Semicosmopolitan.

· ***Rhysotritia dicra*** NIEDBAŁA et SCHATZ, 1996

(Fig. 123)

D i a g n o s i s. Colour light brown, integument porose. Prodorsum with lateral carinae forked distally, sensilli setiform with a few spines in distal part, setae fine, sparsely setose, comparative length: *in>le>ro>ex*. Notogaster with relatively short ($c_1 < c_1$-d_1), covered distally with small spines. Ventral region, setae *h* of mentum longer than distance between them, 9 pairs of genital setae, 2 pairs of aggenital setae present. Legs setation and solenidiotaxy (without tarsi): I: 1-3-4(2)-5(1), II: 1-3-3(1)-4(1), III: 2-2-2(1)-3(1), IV: 2-1-2-2(1), tarsi I bidactylous, tarsi II-IV heterotridactylous.

Localities in Florida: Everglades N.P., Ex: Pineland humus tullgren, X 1987, leg. M. PAOLETTI – (1 sp.); Everglades N.P., Ex: humus of mangroves tullgren, X 1987, leg. M. PAOLETTI – (1 sp.); Monroe Co., Big Pine Key, Watson Hammock; 4.VIII.1971, hardwood litter, leg. S. PECK – (5 sp.).

D i s t r i b u t i o n: Central America and Florida.

Rhysotritia dixa NIEDBAŁA & SCHATZ, 1996

(Figs 124-132)

D i a g n o s i s. Colour light brown, surface of body punctate, prodorsum with lateral carinae forked distally, sensilli with narrow stalk and rounded head covered distally with small spines, setae rigid covered with small spines in distal half, *in>le>ro>ex*; notogaster with fine, short ($c_1 < c_1$-d_1) covered with small spines in distal half; 9 pairs of genital and 2 pairs of aggenital setae present; all tarsi monodactylous.

Localities in Florida: Monroe Co., Key Largo, Key Largo, Pole 219, Packrat nest debris, 22 III 1968, leg. R. E. WOODRUFF – (3 sp.)

D i s t r i b u t i o n: Central America and Florida.

Microtritia MARKEL, 1964

type species: *Phthiracarus minimus* BERLESE, 1904

Microtritia: MAHUNKA 1990

D i a g n o s i s. Surface of body punctate or porose. Prodorsum without median carina, with one pair of lateral carinae, bothridial squamae situated above the bothridia, posterior median apodeme present, lamellar and rostral setae in median (paraxial) position, interlamellar setae situated near the bothridia. Notogaster with 14 pairs of setae, setae of row *ps* situated almost in one line, terminal sinus or terminal fissure at posterior end present, one pair of openings of lateral opisthosomal glands and five pairs of lyrifissures: *ia, im, ip, ips, ih* present. Ventral region, genitoaggenital and anoadanal plates completely fused, anogenital cleft present, one, median interlocking triangle present; palps 3-segmented. Legs, each trochanter with one seta, genua IV without solenidia, setae *d* on tibia IV coupled with solenidia, solenidia $\omega 1$ and $\omega 2$ without coupled setae, famuli stands far from solenidia, all tarsi monodactylous.

Microtritia simplex (JACOT, 1930)

Pseudotritia simplex JACOT, 1930
Microtritia simplex: MARSHALL et al. 1987
Rhysotritia paeneminima WALKER, 1965 syn. nov.
Rhysotritia paeneminima: MARSHALL et al. 1987
Microtritia minima: REEVES 1969, SENGBUSCH 1957

(Figs 133-137)

M a t e r i a l e x a m i n e d: 6 specimens on the microscope slide together with cotypes of *Protoribotritia canadaris* JACOT: Connecticut Hill Newfield Tomp. Co. N.Y. pine leaf mould f. of pine crest of hill, Nov. 25/32 Coll. By JACOT" (courtesy Dr. A. B. JOHNSTON from MCZ).

Measurements of one specimen from slide: prodorsum: length 169, height 68.3, sensillus 30.4; notogaster: length 147, height 101. Measurements of figured specimen from Oregon: prodorsum: length 182, width 139, height 65.8, sensillus 49.0, setae: *in* 20.2, *le* 35.4, *ro* 30.4, *ex* 7.6; notogaster: length 323, width 184, height 187, setae c_1 49.0, c_1/c_1-d_1 = 0,63, h_1 43.0, ps_1 27.8; genitoaggenital plates 78.4x43.0, anoadanal plates 149x34.1.

D i a g n o s i s. Colour light brown. Prodorsum with distinct long lateral carinae, sensilli clavate, bearing distally a cap-like appendage, setae minute, rostral setae inserted close to each other, *in-in>le-le>ro-ro*. Notogastral setae very short, flexible. Ventral region, setation of palps: 1-1-8(1), 4 pairs of genital and 1 pair of aggenital, 2 pairs of anal and 3 pairs of adanal minute setae present, lyrifissures *iad* located anteriorly of ad_3 setae.

R e m a r k. All features of *R. paeneminima* idicate that it is *M. simplex*.

Microtritia simplex is distinguishable from *Microtritia minima* (BERLESE, 1904) by the presence of one pair of aggenital setae and longer prodorsal setae. These are typical vicariants, one of the Nearctic and the other of the Palearctic distribution.

Localities in the Nearctic Region: sub *M. simplex*: USA: Connecticut (JACOT 1930, 1938), Maine (JACOT 1930), New York (JACOT 1938) sub *M. paeneminima*: USA: California (WALKER 1965, WALTER et NORTON 1985); sub *M. minima*: New York (REEVES 1969), Virginia (SENGBUSCH 1957).

Localities in Florida: Alachua Co., Gainesville, San Felasco Hammock St. Preserve in stream ca. 0.25 mi along path from entrance, BERLESE of sphagnum from slow moving stream, 14 I 1999, leg. G. FORTIER – (12 sp.); Putnam Co., Florahome, 2.5 mi NE of Etoniah Creek Wildlife Management Area, BERLESE of sphagnum from Tupelo/Pine flatwoods, 30 XII 1998, leg. G. FORTIER – (18 sp.); Alachua Co., Gainesville, San Felasco Hammock State Preserve; 0.5 mi from entrance, BERLESE of sparse liverwort in low, damp area, 14 I 1999, leg. G. FORTIER, P. SKELLEY – (1 sp.); Alachua Co., Paynes Prairie State Preserve, Gate 1; 0.25 mi down Chacala Trail, sifted litter at base of old live oak, 12 I 1999, – (1 sp.); Baker Co., Olustee, 15 X 1993, leg. L. R. DAVIS, Jr. – (11 sp.); Nassau Co., St. Mary's River State Forest, E. Boulogne St., BERLESE of leaf litter, 18 III 1997, leg. P. SKELLEY – (2 sp.); Gilchrist Co., Trenton, 8 mi NE Trenton; off dirt road S from Rt. 232, BERLESE sample, 10 IV 1994, leg. L. R. DAVIS, Jr. – (1 sp.); Duval Co., Baldwin, 5 km W of Baldwin on Rt. 90, 24 X 1993, leg. L. R. DAVIS, Jr. – (4 sp.); Marion Co., Silver Springs, Rt 40; 2 mi E of Silver Springs, BERLESE of mixed litter, 24 VII 1998, leg. L. R. DAVIS, Jr., A. A. ZAKURADA – (5 sp.); Charlotte Co., Punta Gorda, 5 mi E of Punta Gorda; Charlotte Ranchettes, sifted wax myrtle and palmetto litter, 15 II 1999, leg. W. C. WELBOURN – (2 sp.); Levy Co., Cedar Key, ca. 1-2 mi E of Rt. 347 on Rt. 24, BERLESE oak litter on sand ridge, 11 X 1998, leg. P. SKELLEY – (1 sp.).

D i s t r i b u t i o n: Nearctic.

Phthiracaroidea PERTY, 1841

D i a g n o s i s. Body only slightly compressed laterally, anogenital region relatively wide, almost U-shaped.

Phthiracaridae PERTY, 1841

type genus: *Phthiracarus* PERTY, 1839

Monotypic family with the diagnosis as those of the genus.

Phthiracarus PERTY, 1839

type species: *Phthiracarus contractilis* PERTY, 1841
(=*Hoplophora laevigata* C. L. KOCH, 1841)

D i a g n o s i s. Body surface smooth or punctate (with some exceptions). Dorsal and lateral fields of prodorsum not fused, lateral carinae of prodorsum either long, extending beyond or reaching the sinus, or shorter, no furrows in the back of prodorsum (with some exceptions), sensilli most often smooth, short, fusiform or rounded distally, or long and filiform, without a distinct head, interlamellar setae always parallel to surface of prodorsum, setae of prodorsum and notogaster smooth, fine and long, acuminate. Median carina of notogaster absent, 15 pairs of gastronotal setae, rarely more present. Ventral region, genital setae arranged in two rows, setae g_6-g_9 remote from paraxial margin, seta g_6 usually near or above g_5, adanal setae always remote from the paraxial margin of plate, setae ad_1 and ad_2 normal, minute or vestigial, neotrichy involving adanal setae may occur. Legs, setae *d* of tibia IV short, coupled with solenidia, when present, setae *v'* on femora I long, setae *ft*" of tarsi I normal.

Phthiracarus brevisetae JACOT, 1930

Phthiracarus brevisetae: MARSHALL et al. 1987
Phthiracarus restrictus JACOT, 1937 syn. nov.
Phthiracarus restrictus: MARSHALL et al. 1987

(Figs 138-146)

M a t e r i a l e x a m i n e d: microscope slide labelled: „*Phthiracarus brevisetae* JACOT Holotype 2534h East Village Monroe Conn. Haystock on hillside Sept./25 Coll. By A. P. JACOT" (courtesy Dr. A. B. JOHNSTON from MCZ): microscope slide labelled „34F1-27

21=*Phthiracarus sphaerulus* Bks 24=*Phthiracarus restrictus* sp. nov. cotypes" (courtesy Dr. D. G. FURTH from USNM).

Measurements of holotype of *P. brevisetae*: prodorsum: length 368, height 141, sensillus 58.0, setae: *ro* 47,6, *ex* 70.5; notogaster: length 790, height 604, setae: h_1 60.5, ps_1 63.0. Measurements of one of cotypes of *P. restrictus*: prodorsum: length 303, height 126, sensillus 55.7; notogaster: length 596, height 394, setae: c_1 81.0, h_1 58.2; length of genitoaggenital plate 151, length of anoadanal plate 177. Measurements of figured specimen from North Carolina: prodorsum: length 338, width 257, height 116, sensillus 43.0, setae: *in* 78.4, *le* 50.6, *ro* 53.1, *ex* 37.9; notogaster: length 647, width 488, height 444, setae: c_1 75.9, c_1/c_1-d_1 = 0.53, h_1 and ps_1 55.7; genitoaggenital plate 177x131, anoadanal plate 202x111. Measurements of figured specimen from Mississippi: prodorsum: length 303, width 207, height 121, sensillus 40.5, setae: *in* 63.2, *le* 58.2, *ro* 40.5, *ex* 17.7; notogaster: length 571, width 404, height 389, setae: c_1 63.2, h_1 60.7, ps_1 45.5; genitoaggenital plate 136x126, anoadanal plate 202x106.

D i a g n o s i s a n d a d d i t i o n a l d e s c r i p t i o n. Colour brown, light to dark. Prodorsum with lateral carinae reach sinus, fields weakly expressed, sensilli with lanceolate, curved anteriorly head, setae rather short, interlamellar the longest. Notogaster with 16 pairs of short setae, length of setae about half of distance between them, additional setae in row *ps*, setae e_1 and h_1 stronger than other, setae c_2 remote from anterior border more than setae c_1 and c_3, setae vestigial f_1 posteriorly of h_1 setae, all four pairs of lyrifissures: *ia, im, ip, ips* present. Ventral region, setae *h* of mentum longer than distance between them, formula of genital setae: 6(4+2): 3, anoadanal plates with well-developed setae, setae ad_1 and ad_2 longer than anal setae, setae ad_3 the shortest. Legs setation complete, setae *d* on femora I located on distal end of article.

R e m a r k. All characters of *P. restrictus* indicate that this species is a synonym of *P. brevisetae* (see NIEDBAŁA 2002).

Locality in the Nearctic Region: sub *P. brevisetae*: USA: Connecticut (JACOT 1930), New York (JACOT 1938); sub *P. restrictus*: North Carolina (JACOT 1937).

Localities in Florida: Leon Co., Tall Timbers Research Station, woodyard hammock (3), BERLESE funneled, 14 VI 1968, leg. W. WHITCOLM – (2 sp.); Leon Co., Tall Timbers Research Station, woodyard hammock (4), BERLESE funneled, 14 VI 1968, leg. W. WHITCOLM – (4 sp.)

D i s t r i b u t i o n: Nearctic.

Phthiracarus curtulus BERLESE, 1923

(Figs 147-151)

Type material examined by NIEDBAŁA (1994).

D i a g n o s i s. Colour light brown. Prodorsum with fine lateral carinae, sensilli spindle-shaped, rostral setae fine, curved. Notogaster with 15 fine moderately long setae, $c_1 < c_1$–d_1. Ventral region, arrangement of genital setae: 6(4+2): 3, adanal setae ad_1 and ad_2 vestigial, anal setae longer than ad_3 setae. Legs setation of complete type, setae *d* on femora I situated in the middle of article.

Citations: *Phthiracarus curtulus*: JACOT 1923, HAMMEN 1959, NORTON et KETHLEY 1989, NIEDBAŁA 1994a, MARSHALL et al. 1987, MAHUNKA et MAHUNKA-PAPP 1995.

Locality in Florida, Lake City (BERLESE 1923, NORTON et KETHLEY 1989).

D i s t r i b u t i o n: Endemic.

Phthiracarus globosus (C. L. KOCH, 1841)

Hoplophora globosa C. L. KOCH, 1841
Hoplophora sphaerula BANKS, 1895 syn. nov.
Phthiracarus sphaerulum: JACOT 1930, 1933
Phthiracarus sphaerulus: MARSHALL et al. 1987

Phthiracarus rotundus EWING, 1908 syn. nov.
Phthiracarus rotundus: MARSHALL et al. 1987

(Figs 152-158)

M a t e r i a l e x a m i n e d: microscope slide labelled:"*H. sphaerula* (Bks) 1895 Sea Cliff, L.I., N.Y. Types 26B64b (courtesy Dr. A. B. JOHNSTON from MCZ); microscope slide labelled:"*Phthiracarus rotundus* n. sp. non-type Columbia, Mo., by C.R.Crosby, In trash M. in bal., Jun. 19, '08 H. E. EWING"(courtesy Dr. D. G. FURTH from USNM).

Measurements of type of *H. sphaerula*: length of prodorsum 247, length of notogaster 505. Measurements of specimen of *P. rotundus*: sensillus 58.2; notogaster: length 646, width 515.

D i a g n o s i s: Colour brown. Prodorsum with robust median carina, lateral carinae long, extend beyond sinus, median field narrow, sensilli long and narrow; *in>le>ro>ex*. Notogaster with 15 pairs of medium length setae, $c_1 < c_1$-d_1, setae c_1 and c_2 remote from anterior border, setae c_3 near border, vestigial setae f_1 anteriorly of h_1 setae, two pairs of lyrifissures *ia* and *im* present. Ventral region, setae *h* of mentum shorter than distance between them, formula of genital setae: 7(4+3): 2, anoadanal plates with 5 pairs of setae, setae ad_1 and ad_2 vestigial, but occasionally setae ad_1 and ad_2 found normally developed, anal setae longer than setae ad_3. Legs setation complete, setae *d* of femora I long and slightly remote from anterior border and located in the same level with other setae.

Citations: sub *Phthiracarus globosus*: BALOGH et MAHUNKA 1983, MARSHALL et al. 1987, NIEDBAŁA 1986, 1992.

R e m a r k. Despite weakly marked features in the type of *H. sphaerula* and specimen of *P. rotundus* the shape of body and shape of sensilli indicate that these species are synonyms of *P. globosus*.

Localities in the Nearctic Region: sub *P. sphaerulus*: USA: New York (BANKS 1895, JACOT 1930, 1933, 1938, NORTON et MACNAMARA 1976), Connecticut (JACOT 1930, 1933, 1938), Ohio (JACOT 1938); sub *P. rotundus*: Illinois (EWING 1908); sub. *P. globosus*: Virginia (SENGBUSCH 1957).

Localities in Florida: sub *P. sphaerulum*: Wellborn, Gainesville, Pinkoson Springs, Micanopy, White City (JACOT 1933); Florida (JACOT 1938), Highlands Co., SE Lk. Placid, Parker Isl. Baygall; 28.XII.1973, *Osmunda rhizome* crowns; leg. W. SUTER – (1 sp.); St. Johns Co., S Ponta Verde Recreational Area, Route A1A, 27 XI 1993, leg. L. R. DAVIS, Jr. – (2 sp.); Putnam Co., Ordway Nature Preserve, 1.3 mi from main entrance, 28 XI 1993, leg. L. R. DAVIS, Jr. – (8 sp.); Alachua Co., Sante Fe River at Rt. 441, leaf litter BERLESE debris near river and cypress, 24 X 1990, leg. P. SKELLEY – (3 sp.); Nassau Co., Fort Clinch State Park, leaf litter, 5 V 1988, leg. P. SKELLEY – (1 sp.); Leon Co., Tall Timbers Research Station, No. T5-8 plot, 22 VII 1968, leg. W. W. BAKER – (1 sp.); Leon Co., Tall Timbers Research Station, Woodyard hammock (4), BERLESE funneled, 14 VI 1968, leg. W. WHITCOLM – (3 sp.); Leon Co., Tall Timbers Research Station, Woodyard hammock (3), BERLESE funneled, 14 VI 1968, leg. W. WHITCOLM – (2 sp.); Alachua Co., Gainesville, Doyle O'Conner Building grounds; 1911 SW 34th St., leaf litter, 3 IX 1992, leg. P. E. SKELLEY – (4 sp.); Alachua Co., Rt 441 at Sante Fe River, leaf litter at edge of cypress backwater, 1 X 1992, leg. P. SKELLEY – (6 sp.).

D i s t r i b u t i o n: Holarctic.

Phthiracarus longulus (C. L. KOCH, 1841)

Hoplophora longula C. L. KOCH, 1841
Phthiracarus longulus: NIEDBAŁA 1986, 1992
Phthiracarus setosellus JACOT 1928: NIEDBAŁA 1992
Phthiracarus setosellus: JACOT 1930, MARSHALL et al. 1987
Phthiracarus prior JACOT, 1933 syn. nov.
Phthiracarus prior: MARSHALL et al. 1987
Phthiracarus montium JACOT, 1937 syn. nov.

Phthiracarus montium: MARSHALL et al. 1987
Phthiracarus apiculatus JACOT, 1939 syn. nov.
Phthiracarus apiculatus: MARSHALL et al. 1987

(Figs 159-171)

M a t e r i a l e x a m i n e d. Microscope slide labelled: „*Phthiracarus setosellus* JACOT 209h Cotypes Elen Cone Long Is. N.Y. Rotten wood under bark slabs May 8/29 Coll. By A. P. JACOT" (courtesy Dr. J. HUNTER from MCZ). Two microscope slides – the first labelled: „Pinkoson Springs Fla. dry leaves B.F. 3/14/38 GROSSMAN Col. *Phthiracarus prior* sp. nov. Cotype figured G33P9", the second labelled:"Palatka Fla live oak leaves F.B. 4/15/38 GROSSMAN Col. *Phthiracarus prior* sp. nov. Figured dorsal G69P4" (courtesy Dr. H. A. DENMARK from FSCA). Microscope slide labelled: „34 F 10.3 Ph 2 55 = *Phthiracarus montium* sp. nov. Cotypes" and microscope slide labelled: „35 F 8.2.-74 Cotypes 48 = *Phthiracarus apiculatus* sp. n. 12 = *Ph. montium* 1 = P. prior 48 = *Pseudotritia simplex* 32 = indet. (closed or oblique) chiefly *Ph. restrictus*" (courtesy Dr. D. G. FURTH from USNM, loan 2011593).

Measurements of cotype of *P. prior*: prodorsum: length: 192, height 75.9, sensillus 27.8; length of notogaster 318, length of genitoaggenital plate 88.5, length of anoadanal plate 101; measurements of cotype of *P. montium*: prodorsum: length 172, height 78.4, sensillus 32.9; notogaster: length 303, height 182; length of genitoaggenital plate, length of anoadanal plate 101; measurements of cotype of *P. apiculatus*: prodorsum: length 182, height 75.9, sensillus 32.9; notogaster: length 348, height 212, length of genitoaggenital plate 106, length of anoadanal plate 106.

D i a g n o s i s. Colour yellow. Prodorsum with median and lateral fields distinct; lateral carinae long, extend beyond sinus, sensilli short, with head as enlarged spindle, *in*>*le*>*ro*>*ex*. Notogaster with 15 pairs of medium length (c_1< c_1-d_1) setae, setae c_1 and c_3 near anterior border, setae c_2 remote from border, vestigial setae f_1 positioned variable but in neotype (see NIEDBAŁA 1992) on the level of h_1 or sligtly anteriorly of h_1 setae, two pairs of lyrifissures *ia* and *im* present. Ventral region, setae *h* of mentum shorter than distance between them; formula of genital setae: 7(4+3): 2, anoadanal plates each with 5 setae, setae ad_1 and ad_2 vestigial, anal setae longer then ad_3 setae. Chaetome of legs reduced, setae *v'* on femora I, setae *a'* on tarsi I and setae l' on genua IV absent, setae *d* on femora I positioned in middle of article.

R e m a r k. The shape of sensilli, position of setae d on femora I, length of notogastral setae, arrangement of genital setae, shape and length of anoadanal setae indicate that all three species *P. prior*, *P. montium* and *P. apiculatus* are synonyms of *P. longulus*.

Localities in the Nearctic Region:, sub *P. apiculatus* and *P. montium*: North Carolina (JACOT 1937, 1939); sub *P. setosellus*: New York (JACOT 1928, 1930, NORTON et MACNAMARA 1976).

Localities in Florida: sub *P. prior*: Pinkoson Springs, Gainesville (JACOT 1933) Alachua Co., Paynes Prairie State Preserve, Gate 1; 0.25 mi down Chacala Trail, sifted litter at base of old live oak, 12 I 1999 – (2 sp.); Alachua Co., Sante Fe River at Rt. 441, leaf litter BERLESE debris near river and cypress, 24 X 1990, leg. P. SKELLEY – (2 sp.); Jackson Co., Florida Caverns State Park, leaf litter, 30 V 1988, leg. P. SKELLEY – (6 sp.); Nassau Co., Fort Clinch State Park, leaf litter, 5 V 1988, leg. P. SKELLEY – (2 sp.); Union Co., Lake Butler, 22 X 1993, leg. L. R. DAVIS, Jr. – (1 sp.); Duval Co., Baldwin, 5 km W of Baldwin on Rt. 90, 24 X 1993, leg. L. R. DAVIS, Jr. – (8 sp.)

D i s t r i b u t i o n: Holarctic.

Phthiracarus pusillus sp. nov.

(Figs 172-175)

Measurements of holotype: prodorsum: length 162, width 134, height 75.9, sensillus 35.4, setae: *in* 50.6, *le* 37.9, *ro* 43.0, *ex* 12.6; notogaster: length 311, width 215, height 185, setae: c_1, h_1 and ps_1 37.9; genitoaggenital plate 96.1x70.8; anoadanal plate 98.7x58.2.

D e s c r i p t i o n. Small species. Colour yellow, surface of body punctated.

Prodorsum with short lateral carinae, fields invisible, sensilli with fairly long, narrow pedicel and club-like head, setae fione, *in>ro>le* sensillus *>ex.*

Notogaster with 15 pairs of fine, flexible, attenuate setae, cosiderably shorter than distance between them, setae of row *c* located near anterior border, vestigial setae f_1 posteriorly of h_1 setae; two pairs of lyrifissures *ia* and *im* present.

Ventral region, arrangement of genital setae: 7(4+3): 2, adanal setae ad_1 and ad_2 vestigial, anal setae located near each other and longer than ad_3 setae.

Legs setation incomplete, setae *a'* of tarsi I and genua IV absent, setae *d* on femora I located in middle of article.

Holotype: USA: Tennessee, Sevier Co., Gt. Smky. Mnts. Natl. Pk., Greenbrier Cove; 14.IV.1973, hemlock buttress, leg. W. SUTER.

Localities in Folorida: Walton Co., Defuniak Springs, Elgin AFB S of Defuniak Springs, BERLESE near beech trees, 20 XII 1999, leg. R. TURNBOW, P. SKELLEY – (4 sp.); Alachua Co., Paynes Prairie State Preserve, Gate 1; 0.25 mi down Chacala Trail, sifted litter at base of old live oak, 12 I 1999 – (4 sp.); Putnam Co., Ordway Nature Preserve, litter along and beneath pine log, 7 I 1999, leg. L. R. DAVIS, Jr. – (2 sp.); Putnam Co., Ordway Nature Preserve, 0.5 mi from main entrance, 20 XI 1993, leg. L. R. DAVIS, Jr. – (3 sp.); Baker Co., Olustee, 15 X 1993, leg. L. R. DAVIS, Jr. – (1 sp.); St. Johns Co., S Ponta Verde Recreational Area, Route A1A, 27 XI 1993, leg. L. R. DAVIS, Jr. – (2 sp.).

Localities in the Nearctic Region: NIEDBAŁA 2002.

D i s t r i b u t i o n: Nearctic.

Phthiracarus pygmaeus BALOGH, 1958

Phthiracarus pygmaeus: NIEDBAŁA 1986, 1992

(Figs 176-180)

D i a g n o s i s: Colour yellowish, surface of body with strong, spaced concavities. Prodorsum with median field broad and lateral fields very short, lateral carinae short, sensilli rough, long and narrow, ending in a points, interlamellar setae located anteriorly of lamellar setae, *ro>le>in.* Notogaster with 15 pairs of short setae, $c_1 < c_1$-d_1. Ventral region, formula of genital setae: 9(4+5): 0, anoadanal plates each with 5 well-developed setae. Chaetome of legs reduced, setae *v'* on femora, *a'* on tarsi I and II missing, setae *d* on femora I located in distal end of article.

Localities in Florida: Alachua Co., Gainesville, San Felasco Hammock St. Preserve in stream ca. 0.25 mi along path from entrance, BERLESE of sphagnum from slow moving stream, 14 I 1999, leg. G. FORTIER – (2 sp.); Levy Co., Cedar Key, ca. 1-2 mi E of Rt. 347 on Rt. 24, BERLESE oak litter on sand ridge, 11 X 1998, leg. P. SKELLEY – (4 sp.); Alachua Co., Gainesville, San Felasco Hammock State Preserve; 0.5 mi from entrance, BERLESE of sparse liverwort in low, damp area, 14 I 1999, leg. G. FORTIER, P. SKELLEY – (1 sp.); Alachua Co., Paynes Prairie State Preserve, Gate 1; 0.25 mi down Chacala Trail, sifted litter at base of old live oak, 12 I 1999, – (14 sp.); Baker Co., Olustee, 15 X 1993, leg. L. R. DAVIS, Jr. – (2 sp.); Putnam Co., Ordway Nature Preserve, 1.3 mi from main entrance, 28 XI 1993, leg. L. R. DAVIS, Jr. – (24 sp.); Putnam Co., Ordway Nature Preserve, 2.1 mi E of Melrose, FL., 5 II 1994, leg. L. R. DAVIS, Jr. – (6 sp.); Lafayette Co., Suwannee River, Junction of 27 and Rt 349 1.2 mi W of Suwannee River, 11 X 1993, leg. L. R. DAVIS, Jr. – (7 sp.); Gilchrist Co., Trenton, 8 mi NE Trenton; off dirt road S from Rt. 232, BERLESE sample, 10 IV 1994, leg. L. R. DAVIS, Jr. – (1 sp.); Putnam Co., Ordway Nature Preserve, Blue Pond, base of pine tree, 4 XII 1955, leg. L. R. DAVIS, Jr. – (5 sp.); Charlotte Co., Punta Gorda, 5 mi E of Punta Gorda; Charlotte Ranchettes, sifted wax myrtle and palmetto litter, 15 II 1999, leg. W.C. WELBOURN – (2 sp.)

D i s t r i b u t i o n: Pantropical.

Steganacaridae NIEDBAŁA, 1986

D i a g n o s i s. Body surface usually covered with concavities and protuberances; posterior furrows of prodorsum usually present, lateral carinae rarely long, extending beyond the sinus;

setae of variable form, if smooth, they are spiniform or flagelliform, most commonly covered with spicules; usually 9 pairs of genital setae present.

Plonaphacarus NIEDBAŁA, 1986

D i a g n o s i s. Dorsal and lateral fields of prodorsum not fused, rostral setae inserted far from the end of rostrum. Ventral region, genital setae arranged in two rows, setae g_7-g_9 always remote from the paraxial margin, adanal setae at a distance from the paraxial margin of ano-adanal plate. Legs, setae *d* of tibiae IV long and independent of solenidia, seta *v'* of femora I present.

Plonaphacarus kugohi (AOKI, 1959)

Hoplophthiracarus kugohi AOKI, 1959

Hoplophthiracarus kugohi: AOKI 1980

Plonaphacarus kugohi: NIEDBAŁA 1986, 1992

(Figs 181-186)

D i a g n o s i s: Colour yellow, surface of body covered with concavities. Prodorsum with median and laterals fields distinct, posterior furrows present, lateral carinae very long, extend beyond sinus and reach the end of rostrum, sensilli long, narrow, swollen at the end and covered with small spines, interlamellar setae long, erect covered with small spines in distal half, remaining setae short, smooth. Notogaster with 15 pairs of rigid, fairly short ($c_1 < c_1$-d_1) setae, covered with small spines, vestigial setae f_1 posteriorly of h_1 setae, sometimes anteriorly of them, two pairs of lyrifissures *ia* and *im* present. Ventral region, setae *h* of mentum minute, arrangement of genital setae: 6(4+2): 3, anoadanal plates each with 5 setae, setae ad_2 the longest and the thickest, an_1 and $an_2 = ad_3 < ad_1 < ad_2$. Chaetome of legs reduced, setae *a'* on tarsi I absent.

Localities in Florida: Monroe Co., Big Pine Key, Watson Hammock; 4.VIII.1971, hardwood litter: 75 liters, 22 kg; S. PECK, B.221.– (2 sp.); Nassau Co., St. Mary's River State Forest, E. Boulogne St., BERLESE of leaf litter, 18 III 1997, leg. P. SKELLEY – (5 sp.); Leon Co., Tall Timbers Research Station, *Magnolia* leaf litter "c"; BERLESE funneled., 18 V 1968, leg. W. WHITCOLM – (10 sp.); Alachua Co., Gainesville, Doyle O'Conner Building grounds; 1911 SW 34th St., leaf litter, 3 IX 1992, leg. P. E. SKELLEY – (2 sp.).

D i s t r i b u t i o n: Semicosmopolitan.

Hoplophthiracarus JACOT, 1933

type species: *Hoploderma histricinum* BERLESE, 1908

D i a g n o s i s. Body surface usually covered with concavities. Dorsal field of prodorsum not fused with the laterals, furrows usually present on back of prodorsum, interlamellar setae more or less erect, lamellar setae usually very short. Notogaster with 15 pairs of setae, setae c_1 shorter than the distance between setae c_1 and d_1. Ventral region, always 9 pairs of genital setae, setae $g_{6\text{-}9}$ or $g_{7\text{-}9}$ located almost in one row with setae $g_{1\text{-}5}$, adanal setae remote from paraxial margin of ano-adanal plate, setae ad_1 longer than anal setae, all setae on anoadanal plate normal, neotrichy of adanal setae present. Legs, setae *d* on femora I usually at distal end of segment, setae *d* of tibiae IV long and independent of solenidia.

Hoplophthiracarus grossmani JACOT, 1933 nomen dubium

Hoplophthiracarus grossmani: MARSHALL et al. 1987

Type material contains small fragment of notogaster and chelicerae only – examined by NIEDBAŁA (1994). The bad shape of the type makes its specific identification impossible, therefore the name is proposed to be a nomen dubium.

Hoplophthiracarus histricinus (BERLESE, 1908)

Hoploderma histricinum BERLESE, 1908

Phthiracarus histricinus v. *nitidor* BERLESE, 1923 syn. nov. (?)

Hoplophthiracarus robustior JACOT, 1933 syn. nov.

Hoplophthiracarus robustior: MARSHALL et al. 1987, NIEDBAŁA 1994b

Hoplophthiracarus pavidus: sensu AOKI 1980

(Figs 187-194)

Type material of *H. histricinus* examined by NIEDBAŁA (1991) and of *H. robustior* by NIEDBAŁA (1994)

D i a g n o s i s. Colour yellow or light brown, surface of body covered with distinct concavities. Prodorsum with fields weakly marked, lateral carinae indistinct reach sinus, sensilli sickle-shaped, thickened in distal part with acute tip, slightly roughened, interlamellar setae perpendicular to surface of prodorsum, similar to gastronotic setae, thick, rigid with distinct barbs distally, lamellar and rostral setae small, setiform. Notogaster with rigid, short (c_1<c_1-d_1) setae covered with small spines in distal half, setae c_1 and c_3 some distance from anterior border, setae c_2 far from border, two pairs of lyrifissures *ia* and *im* present. Ventral region, setae *h* of mentum shorter than distance between them, arrangement of genital setae: 7(4+3): 2, anoadanal plates with rigid setae, ad_2>ad_1>*an*>ad_3. Chaetome of legs incomplete, setae *a*' of tarsi I absent.

Citations: sub *H. histricinus* and *H. histricinus nitidor*: HAMMEN 1959, MARSHALL et al. 1987, MAHUNKA et MAHUNKA-PAPP 1995.

R e m a r k 1. All characters examined by NIEDBAŁA (1991, 1994) indicate that *H. histricinus nitidor* and *H. robustior* are synonyms of *H. histricinus* (see NIEDBAŁA 2002).

R e m a r k 2. I suppose that *H. pavidus* sensu AOKI 1980 is *H. histricinus* because surface of body covered with concavities.

Localities in the Nearctic Region: sub *H. histricinus*: USA: BERLESE (1908), District of Columbia ((JACOT 1933), Missouri (JACOT 1930, 1933).

Localities in Florida: sub *H. robustior*: Bradenton (JACOT 1933), sub *H. histricinum*: Pensacola, Perry, Gainesville, Bradenton (JACOT 1933); sub *H. histricinus nitidor*: Florida (BERLESE 1923, JACOT 1930, 1933).

Baker Co., 19 mi NE Lake City Osceola Nat. For. Nat. Area on FS rd 235, Ex: sifted mixed leaf litter, 7 VII 1987, leg. R. M. REEVES – (2 sp.); Highlands Co., Archbold Biol. Sta.; 30.XII.1973, palmetto stem litter, leg. W. SUTER – (1 sp.); Highlands Co., 4 mi W Venus, Fisheating Ck., Big Cypress Swamp; 30.XII.1973, litter u. bushes, leg. W. SUTER – (1 sp.); Highlands Co., 4 mi W Venus, Fisheating Ck., Big Cypress Swamp; 30.XII.1973, cypress stub buttress, leg. W. SUTER – (13 sp.); Highlands Co., 4 mi W Venus, Fisheating Ck., Big Cypress Swamp; 30.XII.1973, litter u. hyacinth & grasses, leg. W. SUTER – (15 sp.); Highlands Co., 4 mi E Venus, Fisheating Ck., Big Cypress Swamp; 30.XII.1973, litter u. water hyacinth, leg. W. SUTER – (4 sp.); Highlands Co., SE Lk. Placid, Parker Isl. Baygall; 28.XII.1973, floor litter between *Osmunda* hummocks, leg. W. SUTER – (1 sp.); Highlands Co., 4 mi W Venus, Fisheating Ck., Big Cypress Swamp; 30.XII.1973, epiphyte litter, leg. W. SUTER – (1 sp.); Everglades N.P., Ex: Pineland humus tullgren, X 1987, leg. M. PAOLETTI – (1 sp.); Alachua Co., Gainesville, San Felasco Hammock St. Preserve in stream ca. 0.25 mi along path from entrance, BERLESE of sphagnum from slow moving stream, 14 I 1999, leg. G. FORTIER – (3 sp.); Alachua Co., Gainesville, Doyle O'Conner Building grounds; 1911 SW 34th St., sand and leaf litter; living grapevine trunk, 15 II 1999, leg. T. E. CRONIN – (1 sp.); Putnam Co., Florahome, 2.5 mi NE of Etoniah Creek Wildlife Management Area, BERLESE of sphagnum from Tupelo/Pine flatwoods, 30 XII 1998, leg. G. FORTIER – (22 sp.); Alachua Co., Gainesville, Gainesville Regional Airport; field W of Gun Club, BERLESE of sphagnum, 30 XII 1998, leg. G. FORTIER – (1 sp.); Alachua Co., Gainesville, San Felasco Hammock State Preserve; 0.5 mi from entrance, BERLESE of sparse liverwort in low, damp area, 14 I 1999, leg. G. FORTIER, P. SKELLEY – (3 sp.); Alachua Co., Paynes Prairie State Preserve, Gate 1; 0.25 mi down Chacala Trail, sifted litter at base of old live oak, 12 I 1999, – (2 sp.); Baker Co., ca. 5 km E MacClenny, 24 X 1993, leg. L. R. DAVIS, Jr. – (2 sp.); Duval Co., Baldwin, 17 X 1993, leg. L. R. DAVIS, Jr. – (3 sp.); Alachua Co., Sante Fe River at Rt. 441, leaf litter BERLESE debris near river and cypress, 24 X 1990, leg. P. SKELLEY – (3 sp.); Gilchrist Co., Trenton, 8 mi NE Trenton; off dirt road S from Rt. 232, BERLESE sample, 10 IV 1994, leg. L. R. DAVIS, Jr. – (2 sp.); Monroe Co.,

Dry Tortugas National Park, Loggerhead Key, in litter of *Cashurina* sp. , 12 I 1962, leg. H. A. DENMARK – (1 sp.); Alachua Co., Gainesville, Doyle O'Conner Building grounds; 1911 SW 34th St., leaf litter, 3 IX 1992, leg. P. E. SKELLEY – (14 sp.); Highlands Co., Highlands Hammock State Park, BERLESE of sifted pine litter, 23 II 1999, leg. W.C. WELBOURN, W. NIEDBAŁA – (1 sp.).

D i s t r i b u t i o n: Nearctic.

Hoplophthiracarus illinoisensis (EWING, 1909)

Hoploderma illinoisensis EWING, 1909

Hoplophthiracarus paludis JACOT, 1938 syn. nov.

Hoplophthiracarus paludis: MARSHALL et al. 1987, NIEDBAŁA 1994b

Hoplophthiracarus vanderhammeni NIEDBAŁA, 1991 syn. nov.

Hoplophthiracarus pavidus (BERLESE, 1913) sensu HAMMEN (1963)

(Figs 195-199)

M a t e r i a l e x a m i n e d: microscope slide labelled: „Types *Atropacarus illinoisensis* (EWING) Havana, Ill. Aug. 9, '08 by myself under logs M. in gl. J. + ac Aug. 10, '08 H. E. EWING" (courtesy Dr. D. G. FURTH from USNM, loan 2011593). Type material of *H. paludis* examined by NIEDBAŁA (1994).

Measurements of type: length of prodorsum: 233, setae *in* 86; length of notogaster 606, setae: $c_1$75.9, h_1 88.5, ps_1 70.8, genitoaggenital plate 116x101, anoadanal plate 212x121.

D i a g n o s i s. Colour reddish, surface of body punctated. Median field of prodorsum absent, lateral fields weak, lateral carinae reach sinus, posterior furrows absent; sensilli long, inflated at distal end, interlamellar setae erect, covered with small spines, lamellar and rostral setae spiniform and smooth, *in*>*ro*>*ex*>*le*. Notogaster with setae fairly short (c_1< c_1-d_1), rigid covered with small spines, vestigial setae f_1 posteriorly of h_1 setae, two pairs of lyrifissures *ia* and *im* present. Ventral region: setae *h* of mentum shorter than distance between them; formula of genital setae: 7(4+3): 2, anoadanal plates with 5 pairs of setae, ad_2>ad_1> an_1 and an_2>ad_3. Chaetotome of legs reduced, setae *a'* on tarsi I absent.

Citations: sub *H. pavidus* sensu HAMMEN: BALOGH et MAHUNKA 1983, NIEDBAŁA 1986, 1992.

R e m a r k. All examined caracters indicate that *H. vanderhammeni*, *H. illinoisensis* and *H. paludis* are the same species.

Localities in the Nearctic Region: sub. *H. illinoisiensis*: USA: Illinois (EWING 1909); sub *H. paludis*: Connecticut (JACOT 1938), New York (JACOT 1938).

Localities in Florida: Dade Co., Everglades National Park, Pine Key; 21.I.1973; J. BENGTSON. – (1 sp.); Putnam Co., Ordway Nature Preserve, BERLESE of deer dung, I 1999, leg. T. E. CRONIN – (2 sp.); Alachua Co., Gainesville, San Felasco Hammock St. Preserve in stream ca. 0.25 mi along path from entrance, BERLESE of sphagnum from slow moving stream, 14 I 1999, leg. G. FORTIER – (6 sp.); Nassau Co., St. Mary's River State Forest, 1.5 mi E Boulogne, BERLESE of sifted mixed forest litter, 24 III 1998, leg. W.C. WELBOURN – (1 sp.); Putnam Co., Florahome, 2.5 mi NE of Etoniah Creek Wildlife Management Area, BERLESE of sphagnum from Tupelo/Pine flatwoods, 30 XII 1998, leg. G. FORTIER – (5 sp.); Walton Co., Defuniak Springs, Elgin AFB S of Defuniak Springs, BERLESE near beech trees, 20 XII 1999, leg. R. TURNBOW, P. SKELLEY – (4 sp.); Alachua Co., Gainesville, San Felasco Hammock State Preserve; 0.5 mi from entrance, BERLESE of sparse liverwort in low, damp area, 14 I 1999, leg. G. FORTIER, P. SKELLEY – (12 sp.); Alachua Co., Paynes Prairie State Preserve, Gate 1; 0.25 mi down Chacala Trail, jct. of frond and trunk of sabal palmetto, 12 I 1999, – (1 sp.); Putnam Co., Ordway Nature Preserve, One Shot Pond, 26 X 1993, leg. L. R. DAVIS, Jr. – (6 sp.); Baker Co., ca. 5 km E MacClenny, 24 X 1993, leg. L. R. DAVIS, Jr. – (8 sp.); Alachua Co., Arredondo, SW of Gainesville, leaf litter at the base of a pine tree, 3 XI 1993, leg. L. R. DAVIS, Jr. – (5 sp.); Putnam Co., Ordway Nature Preserve, 0.5 mi from main entrance, 20 XI 1993, leg. L. R. DAVIS, Jr. – (1 sp.); Putnam Co., Ordway Nature Preserve, 1.3 mi from main entrance, 28 XI 1993, leg. L. R. DAVIS, Jr. – (3 sp.); Duval Co., Baldwin, 17 X 1993, leg. L. R. DAVIS, Jr. – (5 sp.); Alachua Co., Gainesville, SW 20th Ave and I-75, 5 XI 1993, leg. L. R. DAVIS, Jr. – (1 sp.); Dade Co., Homestead, Bauer Hammock, BERLESE of leaf litter, leg. MATHEWS, 20 XI 1988, LOTT, and WATTS – (2 sp.); Alachua Co., Sante Fe River at Rt. 441, leaf litter BERLESE debris near river

and cypress, 24 X 1990, leg. P. SKELLEY – (6 sp.); Highlands Co., Lake Placid, Archbold Biological Station, leaf litter, 7 VII 1988, leg. P. SKELLEY – (1 sp.); Duval Co., Jacksonville, University of Northern Florida Campus Wildlife Preserve, leaf litter under palmetto, 20 III 1988, leg. P. SKELLEY – (2 sp.); Nassau Co., Fort Clinch State Park, leaf litter, 5 V 1988, leg. P. SKELLEY – (2 sp.); Duval Co., Baldwin, 5 km W of Baldwin on Rt. 90, 24 X 1993, leg. L. R. DAVIS, Jr. – (2 sp.); Alachua Co., Archer, litter from oak forest, 15 III 1998, leg. W.C. WELBOURN – (2 sp.); Lake Co., Aster, on litter of hickory and sweet gum, 8 X 1963, leg. H. A. DENMARK – (6 sp.); Baker Co., Olustee, 15 X 1993, leg. L. R. DAVIS, Jr. – (9 sp.); Hamilton Co., Jennings, Piney Woods, pine buttress/bush, leg. W. SUTER – (2 sp.).

D i s t r i b u t i o n: Holarctic.

Steganacarus EWING, 1917

D i a g n o s i s. Body surface covered with concavities. Lateral carinae of prodorsum does not extend beyond sinus, furrows present on back of prodorsum; 15 pairs of notogastral setae present. Ventral region: genital setae g_{7-9} located in paraxial margin of plates and forming with setae g_{1-5} almost one row, setae g_6 remote from paraxial border, setae ad_1 near the paraxial margin, in row with anal setae, setae ad_2 near anal setae, or displaced towards paraxial margin, in longitudinal row with anal setae on the anoadanal plates. Legs, setae *v'* on femora I and setae *l'* on genua IV present, setae *d* of tibiae IV long and independent of solenidia.

Steganacarus (*Rhacaplacarus*) NIEDBAŁA, 1986

D i a g n o s i s. Prodorsum, lamellar and exobothridial seta short, length ratio of lamellar seta/prodorsum.18, length ratio of exobothridial seta/prodorsum.07. Ventral region, setae *h* on infracapitulum usually shorter than distance between them; setae ad_2 displaced towards paraxial margin, near anal setae, distance between setae ad_2 and anal setae equal to that between anal setae and paraxial margin. Legs, setae *v'* on femora short, length ratio *v"*/*v'*<2.25.

Steganacarus (*Rhacaplacarus*) *thoreaui* JACOT, 1930

Steganacarus thoreaui JACOT, 1930

Hoplophorella thoreaui: MARSHALL et al. 1987

Steganacarus (*Rhacaplacarus*) *thoreaui*: NIEDBAŁA 1994a

(Figs 200-206)

Type material examined by NIEDBAŁA (1992).

D i a g n o s i s. Colour dark brown. Dorsal carinae of prodorsum distinct, lateral carinae reach sinus, fields weakly visible, sensillus long, narrow, curved, ending in point, interlamellar setae similar to notogastral setae, rostral and lamellar setae rigid, rough, *in*>*le*>*ro*>*ex*. Notogaster with 15 pairs of rigid setae, covered with small spines, c_1<c_1–d_1, setae c_1 and c_2 remote from anterior border, setae c_3 near border, vestigial setae f_1 posteriorly of h_1, two pairs of lyrifissures *ia* and *im* present. Ventral region: setae *h* of mentum longer than distance between them, formula of genital setae: 6(4+2): 3, anoadanal plates with setae ad_2 the longest and setae ad_3 the shortest. Legs setation complete, setae *d* of femora I located in distal end.

Localities in the Nearctic Region: USA: Connecticut (JACOT 1938), Maine (JACOT 1930), New York (JACOT 1938).

Localities in Florida: Highlands Co., SE Lk. Placid, Parker Isl. Baygall; 28.XII.1973, *Osmunda rhizome* crowns, leg. W. SUTER – (1 sp.); Highlands Co., 7 mi SE Lake Placid, Parker Is. Baygall; 5.I.1975, subcortical litter, passalid log; leg. W. SUTER – (1 sp.); Highlands Co., SE Lk. Placid, Parker Isl. Baygall; 28.XII.1973, floor litter between *Osmunda* hummocks, leg. W. SUTER – (1 sp.); Levy Co., Cedar Key, ca. 1-2 mi E of Rt. 347 on Rt. 24, BERLESE oak litter on sand ridge, 11 X 1998, leg. P.G. SKELLEY – (1 sp.)

D i s t r i b u t i o n: Nearctic.

Protophthiracarus BALOGH, 1972

type species: *Neophthiracarus chilensis* BALOGH et MAHUNKA, 1967

D i a g n o s i s: Body surface covered with concavities. Prodorsal posterior furrows present, dorsal and lateral fields of prodorsum not fused, exobothridial setae short or vestigial. Neotrichy of notogastral and anoadanal setae present, setae c_1 shorter than distance between setae c_1 and d_1. Ventral region: genital plates with 9 pairs of genital setae present; setae g_7-g_9 displaced towards the paraxial margin, form a row with setae g_1-g_5 (sometimes one of these setae not displaced), setae g_6 remote from the margin and situated on the side or analteriorly of g_5; setae of anoadanal plates well-developed, setae ad_1 displaced towards the paraxial margin in a row with anal setae, setae ad_2 at a distance from the margin. Legs: setae *v'* on femora I short (length ratio *v''/v'*>2.25), setae *ft''* on tarsus I well developed, setae *l'* of genua IV present.

Protophthiracarus evergladensis sp. nov.

(Figs 207-215)

Measurements of holotype: prodorsum: length 227, width 151, height 106, sensillus 101, setae: *in* 93.6, *le* 12.6, *ro* 40.5, *ex* 20.2; notogaster: length 454, width 237, height 323, setae: c_1 78.4, ps_1 83.5; genitoaggenital plate 116x75.7, anoadanal plate 156x75.7.

D e s c r i p t i o n. Colour light brown.

Prodorsum with short fields, especially laterals; lateral carinae absent; distinct lamella present above bothridia; sensilli sickle shaped, enlarged distally, rough; interlamellar setae long erect, rigid covered with small spines in distal end, lamellar and rostral setae spiniform, rough, *in*>*ro*>*ex*>*in*.

Notogaster with 15 pairs of rigid setae, relatively short (c_1<c_1-d_1), distally obtuse, covered with small spines in distal half, setae c_1 and c_2 remote slightly from anterior border, setae c_2 far from border; vestigial setae not visible, two pairs of lyrifissures ia and im present.

Ventral region: Setae *h* of mentum shorter than distance between them; formula of genital setae: plate right: 8(6+2): 1, plate left 6(4+2): 3; anoadanal plates with setae ad_2 the longest, ad_2>an_1>an>ad_3.

Legs: setation complete.

Holotype: Florida, Everglades NP., Ex. humus of mangroves, X 1987, leg. M. PAOLETTI (Can. Nat. Collection).

Comparison. The new species is distinguishable from congeners by the presence of short fields of prodorsum, shape and length of sensilli and interlamellar setae.

Etymology. The specific epithet *evergladensis* refers to the locality of this species.

D i s t r i b u t i o n: Endemic.

Protophithiracarus varians (JACOT, 1993)

Hoplophorella varians JACOT, 1933

Hoplophorella varians: MARSHALL et al. 1987

(Figs 216-230)

Type material examined by NIEDBAŁA (1994)

D i a g n o s i s. Colour dark brown. Prodorsum with distinct drosal carina, lateral carinae invisible, fields long and narrow, sensilli long, swollen covered with small spines, dorsal setae short, spiniform, rough, exobothridial setae vestigial. Notogaster with 15 pairs of different shape of setae, setae c_1, d_1, e_1, h_1, *ps* swollen in distal end and covered with small spines, other setae thickly

spiniform, rough, setae c_1 and c_2 remote from anterior border, setae c_3 near border. Ventral region: formula of genital setae: 6(4+2): 3, anoadanal plates with ad_2 setae the longest, swollen in middle, setae ad_3 the shortest. Legs setation complete.

Locality in Florida: sub *Hoplophorella varians*: Geinesville, Pinkoson Springs, Orange Heights, Micanopy, St. Augustine, Vero Beach, White City, Cortez (JACOT 1933). Putnam Co., Ordway Nature Preserve, BERLESE of deer dung, I 1999, leg. T. E. CRONIN – (1 sp.); Alachua Co., Paynes Prairie State Preserve, Gate 1; 0.25 mi down Chacala Trail, sifted litter at base of old live oak, 12 I 1999 – (1 sp.); Putnam Co., Ordway Nature Preserve, litter along and beneath pine log, 7 I 1999, leg. L. R. DAVIS, Jr. – (4 sp.); Alachua Co., Arredondo, SW of Gainesville, leaf litter at the base of a pine tree, 3 XI 1993, leg. L. R. DAVIS, Jr. – (1 sp.); St. Johns Co., S Ponta Verde Recreational Area, Route A1A, 27 XI 1993, leg. L. R. DAVIS, Jr. – (5 sp.); Putnam Co., Ordway Nature Preserve, 1.3 mi from main entrance, 28 XI 1993, leg. L. R. DAVIS, Jr. – (5 sp.); Alachua, Gainesville, SW 20th Ave and I-75, 5 XI 1993, leg. L. R. DAVIS, Jr. – (1 sp.); Alachua Co., Sante Fe River at Rt. 441, leaf litter BERLESE debris near river and cypress, 24 X 1990, leg. P. SKELLEY – (5 sp.); Nassau Co., Fort Clinch State Park, leaf litter, 5 V 1988, leg. P. SKELLEY – (2 sp.); Putnam Co., Ordway Nature Preserve, Blue Pond, base of pine tree, 4 XII 1955, leg. L. R. DAVIS, Jr. – (12 sp.); Alachua, Rt 441 at Sante Fe River, leaf litter at edge of cypress backwater, 1 X 1992, leg. P. SKELLEY – (9 sp.); Marion Co., Ocala National Forest, Salt Springs, in oak litter, 8 X 1963, leg. H. A. DENMARK – (2 sp.); Alachua Co., Gainesville, Hogtown Creek ravine, damp leaf litter, 1 VII 1959, leg. William J. PLATT – (2 sp.); Leon Co., Natural Bridge Battlefield, 0.35 mi E of Natural Bridge Battlefield, sifted mixed litter, 28 I 1999, leg. W.C. WELBOURN – (3 sp.); Alachua Co., Gainesville, San Felasco Hammock State Preserve, BERLESE of mixed, pine, and oak litter; under *Pinus* log, 23 II 1999, leg. G. FORTIER, W. NIEDBAŁA, W.C. WELBOURN – (1 sp.); Nassau Co., Fort Clinch State Park, leaf litter, 5 V 1988, leg. P. SKELLEY – (2 sp.)

D i s t r i b u t i o n: Nearctic.

Atropacarus EWING, 1917

type species: *Hoplophora stricula* C. L. KOCH, 1936.

D i a g n o s i s. Body surface covered with concavities. Posterior furrows of prodorsum present, lamellar setae minute (length ratio of lamellar setae/prodorsum<0.18). Ventral region, genital setae in a single row or nearly so, distance between setae g_6 and g_5 longer than that between g_5 and g_4, setae ad_1 always close to paraxial margin, in a row with anal setae, setae ad_2 remote from the paraxial margin or close to it. Legs, setae *v'* on femora I minute (length ratio *v"*/*v'*<2.25).

***Atropacarus* (*Hoplophorella*)** NIEDBAŁA, 1986

type species: *Hoplophorella cucullatum* EWING, 1909.

D i a g n o s i s. 15 pairs of notogastral setae, as a rule only two pairs of lyrifissures, *ia* and *im* present. Ventral region, 9 pairs of genital setae and 5 pairs of anal and adanal setae present, setae ad_2 remote from the paraxial margin. Legs: setae *ft"* on tarsi I normal.

Atropacarus* (*Hoplophorella*) *cucullatus (EWING, 1909)

Hoploderma cucullatum EWING, 1909
Steganacarus cucullatum: EWING 1917
Steganacarus cucullatus: BALOGH et MAHUNKA 1983
Hoplophorella cucullatus cuculloides JACOT, 1933 syn. nov.
Hoploderma licnophorum BERLESE, 1913: HAMMEN 1959

(Figs 231-237)

M a t e r i a l e x a m i n e d: microscope slide labelled: „*Steganacarus cucullatus* (EWING) Columbia, Mo., by C.R. Crosby In trash. M. in bal. Jun, 19, '08 H. E. EWING" (courtesy Dr. D. G. FURTH from USNM); 3 microscope slides in poor condition labelled: 1. „Gainesville Fla.

dry leaves F.B. 4/21/28 Grossman cl. 1 *Hoplophorella cucullata cuculloides* subsp. nov. Best co-type $G_{75}P_{12}$" , 2. E. of Chocatache Bay Fla. dry leaves F.B. 5/18/28 Blacklock Grossman Col. 1 *Hoplophorella cucullata cuculloides* subsp. nov. $G_{101}P_1$, 3. „Milton Fla Live Oak leaves B.F. 3/29/28 Blackman Grossman Col. 1 *Hoplophorella cucullata cuculloides* subsp. nov. $G_{62}P_2$" (courtesy of Dr. W.C. WELBOURN from FSCA).

Measurements of the specimen examined: prodorsum: length 202, height 85.8; notogaster: length 459, height 268, setae: c_1 55.7, h_1 and ps_1 45.5.

D i a g n o s i s. Colour yellowish. Prodorsum with median field fairly broad, with incision between rostral setae, lateral fields much shorter; lateral carinae reaching sinus, sensilli long, narrow, sickle-shaped, covered with thin spines in distal end, setae spiniform, *ex>in=le=ro*. Notogaster with well-developed anterior hood, setae short ($c_1<c_1$-d_1), leaf-shaped; vestigial setae f_1 posteriorly of h_1 setae. Ventral region, setae *h* of mentum shorter than distance between them; formula of genital setae: 7: 2, anoadanal plates with setae ad_2 of foliate form, the remaining setae smooth, spiniform, setae ad_3 the shortest. Chaetome of legs reduced, setae *a'* on tarsi I and setae *l'* on genua IV are missing.

Citations: sub *Hoplophorella cucullata*: BERLESE 1923, HAMMEN 1959, AOKI 1980, MARSHALL et al. 1987, NIEDBAŁA 1986, 1992.

R e m a r k. On the basis of analysis of the examined specimens of *H. cucullata cuculloides* in my opinion all differences in the features given by JACOT (1933 p. 250) can be explained by variation in *H. cucullata*, and do not justify the introduction of a new subspecies.

Localities in the Nearctic Region: sub *H. cucullata*: USA: Missouri (EWING 1909, BERLESE 1913, JACOT 1933, MARSHALL et al. 1987);

Localities in Florida: sub *Hoplophorella cucullata cuculloides*: Milton, Gainesville, Bonita Springs, Villa Tasso (JACOT 1933).

Allachua Co., Gainesville, park-forest near Campus, litter under palms, 7 V 1979, leg. W. WEINER – (1 sp.); Highlands Co., Archbold Biol. Sta.; 30.XII.1973, palmetto stem litter, leg. W. SUTER – (3 sp.); Putnam Co., Ordway Nature Preserve, BERLESE of deer dung, I 1999, leg. T. E. CRONIN – (3 sp.); Alachua Co., Gainesville, San Felasco Hammock St. Preserve in stream ca. 0.25 mi along path from entrance, BERLESE of sphagnum from slow moving stream, 14 I 1999, leg. G. FORTIER – (3 sp.); Nassau Co., St. Mary's River State Forest, 1.5 mi E Boulogne, BERLESE of sifted mixed forest litter, 24 III 1998, leg. W.C. WELBOURN – (2 sp.); Walton Co., Defuniak Springs, Elgin, S of Defuniak Springs, BERLESE near beech trees, 20 XII 1999, leg. R. TURNBOW, P. SKELLEY – (3 sp.); Alachua Co., Gainesville, San Felasco Hammock State Preserve; 0.5 mi from entrance, BERLESE of sifted litter from turkey oak sample, 14 I 1999, leg. G. FORTIER, P. SKELLEY – (5 sp.); Alachua Co., Gainesville, San Felasco Hammock State Preserve; 0.5 mi from entrance, BERLESE of sparse liverwort in low, damp area, 14 I 1999, leg. G. FORTIER, P. SKELLEY – (1 sp.); Alachua Co., Paynes Prairie State Preserve, dry stream bed near the visitor center, BERLESE of mixed litter, 17 XI 1998, – (5 sp.); Alachua Co., Paynes Prairie State Preserve, Gate 1; 0.25 mi down Chacala Trail, moss from ground and on log, 12 I 1999, – (1 sp.); Alachua Co., Paynes Prairie State Preserve, Gate 1; 0.25 mi down Chacala Trail, jct. of frond and trunk of sabal palmetto, 12 I 1999, – (1 sp.); Putnam Co., Ordway Nature Preserve, litter along and beneath pine log, 7 I 1999, leg. L. R. DAVIS, Jr. – (6 sp.); Putnam Co., Ordway Nature Preserve, One Shot Pond, 26 X 1993, leg. L. R. DAVIS, Jr. – (1 sp.); Baker Co., ca. 5 km E MacClenny, 24 X 1993, leg. L. R. DAVIS, Jr. – (1 sp.); Alachua Co., Arredondo, SW of Gainesville, leaf litter at the base of a pine tree, 3 XI 1993, leg. L. R. DAVIS, Jr. – (3 sp.); Union Co., Lake Bulter, 5 mi NW of Lake Bulter, 22 X 1993, leg. L. R. DAVIS, Jr. – (3 sp.); Baker Co., Olustee, 15 X 1993, leg. L. R. DAVIS, Jr. – (4 sp.); St. Johns Co., S Ponta Verde Recreational Area, Route A1A, 27 XI 1993, leg. L. R. DAVIS, Jr. – (4 sp.); Putnam Co., Ordway Nature Preserve, 1.3 mi from main entrance, 28 XI 1993, leg. L. R. DAVIS, Jr. – (3 sp.); Columbia Co., Lake City, 4 mi S of Lake City along Rt. 41/441, 7 XI 1993, leg. L. R. DAVIS, Jr. – (2 sp.); Alachua, Gainesville, SW 20th Ave and I-75, 5 XI 1993, leg. L. R. DAVIS, Jr. – (2 sp.); Putnam Co., Ordway Nature Preserve, 2.1 mi E of Melrose, FL., 5 II 1994, leg. L. R. DAVIS, Jr. – (5 sp.); Lafayette Co., Suwannee River, Junction of 27 and Rt 349 1.2 mi W of Suwannee River, 11 X 1993, leg. L. R. DAVIS, Jr.– (1 sp.); Nassau Co., St. Mary's River State Forest, E. Boulogne St., BERLESE of leaf litter, 18 III 1997, leg. P. SKELLEY – (2 sp.); Dade Co., Homestead, Bauer Hammock, BERLESE of leaf litter, leg. MATHEWS, 20 XI 1988, LOTT, and WATTS – (2 sp.); Levy Co., Cedar Key, Cedar Key Scrub, BERLESE of leaf litter, 27 XI 1988, leg. P. SKELLEY- (1 sp.); Duval Co., Jacksonville, University of Northern Florida Campus Wildlife Preserve, eaf litter under palmetto, 20 III 1988, leg.

P. SKELLEY – (7 sp.); Levy Co., Archer, 3.8 mi SW of Archer, BERLESE of litter under rosemary, 27 II 1988, leg. P. SKELLEY – (2 sp.); Nassau Co., Fort Clinch State Park, leaf litter, 5 V 1988, leg. P. SKELLEY – (1 sp.); Gilchrist Co., Trenton, 8 mi NE Trenton; off dirt road S from Rt. 232, BERLESE sample, 10 IV 1994, leg. L. R. DAVIS, Jr. – (2 sp.); Putnam Co., Ordway Nature Preserve, Blue Pond, base of pine tree, 4 XII 1955, leg. L. R. DAVIS, Jr. – (2 sp.); Duval Co., Baldwin, 5 km W of Baldwin on Rt. 90, 24 X 1993, leg. L. R. DAVIS, Jr. – (2 sp.); Alachua Co., Gainesville, Doyle O'Conner Building grounds; 1911 SW 34th St., leaf litter, 3 IX 1992, leg. P. E. SKELLEY – (2 sp.); Marion Co., Silver Springs, Rt 40; 2 mi E of Silver Springs, BERLESE of mixed litter, 24 VII 1998, leg. L. R. DAVIS, Jr., A. A. ZAKURADA – (1 sp.); Alachua Co., Rt 441 at Sante Fe River, leaf litter at edge of cypress backwater, 1 X 1992, leg. P. SKELLEY – (1 sp.); Alachua Co., Gainesville, San Felasco Hammock State Preserve, BERLESE of mixed, pine, and oak litter; under *Pinus* log, 23 II 1999, leg. G. FORTIER, W. NIEDBAŁA, W.C. WELBOURN – (2 sp.); Jefferson Co., Wacissa, Goose Pasture; ca. 11.5 mi S of Wacissa, sifted litter at base of oak, 28 I 1999, leg. W.C. WELBOURN – (1 sp.); Charlotte Co., Punta Gorda, 5 mi E of Punta Gorda; Charlotte Ranchettes, sifted wax myrtle and palmetto litter, 15 II 1999, leg. W.C. WELBOURN – (1 sp.); Charlotte Co., Punta Gorda, 5 mi E of Punta Gorda; Charlotte Ranchettes, sifted pine and palmetto litter, 15 II 1999, leg. W.C. WELBOURN – (4 sp.); Hamilton Co., Jennings, Piney Woods, pine buttress/bush, leg. W. SUTER – (1 sp).

D i s t r i b u t i o n: Semicosmopolitan.

Atropacarus* (*Hoplophorella*) *hamatus (EWING, 1909)

Hoploderma hamatum EWING, 1909
Hoplophorella cucullata hamata: JACOT 1933
Hoplophorella cucullata floridae JACOT, 1933 syn. nov.
Hoplophorella floridae: AOKI 1980, MARSHALL et al. 1987
Atropacarus (*Hoplophorella*) *floridae*: NIEDBAŁA 1986,1992
Atropacarus (*Hoplophorella*) *floridus*: NIEDBAŁA 1994b

(Figs 238-242)

M a t e r i a l e x a m i n e d: microscope slide with type of *H. hamatum* labelled: „*Hoploderma hamatum* n. sp. Type Arcola, Ill. June 12'08 by myself under logs M. in bal. June 13,'o8 H. E. EWING" (courtesy Dr. D. G. FURTH from USNM, loan 2011593). Type material of *H. floridus* was examined by NIEDBAŁA (1994).

Type material of *Hoplophorella cucullata floridae* examined by NIEDBAŁA (1994).

Measurement of type of *H. hamatum*: length of prodorsum 187, sensillus 88.5, setae: *le* 22.8, *ro* 20.2; notogaster: length 424, height 262, setae c_1 and h_1 48.1.

D i a g n o s i s. Colour yellow. Median field of prodorsum longer than laterals and enlarging towards rostral setae, median carina weak, lateral carinae short not reach sinus, sensilli long, narrow, sickle-shaped with narrow pedicel and broad head covered with thin spines, interlamellar setae phylliform, similar to notogastral setae, lamellar setae spiniform, smooth, *in*>*ro*>*le*, exobothridial setae vestigial. Notogaster with setae spoon-shaped, short (c_1<c_1-d_1), covered with small spines, vestigial setae f_1 posteriorly of h_1 setae. Ventral region: setae *h* of mentum shorter than distance between them, formula of genital setae: 6: 3, anoadanal plates with setae ad_2 spoon-shaped, the remaining setae spiniform, setae ad_3 shorter than anal setae and ad_1 setae. Chaetome of legs reduced, setae *a'* on tarsi I and setae *l'* on gena IV absent.

R e m a r k. Analysis of the figured type of *H. hamatus* and its comparison with the earlier examined type of *H. floridae* (NIEDBAŁA 1994b) indicates that these names are synonyms (see NIEDBAŁA 2002).

Localities in the Nearctic Region: USA: sub *H. hamata*: Illinois (EWING 1909).

Localities in Florida: sub *H. cucullata floridae*: Gainesville, St. Augustine, Palatka, Crescent City, White City, Bradenton, Bonita Springs (JACOT 1933).

Dade Co., Everglades N.P., Ex: humus of mangroves tullgren, X 1987, leg. M. PAOLETTI – (15 sp.); Dade Co., Everglades National Park, Pine Key; 21.I.1973; J. BENGTSON – (2 sp.); Putnam Co., Ordway Nature Preserve, BERLESE of deer dung, I 1999, leg. T. E. CRONIN – (3 sp.); Alachua Co., Gainesville, Doyle O'Conner

Building grounds; 1911 SW 34th St., sand and leaf litter; living grapevine trunk, 15 II 1999, leg. T. E. CRONIN – (1 sp.); Alachua Co., Paynes Prairie State Preserve, Gate 1; 0.25 mi down Chacala trail, BERLESE of sifted live oak leaf litter, 13 X 1998, – (2 sp.); Alachua, Paynes Prairie State Preserve, dry stream bed near the visitor center, BERLESE of mixed litter, 17 XI 1998, – (3 sp.); Alachua Co., Paynes Prairie State Preserve, 0.125 mi from Gate 15, BERLESE of light loblolly pine litter (sifted); recently burned area, 22 XII 1998, – (2 sp.); Alachua Co., Paynes Prairie State Preserve, Gate 1; 0.25 mi down Chacala Trail, sifted litter at base of old live oak, 12 I 1999, – (8 sp.); Putnam Co., Ordway Nature Preserve, One Shot Pond, 26 X 1993, leg. L. R. DAVIS, Jr. – (2 sp.); Alachua Co., Arredondo, SW of Gainesville, leaf litter at the base of a pine tree, 3 XI 1993, leg. L. R. DAVIS, Jr. – (5 sp.); Union Co., Lake Bulter, 5 mi NW of Lake Bulter, 22 X 1993, leg. L. R. DAVIS, Jr. – (4 sp.); St. Johns Co., S Ponta Verde Recreational Area, Route A1A, 27 XI 1993, leg. L. R. DAVIS, Jr. – (4 sp.); Putnam Co., Ordway Nature Preserve, 1.3 mi from main entrance, 28 XI 1993, leg. L. R. DAVIS, Jr. – (7 sp.); Marion Co., Ocala National Forest, Big Scrub Recreational Area, 29 VII 1993, leg. L. R. DAVIS, Jr. – (1 sp.); Lafayette Co., Suwannee River, Junction of 27 and Rt 349 1.2 mi W of Suwannee River, 11 X 1993, leg. L. R. DAVIS, Jr. – (1 sp.); Dade Co., Homestead, Bauer Hammock, BERLESE of leaf litter, leg. MATHEWS, 20 XI 1988, LOTT, and WATTS – (2 sp.); Highlands Co., Lake Placid, Archbold Biological Station, leaf litter, 7 VII 1988, leg. P. SKELLEY – (3 sp.); Alachua Co., Gainesville, Hogtown Creek at I-75, leaf litter base of tree, 13 IX 1990, – (3 sp.); Levy Co., Archer, 3.8 mi SW of Archer, BERLESE of leaf litter, 23 VI 1987, leg. P. SKELLEY – (4 sp.); Nassau Co., Fort Clinch State Park, leaf litter, 5 V 1988, leg. P. SKELLEY – (1 sp.); Gilchrist Co., Trenton, 8 mi NE Trenton; off dirt road S from Rt. 232, BERLESE sample, 10 IV 1994, leg. L. R. DAVIS, Jr. – (2 sp.); Putnam Co., Ordway Nature Preserve, Blue Pond, base of pine tree, 4 XII 1955, leg. L. R. DAVIS, Jr. – (4 sp.); Alachua Co.,Gainesville, Doyle O'Conner Building grounds; 1911 SW 34th St., leaf litter, 3 IX 1992, leg. P. E. SKELLEY – (2 sp.); Marion Co., Silver Springs, Rt 40; 2 mi E of Silver Springs, BERLESE of mixed litter, 24 VII 1998, leg. L. R. DAVIS, Jr., A. A. ZAKURADA – (1 sp.); Alachua Co., Rt 441 at Sante Fe River, leaf litter at edge of cypress backwater, 1 X 1992, leg. P. SKELLEY – (1 sp.); Jefferson Co., Wacissa, Goose Pasture; ca. 11.5 mi S of Wacissa, sifted litter at base of oak, 28 I 1999, leg. W.C. WELBOURN – (1 sp.); Charlotte Co., Punta Gorda, 5 mi E of Punta Gorda; Charlotte Ranchettes, sifted wax myrtle and palmetto litter, 15 II 1999, leg. W.C. WELBOURN – (4 sp.); Charlotte Co., Punta Gorda, 5 mi E of Punta Gorda; Charlotte Ranchettes, sifted pine and palmetto litter, 15 II 1999, leg. W.C. WELBOURN – (4 sp.).

D i s t r i b u t i o n: Pantropical.

Atropacarus* (*Hoplophorella*) *vitrinus (BERLESE,1913)

Hoploderma vitrinum BERLESE, 1913
Hoplophorella vitrinum: MAHUNKA 1994
Atropacarus (*Hoplophorella*) *vitrinum*: NIEDBAŁA 1994a
Steganacarus andrei BALOGH, 1958: NIEDBAŁA 2000
Hoplophorella scapellata AOKI, 1965: NIEDBAŁA 2000
Atropacarus (Hoplophorella) scapellatus: NIEDBAŁA 1986,1992
Hoplophorella africana WALLWORK, 1967: NIEDBAŁA 1992
Hoplophorella raychaudhurii SUBIAS, SARKAR, 1984: NIEDBAŁA 1992
Hoplophorella lienhardi MAHUNKA, 1987: NIEDBAŁA 2000

(Figs 243-248)

D i a g n o s i s. Median field of prodorsum bifurcate, with deep incision, longer than laterals; lateral carinae reach sinus; sensilli long, narrow, inflated in middle, covered with thin spines; interlamellar setae lanceolate, rough, lamellar setae spiniform, minute, rostral setae robust, thick, directed inwards, rough, *ro>in>ex>le*. Notogaster with setae foliate, fairly short ($c_1 < c_1$-d_1), covered with small spines; vestigial setae f_1 posteriorly of h_1 setae; two pairs of lyrifissures *ia* and *im* present. Ventral region: setae *h* of mentum shorter than distance between them; formula of genital setae: 6: 3, anoadanal plate with setae ad_2 foliate, covered with small spines, remaining setae short, spiniform, setae ad_3 a little shorter than others. Chaetome of legs reduced, setae *a'* on tarsi I absent.

Localities in Florida: Alachua Co., Gainesville, Doyle O'Conner Building grounds; 1911 SW 34th St., leaf litter, 3 IX 1992, leg. P. E. SKELLEY - (2 sp.).

D i s t r i b u t i o n: Pantropical.

V. KEYS FOR DETERMINATIONS OF GENERA, SUBGENERA AND SPECIES

Phthiracaroidea

1. Three setae (ad_1, an_1, an_2) in a row near paraxial margin of anoadanal plate 2
–. Two setae (an_1 and an_2) near paraxial margin of anoadanal plate 3
2. Genital setae $g_{7\text{-}9}$ displaced towards paraxial margin of genitoaggenital plates and arranged in a row with setae $g_{1\text{-}5}$, setae g_6 not displaced . . . . . *Protophthiracarus*
–. All genital setae located in one row along paraxial margin . . . . . *Atropacarus* (*Hoplophorella*)
3. Setae on notogaster smooth, thin, tapering, attenuate, genital setae arranged in two rows, $g_{6\text{-}9}$ always in some distance from paraxial margin . . . . . *Phthiracarus*
–. Setae on notogaster barbed, genital setae situated in one row or only setae $g_{1\text{-}5}$ situated with setae $g_{7\text{-}9}$ in one paraxial row, setae g_6 remote from paraxial margin. . *Hoplophthiracarus*

Phthiracarus

1. Surface of body covered with concavities, sensilli long and narrow, 10 times as long as their width . . . . . *P. pygmaeus*
–. Surface of body punctated, sensilli short and wide, less than 10 times as long as their width. . . . 2
2. 16 pairs of notogastral setae present, four pairs of lyrifissures (*ia, im. ip. ips*) present, all setae of anoadanal plates well developed . . . . . *P. brevisetae*
–. 15 pairs of notogastral setae present, two pairs of lyrifissures (*ia* and *im*) present, adanal setae ad_1 and ad_2 vestigial or minute 3
3. Prodorsum with dorsal carina . . . . . *P. globosus*
–. Prodorsum without dorsal carina 4
4. Chaetome of legs incomplete, femora with 3 setae, setae *l'* on tibiae IV absent . . . . . *P. longulus*
–. Chaetome of legs complete, femora with 4 setae and tibiae IV with *l'* seta . . . . . *P. pusillus*

Hoplophthiracarus

1. Surface of body punctated . . . . . *H. illinoisensis*
–. Surface of body covered with small concavities . . . . . *H. histricinus*

Protophthiracarus

1. Dorsal notogastral setae different in shape (swollen) from other setae. . . . . *P. varians*
–. All notogastral setae similar in shape, spiniform, slightly barbed . . . . . *P. evergladensis*

Atropacarus (*Hoplophorella*)

1. Notogaster with distinct anterior cowl . . . . . *A.* (*H.*) *cucullatus*
–. Anterior cowl of notogaster absent. 2
2. Rostral setae directed inwards. . . . . *A.* (*H.*) *vitrinus*
–. Rostral setae directed forwards . . . . . *A.* (*H.*) *hamatus*

Mesoplophoroidea

1. Anal and genital plates touching, adanal plates present and distinct, three pairs of anal, three pairs of adanal setae present . . . . . *Archoplophora*
–. Anal plates separated from genital plates, adanal plates absent, 2-4 pairs of anal setae present . . . . . *Mesoplophora*
a. 3-4 pairs of anal setae present . . . . . *Mesoplophora* (*Parplophora*)
b. 2 pairs of anal setae present . . . . . *Mesoplophora* (*Mesoplophora*)

1. Sensilli without head, covered with 6 branches in distal half . . . . . *M. (P.) pertenuis*
2. Sensilli with brown slightly swollen head, without branches . . . . . *M. (P.) abscondita*

Euphthiracaroidea

1. Ventral plates not completely fused, at least anal plate separated by suture, longitudinal suture of anogenital region without interlocking triangle . . . . . Oribotritiidae
–. Ventral plates completely fused, at least one triangle in longitudinal suture of anogenital region present . . . . . Euphthiracaridae

Oribotritiidae

1. Genitoaggenital suture incomplete, at least partly present, two plates at least posteriorly well separated from each other . . . . . *Indotritia*
–. Genitoaggenital suture complete 2
2. Bothridial scale situated above bothridium, suture between genital and anal plates present . . . . . *Oribotritia*
–. Bothridial scale situated below bothridium, suture between genital and anal plates absent . . *Mesotritia*

Euphthiracariidae

1. Two triangles, one medial and one posterior situated in longitudinal suture separating ventral plates, bothridial scale situated below bothridium. . . . . *Euphthiracarus*
–. Only one medial triangle in longitudinal suture, bothridial scale situated above bothridium . . . 2
2. Genitoaggenital plates with 4-5 genital setae, trochanters of legs III and IV with one seta . . . *Microtritia*
–. Genitoaggenital plates with 7-9 genital setae, trochanters of legs III and IV with two setae . . . . . *Rhysotritia*

Oribotritia

1. Anal plates without setae, single pair of lateral carinae of prodorsum present. . . . . *O. banksi*
–. 3 pairs of anal setae present, lateral carinae consisting of three lines . . . . . *O. magna*

Mesotritia

1. Anal plates with 1 pair of setae . . . . . *M. flagelliformis*
–. Anal plates with 2 pairs of setae 2
2. Rostral setae on the level of lamellar setae or slightly anterior of them; setae ad_2 considerably nearer setae ad_3 than ad_1 setae . . . . . *M. nuda*
–. Rostral setae situated between interlamellar and lamellar setae, setae ad_2 nearer setae ad_1 than ad_3 setae or in the middle of them . . . . . *M. jacoti*

Indotritia

1. One pair of anal setae present 2
–. Two pairs of anal setae present. 3
2. Lateral carinae of prodorsum consisting of three lines, two pairs of adanal setae present . . *I. jacoti*
–. Lateral carinae of prodorsum single, three pairs of adanal setae present. . . . . *I. retusa*
3. Interlamellar setae stout, erect . . . . . *I. bellingeri*
–. Interlamellar setae bent backwards . . . . . *I. krakatauensis*

Euphthiracarus

1. Prodorsum with one pair of single lateral carinae. . . . . *E. fusulus*
–. Prodorsum with two pairs of lateral carinae 2
2. Head of prodorsal sensilli slightly spindle shaped or fusiform. 3
–. Sensilli of prodorsum baciliform, without head 4
3. Surface of body covered with distinct concavities . . . . . *E. depressculus*
–. Surface of body punctuated or porose . . . . . *E. fulvus*
4. Surface of body covered by special kind of mosaic. . . . . *E. pulchrus*
–. Surface of notogaster covered with deep concavities. . . . . *E. cribarius*

Rhysotritia

1. Prodorsal lateral carinae bifurcated in distal end. 2
–. Lateral carinae not bifurcated 3
2. Tarsi of legs I bidactylous, tarsi of legs II-IV heterotridactylous . . . . . *R. dikra*
–. Tarsi of legs monodactylous. . . . . *R. dixa*
3. Tarsi of legs I bidactylous, tarsi of legs II-IV heterotridactylous. . . . . *R. ardua*
–. Tarsi of legs monodactylous . . . . . *R. curticephala*

VI. PRESENTATION OF GENERIC TAXA

The ptyctimous mite fauna of Florida is harmonic. The Phthiracaroidea and Euphthiracaroidea are represented by both primitive and derived genera, even in the respect of the proportion of the representing species in similar numbers of species.

An interesting observation is the absence of the Phthiracaroidea genera of southern origin such as *Arphthicarus, Austrophthiracarus* and *Notophthiracarus* and those of northern origin: *Steganacarus* (*Steganacarus*) and *Atropacarus (Atropacarus)*. A notable absence among the Euphthiracaroidea is that of the southern genus *Austrotritia*, while the Nearctic genus *Euphthiracarus* is most abundantly represented.

	no of species
Phthiracaroidea	
Phthiracarus	6
Plonaphacarus	1
Hoplophthiracarus	2
Steganacarus (*Rhacaplacarus*)	1
Protophthiracarus	2
Atropacarus (*Hoplophorella*)	3
Euphthiracaroidea	
Oribotritia	2
Mesotritia	3
Indotritia	4
Euphthiracarus	5
Rhysotritia	4
Microtritia	1
Mesoplophoroidea	
Archoplophora	1
Mesoplophora	2
Protoplophoroidea	
Prototritia	1

VII. PROPORTIONS OF ZOOGEOGRAPHIC ELEMENTS

Most ptyctimous mites of Florida belong to relatively widespread species. The majority of them are Nearctic elements.

	no of species
Semicosmopolitan	5
Pantropical	4
Holarctic	6
Nearctic	16
Central America and Florida	4
Endemic	3

An interesting feature is a low number (3) of endemic species, one restricted to the central and two to the southern part of the peninsula (however one of those two – *P. major* may be of Neotropical origin).

The geographic distribution of almost all species is much wider than previously known (JACOT 1933):

After JACOT (1933)		now	
A. major	south tip	*P. major*	Endemic (or Neotropical?)
H. histricinus	w. and w. coast	*H. histricinus*	Nearctic
H. robustior	„		
H. grossmani	peninsular	*H. grossmani*	nom. dubium
P. sphaerulum	peninsular	*P. globosus*	Holarctic
P. prior	northcentral	*P. longulus*	Holarctic
H. cucullata cuculloides	w. and w. coast	*A.(H.) cucullatus*	Semicosmopolitan
H. cucullata floridae	peninsular	*A.(H.) hamatus*	Pantropical
H. varians	peninsular	*P. varians*	Nearctic
P. ardua	except w. coast	*R. ardua*	Semicosmopolitan
P. ardua sinensi	„		
O. glabrata	peninsular	*M. jacoti*	Endemic
O. carolinae	e. coast	*I. jacoti*	Nearctic

VIII. ASSESSMENT OF THE REGIONALISATION OF THE SPECIES

Half of the species, a number proportionally similar among the Phthiracaroidea and Euphthiracaroidea, is distributed along the whole peninsula showing no regional or environmental preferences. Half of them are Nearctic, while the others are widespread.

Semicosmopolitan
P. kugohi
A. (H.) cucullatus
R. ardua
R. curticephala

Pantropical
P. pygmaeus
A. (H.) hamatus
A. (H.) vitrinus

Holarctic
P. globosus
H. illinoisensis
M. nuda

Nearctic
H. histricinus
S. (R.) thoreaui
M. jacoti
E. depresculus
E. fulvus
E. fusulus
M. simplex
M. absondita

Endemic
P. curtulus

The other half of the species seem to prefer either northern or southern part of Florida. The Phthiracaroidea and Euphthiracaroidea are represented here by a proportionally similar number of species. Among the nine northern species Neartic ones are significantly dominant. Most probably for Holarctic and Nearctic species Florida is the southern limit of their range.

Holarctic
P. longulus
M. flagelliformis

Nearctic
P. brevisetae
P. pusillus
P. varians
O. banksi
O. magna
E. pulchrus
M. pertenuis

A similar number of species (10) occur only in the southern part of Florida, which most probably, is the northern limit of their range. They are mainly representatives of the Euphthiracaroidea, mostly of central American origin.

Semicosmopolitan
A. rostralis

Pantropical
I. krakatauensis

Holarctic
E. cribarius

Nearctic
I. Jacoti

Central America and Florida
I. bellingeri
I. retusa
R. dikra
R. dixa

Endemic
P. major
P. evergladensis

There is no apparent correlation between the ptyctimous mites represented in the western and eastern part of the peninsula. It seems that for the three species, namely: *P. brevisetae, E. pulchrus* and *M. pertenuis* north-western Florida is the limit of their range. Four species: *I. bellingeri, I. krakatauensis, I. retusa* and *R. dixa* of south-western origin reach in Florida the northern limit of the range. The occurrence of the Holarctic – *E. cribarius* only in the north-eastern part of Florida indicates that this species reaches there the southern limit of the range. The endemic species *P. evergladensis* occurs in the eastern part of the peninsula, while the Nearctic species *I. jacoti* in the south-astern part.

IX. SUMMARY

Prior to this study the fauna of ptyctimous mites of Florida was known to include 11 species. As present by established it is represented by 38 species (plus one nom. dubium), including 15 Phthiracaroidea, 19 Euphthiracaroidea, 3 Mesoplophoroidea and 1 Protoplophoroidea. Six new species are described: *Mesoplophora pertenuis* sp. nov., *Mesotritia jacoti* sp. nov, *Indotritia jacoti* sp. nov., *Euphthiracarus fusulus* sp. nov., *Phthiracarus pusillus* sp. nov., *Protophthiracarus evergladensis* sp. nov. and *Oribotritia magna* has been redescribed. Description of 6 species are supplemented with diagnosis and additional descriptions, and descriptions of the others are supplemented with morphological diagnosis. The taxonomic analysis shows that as many as 32 names among the known 38 species are synonyms. Keys for determination of genera, subgenera and species are given.

The fauna of ptyctimous mites of Florida is harmonic. The Phthiracaroidea and Euphthiracaroidea are proportionally represented by the primitive as well as phylogenetically young species.

Specificity of the fauna of Florida is indicated by the absence of certain genera of southern origin: *Arphthicarus*, *Austrophthiracarus* and *Notophthiracarus*, *Austrotritia* and subgenera of northern origin: *Steganacarus* (*Steganacarus*) and *Atropacarus* (*Atropacarus*).

The ptyctimous mites of Florida belong to relatively widespread species and the majority of them have a Nearctic distribution. An interesting feature is a low number of endemic species. Geographic distribution of almost all species is wider than recognised before, by JACOT (1933).

Approximately half of the species representing the Phthiracaroidea and Euphthiracaroidea are distributed along the whole peninsula showing no regional or environmental preferences. These are mainly the Nearctic and widespead species.

The other half are the species showing distinct preferences either in northern or in southern part of Florida. Proportionally similar number of species represent the Phthiracaroidea and Euphthiracaroidea. Among the nine species preferring northern distribution, the Nearctic species are dominant. Most probably for the Holarctic and Nearctic species Florida is the southern limit of their distribution. A similar number of species (10) prefer the southern part of Florida, which is probably the northern limit of their distribution. These are mainly representatives of the Euphthiracaroidea, mostly of south American origin.

There is no particular correlation between the ptyctimous mites in the western and eastern parts of the peninsula.

REFERENCES

AOKI J. 1959. Die Moosmilben (Oribatei) aus Südjapan. *Bulletin of the Biogeographical Society of Japan*, **21**(1): 1-22.

AOKI J. 1965. Oribatiden (Acarina) Thailands. I. *Nature and Life*, **4**: 129-193.

AOKI J. 1980. A revision of the Oribatid mites of Japan. I. The families Phthiracaroidae and Oribotritiidae. *Bulletin of the Institute of Environmental Science and Technology*, **6**(2): 1-88.

BALOGH J. 1958. Oribatides nouvelles de l' Afrique tropicale. *Revue de zoologie et de botanique africaines*, **58**(1-2): 1-34.

BALOGH J., MAHUNKA S. 1983. The soil mites of the world. I. Primitive oribatids of the Palearctic region. *Akademiai Kiado,* 372 pp.

BANKS N. 1895. On the Oribatoidea of the United States. *Transactions of the American Entomological Society*, **22**: 1-16.

BERLESE A. 1887. Acari, Myriapoda et Scorpiones hucusque in Italia reperta. *Redia*, **35**: 3-10.

BERLESE A. 1904. Acari nuovi. Manipulus III. *Redia*, **2**(1): 10-32.

BERLESE A. 1908. Elenco di generi e specie nuove di Acari. *Redia*, **5**(1): 1-15.

BERLESE A. 1910. Acari nuovi. Manipulus V-VI. *Redia*, **6**(2): 199-230.

BERLESE A. 1913. Acari nuovi. Manipuli VII-VIII. *Redia*, **9**(1): 77-111.

BERLESE A. 1923. Centuria sesta di Acari nuovi. *Redia*, **15**(1-2): 237-262.

EWING H. E. 1908. Two new species of the genus *Phthiracarus*. *Entomological News and Proceedings of the Entomological Section of the Academy of Natural Sciences of Philafelphia*, **19**(10): 449-451.

EWING H. E. 1909a. The Oribatoidea of Illinois. *Bulletin of the Illinois State Laboratory of Natural History*, 7(10): 337-389.

EWING H. E. 1909b. New American Oribatoidea. *Journal of the New York Entomological Society*, **17**(3): 116-136.

EWING H. E. 1917. A synopsis of the genera of beetle mites with special reference to the North American fauna. *Annals of The Entomological Society of America*, **10**(2): 117-132.

FORSSLUND K. 1963. Notizen über Oribatei (Acari). III. *Entomolist. Tidskrift utvigen av Entomologiska Foreningen*, **84**(3-4): 282-283.

GRANDJEAN F. 1932. La famille des Protoplophoridae (Acariens). *Bulletin de la Societe zoologique de France*, **57**: 10-36.

GRANDJEAN F. 1954. Essai de classification des Oribates (Acariens). *Bulletin de la Societe zoologique de France*, **78**(5-6): 421-446.

JACOT A. P. 1923. Oribatoidea Sinensis II. *Journal Natural China Branch Royal Asiatic Society*, **54**: 168-181.

JACOT A. P. 1924. Oribatid mites: *Euphthiracarus depressculus* sp. n. and *Euphthiracarus flavus* (EWING). *Transactions of the American Microscopical Society*, **43**: 90-96.

JACOT A. P. 1929. New Oribatid mites. *Psyche*, **35**: 213-215.

JACOT A. P. 1930. Oribatid mites of the subfamily Phthiracarinae of the Northeastern United States. *Proceedings of the Boston Society of Natural History*, **39**(6): 209-261.

JACOT A. P. 1933. Phthiracarid mites of Florida. *Journal of the Elisha Mitchell Scientific Society Raleigh and Chapel Hill, N.C.*, **48**(2): 232-267.

JACOT A. P. 1937. Six new mites from western noth carolina. *Proceedings of the Entomological Society of Washington*, **39**(6): 163-166.

JACOT A. P. 1938. More box-mites of the northeastern United States. *Journal of the New York Entomological Society*, **46**(2): 109-145.

JACOT A. P. 1939. New Mites from Western North Carolina. *Journal of the Elisha Mitchell Scientific Society Raleigh and Chapel Hill, N.C.*, **55**(1): 197-202.

KOCH C. L. 1836-1841. Deutschlands Crustaceen, Myriapoden und Arachniden. Regensburg.

MAHUNKA S. 1987. Neue und interessante Milben aus dem Genfer Museum LVIII. Some primitive Oribatids from the Cape Verde Islands (Acari: Oribatida). *Revue suisse de Zoologie. Annales de la Societe zoologique suisse et du Musee d'historie naturelle de Geneve*, **94**(1): 109-116.

MAHUNKA S. 1990. A survey of the superfamily Euphthiracaroidea JACOT, 1930 (Acari, Oribatida). *Folia entomologica hungarica*, **51**: 37-80.

MAHUNKA S. 1994. Further notes, additions and redescriptions of the Oribatid species preserved in the BERLESE Collection (Acari: Oribatida), II. *Folia entomologica hungarica*, **55**: 233-261.

MAHUNKA S. 1995. *Hoffmanacarus virginianus* gen.n., sp.n. and some other moss mites from Virginia, USA (Acari: Oribatida). *Archives des Sciences*, **48**(1): 1-10.

MAHUNKA S., MAHUNKA-PAPP L. 1995. The Oribatid species described by BERLESE (Acari). *Studia Naturalia, Scientific studies from the Hungarian Natural History Museum*, 325 pp.

MARKEL K. 1964. Die Euphthiracaridae JACOT, 1930, und ihre Gattungen (Acari, Oribatei). *Zoologische Verhandelingen*, **67**: 1-78.

MARKEL K., MEYER I. 1959. Zur Systematik der deutschen Euphthiracarini (Acari, Oribatei). *Zoologischer Anzeiger*, **163**(9/10): 327-342.

MARSHALL V. G., REEVES R. M., NORTON R. A. Catalogue of the Oribatida (Acari) of the continental United States and Canada. *Memoirs of the Entomological Society of Canada*, **139**: 1-418.

NIEDBAŁA W. 1984. Mesoplophoroidea (Acari, Oribatida). Changement du systeme et redescription d'especes-types. *Bulletin of the Polish Academy of Sciences. Biological Sciences*, **32** (3-4): 137-155.

NIEDBAŁA W. 1986. Catalogue des Phthiracaroidea (Acari, Oribatida), clef pour la determination des especes et descriptions d'especes nouvelles. *Annales zoologici*, **40**(4): 309-370.

NIEDBAŁA W. 1988. Deux nouveaux Mesoplophoroidea (Acari, Oribatida) d'Amerique. *Bulletin of the Polish Academy of Sciences. Biological Sciences*, **36**(1-3): 61-66.

NIEDBAŁA W. 1988. Phthiracaridae (Acari, Oribatida) nouveaux des Etats-Unis d'Amerique. *Bulletin of the Polish Academy of Sciences. Biological Sciences*, **36**(1-3): 67-77.

NIEDBAŁA W. 1991. Revision of Oribatid mites from the BERLESE collection I. Systematic position of *Hoploderma histricinum* BERLESE, 1908 and *Hoploderma pavidum* BERLESE, 1913. *Genus. International Journal of Invertebrate Taksonomy*, **2**: 327-335.

NIEDBAŁA W. 1993. Revision of Oribatid mites from BERLESE's collection. III. Redescription of species from Mesoplophoroidea and Euphthiracaroidea (Acari, Oribatida). *Genus. International Journal of Invertebrate Taksonomy*, **4**: 41-58.

NIEDBAŁA W. 1994a. Revision of Oribatid mites from BERLESE's collection II. Descriptions and redescriptions of species from the superfamily Phthiracaroidea (Acari, Oribatida). *Bulletin of the Polish Academy of Sciences. Biological Sciences*, **30**: 37-62.

NIEDBAŁA W. 1994b. Supplement to the classification of Phthiracaroidea, with redescriptions and descriptions of some species (Acari, Oribatida, Euptyctima). *Genus. International Journal of Invertebrate Taksonomy*, **5**(1-2): 1-152.

NIEDBAŁA W. 2000. The ptyctimous mites fauna of the Oriental and Australian Regions and their centres of origin (Acari, Oribatida). *Genus. International Journal of Invertebrate Taksonomy* (supplement), 489 pp.

NIEDBAŁA W. 2002. The ptyctimous mites fauna of the Nearctic Region. (in prepar.)

NIEDBAŁA W., SCHATZ H. 1996. Euptyctimous mites from the Galapagos Islands, Cocos Island, and Central America (Acari: Oribatida). *Genus. International Journal of Invertebrate Taksonomy*, **7**(2): 239-317.

NORTON R. A., KETHLEY J. B. 1989. BERLESE's North American Oribatid mites: Historical notes, recombinations, synonymies and type designations. *Redia*, **62**(2): 421-499.

NORTON R. A., MACNAMARA M. C.1976. The common (*Nototopthalmus viridescens*) as a predator of soil mites in New York. *Journal of the Georgia Entomological Society*, **11**(1): 89-93, 1 t.

OUDEMANS A. C. 1916. Overzicht der tot 1898 beschreven Phthiracaridae. *Entomologische Berichten, uitgegeven door de Nederlandsche Entomologische Vereeniging*, **4**(87): 245-251.

PERTY M. 1839. *Isis*. Jena, 23, HFT. 11 and 12: column 84.

PERTY M. 1841. Allgemeine Naturgeschichte, als Philosophische and Humanitatswissenschaft fur Naturforscher. *Philosophen und das hoher gebildete Publicum.* vol. 3.

REEVES R. M. 1969. Seasonal distribution of some forest soil Oribatei. *Proc. of 2nd International Congress of Acarology*, **1967**: 23-30.

SELLNICK M. 1923. Die mir bekannten Arten der Gattung *Tritia* Berl. Acari. *Blatter fur Milbenkunde*, **3**: 7-22.

SELLNICK M. 1924. Oribatiden der Insel Krakatau. *Treubia, Buitenzorg*, **5**(4): 371-373.

SELLNICK M. 1928. Formenkreis: Hornmilben, Oribatei. [In:] P. BROHMER – *Die Tierwelt Mitteleuropas*, **3**(9): 1-42.

SENGBUSCH H. G. 1957. Checklist of Oribatoid Mites in the Vicinity of Mountain Lake Biological Station – Virginia. *The Virginia Journal of Sciences*, **8**(2): 128-134.

SERGENKO G. D. 1988. Novy vid pantsirnogo kleshcha s Ukrainy (Oribatei, Oribotritiidae). *Vesti zoologiczeskije*, **2**: 66-69.

SUBIAS L. S., SARKAR S. 1984. Three new species of Ptyctimines Oribates (Acarida) from India (Mesoplophoridae and Phthiracaridae). *Folia entomologica hungarica*, **45**(1): 215-220.

WALLWORK J. A. 1958. Notes on the feeding behaviour of some forest soil Acarina. *Oikos*, **9**(2): 260-271.

WALLWORK J. A. 1959. The distribution and dynamics of some forest soil mites. *Ecology*, **40**(4): 557-563.

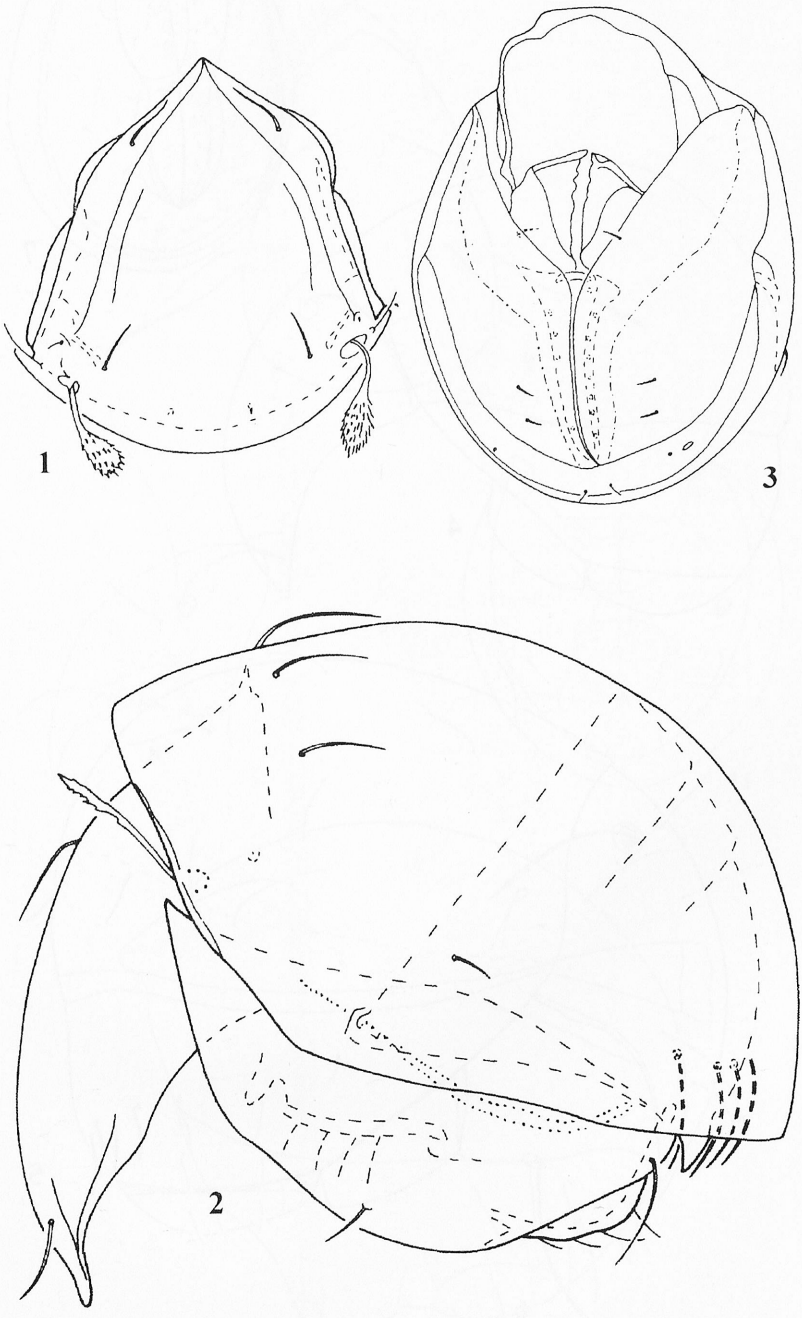
WALLWORK J. A. 1960. Observations on the behaviour of some Oribatid mites in experimentally-controlled temperature gradients. *Proceedings of the Zoological Society*, **135**(4): 619-629.

WALLWORK J. A. 1967. Some Oribatei (Acari: Cryptostigmata) from Tchad (3rd. Series). *Revue zoologique et botanique africaine*, **75**(1-2): 35-45.

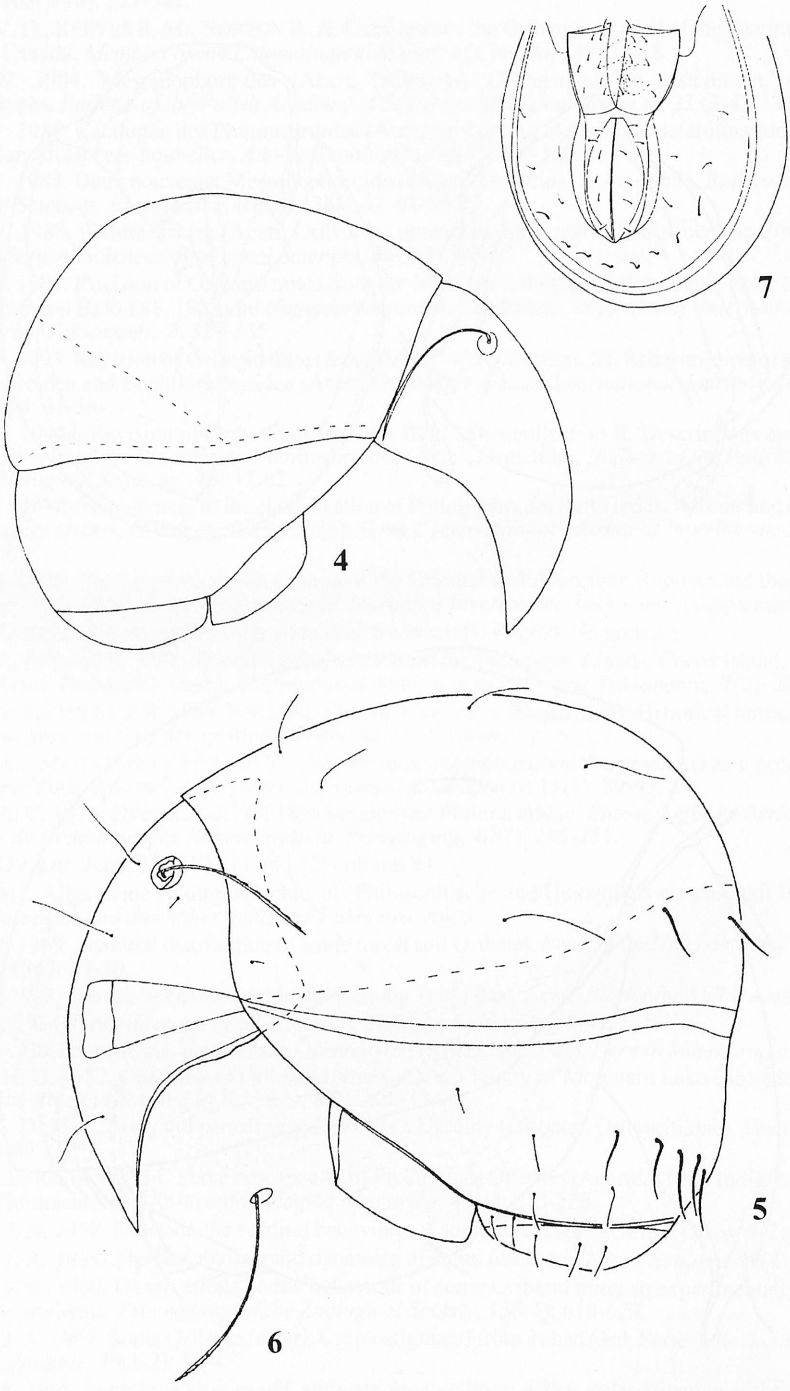
WALKER N. A. 1965. Euphthiracaroidea of California *Sequoia* litter: with a reclassification of the families and genera of the world (Acarina: Oribatei*). Fort Hays Studies., New Series*, **3**, 153 pp.

WALTER D. E., NORTON R. A. 1985. Body size distriburion in sympatric oribatid mites (Acari: Sarcoptiformes) from California pine litter. *Pedobiologia*, **27**: 99-106.

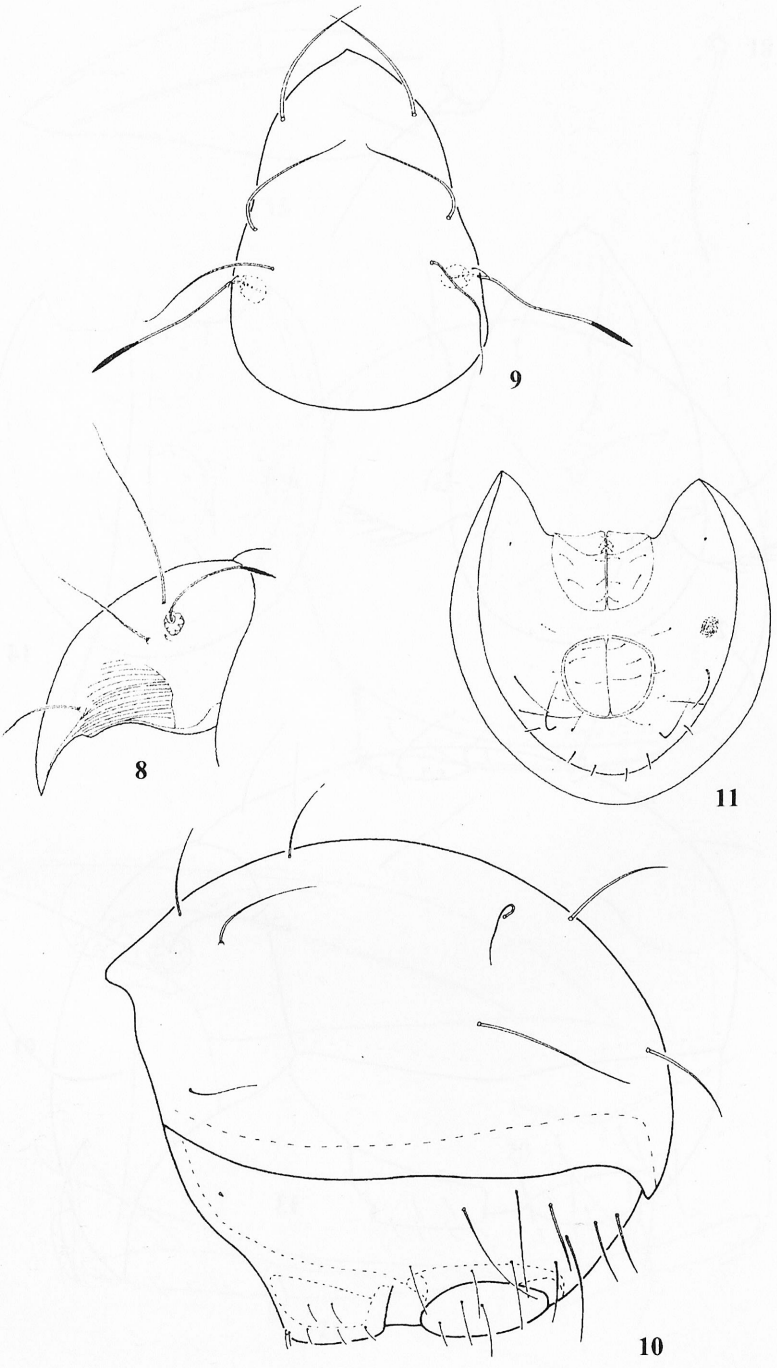
WILLMANN C. 1930. Neue Oribatiden aus Guatemala. *Zoologischer Anzeiger*, **88**(9/10): 239-246.



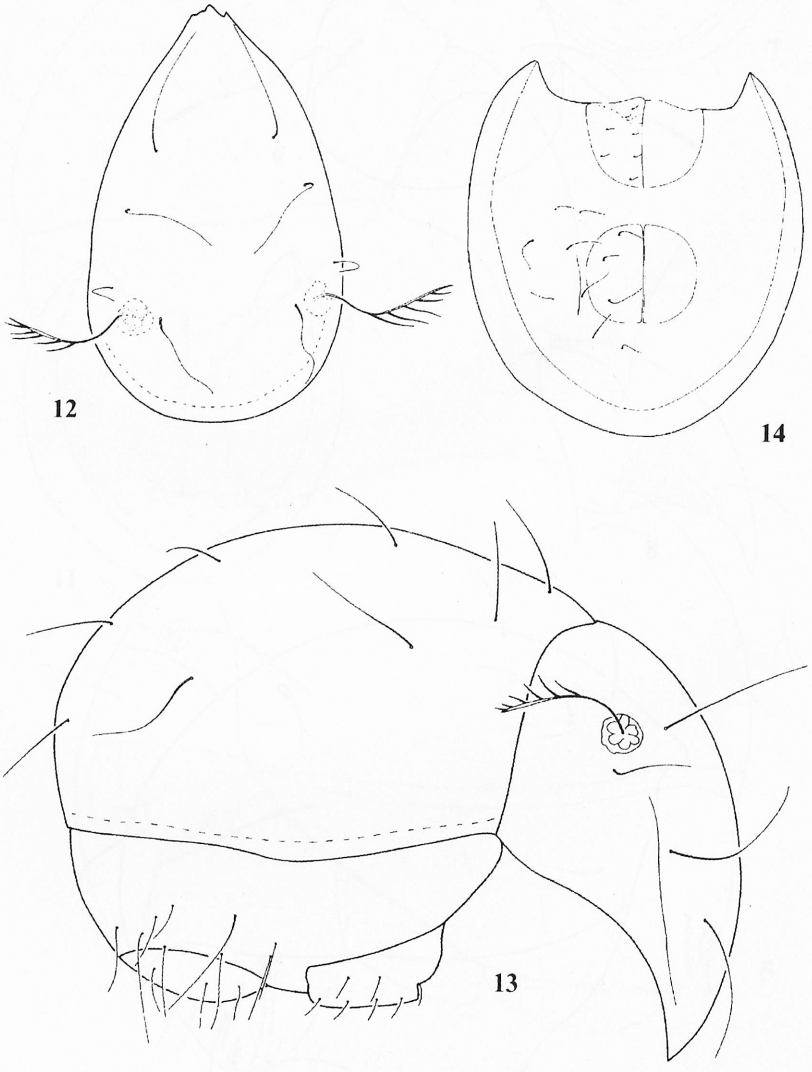
Figs 1-3. *Prototritia major* (JACOT, 1933) (after JACOT 1933): 1 – prodorsum, dorsal view, 2 – lateral view of body, 3 – ventral view of body.



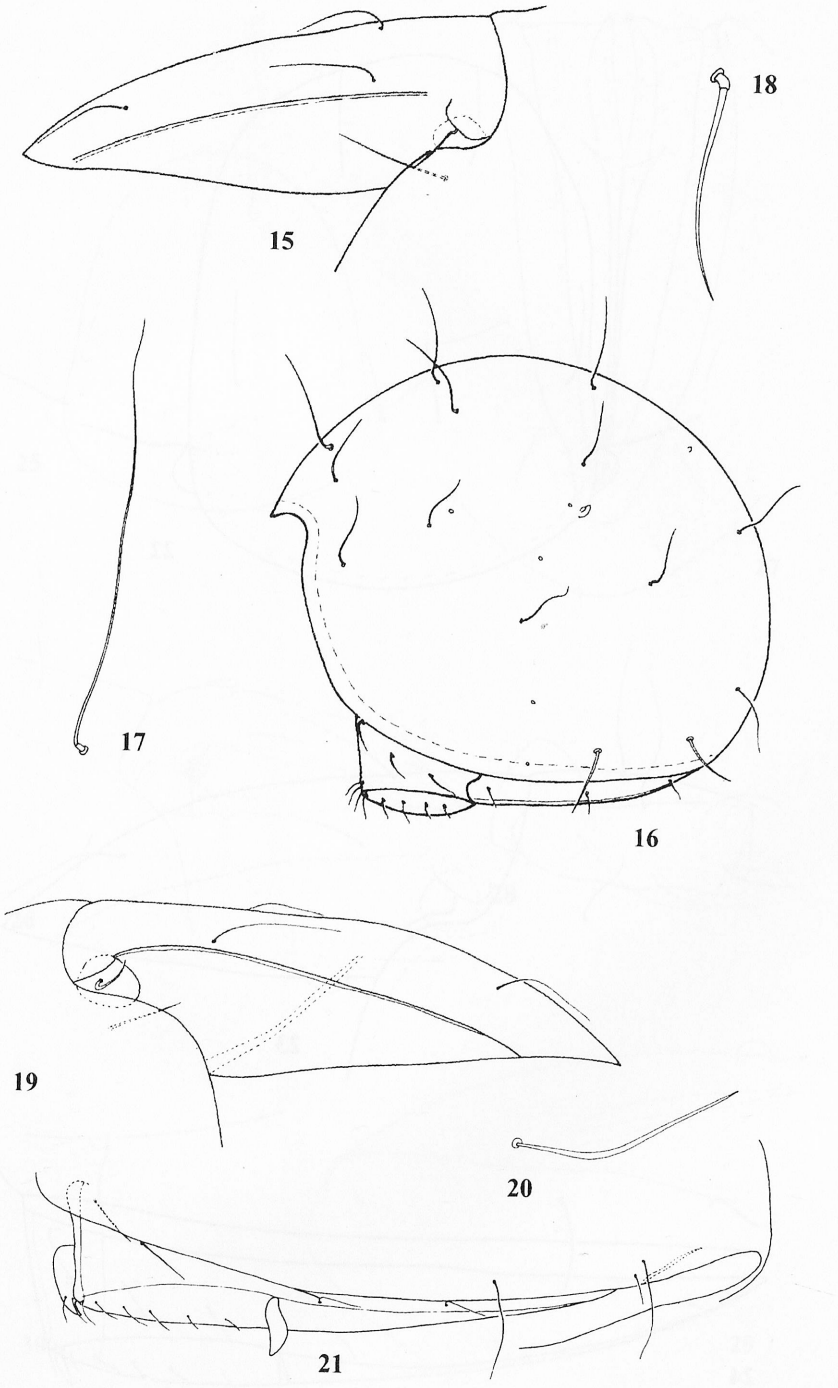
Figs 4-7. 4 – *Phthiracarulus laevis* JACOT, 1938 – synonym of *Archoplophora rostralis* (WILLMANN, 1930) (syntype) – lateral view of body, 5-7– *Archoplophora rostralis* (WILLMANN, 1930) (specimen from Korea): 5 – lateral view of body, 6 – sensillus, 7 – ventral side.



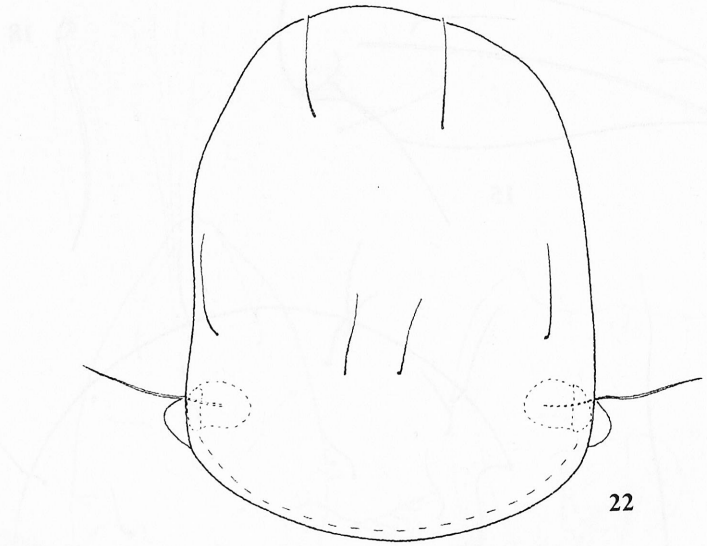
Figs 8-11. *Mesoplophora* (*Parplophora*) *abscondita* NIEDBAŁA, 1988 (holotype): 8 – prodorsum, lateral view, 9 – prodorsum, dorsal view, 10 – notogaster, 11 – ventral side.

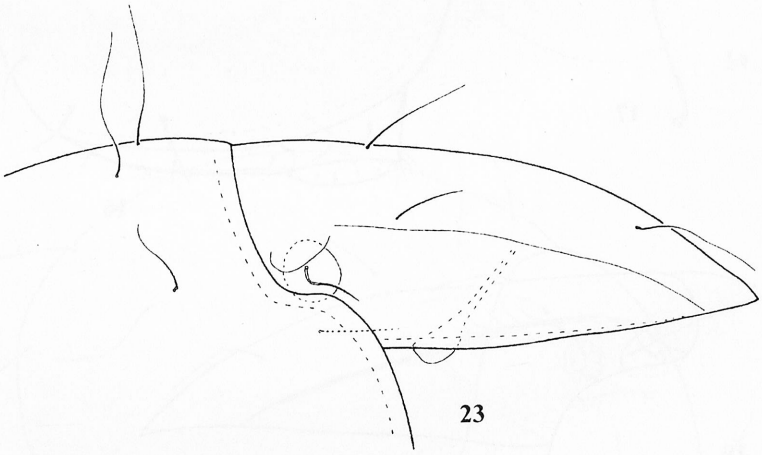


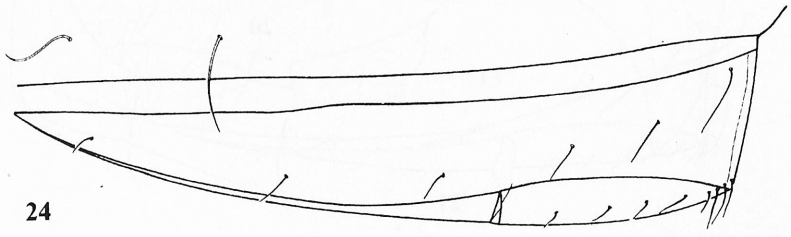
Figs 12-14. *Mesoplophora* (*Parplophora*) *pertenuis* sp. nov. (holotype): 12 – prodorsum, dorsal view, 13 – lateral view of body, 14 – ventral side.



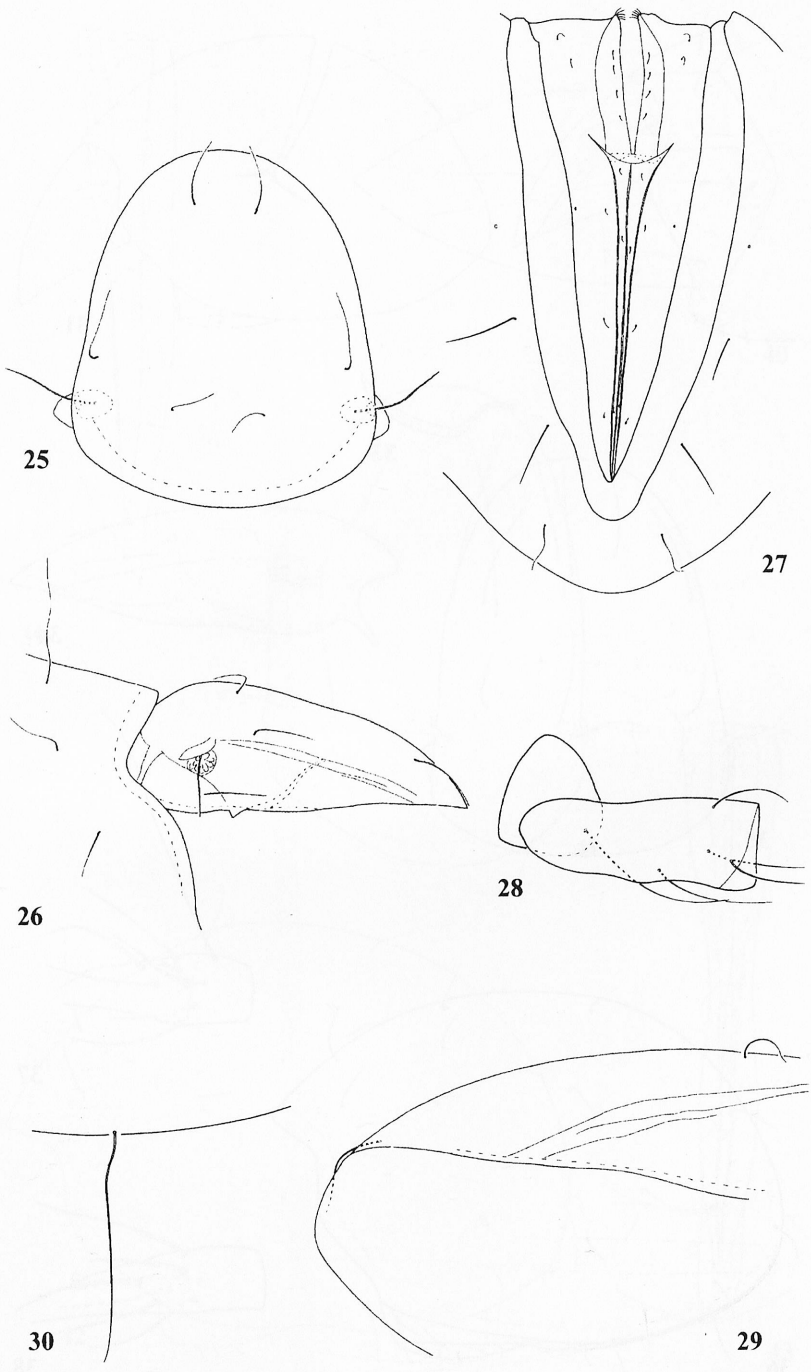
Figs 15-21. 15-18 – *Oribotritia banksi* (OUDEMANS, 1916) (holotype): 15 – prodorsum, lateral view, 16 – notogaster, 17 – seta c_1, 18 – seta ps_2; 19-21 – *Oribotritia banksi* (OUDEMANS, 1916) (cotype): 19 – prodorsum, lateral view, 20 – sensillus, 21 – genital, aggenital and anal, adanal plates, lateral view.



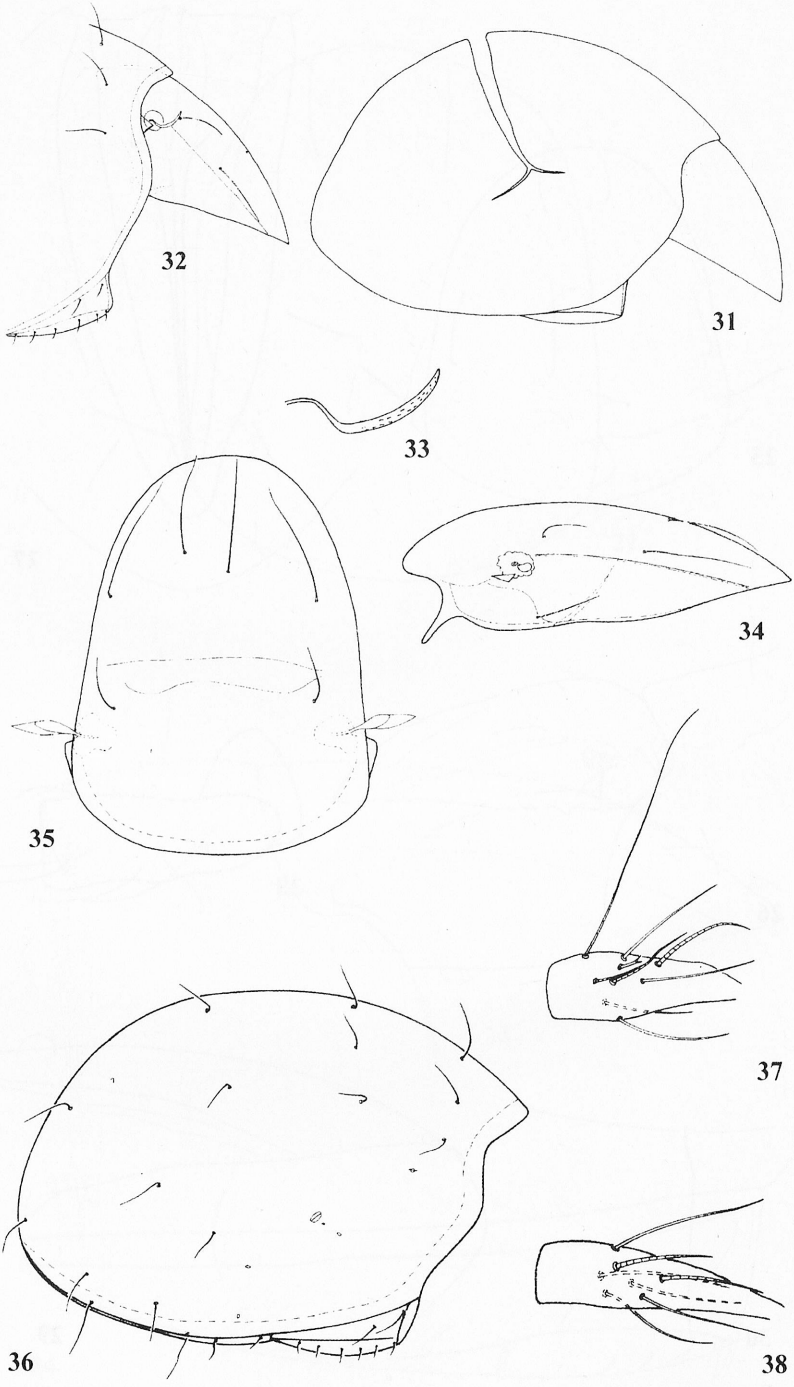




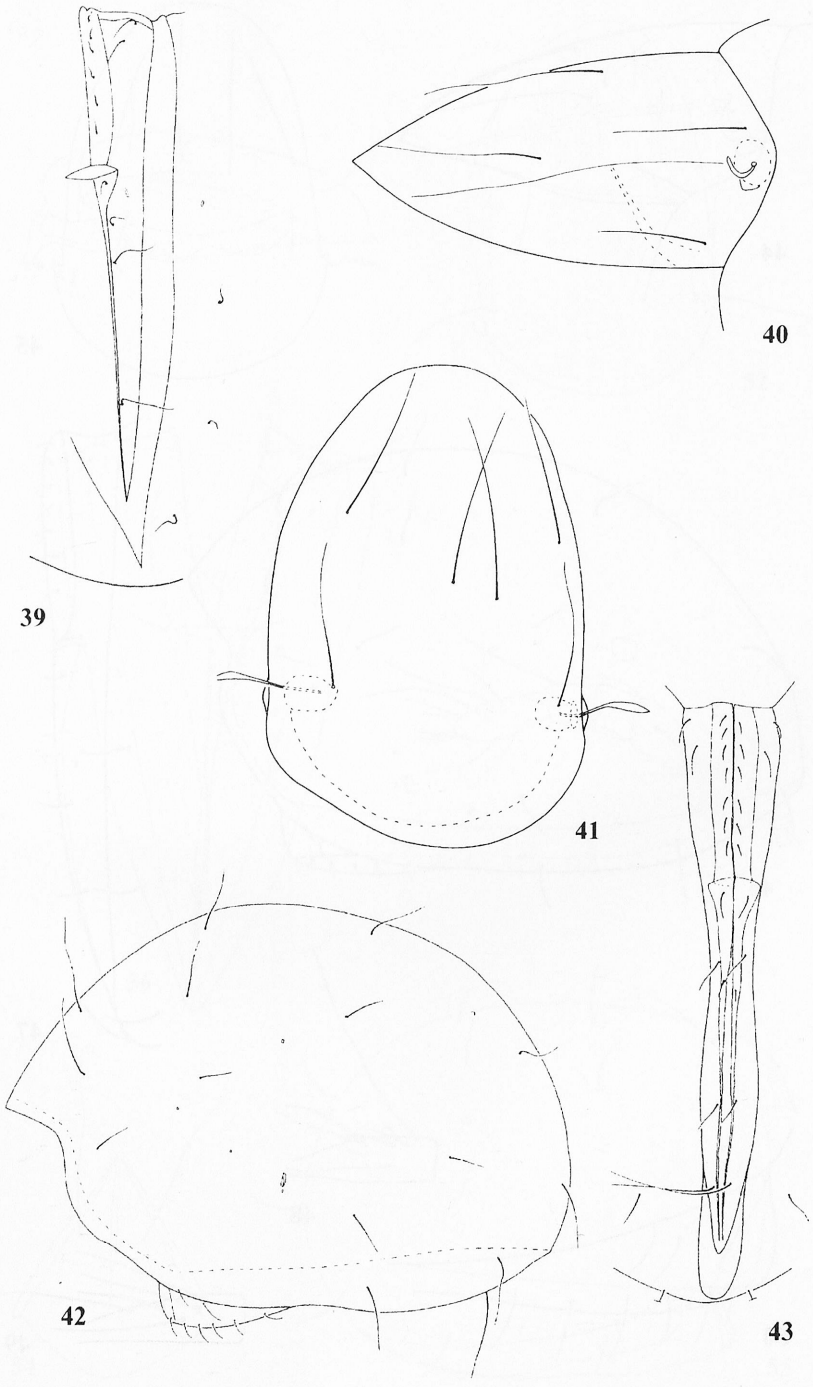
Figs 22-24. *Oribotritia banksi* (OUDEMANS, 1916) (specimen from Virginia): 22 – prodorsum, dorsal view, 23 – prodorsum and anterior part of notogaster, lateral view, 24 – genital, aggenital and anal, adanal plates, lateral view.



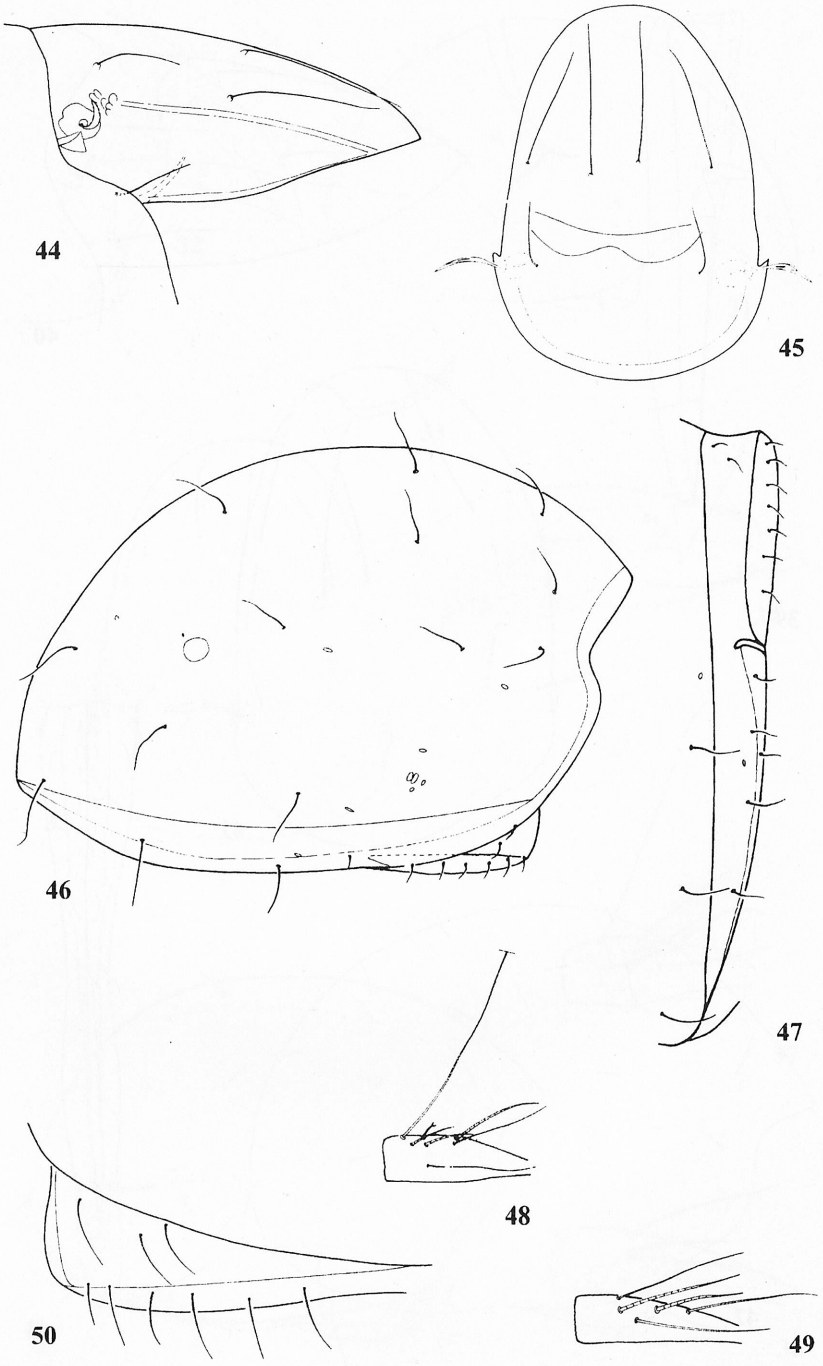
Figs 25-30. 25-28 – *Oribotritia magna* (EWING, 1907) (specimen from Florida): 25 – prodorsum, dorsal view, 26 – prodorsum and anterior part of notogaster, lateral view, 27 – ventral region, 28 – trochanter and femur of leg I; 29, 30 – *Oribotritia magna* (EWING, 1907) (syntype): 29 – prodorsum, anterior wiew, 30 – seta c_1.



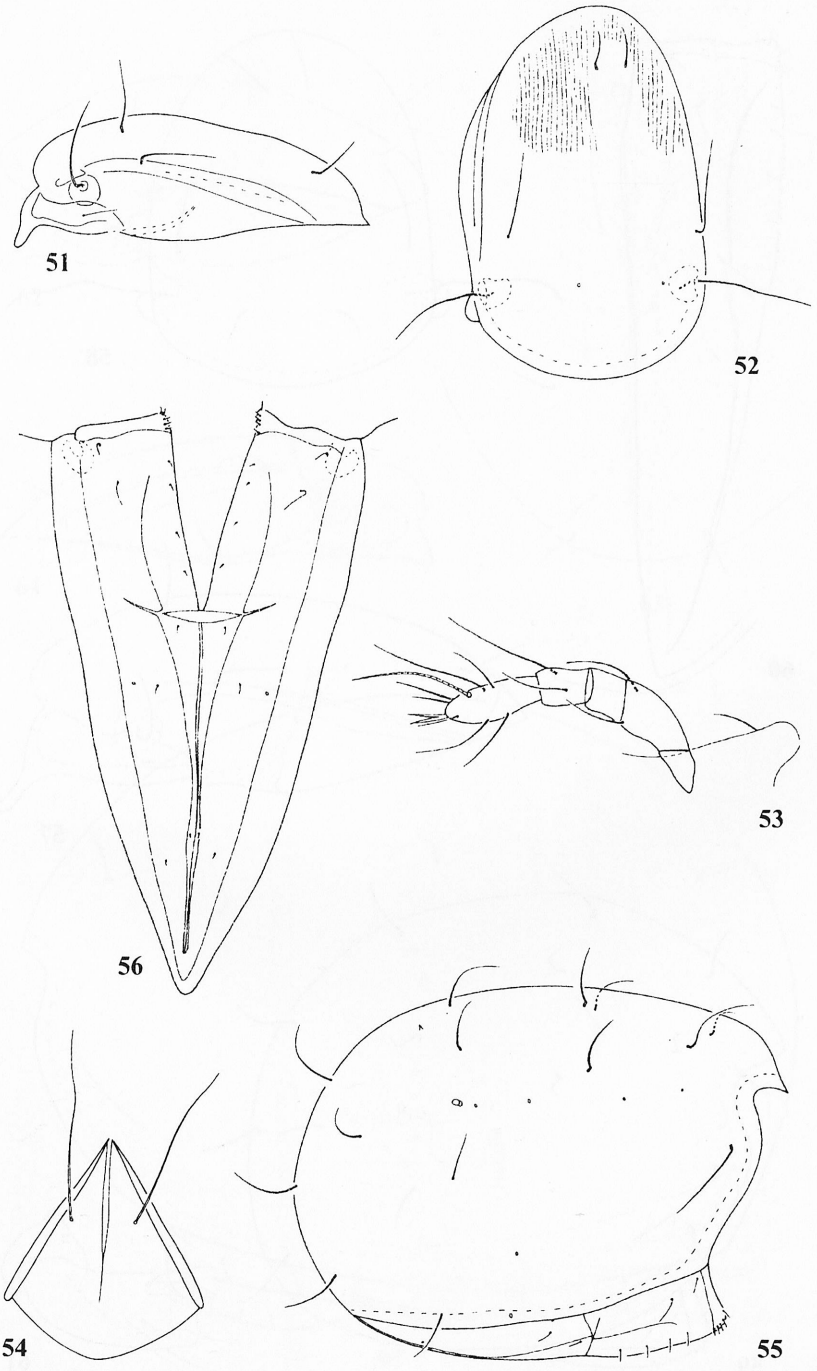
Figs 31-38. *Mesotritia flagelliformis* (EWING, 1909) (neotype): 31 – sketchy, lateral view of body, 32 – prodorsum with anterior part of notogaster, lateral view, 33 – sensillus; 34-38 – *Mesotritia flagelliformis* (EWING, 1909) (specimen from North Carolina): 34 – prodorsum, lateral view, 35 – prodorsum, dorsal view, 36 – notogaster, 37 – fragment of tarsus I, 38 – fragment of tarsus II.



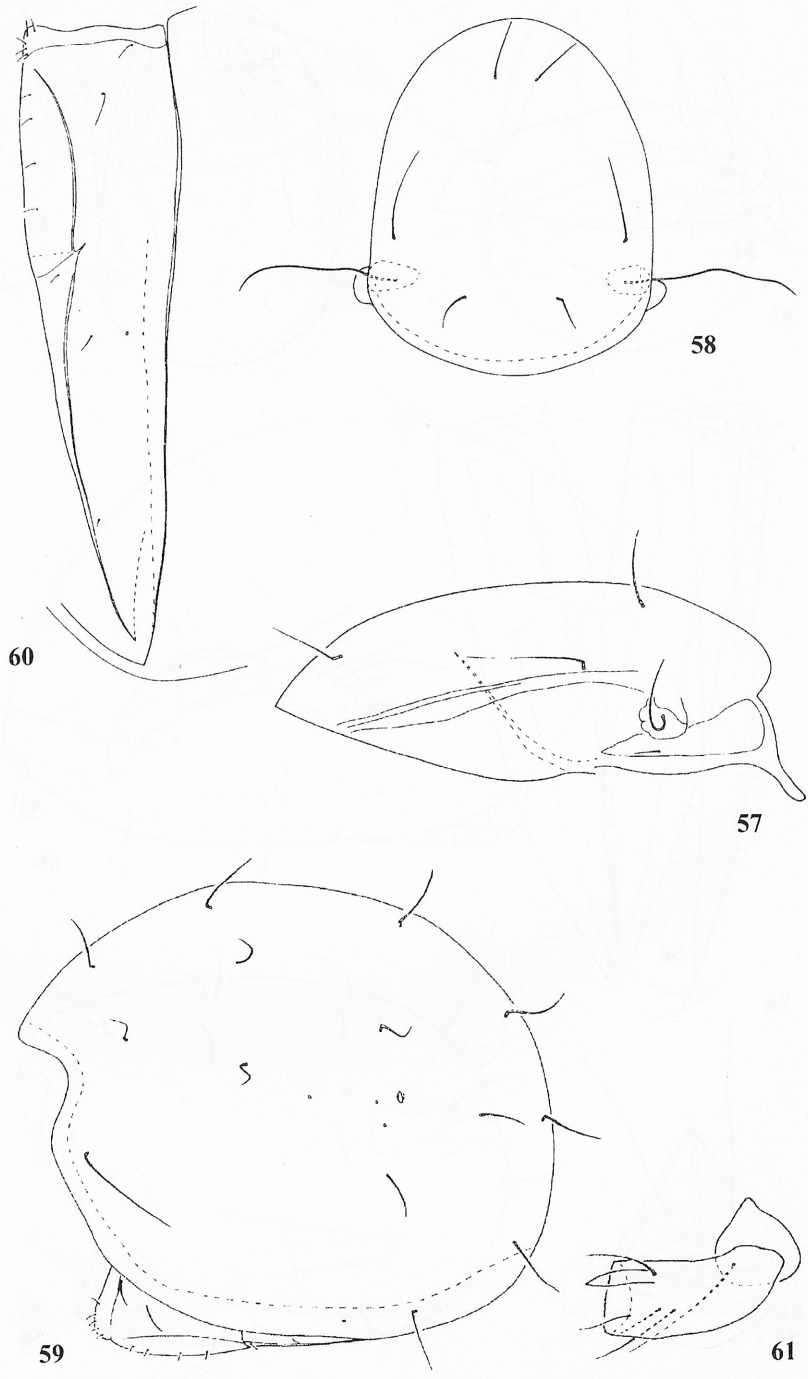
Figs 39-43. 39 – *Mesotritia flagelliformis* (EWING, 1909) (specimen from North Carolina), genital, aggenital and anal, adanal plates; 40-43 – *Mesotritia jacoti* sp. nov. (holotype): 40 – prodorsum, lateral view, 41 – prodorsum, dorsal view, 42 – notogaster, 43 – genital, aggenital and anal, adanal plates.



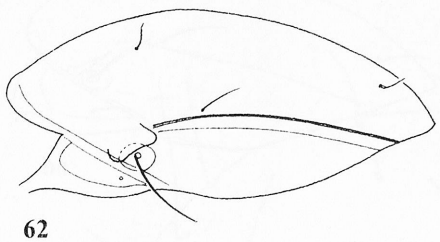
Figs 44-50. *Mesotritia nuda* (BERLESE, 1887) (specimen from Utach): 44 – prodorsum, lateral view, 45 – prodorsum, dorsal view, 46 – notogaster, 47 – genital, aggenital and anal, adanal plates, 48 – fragment of tarsus I, 49 – fragment of tarsus II, 50 – genital and aggenital plates, another specimen.



Figs 51-56. *Indotritia bellingeri* NIEDBAŁA et SCHATZ, 1996 (specimen from Cuba): 51 – prodorsum, lateral view, 52 – prodorsum, dorsal viev, 53 – palp, 54 – mentum of infracapitulum, 55 – notogaster, 56 – ventral side.



Figs 57-61. *Indotritia jacoti* sp. nov.(holotype): 57 – prodorsum, lateral view, 58 – prodorsum. dorsal view, 59 – notogaster, 60 – left genitoaggenital and anal, adanal plates, 61 – trochanter and femur of leg I.



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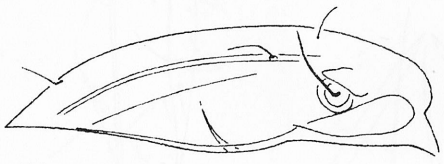

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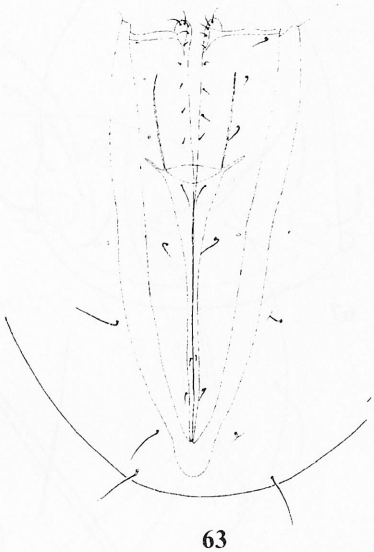

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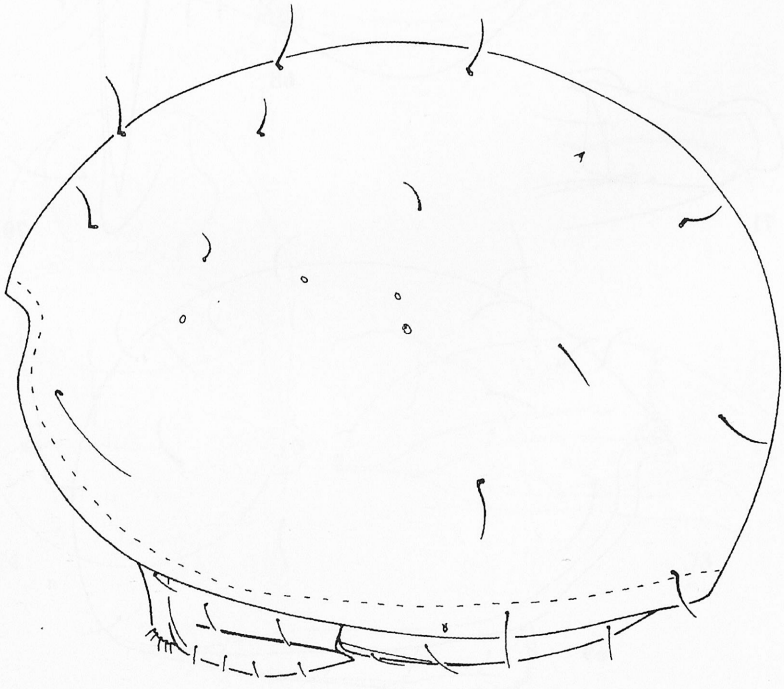

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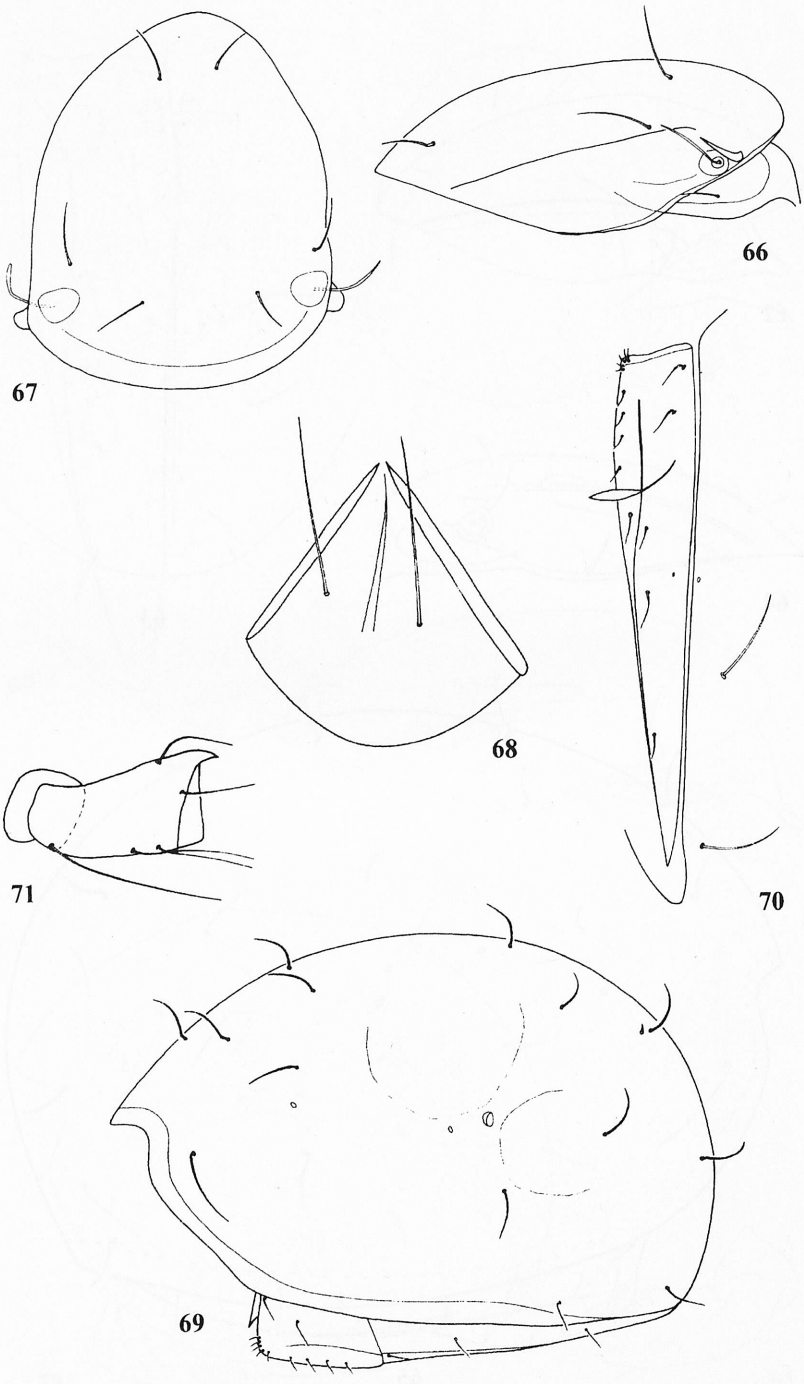
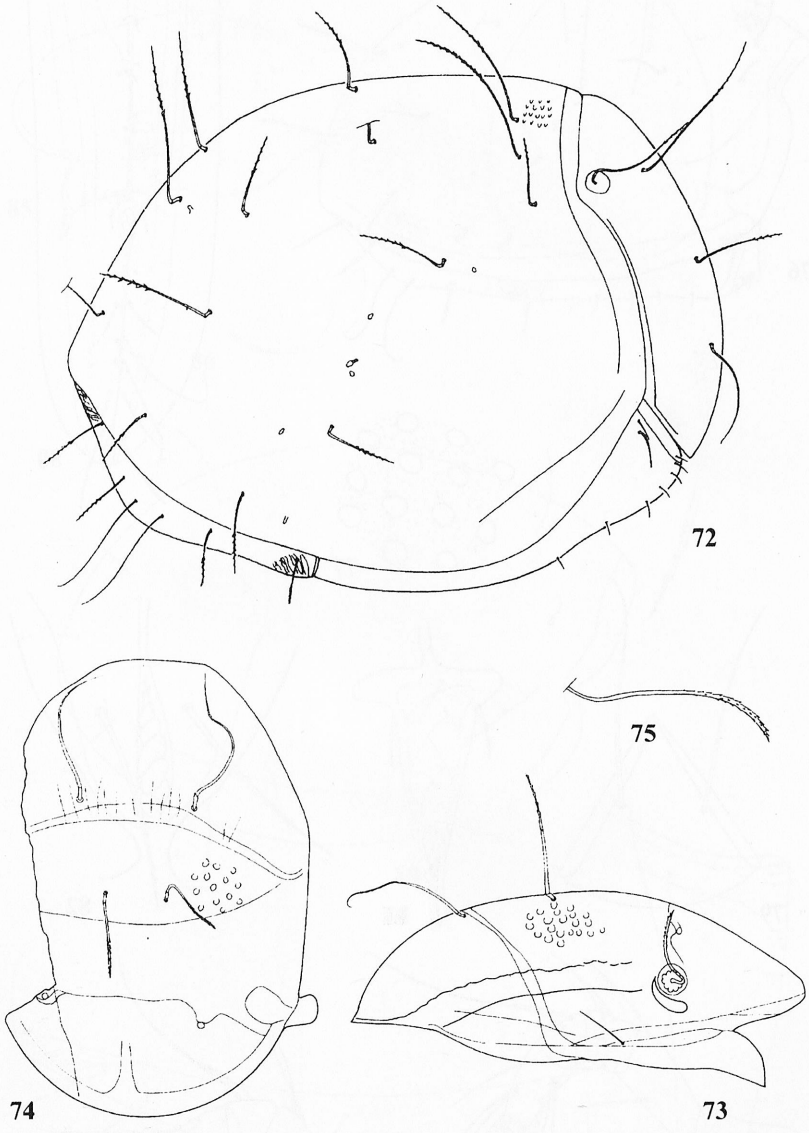
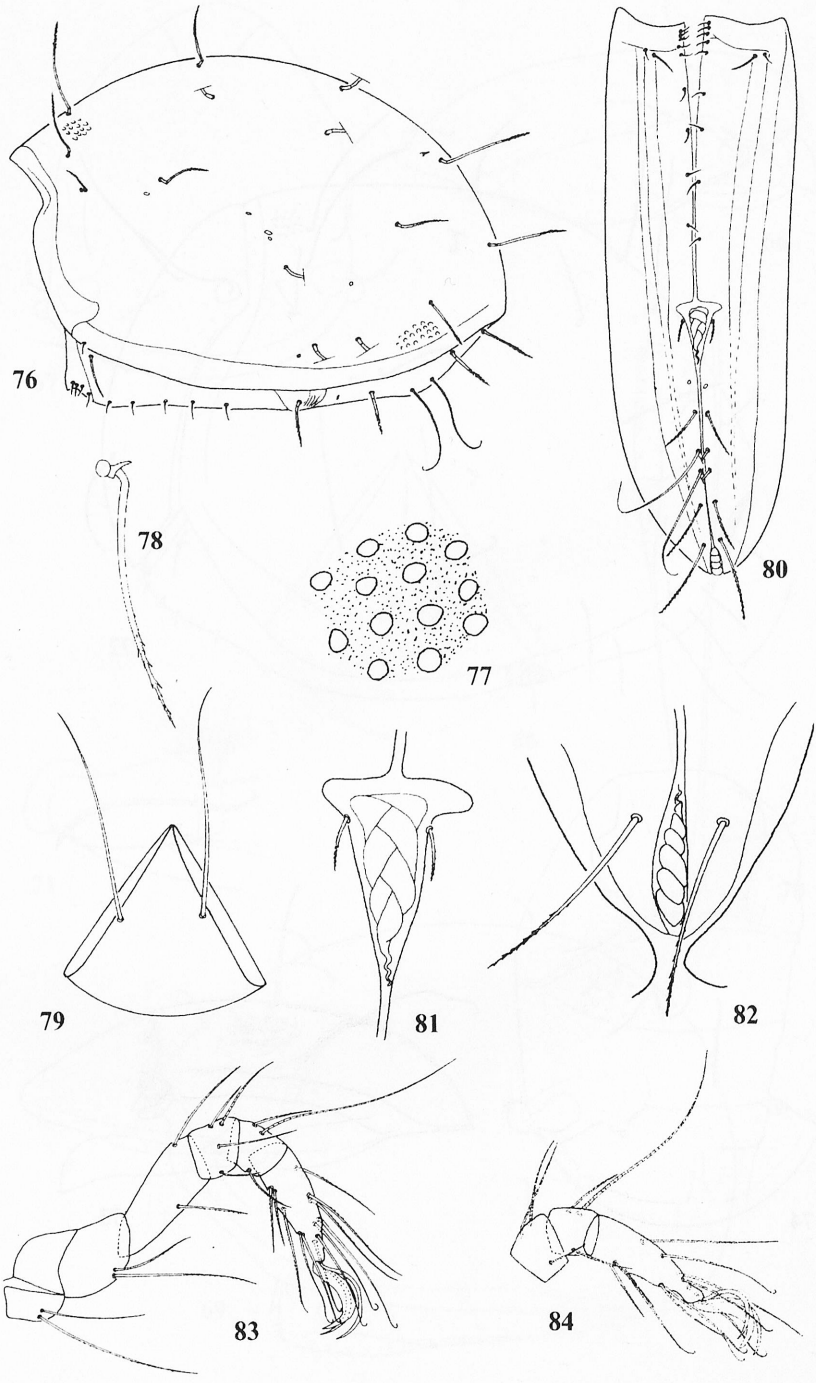
Figs 62-65. 62, 63 – *Indotritia krakatauensis* (SELLNICK, 1923) (specimen from Galapagos): 62 – prodorsum, lateral view, 63 – ventral view; 64, 65 – *Indotritia krakatauensis* (SELLNICK, 1923) (specimen from Comores sl.): 64 – prodorsum, lateral view, 65 – notogaster.



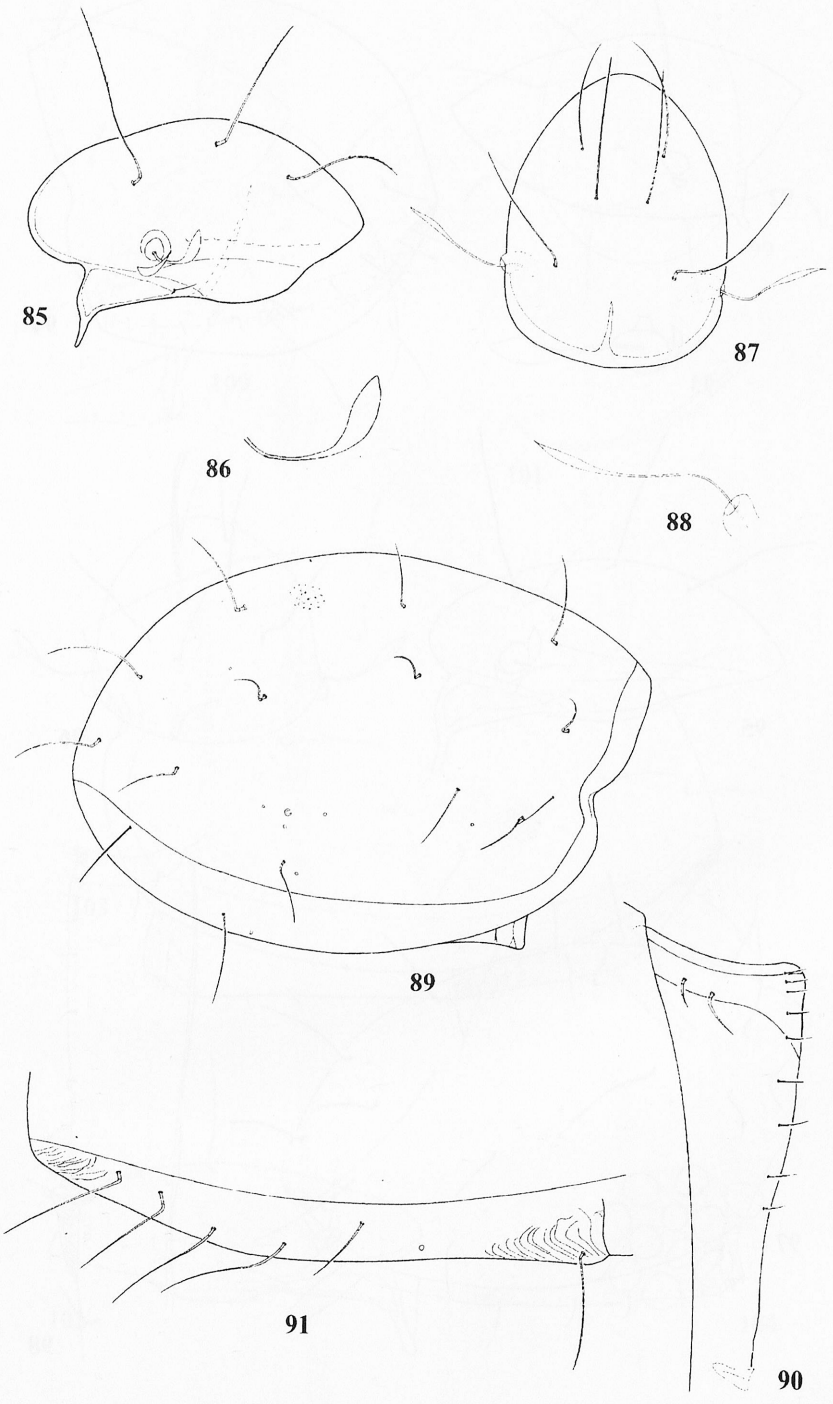
Figs 66-71. *Indotritia retusa* NIEDBAŁA et SCHATZ, 1996 (holotype): 66 – prodorsum, lateral view, 67 – prodorsum, dorsal view, 68 – mentum of infracapitulum, 69 – notogaster, 70 – left genitoaggenital and anal, adanal plates, 71 – trochanter and femur of leg I.



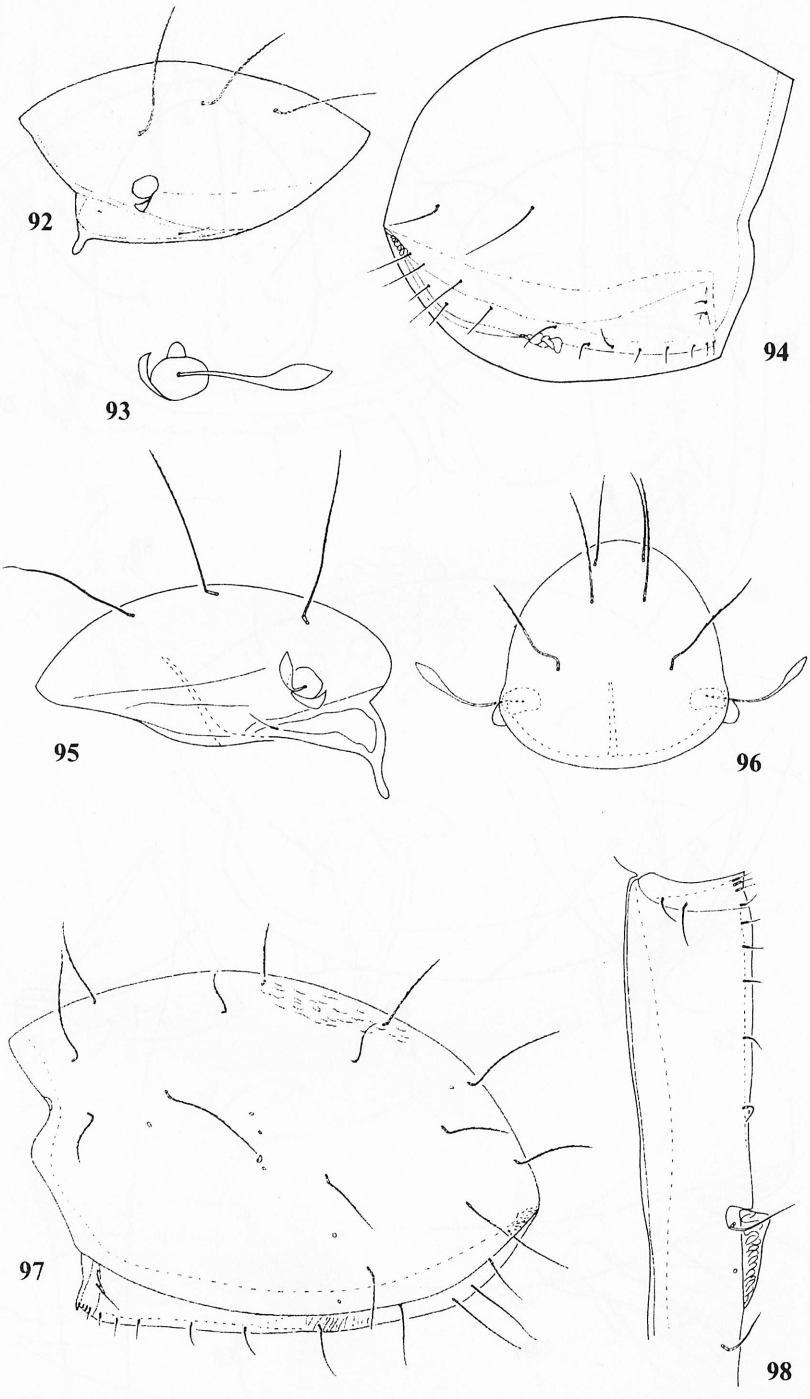
Figs 72-75. 72 – *Euphthiracarus cribarius* (BERLESE, 1904) (paralectotype), lateral view of body; 73-75 – *Euphthiracarus cribarius* (BERLESE, 1904) (specimens from Poland): 73 – prodorsum, lateral view, 74 – prodorsum, dorsal view, 75 – sensillus.



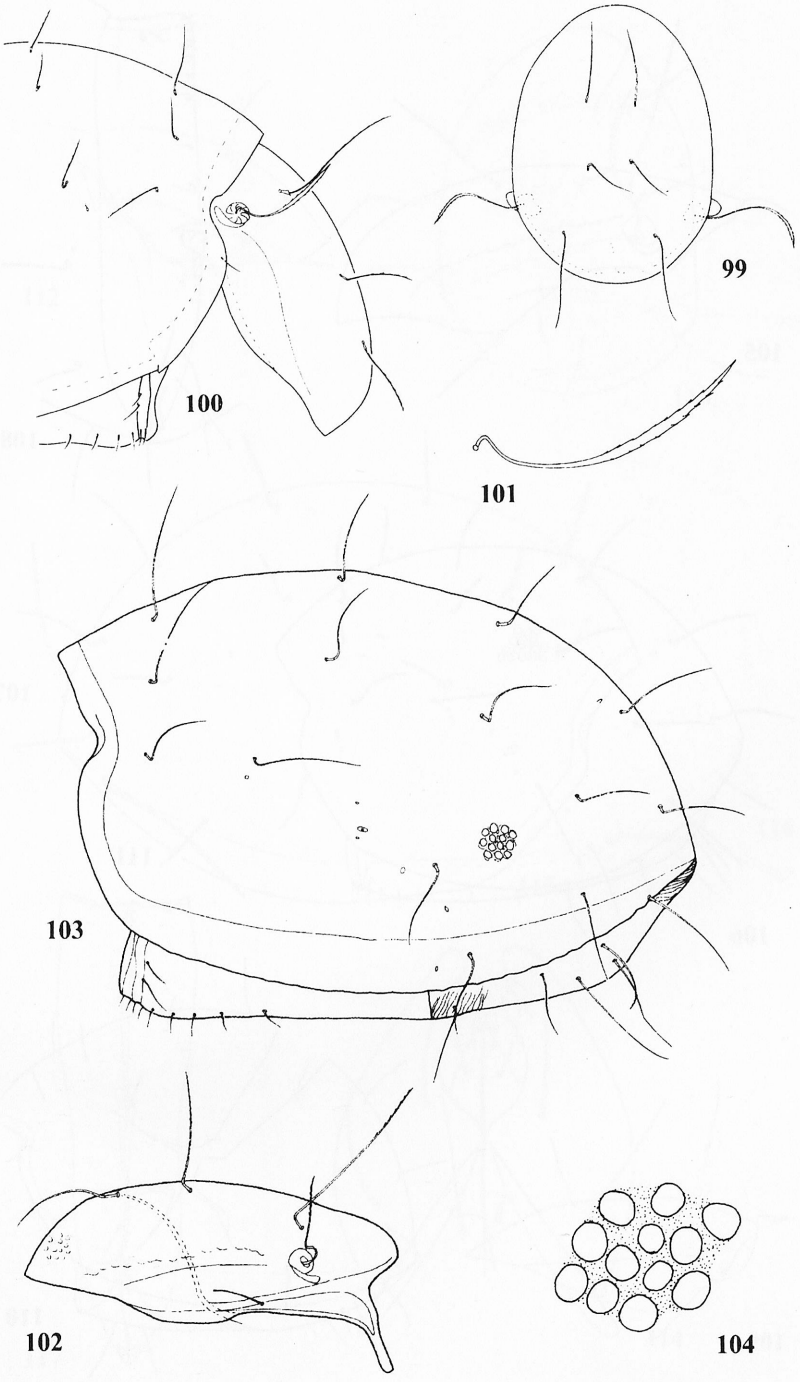
Figs 76-84. *Euphthiracarus cribarius* (BERLESE, 1904) (specimen from Poland): 76 – notogaster, 77 – sculpture of notogaster, 78 – seta ps_2, 79 – mentum of infracapitulum, 80 – ventral side, 81 – anterior triangle of anoadanal plates, 82 – posterior triangle of anoadanal plates, 83 – leg III, 84 – genu, tibia and tarsus of leg IV.



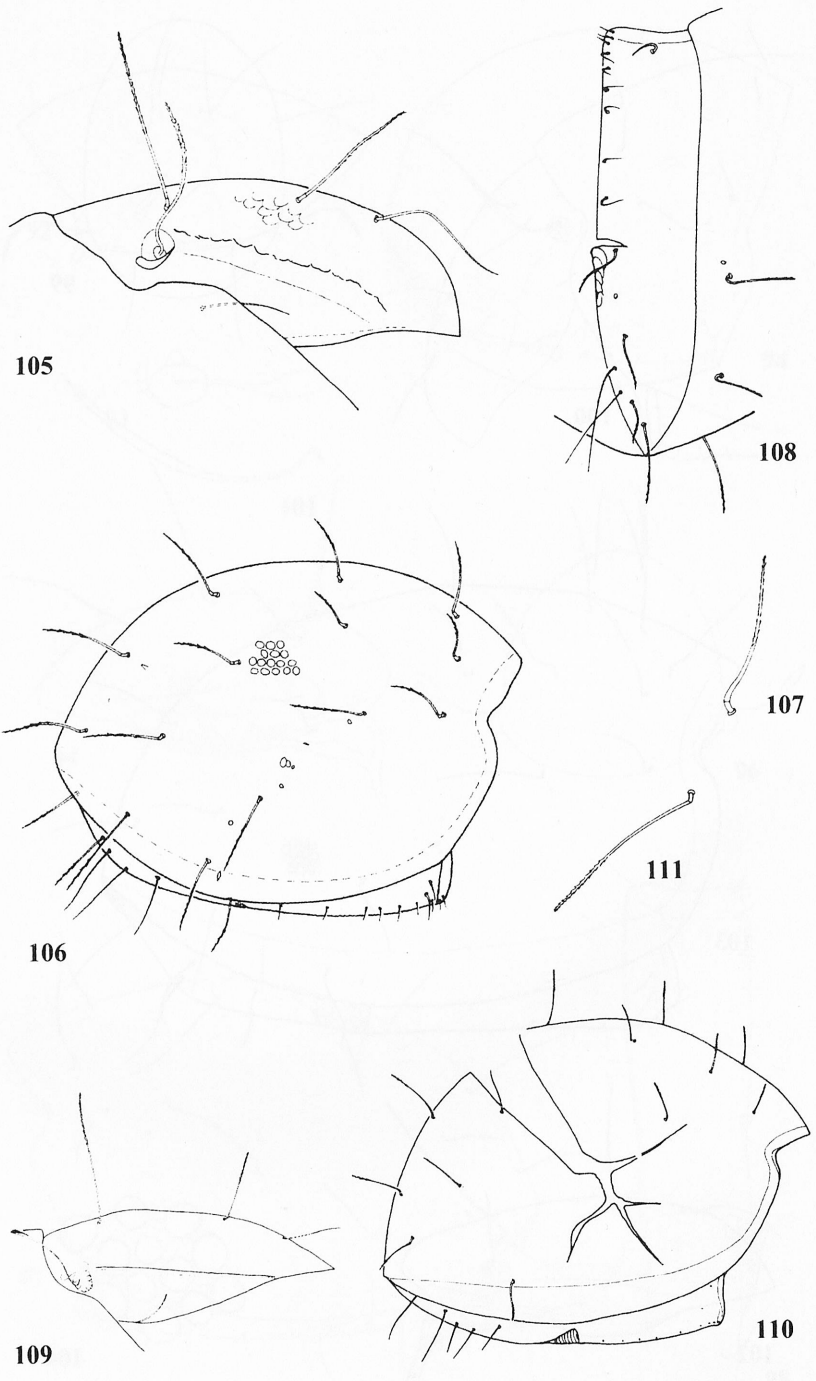
Figs 85-91. *Euphthiracarus depressculus* JACOT, 1924 (cotype): 85 – prodorsum, lateral view, 86 – sensillus, 87 – prodorsum, dorsal view, 88 – sensillus, 89 – notogaster, 90 – right genitoaggenital plate, 91 – right anoadanal plate.



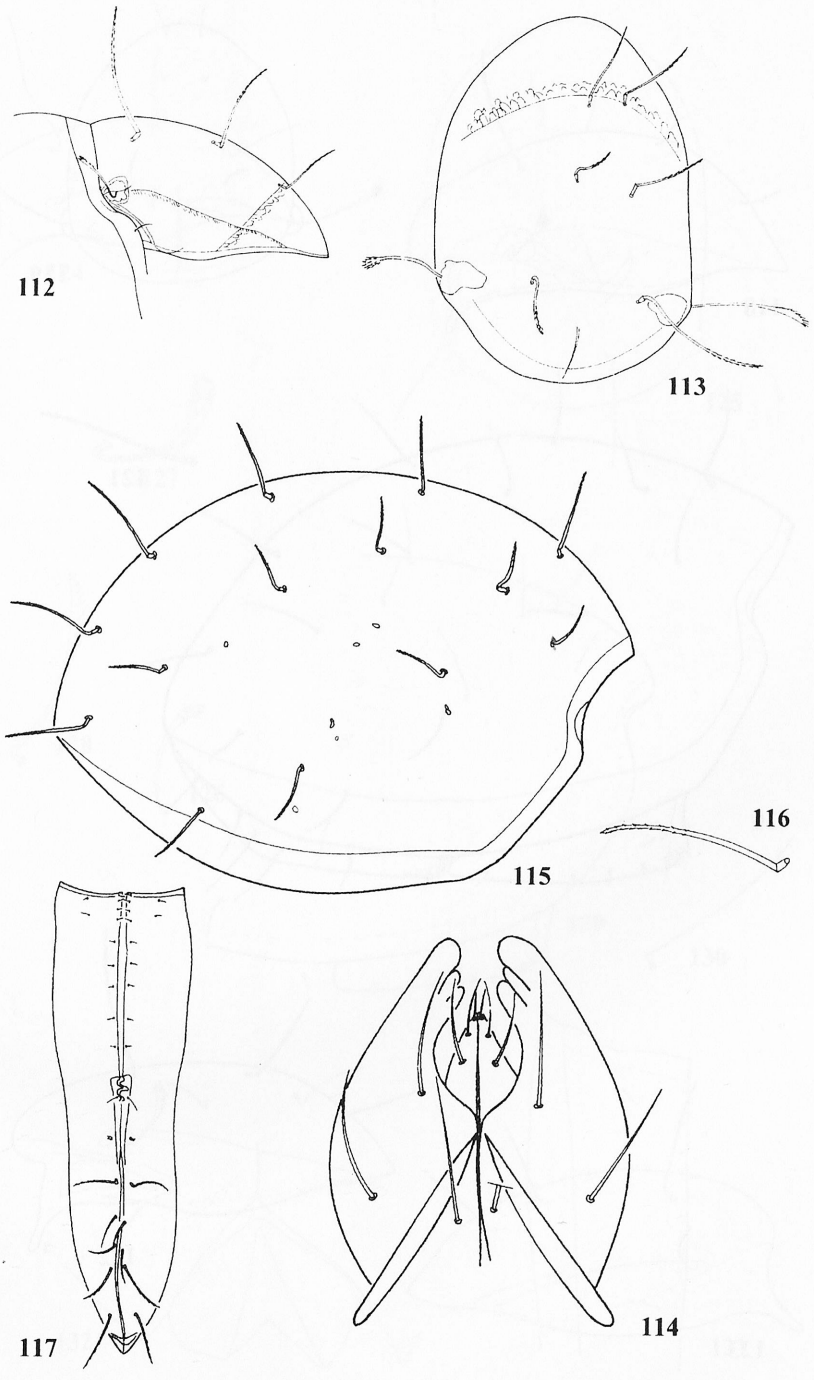
Figs 92-98. 92-94 – *Euphthiracarus fulvus* (EWING, 1909) (type): 92 – prodorsum, lateral view, 93 – sensillus, 94 – notogaster; 95-98 – *Euphthiracarus fulvus* (EWING, 1909) (specimen from Vermont): 95 – prodorsum, lateral view, 96 – prodorsum, dorsal view, 97 – notogaster, 98 – right genitoaggenital plate.



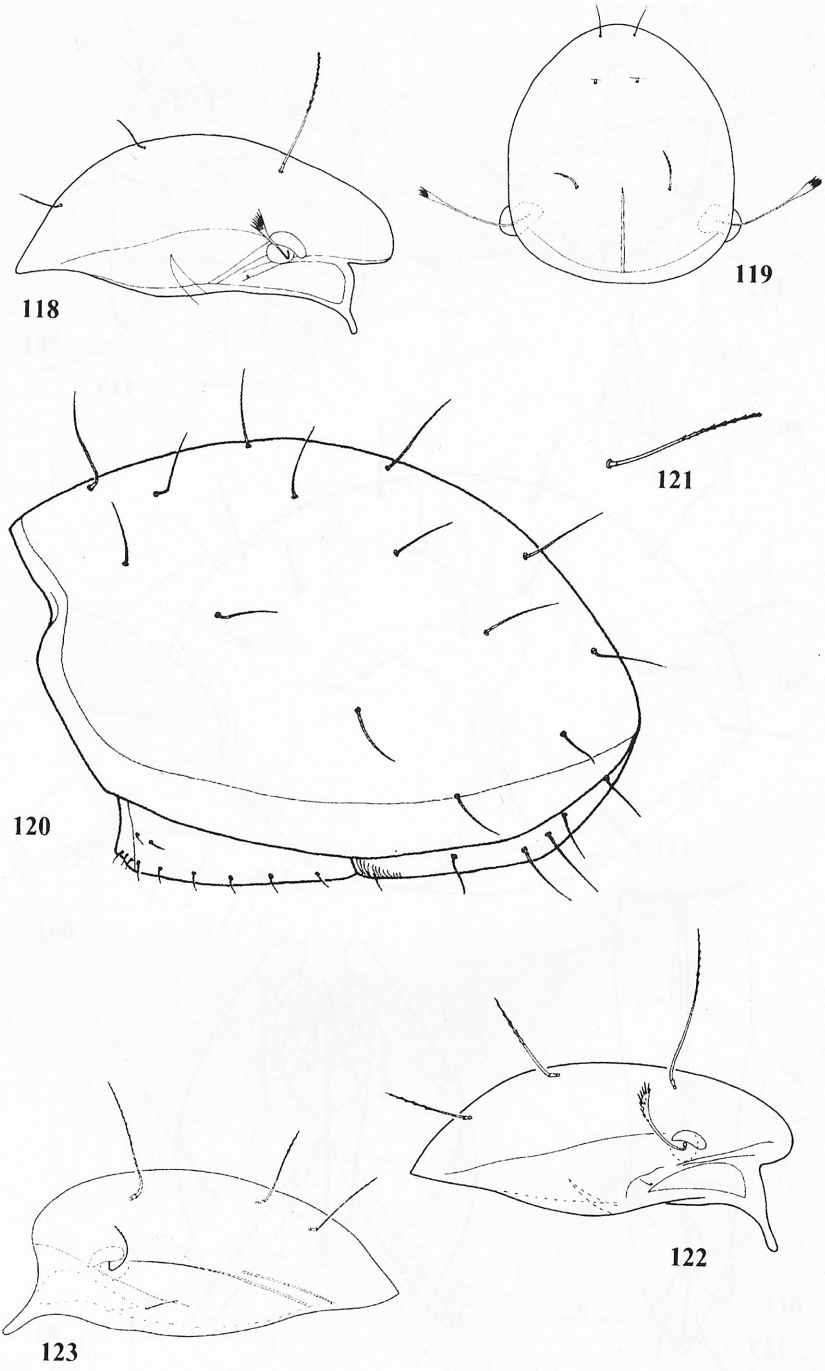
Figs 99-104. 99-101 – *Euphthiracarus fusulus* sp. nov. (holotype): 99 – prodorsum, dorsal view, 100 – prodorsum and anterior part of notogaster, lateral view, 101 – sensillus; 102-104 – *Euphthiracarus pulchrus* JACOT, 1930 (holotype): 102 – prodorsum, lateral view, 103 – notogaster, 104 – sculpture of notogaster.



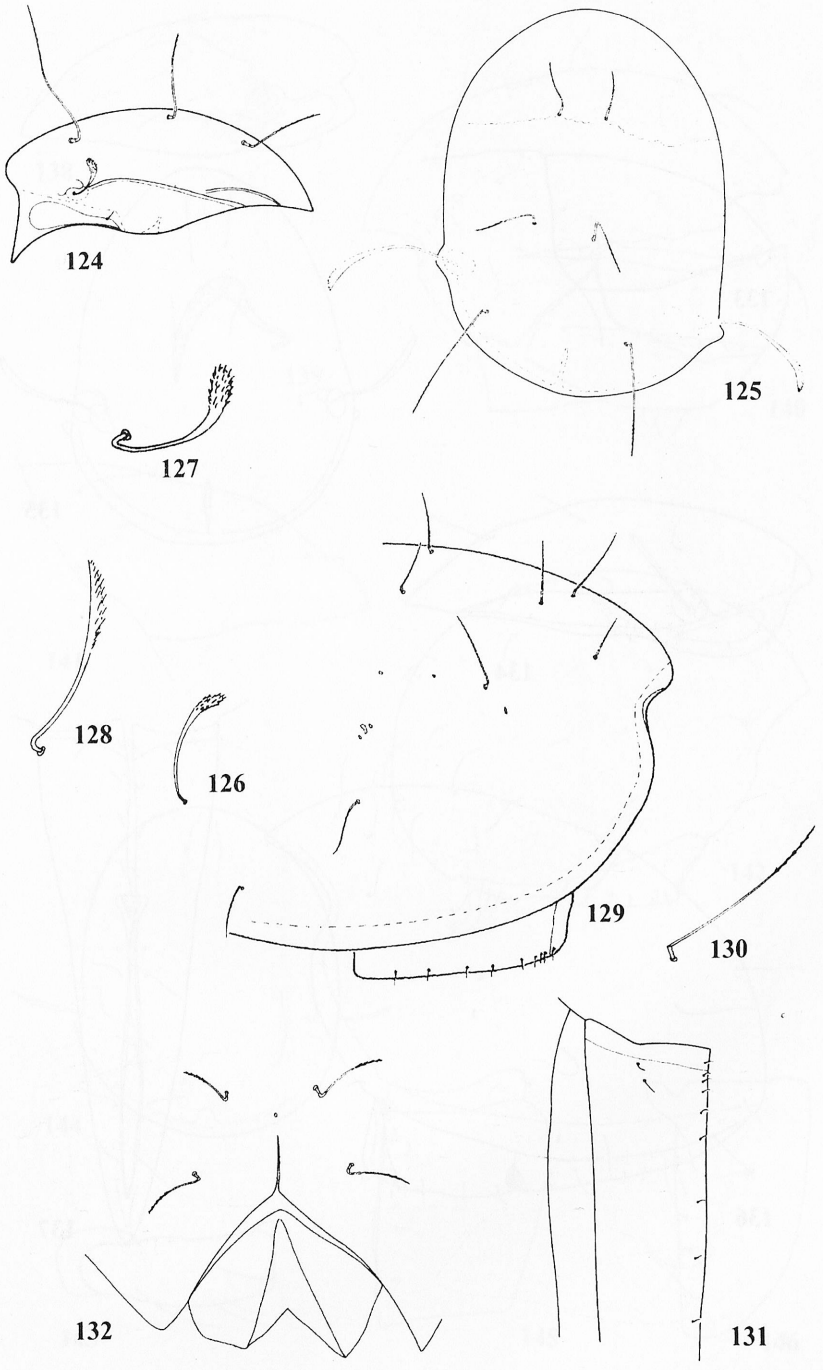
Figs 105-111. 105-108 – *Euphthiracarus pulchrus* JACOT, 1930 (specimen from Missouri): 105 – prodorsum, lateral view, 106 – notogaster, 107 – seta h_1, 108 – left side of genitoaggenital and anoadanal plates; 109-111 – *Phthiracarus americanus* EWING, 1909 (syntype) – synonym of *Rhysotritia ardua* (C. L. KOCH, 1841): 109 – prodorsum, lateral view, 110 – notogaster, 111 – seta ps_1.



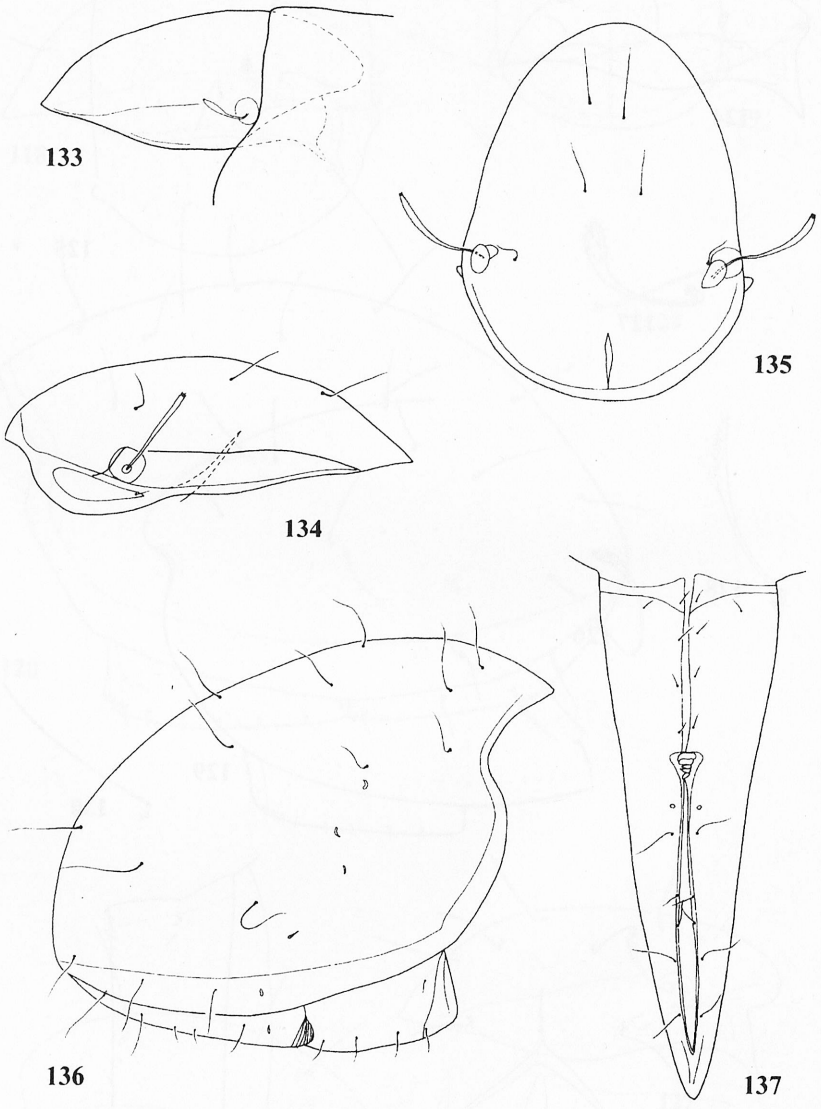
Figs 112-117. *Rhysotritia ardua* (C. L. KOCH, 1841) (specimen from Marocco): 112 – prodorsum, lateral view, 113 – prodorsum, dorsal view, 114 – infracapitulum, 115 – notogaster, 116 – seta h_1, 117 – genitoaggenital and anoadanal plates.



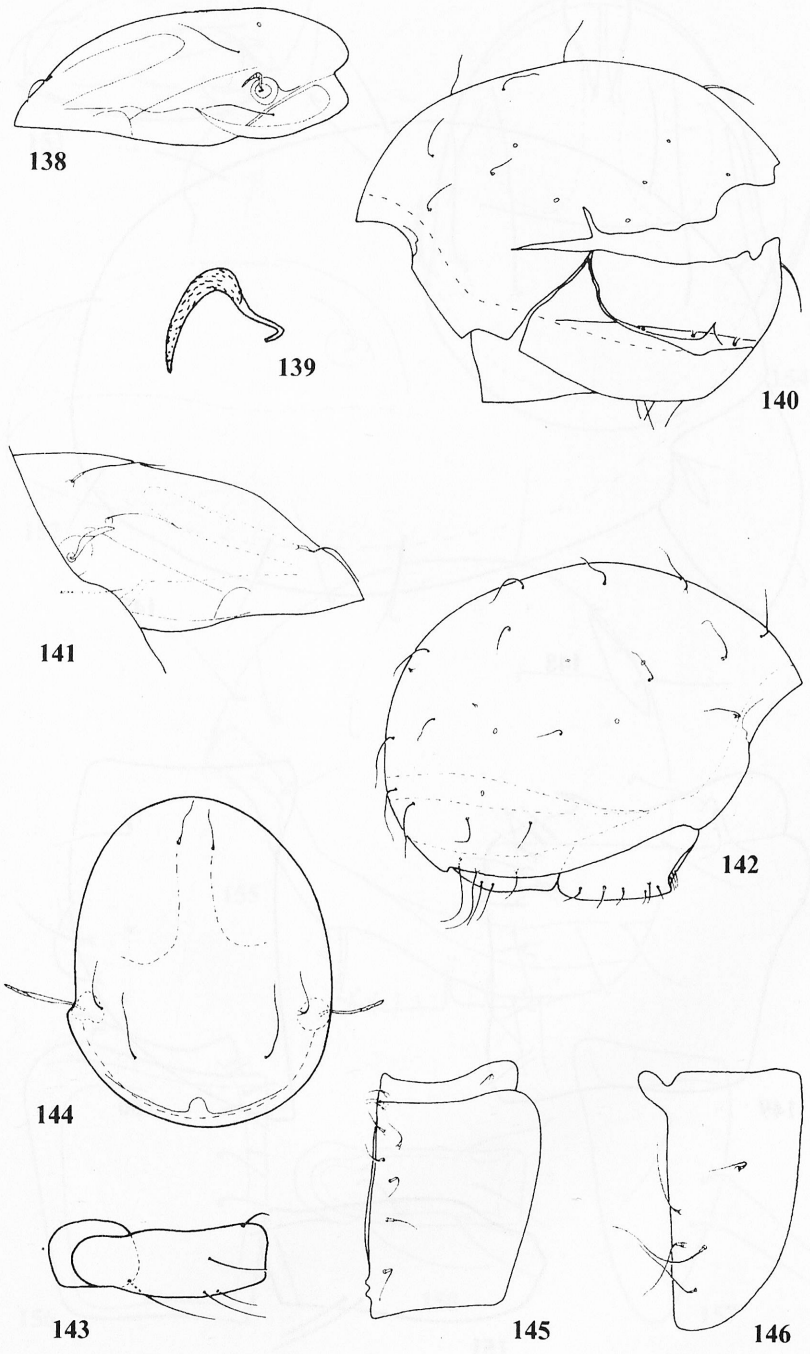
Figs 118-123. 118-121– *Rhysotritia curticephala* JACOT, 1938 (cotype): 118 – prodorsum, lateral view, 119 – prodorsum, dorsal view, 120 – notogaster, 121 – seta h_1; 122 – *Rhysotritia curticephala* JACOT, 1938 (specimen from Florida), prodorsum, lateral view; 123 – *Rhysotritia dicra* NIEDBAŁA et SCHATZ, 1996 (holotype), prodorsum, lateral view.



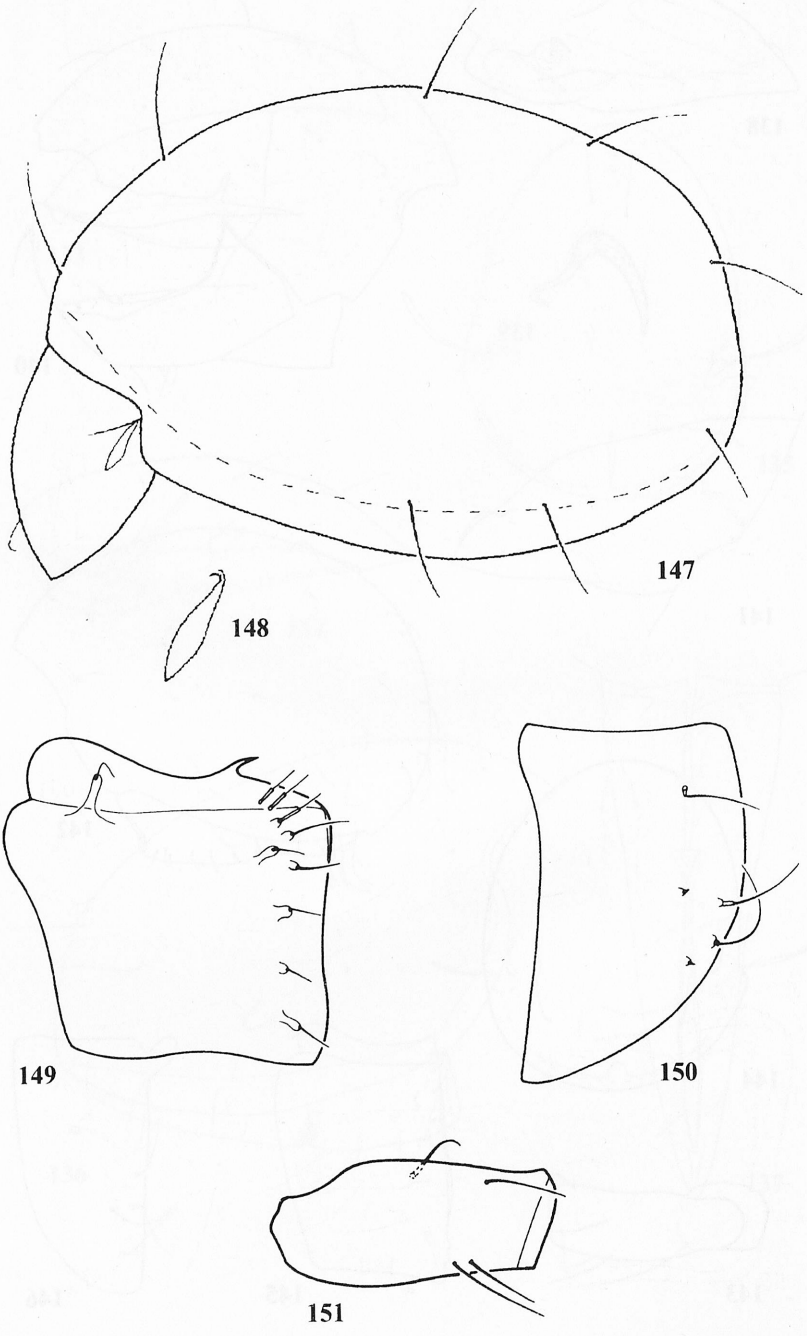
Figs 124-132. *Rhysotritia dixa* NIEDBAŁA et SCHATZ, 1996 (holotype): 124 – prodorsum, lateral view, 125 – prodorsum, dorsal view, 126-128 – different views of sensilli, 129 – anterior part of notogaster, 130 – seta c_1, 131 – right genitoaggenital plate, 132 – posterior view of notogaster.



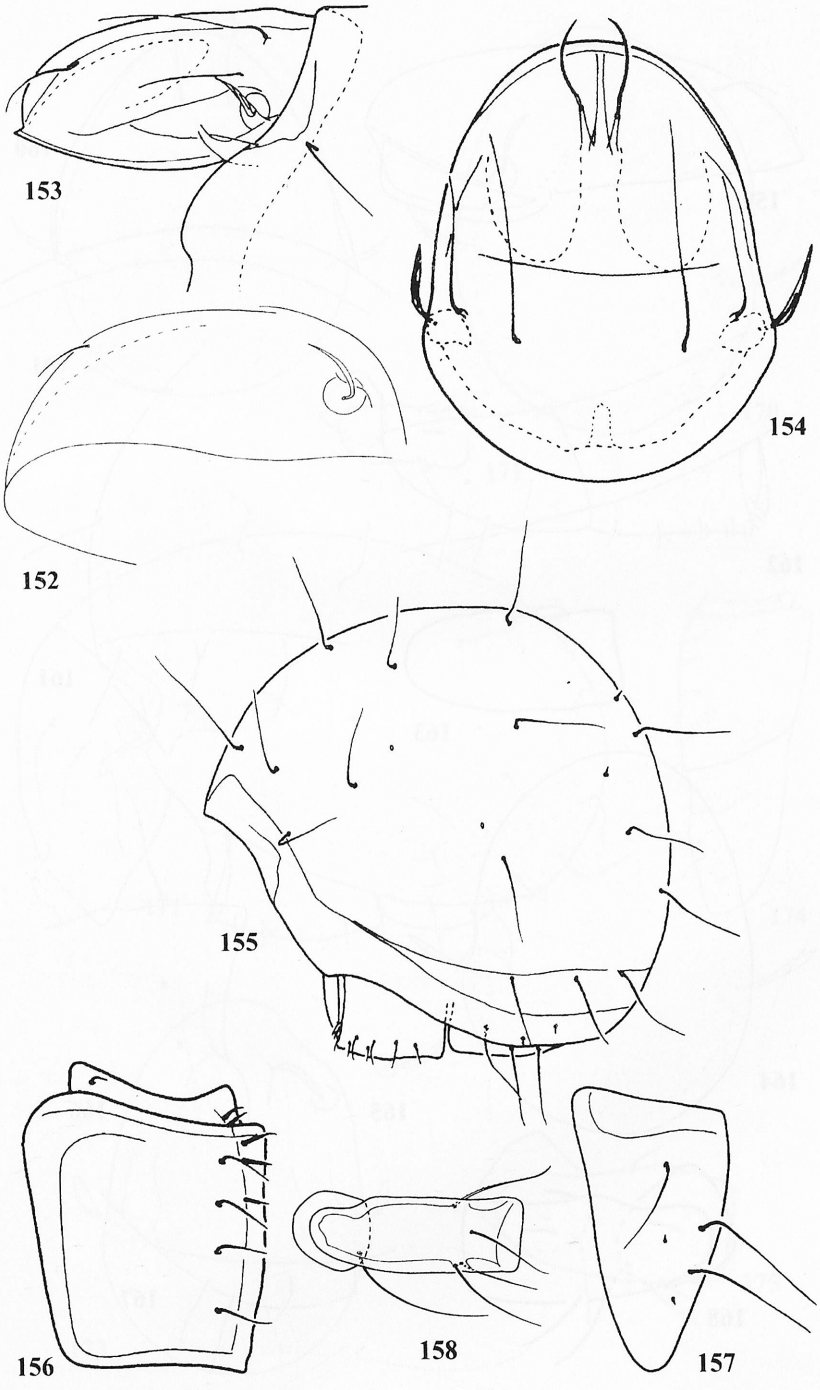
Figs 133-137. 133 – *Microtritia simplex* (JACOT, 1930) (cotype), prodorsum, lateral view; 134-137 –. Microtritia simplex (JACOT, 1930) (specimen from Oregon): 134 – prodorsum, lateral view, 135 – prodorsum, dorsal view, 136 – notogaster, 137 – genitoaggenital and anoadanal plates.



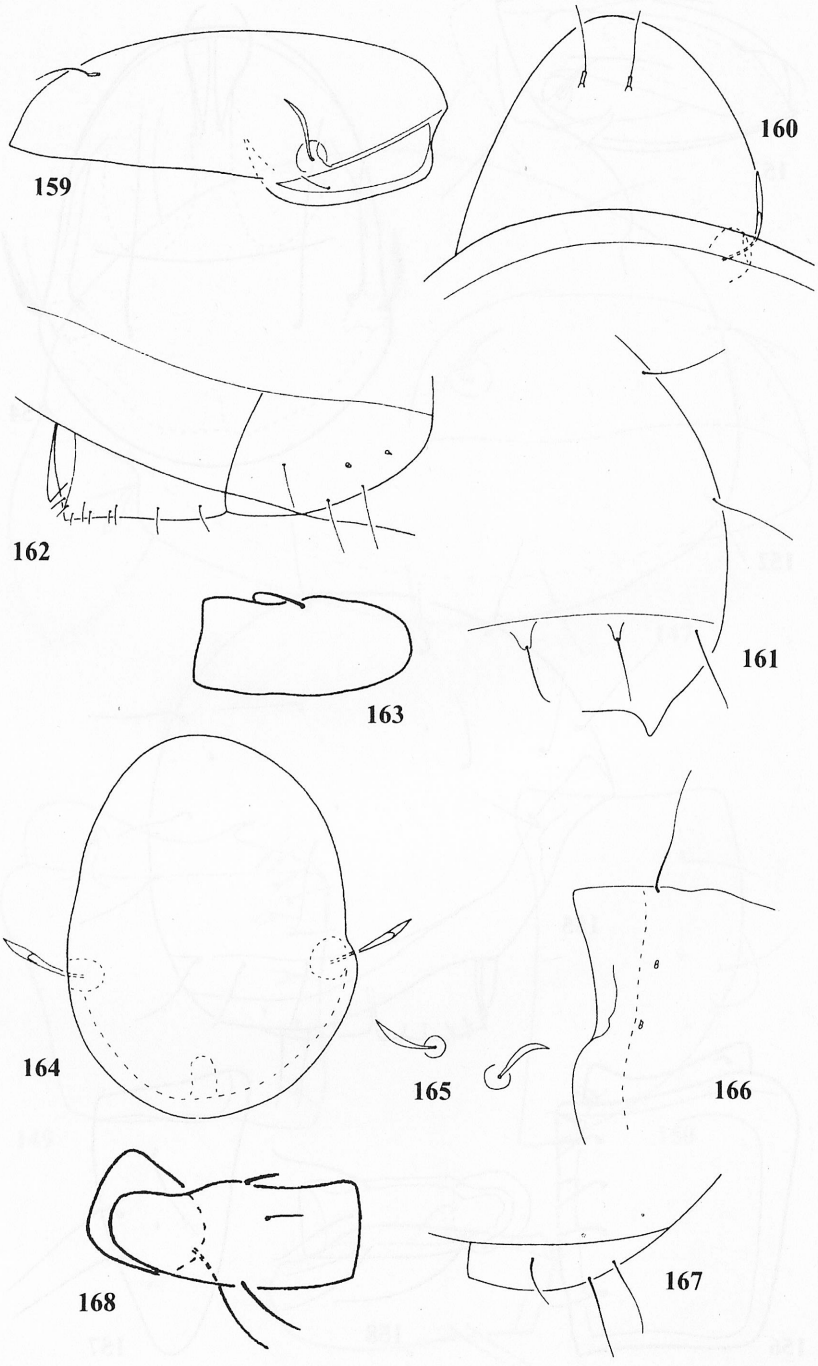
Figs 138-146. 138-140 – *Phthiracarus brevisetae* JACOT, 1930 (holotype): 138 – prodorsum, lateral view, 139 – sensillus, 140 – notogaster; 141-143 – *Phthiracarus brevisetae* JACOT, 1930 (specimen from North Carolina): 141 – prodorsum, lateral view, 142 – notogaster, 143 – trochanter and femur of leg I; 144-146– *Phthiracarus brevisetae* JACOT, 1930 (another specimen from North Carolina): 144 – prodorsum, dorsal view, 145 – genitoaggenital plate, 146 – anoadanal plate.



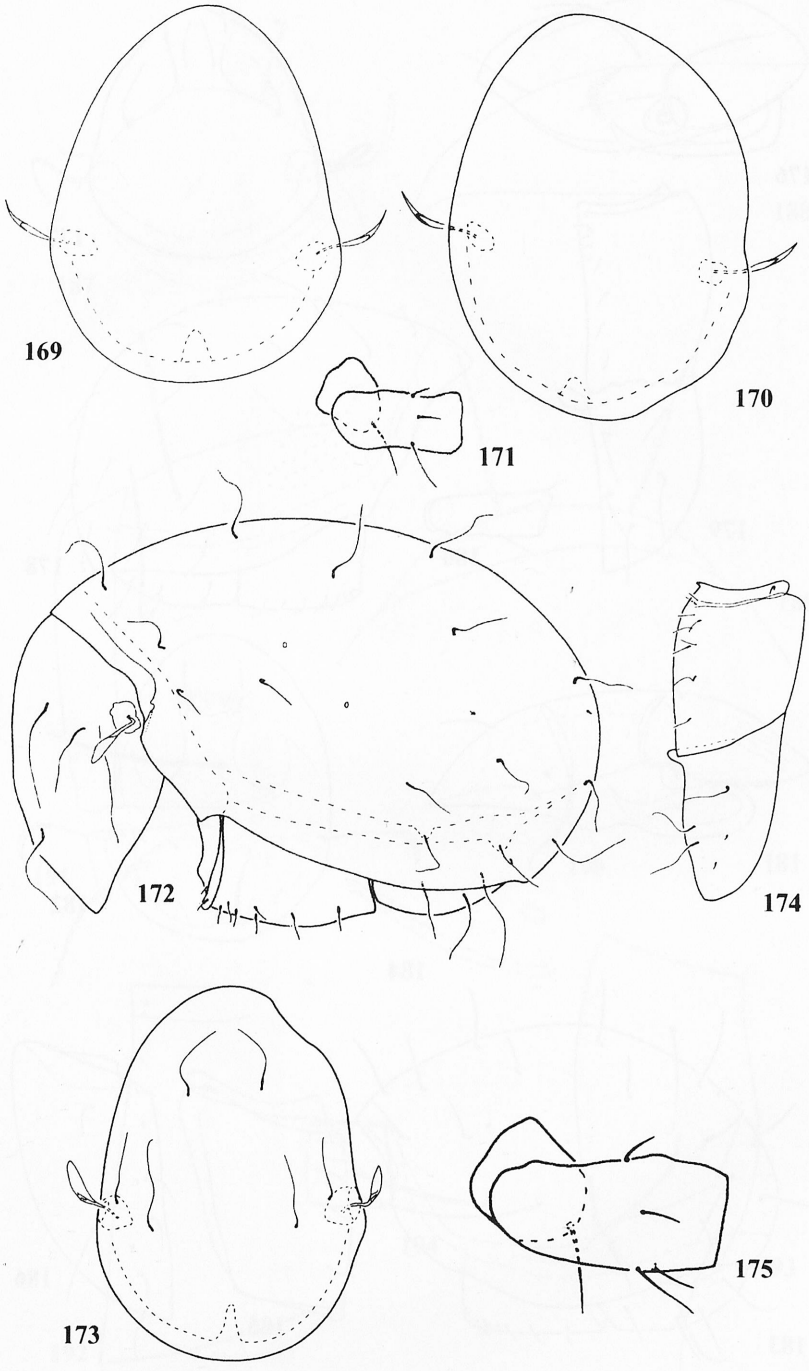
Figs 147-151. *Phthiracarus curtulus* BERLESE, 1923: 147 – lateral view of body, 148 – sensillus, 149 – genitoaggenital plate, 150 – anoadanal plate, 151 – trochanter and femur of leg I; 147, 148 – lectotype, 149-151 – paralectotype.



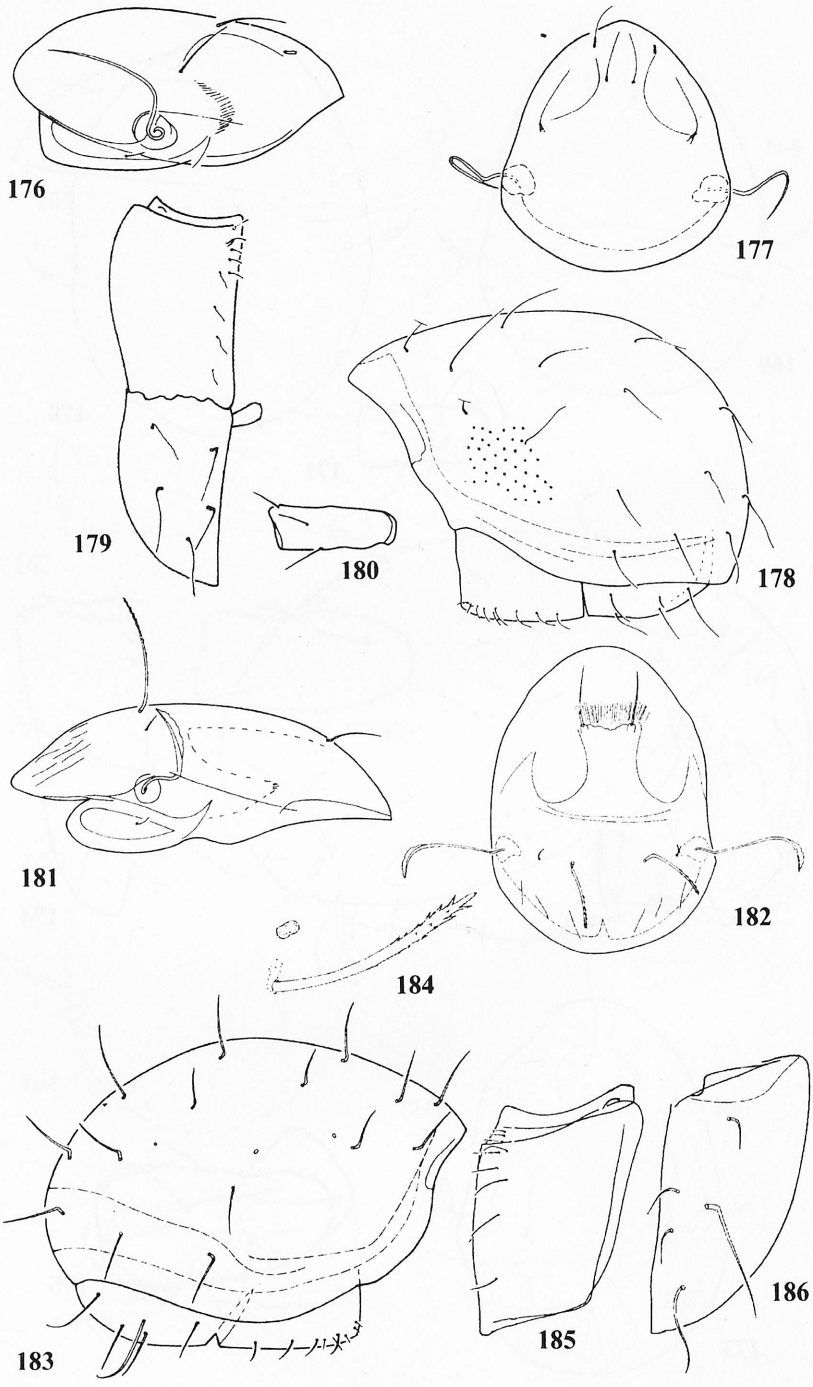
Figs 152-158. 152 – *Hoplophora sphaerula* BANKS, 1895 (type) – synonym of *Phthiracarus globosus* (C. L. KOCH, 1841) – lateral view of prodorsum; 153-158 – *Phthiracarus globosus* (C. L. KOCH, 1841) (specimen from Poland): 153 – prodorsum, lateral view, 154 – prodorsum, dorsal view, 155 – notogaster, 156 – genitoaggenital plate, 157 – anoadanal plate, 158 – trochanter and femur of leg I.



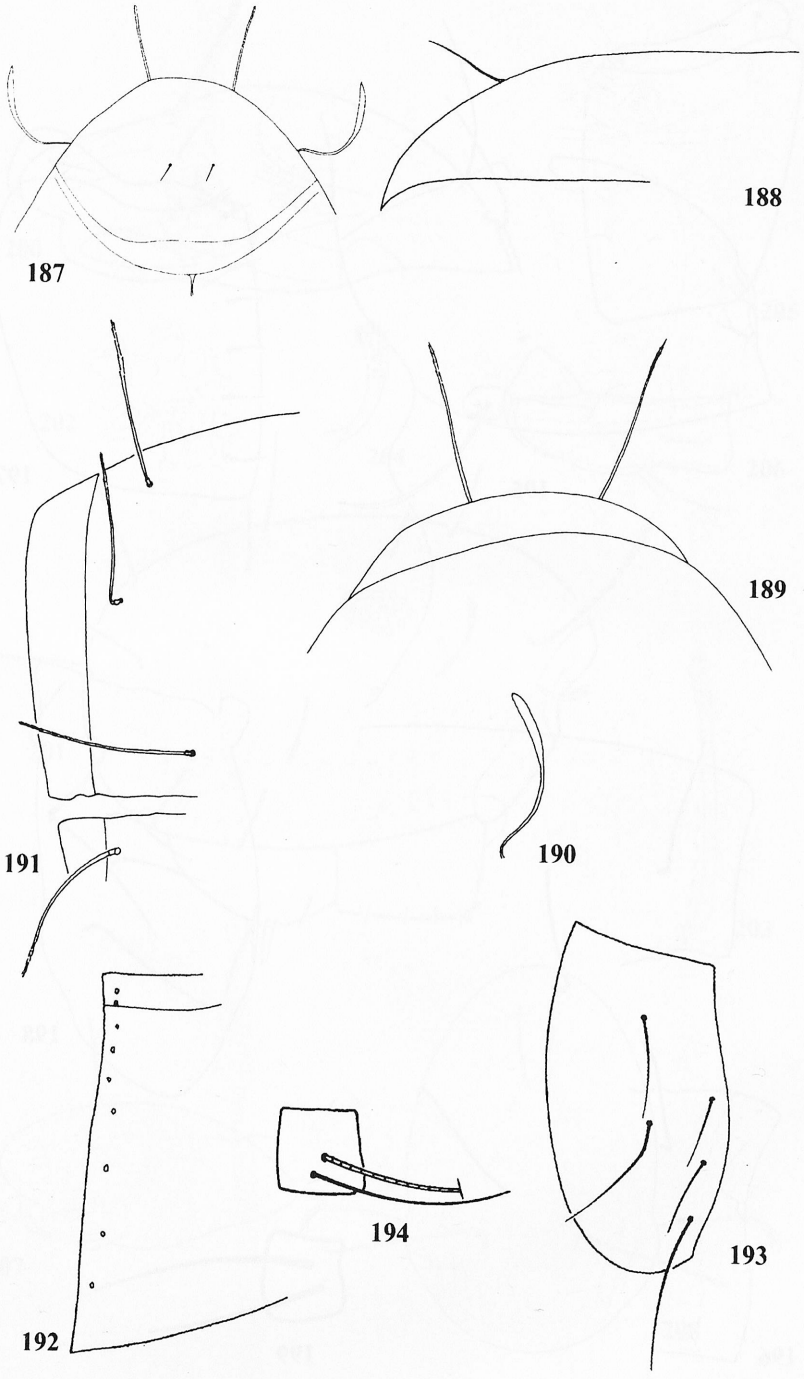
Figs 159-168. 159-163. *Phthiracarus prior* JACOT, 1933 – synonym of *Phthiracarus longulus* (C. L. KOCH, 1841): 159 – prodorsum, lateral view, 160 – prodorsum, dorsal view, 161 – genitoaggenital and anoadanal plates, 162 – posterior part of notogaster, 163 – fragment of femur of leg I; 164-168 – *Phthiracarus montium* JACOT, 1937 – synonym of *Phthiracarus longulus* (C. L. KOCH, 1841): 164 – prodorsum, dorsal view, 165 – sensilli, 166 – anterior part of notogaster, 167 – anoadanal plate, 168 – trochanter and femur of leg I.



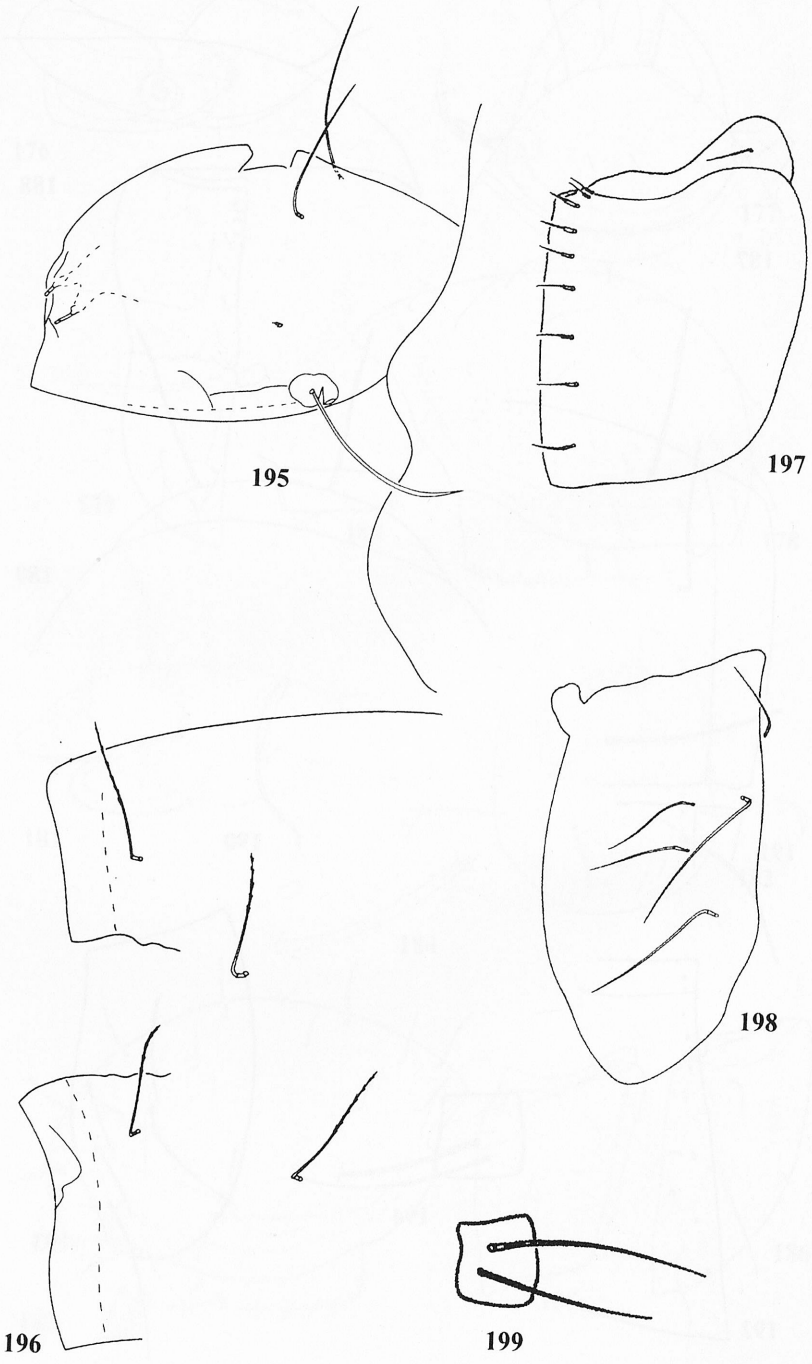
Figs 169-175. 169-171 – *Phthiracarus apiculatus* JACOT, 1939 – synonym of *Phthiracarus longulus* (C. L. KOCH, 1841) (cotypes): 169 – prodorsum, dorsal view (cotype 1), 170 – prodorsum, dorsal view (cotype 2), 171 – trochanter and femur of leg I (cotype 3); 172-175 – *Phthiracarus pusillus* sp. nov. (holotype): 172 – lateral view of body, 173 – prodorsum, dorsal view, 174 – genitoaggenital and anoadanal plates, 175 – trochanter and femur of leg I.



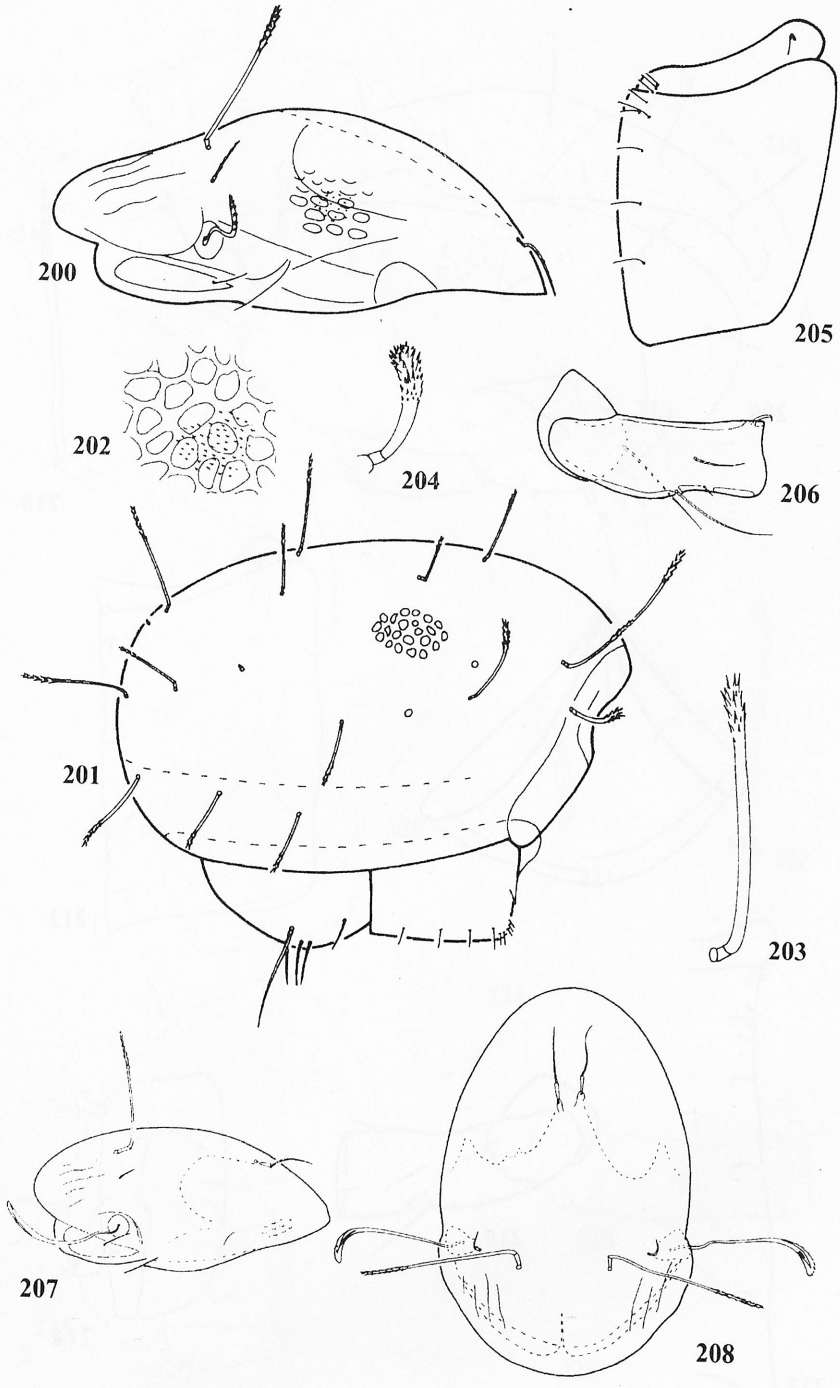
Figs 176-186. 176-180 – *Phthiracarus pygmaeus* BALOGH, 1958 (paratype): 176 – prodorsum. lateral view, 177 – prodorsum, dorsal view, 178 – mentum of infracapitulum, 179 – notogaster, 180 – femur of leg I; 181-186 – *Plonaphacarus kugohi* (AOKI, 1959) (specimen from Australia): 181 – prodorsum, lateral view, 182 – prodorsum, dorsal view, 183 – prodorsum, dorsal view, 184 – notogaster, 185 – genitoaggenital plate, 186 – anoadanal plate.



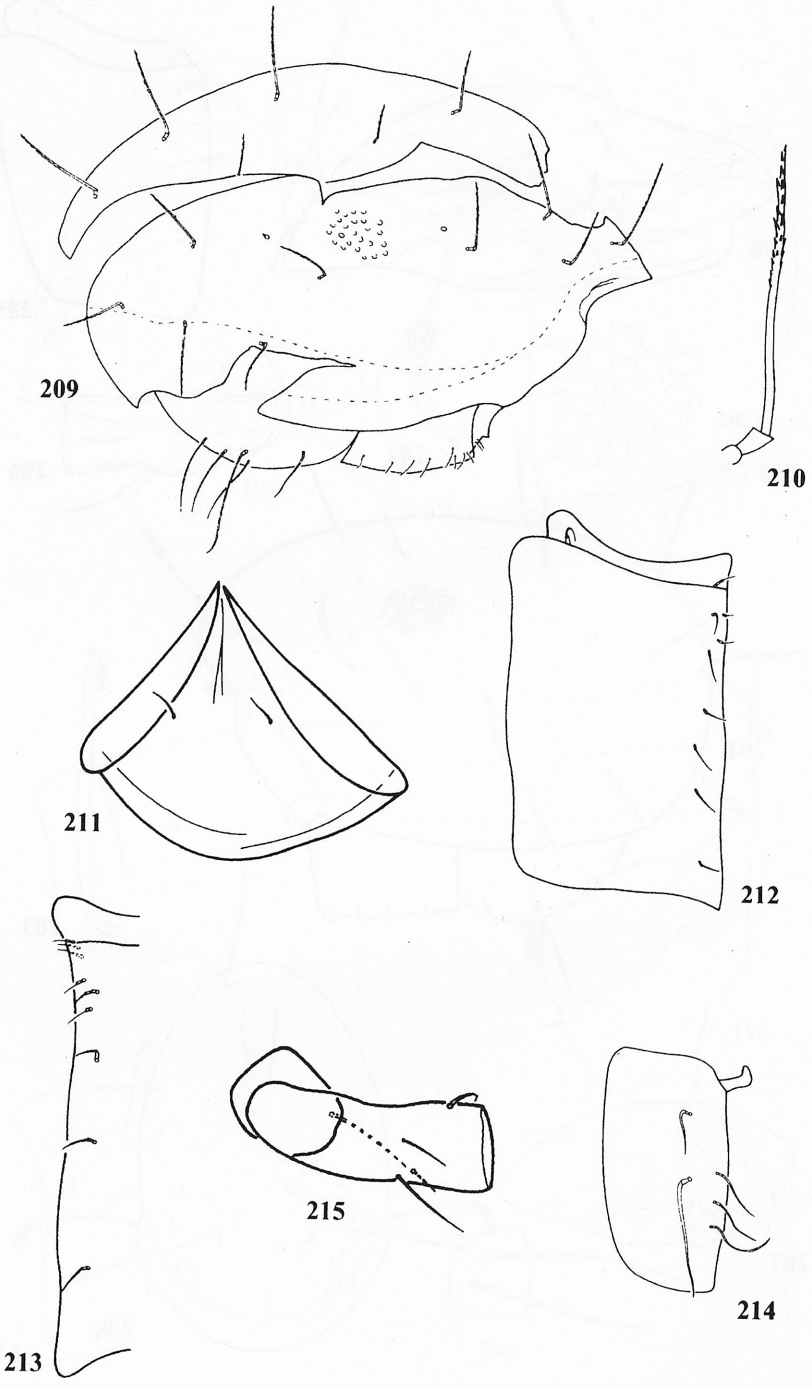
Figs 187-194. *Hoplophthiracarus histricinus* (BERLESE, 1908) (specimen from BERLESE collection): 187 – frontal view of prodorsum, 188 – anterior part of prodorsum, lateral view, 189 – posterior view of prodorsum, 190 – sensilli, 191 – anterior part of notogaster, 192 – paraxial part of genitoaggenital plate, 193 – anoadanal plate, 194 – tibia of leg IV.



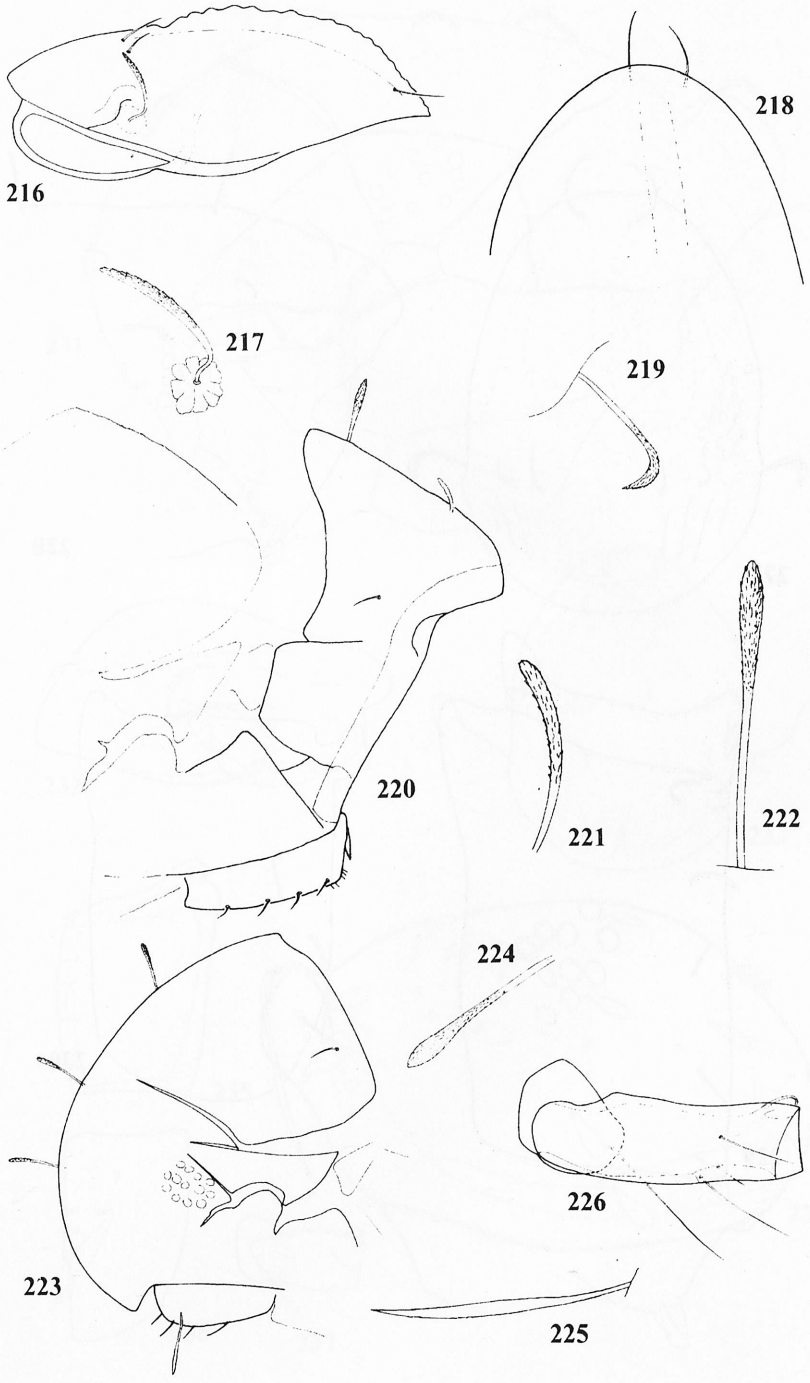
Figs 195-199. *Hoplophthiracarus illinoisensis* (EWING, 1909) (type): 195 – prodorsum, lateral view, 196 – anterior part of notogaster, 197 – genitoaggenital plate, 198 – anoadanal plate, 199 – tibia of leg IV.



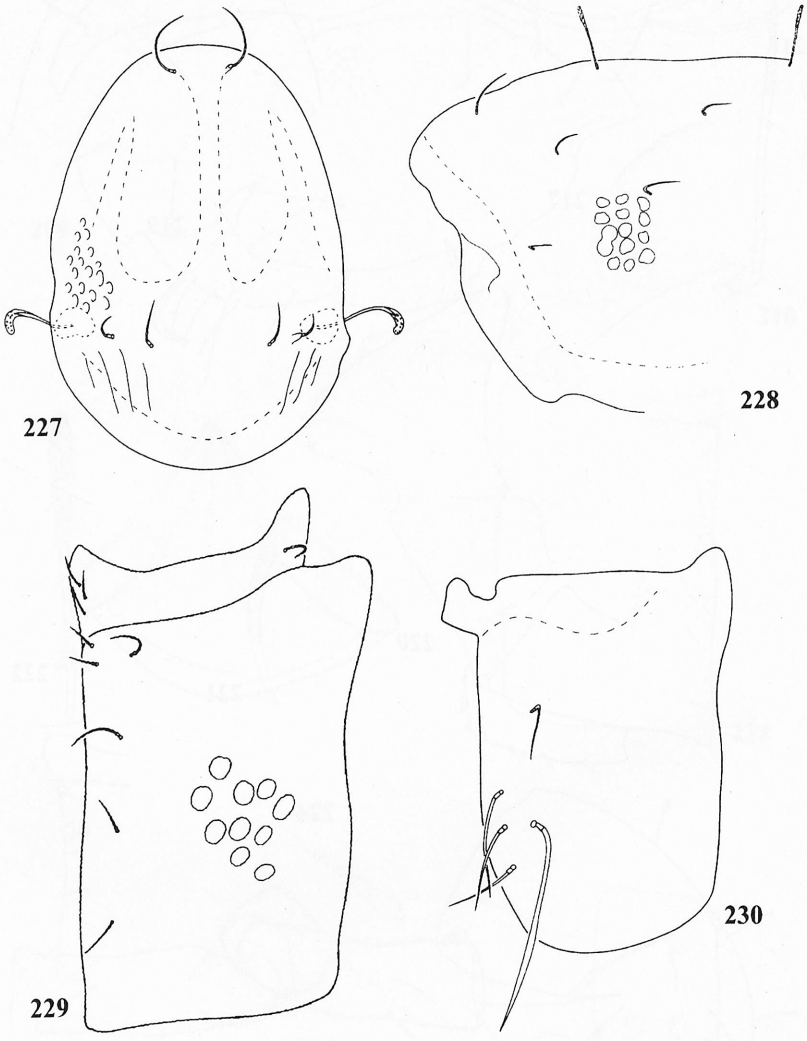
Figs 200-208. 200-206 – *Steganacarus* (*Steganacarus*) *thoreaui* JACOT, 1930 (cotype): 200 – prodorsum, lateral view, 201 – notogaster, 202 – sculpture of notogaster, 203 – seta c_1, 204 – seta c_3, 205 – genitoaggenital plate, 206 – trochanter and femur I; 207, 208 – *Protophthiracarus evergladus* sp. nov. (holotype): 207 – prodorsum, lateral view, 208 – prodorsum, dorsal view.



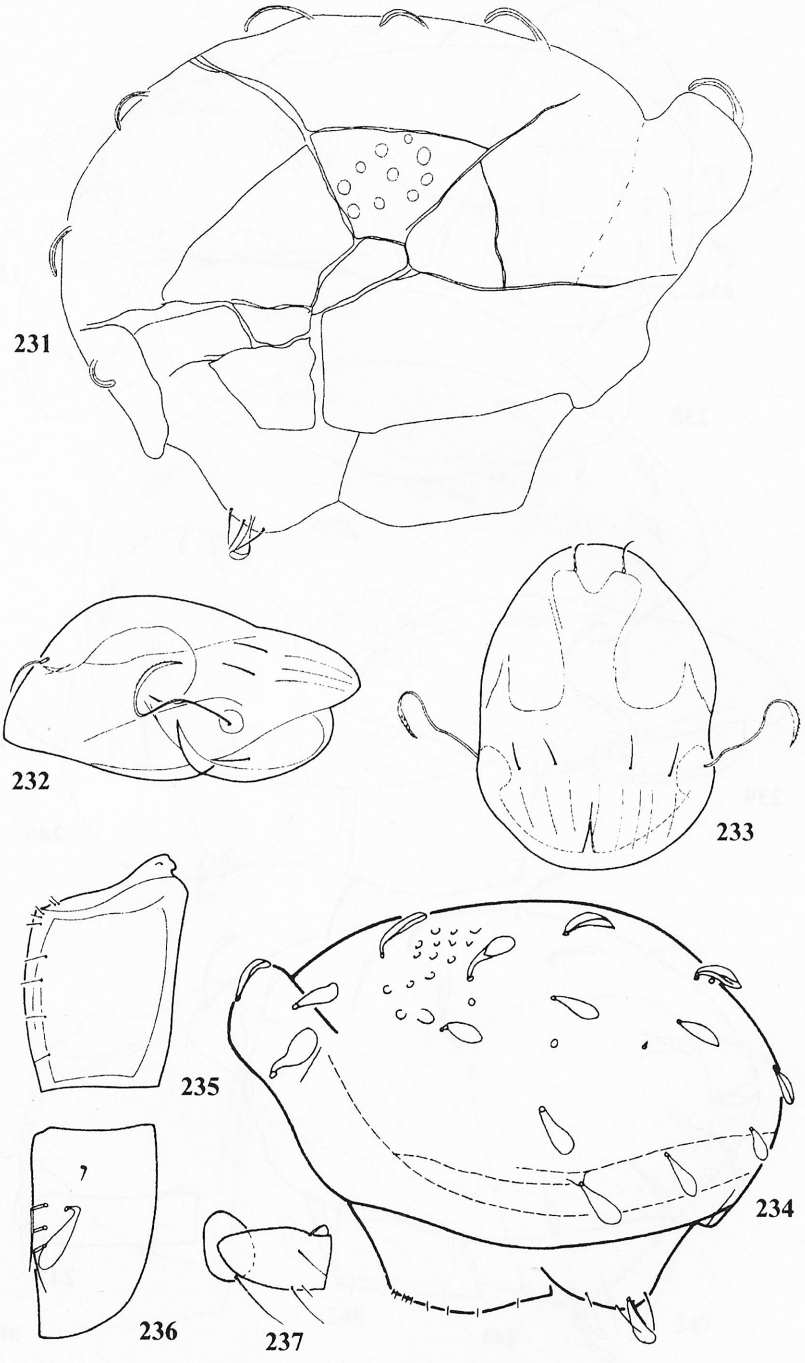
Figs 209-215. *Protophthiracarus evergladus* sp. nov. (holotype): 209 – notogaster, 210 – seta c_1, 211 – mentum of infracapitulum, 212 – genitoaggenital plate, 213 – paraxial part of left genitoaggenital plate, 214 – anoadanal plate, 215 – trochanter and femur of leg I.



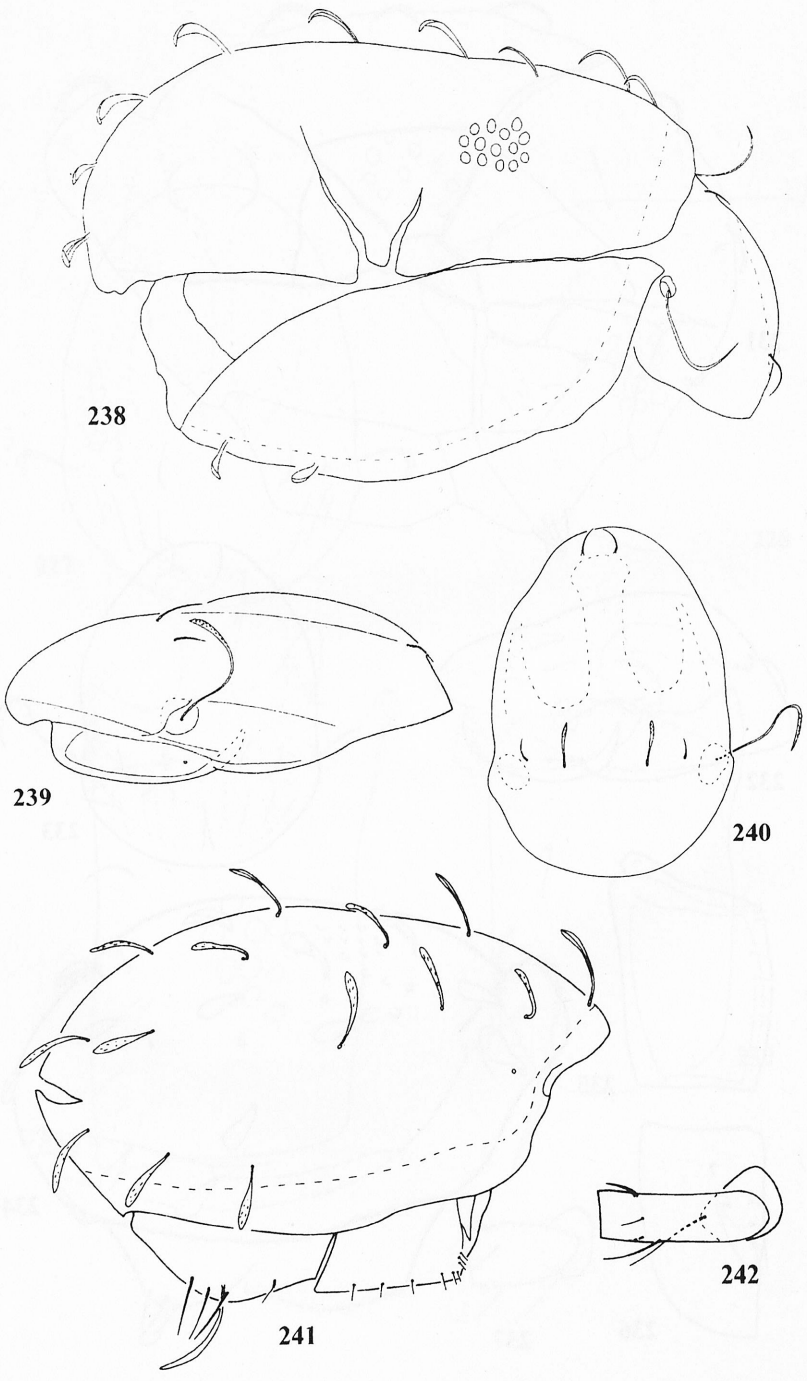
Figs 216-226. *Protophthiracarus varians* (JACOT, 1933) (cotype): 216 – prodorsum, lateral view, 217 – sensillus, 218 – anterior part of prodorsum, dorsal view, 219 – sensillus, 220 – anterior part of notogaster, 221 – seta c_1, 222 – seta d_1, 223 – posterior part of notogaster, 224 – seta ps_1, 225 – seta ad_2, 226 – trochanter and femur of leg I.



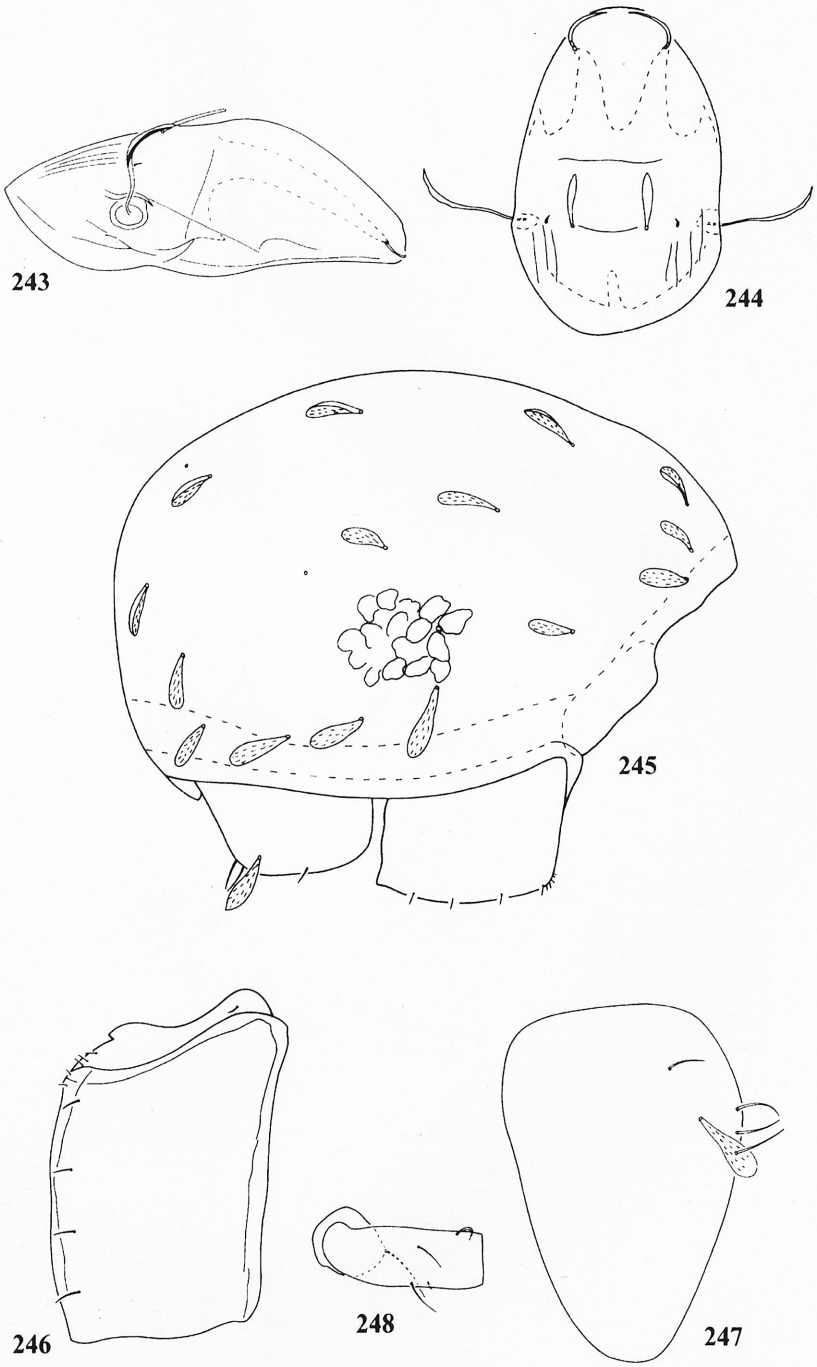
Figs 227-230. *Protophthiracarus varians* (JACOT, 1933) (specimen from Florida): 227 – prodorsum, dorsal view, 228 – anterior part of notogaster, 229 – genitoaggenital plate, 230 – anoadanal plate.



Figs 231-237. 231 – *Atropacarus (Hoplophorella) cucullatus* (EWING, 1909) (type) – notogaster; 232-237 – *Atropacarus (Hoplophorella) cucullatus* (EWING, 1909) (specimen from Canada): 232 – prodorsum, lateral view, 233 – prodorsum, dorsal view, 234 – notogaster, 235 – genitoaggenital plate, 236 – anoadanal plate, 237 – trochanter and femur I



Figs 238-242. 238 – *Atropacarus (Hoplophorella) hamatus* (EWING, 1909) – lateral view of body; 239-242 – *Hoplophorella cucullata floridae* JACOT, 1933 (cotype) – synonym of *Atropacarus (Hoplophorella) hamatus* (EWING, 1909): 239 – prodorsum, lateral view, 240 – prodorsum, dorsal view, 241 – notogaster, 242 – trochanter and femur I.



Figs 243-248. *Atropacarus* (*Hoplophorella*) *vitrinus* (BERLESE, 1913) (specimen from Brazil): 243 – prodorsum, lateral view, 244 – prodorsum, dorsal view, 245 – notogaster, 246 – genitoaggenital plate, 247 – anoadanal plate, 248 – trochanter and femur of leg I.

Erratum

Acta zoologica cracoviensia, 2001, 44(3):173-184.

Selcuk YURTSEVER: "Multiple paternity in the meadow spittlebug *Philaenus spumarius* (L.) (Homoptera, Cercopidae)",

P. 174, line 19: instead of PHORNHILL et al. 1999 should be: PARKER et al. 1999.

P. 178, Table II – supplemented version below.

Table II

Thirteen crosses giving clear evidence of multiple paternity in *Philaenus spumarius*. The last two columns are showing predicted number of offspring sired by the first and last males in 8 females that mated with two different males (TYP offspring ignored where appropriate, for details see the text)

Parents (genotypes are given in brackets)			Number of progeny (proportions are indicated in brackets)		
Cross no	Females	Males	Total	Fathered by first male	Fathered by second male
P/15	TYP*(tt)*	TYP (*tt*) LCE (*Ct*) TRI (*Tt*)	4 TRI 8 LCE 8 TYP		
P/16	TYP*(tt)*	TRI (*TC*) TYP (*tt*)	5 TRI 4 LCE 38 TYP	9(19)	38(81)
P/20	LAT*(Lt)*	LAT (*LO*) TRI (*Tt*)	36 TRI 23 LAT 1 ALB 15 TYP	24(32)	51(68)
P/21	FLA*(FF)*	LCE (*CC*) TRI (*Tt*)	20 TRI 9 FLA 7 LCE		
P/22	TYP*(tt)*	LCE (*Ct*) TRI (*Tt*)	37 TRI 19 LCE 79 TYP	19(34)	37(66)
P/26	TYP*(tt)*	TRI (*Tt*) LCE (*Ct*)	5 TRI 29 LCE 37 TYP	5(15)	29(85)
P/27	TYP*(tt)*	TRI (*Tt*) LCE (*Ct*)	3 TRI 30 LCE 39 TYP	3(9)	30(91)
P/28	TYP*(tt)*	LCE (*Ct*) TRI (*TL*)	5 TRI 6 LAT 12 LCE 1 TYP	13(54)	11(46)
P/31	TYP*(tt)*	TRI (*Tt*) LCE (*Ct*)	3 TRI 20 LCE 23 TYP	3(13)	20(87)
P/32	LAT*(Lt)*	TRI (*Tt*) LCE (*Ct*)	4 TRI 1 MAR 16 LAT 8 LCE 8 TYP	4(31)	9(69)
P/34	TYP*(tt)*	LAT (*Lt*) TRI (*Tt*) LCE (*Ct*)	8 TRI 8 LAT 8 LCE 8 TYP		
P/39	TYP*(tt)*	LAT (*Lt*) TRI (*Tt*) LCE (*Ct*)	3 LAT 4 LCE 1 TYP		
P/40	TYP*(tt)*	LAT (*Lt*) TRI (*TO*) LCE (*Ct*)	1 TRI 2 QUA 1 TYP		

GUIDE TO AUTHORS

General remarks

Acta zoologica cracoviensia publish original papers dealing with systematics, biology, faunistics, zoogeography, ecology and paleontology of land and fresh-water animals. All papers are accepted on the understanding that they have not been published or submitted for publication elsewhere. Manuscripts are submitted to referees for evaluation. Their editing may sometimes be extensive, but this will be done in communication with the Author.

Authors will receive the first proof only. Eventual changes of text or illustrations should be kept to a minimum.

25 reprints are supplied free of charge. Additional reprints may be ordered at cost, not later than together with the proof.

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Manuscripts in English should be submitted in two copies, typewritten, double-spaced, with at least 4 cm margin on the left side. All underlining and indention should be avoided. It is welcomed that Authors submit their material stored as WordPerfect or MS Word files on IBM compatible discs together with one printed copy.

The first page should contain: the title of the paper, full Author's name, abstract, key words, repeated author's name and full address (for every coauthor). In papers dealing with lower taxa, the higher ones should be noted in the title [e.g. Nestling food of *Phylloscopus bonelli* (Passeriformes: Sylviidae)]

Longer papers should be divided into several chapters numbered with Roman numerals. Acknowledgements should be gathered under a single heading (acapit) at the end of introduction.

Tables should be typed on separate sheets and numbered with Roman numerals.

Figures (drawings, maps, diagrams etc.) done in black ink, should be submitted as original and one copy (xero), numbered with Arabic numerals [Fig. 1., Fig. 2. ...]; figures, letters and symbols used on illustrations should be drawn so large that they will be at least 1.5 mm high after reduction in print. Photographs must be sharp and contrast; they will be treated also as figures. Every illustration should bear its own number and Author's name. All captions of illustrations should be gathered on a separate sheet (not incorporated in the figure or photograph itself).

Nomenclature. First used binominal Latin names, according to Intern. Code of Zoological Nomenclature, should be used full i.e. together with not abbreviated names of their authors and dates after coma – be careful using brackets) [e.g. *Passer domesticus* (LINNAEUS, 1758) but *Aquila pomarina* BREHM, 1831]. If repeated later on in text the names might be abbreviated [e.g. *P. domesticus, A. pomarina*].

Citation in text: VOOUS (1962) or (VOOUS 1962), (DEMENTEV & GLADKOV 1952; BROWN et al. 1988).

References. The list of references must be complete and prepared in the following method:

Journal: COOPMANS P., KRABBE N. 2000. A new species of flycatcher (Tyrannidae: *Myiopagis*) from eastern Equador and eastern Peru. *The Winston Bulletin*, **112**(3): 305-312.

Book: VAURIE C. 1959. The birds of the Palearctic fauna. Passeriformes. Witherby, London.

Chapter: OSBORN J. W. 1978. Morphogenetic gradients: fields versus clones. In: P. M. BUTLER and K. A. JOYSEY (Eds.) – Development, function and evolution of teeth. Academic Press, London-New York-San Francisco. Pp: 171-201.

In the case of papers written in the other than Latin letters, if there is English (or German, or French) title in the summary it may be used:

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If there is not English summary or even title – author's name must be transcribed and title of the paper also transcribed (using anglo-american transcription) or translated into English:

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