

TAXONOMY OF NON-TYDEUS GENERA OF THE MITE FAMILY TYDEIDAE (ACARI: PROSTIGMATA) FROM MOSS, LICHENS AND TREES IN SOUTHERN SWEDEN

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TAXONOMY TYDEIDAE SWEDEN	SUMMARY: Five tydeid species, belonging to five genera, are illustrated and described as new to science. <i>Neoapolorryia kristinae</i> n. sp. and <i>Paratydaeolus clavatus</i> n. sp. were both collected from mosses and lichens on the soil-surface. <i>Pseudolorrya striatus</i> n. sp. was found in mosses on the soil surface and on bark of tree trunks. <i>Orthotydeus maculatus</i> n. sp. was sampled from decaying wood in a tree-hole. <i>Stenipedis quadrisetosus</i> n. sp. was found on bark of trees. Another twelve species of eight genera other than <i>Tydeus</i> are here recorded for the first time in Sweden. <i>Tydeus lambi</i> Baker, 1970 is transferred to the genus <i>Orthotydeus</i> on grounds of leg chaetotaxy. Taxonomic comments are made on the genus <i>Tydulosus</i> Baker, 1965, which is considered to be a junior synonym of <i>Tydeus</i> . Notes on variability in the number of genital setae are given for <i>Orthotydeus caudatus</i> (Dugès, 1834) and <i>Eotydeus mirabilis</i> Kuznetzov, 1973.
TAXONOMIE TYDEIDAE SUÈDE	RÉSUMÉ : Cinq espèces nouvelles de tydéides appartenant à cinq genres différents sont décrites. <i>Neoapolorryia kristinae</i> n. sp. et <i>Paratydaeolus clavatus</i> n. sp. ont été récoltées dans les mousses et les lichens au sol ; <i>Pseudolorrya striatus</i> n. sp. dans les mousses au sol et sur l'écorce des troncs d'arbre ; <i>Orthotydeus maculatus</i> n. sp. dans du bois en décomposition dans le trou d'un arbre ; <i>Stenipedis quadrisetosus</i> n. gen., n. sp. sur l'écorce des arbres. Douze autres espèces appartenant à huit genres autres que <i>Tydeus</i> sont citées pour la première fois pour la Suède. <i>Tydeus lambi</i> Baker, 1970, est transférée au genre <i>Orthotydeus</i> sur la base de sa chétotaxie pédieuse. Des commentaires taxonomiques sont faits à propos du genre <i>Tydulosus</i> Baker, 1965, considéré comme synonyme de <i>Tydeus</i> . Des notes sur la variation du nombre de soies génitales sont données à propos d' <i>Orthotydeus caudatus</i> (Dugès, 1834) et d' <i>Eotydeus mirabilis</i> Kuznetzov, 1973.

Tydeid mites are often found in moss and lichens, and are characteristic species in some micro-habitats of tree-trunks (ANDRÉ, 1985a).

A series of samples from southern Sweden revealed twenty-four species of the tydeid genus *Tydeus* (MOMEN & LUNDQVIST, 1995 and unpubl.). In the same series of samples was also found a number of non-*Tydeus* species. Here we report on seventeen species of ten genera. Thus, the hitherto described

fauna of Swedish tydeid mites now comprises forty-one species distributed in eleven genera and four subfamilies.

The terminology and, in most cases, the generic concepts followed are those of ANDRÉ (1980, 1981a, b, 1985c).

The mites were extracted in Berlese funnels and mounted individually on microscopic slides in a gum-chloral hydrate medium.

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Mites were prepared for scanning electron microscopy (SEM) by removing the cover-slip of microscopic slides in hot water. The mites were dehydrated through a series of increasing alcohol concentrations ending in absolute ethanol. They were dried in a critical-point dryer, attached to stubs with double-sided tape and sputter-coated with gold-palladium (40:60) in a Polaron 5400 high resolution sputter.

All measurements are given in microns (μm) and based on means when more than two specimens are available. The margin of error when measuring a curved body is indicated by \pm .

Type specimens are deposited in the collection of the Zoological Museum, Lund University.

LOCALITIES

Mites were collected from the following localities:

1. Alnarp, Agricultural University, 6 km N of Malmö (N 55°32'; E 13°04').
2. Billebjör, 8 km E of Lund (N 55°42'; E 13°19'). Rich deciduous forest on wet clay.
3. Borby tuvor, 21 km E of Ystad (N 55°27'; E 14°09'). Agricultural fields with few, scattered, stands of *Ulmus glabra*, *Betula verrucosa*, and hedges of *Crataegus monogyna*, *Carpinus betulus* and *Syringa vulgaris*.
4. Dalby Norreskog, 9 km E of Lund (N 55°41'; E 13°21'). Tall (15–20 m) deciduous forest, *Fagus sylvatica*, *Fraxinus excelsior*, *Ulmus glabra*; almost no field-layer.
5. Dörröd, 5 km WSW of Genarp (N 55°35'; E 13°29'). Old hollow trees, *Salix fragilis*, along a road.
6. Falsterbo kanal, 24 km SSW of Malmö (N 55°24'; E 12°57'). Planted pine forest, close to the shores of the Baltic sea. *Pinus* sp. (ca 10 m). *Calluna vulgaris*, grass, lichens and moss on ground. Bare sand in patches.
7. Gödeslövsskogen, 27 km E of Malmö (N 55°37'; E 13°26'). Dense planted coniferous forest, *Picea abies* of moderate (10–15 m) height; sparse field layer.
8. Häckeberga, 27 km E of Malmö (N 55°35'; E 13°26'). Old, tall deciduous trees, *Alnus glutinosa*, *Fagus sylvatica*, *Quercus robur*, *Ulmus glabra*, close by a lake.
9. Kaffatorp, 17 km SW of Olofström (N 56°12'; E 14°18'). Abandoned apple orchards.
10. Lahibiagrottan, Kullaberg, 13 km N of Höganäs (N 56°18'; E 12°27'). Sparse vegetation of *Pinus* sp., *Prunus spinosa*, *Quercus robur*, and *Euonymus europaeus* on a stony south-facing slope of a cliff that juts out into the Kattegat sea.

11. Norrekås, 1.5 km S of Skillinge (N 55°28'; E 14°17'). Planted coniferous (*Pinus* sp.) forest of moderate height, 10–15 m, close to the sea-shore. Bushes of *Populus tremula*, *Rosa* sp., *Sambucus nigra*, *S. racemosa*, *Sorbus aucuparia*, and *S. intermedia*.
12. Nyteboda, 11 km NW of Olofström (N 56°20'; E 14°23'). Old (ca 200 years) coniferous forest. Tall trees of *Picea abies* and *Pinus sylvestris*. A deep moss layer mixed with grasses.
13. Prästtorpasjön, 7 km N of Höör (N 55°59'; E 13°34'). Deciduous forest. Tall trees of *Quercus robur* and *Fagus sylvatica*.
14. Ransvik, Kullaberg, 12 km N of Höganäs (N 56°18'; E 12°29'). Deciduous forest. Tall trees of *Quercus robur* and *Fagus sylvatica*.
15. Sandhammaren, 24 km E of Ystad (N 55°23'; E 14°12'). Planted pine forest of moderate height (ca 10 m), *Pinus* sp. *Betula* sp., with a dense bush and field layer of *Quercus robur*, *Calluna vulgaris*, grasses and *Sphagnum* spp.
16. Skanörs ljung, 24 km SSW of Malmö (N 55°24'; E 12°53'). Planted pine (*Pinus* sp.) forest of moderate height (10–15 m). Sparse field layer of grasses.
17. Skogaby, 30 km NE of Halmstad (N 56°33'; E 13°13'). *Picea abies* planted in 1966.
18. Slätteröd, 28 km ESE of Malmö (N 55°31'; E 13°25'). Tall (ca 15m) deciduous trees, *Fagus sylvatica*, *Quercus robur*, dense shrub-layer of *Corylus avellana*, *Crataegus oxyacantha*, *F. sylvatica*, and *Fraxinus excelsior*.
19. Stenshuvud, 13 km NNE of Simrishamn (N 55°40'; E 14°17'). Tall (15–20 m) deciduous trees of *Acer platanoides*, *Carpinus betulus*, *Corylus avellana*, and *Fagus sylvatica*. Sparse shrub-layer of *Fraxinus excelsior*, *Hedera helix*, and *Ulmus glabra*.
20. Stensoffa, 16 km E of Lund (N 55°42'; E 13°26'). Mixed forest, bushes and trees of moderate height, *Acer platanoides*, *Tilia cordata*, *Fagus sylvatica*, *Betula pubescens*, and *Quercus robur*.
21. Vomb, 23 km E of Lund (N 55°41'; E 13°33'). Coniferous forest, with *Pinus sylvestris* of moderate height. Sparse field layer of grasses and, in patches, dense layer of lichens (*Cladonia* sp.).

SUBFAMILY TYDEINAE ANDRÉ, 1980

Genus *Metalorryia* André, 1980

Type species: *Lorryia armaghensis* Baker, 1968 by original designation.

Prodorsum: recurved. Opisthosoma: dorsal chaetotaxy: 10 (l_2 and h_1 missing); genital organotaxy (Ad): (0 eugenital, 6 genital, and 4 aggenital setae, male with 4 eugenitals); poroidotaxy: 3.

Epimeral formula (Ad): (3 - 1 - 4 - 2); leg chaetotaxy (Ad): I (8 - 3 - 2 - 3 - 0), II (6 - 2 - 1 - 2 - 0), III (5 - 2 - 1 - 1 - 1), IV (5 - 2 - 1 - 1 - 0); solenidiotaxy: 2; palp (6 - 1 - 2) + ω with a double eupathidium at the end of the palp.

Metalorryia armaghensis (Baker, 1968)

2 females, Sandhammaren (Loc. 15) and Skanörs ljungh (Loc. 16); ex dead twigs on trees (*Pinus* sp.); 1 tritonymph, Vomb, (Loc. 21); ex lichens on pine-twigs on ground; 1 tritonymph, Stenoffa (Loc. 20), ex leaves of bush.

BAKER's (1968) description of the species was based on a tritonymph collected from apple-tree, Armagh County, Northern Ireland. Adult, nymphs and larvae have since been collected in Belgium (ANDRÉ, 1980, 1987).

Genus *Neoapolorryia* El-Bagoury & Momen, 1990

Type species: *N. aegyptica* El-Bagoury & Momen, 1990 by monotypy.

Prodorsum: recurved. Opisthosoma: dorsal chaetotaxy: 9 (l_2 , h_1 and h_2 missing); genital organotaxy (Ad): (0 - 6 - 4); poroidotaxy: 3.

Epimeral formula (Ad): (3 - 1 - 4 - 2); leg chaetotaxy (Ad): I (8 - 3 - 2 - 2 - 0), II (6 - 1 - 1 - 2 - 0), III (5 - 1 - 0 - 1 - 0), IV (5 - 1 - 0 - 1 - 0), solenidiotaxy: 2; palp (6 - 1 - 2) + ω with a double eupathidium at the tip of tarsus.

Neoapolorryia kristinae n. sp.

(Figs. 1–10)

ADULT FEMALE (Fig. 1): Length of body $270 \pm 3 \mu\text{m}$; width $182 \pm 6 \mu\text{m}$; Opisthosoma: the reticulation of dorsum is conspicuous, consisting of irregular cells connected to each other by simple and Y-shaped cross-ties (Figs. 9–10). All dorsal

setae plumose except for the trichobothrium, which is filiform and smooth.

Setal measurements: p_1-p_3 , d_1 , d_2 and l_1 all subequal $15 \mu\text{m}$, d_3 $13 \mu\text{m}$, d_4 , l_4 and l_5 subequal $15 \mu\text{m}$, d_5 $12 \mu\text{m}$, ps $10 \mu\text{m}$, s $39 \mu\text{m}$.

Genital setae typical for the genus (Fig. 7). Epimeral formula as for the genus.

Each apotele of the legs has two claws and an empodial hook (Figs. 2–5). Solenidion on tarsus I is short, and seta k on tibia I is simple (Fig. 2).

Terminal eupathidium of palp thick and bidentate distally; seta ba short, seta d forked (Fig. 6). Moveable digit of chelicera ($16 \mu\text{m}$) slightly shorter than palptarsus ($19 \mu\text{m}$).

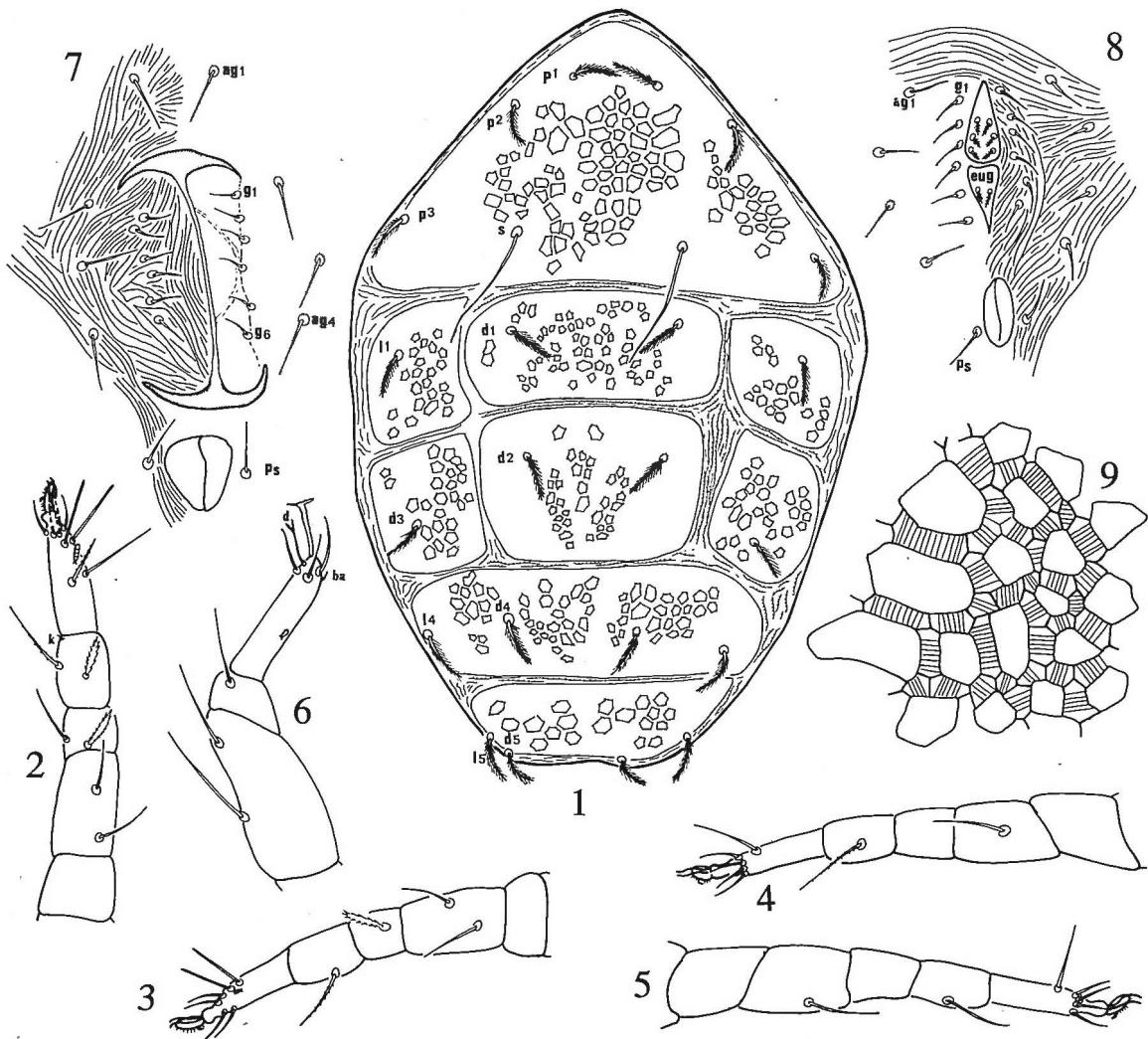
ADULT MALE: Similar to female except for the genital area. Anterior eugenital flap with three pairs of feathered setae, posterior eugenital flap with a single pair of setae (Fig. 8).

TYPE DATA: Holotype, female, slide no. 5888, 8 females, 2 males, 1 tritonymph paratypes: Falsterbo kanal (Loc. 6) August 22, 1993, ex moss and lichens on the soil surface. 1 female, 1 male, paratypes, same locality, ex mosses on the soil surface, leg. LUNDQVIST.

ETYMOLOGY: The specific trivial name is a noun in the genitive case, named after Miss Kristina DAHMÉN, who helped collect the types.

REMARKS: *Neoapolorryia kristinae* n. sp. is the second described species of the genus. It differs from the type species *N. aegyptica* El-Bagoury & Momen, 1990, by having plumose dorsal body setae, rather than serrate as in *N. aegyptica*. It can also be distinguished by having the terminal eupathidium on palptarsus bidentate distally (thick and rounded in *N. aegyptica*), and seta d on palp divided (simple in *N. aegyptica*). The dorsum of *N. kristinae* n. sp. is divided into 9 discrete areas as opposed to 13 in *N. aegyptica*.

NOTES: EL-BAGOURY & MOMEN (1990) described *N. aegyptica* from sandy soil with roots of tomato plants, *Lycopersicum esculentum*, Tahrir Province, Egypt, and from sandy soil with roots of the egg plant, *Solanum melongena*, South Sinai, Egypt. The new species, *N. kristinae* n. sp. was also found on sandy soil, close to the shore of the Baltic Sea. *N.*



FIGS. 1-9: *Neoapolorryia kristinae* n. sp., adult female (1-7, 9) and male (8)

1. — Dorsal view.
2. — Leg I.
3. — Leg II.
4. — Leg III.
5. — Leg IV.
6. — Palp.
7. — Genital region.
8. — male, Genital region.
9. — Reticulation pattern of dorsum.

kristinae n. sp. is the only species of the genus in which the male is known.

Genus *Orthotydeus* André, 1980

Type species: *Tydeus goetzi* Schruft, 1972 by original designation.

Prodorsum: recurved. Opisthosoma: dorsal chaetotaxy: 10 (l_2 and h_1 missing); genital organotaxy (Ad): (0 (female), 4 (male) - 6 - 4); poroidotaxy: 3.

Epimeral formula (Ad): (3 - 1 - 4 - 2); Leg chaetotaxy: I (8 - 4 - 3 - 3 - 1), II (6 - 2 - 2 - 2 - 0), III (5 - 2 - 1 - 1 - 1), IV (5 - 2 - 1 - 1 - 0); solenidiotaxy: 2; palp (6 - 2 - 2) + ω with a double eupathidium at the tip of tarsus.

Orthotydeus calabrus Castagnoli, 1984

2 females and 2 males from Alnarp (Loc. 1), ex bark of apple tree.

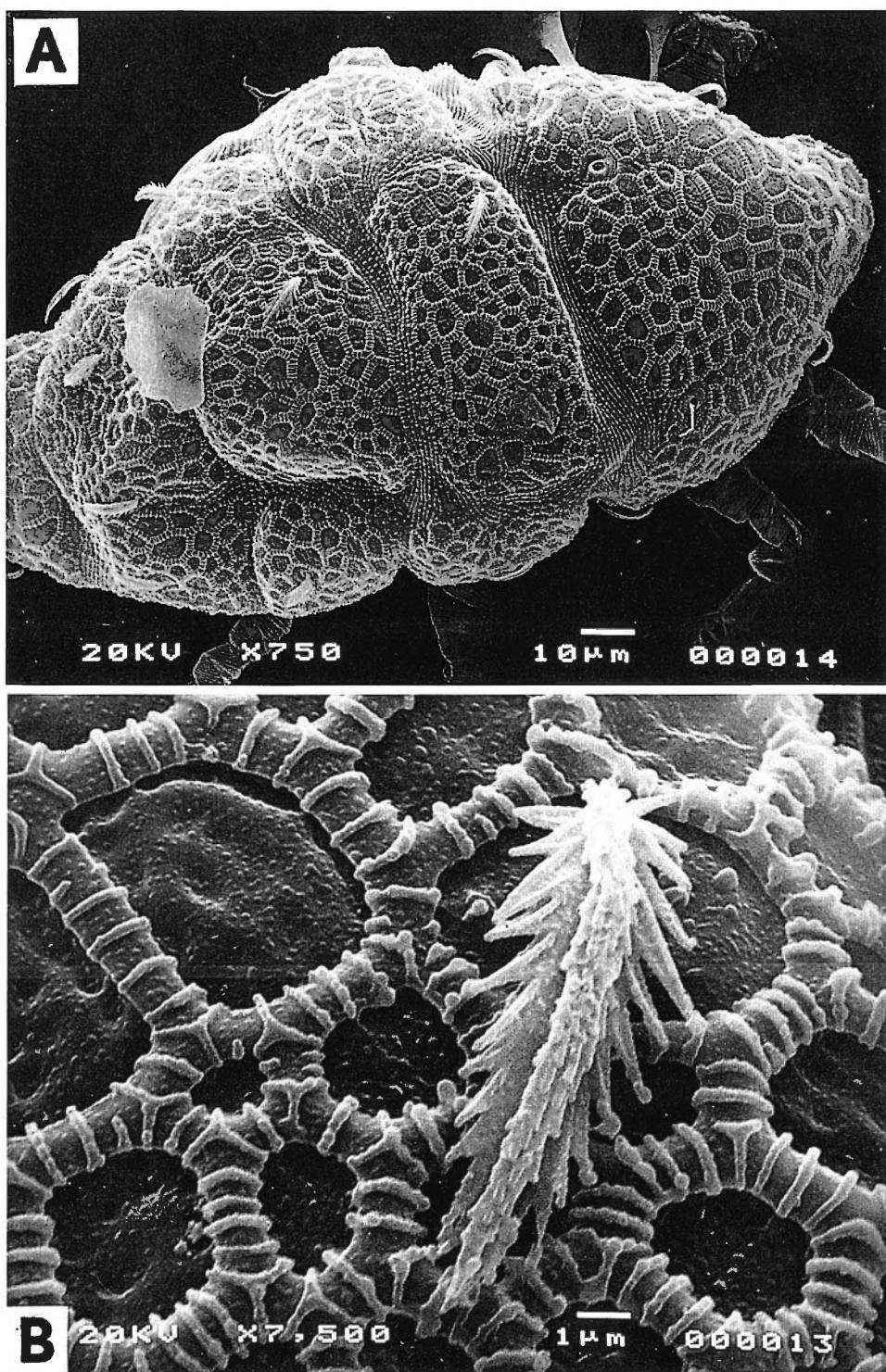


FIG. 10: *Neoapolorryia kristinae* n. sp., SEM photograph, adult female. A: Dorsal view. B: Detail of A, with seta d_i .

CASTAGNOLI (1984) collected *O. calabrus* from olive trees in Italy.

Orthotydeus caudatus (Dugès)
sensu Castagnoli, 1984

Tetranychus caudatus DUGÈS, 1834.
Tydeus croceus (L.), OUDEMANS, 1914.
Tydeus spathulatus OUDEMANS, 1928.
Brachytydeus caudatus (Dugès); THOR 1933.
Tydeus (*Tydeus*) *caudatus* (Dugès); BAKER, 1970.

The species was found on leaves; 2 females from *Alnus glutinosa* at Billebjör (Loc. 2), 1 tritonymph on *Prunus padus* at Dalby Norreskog (Loc. 4), 5 tritonymphs on *Acer platanoides*, *Pyrus malus* and *Tussilago farfara* at Stenoffa (Loc. 20), 5 tritonymphs on *Fraxinus excelsior* and *Pteridium aquilinum* at Ransvik (Loc. 14), 1 female and 1 tritonymph, ex tree hole, *Salix fragilis*, at Dörröd (Loc. 5).

The species is widespread on different plants in temperate areas of the world (BAKER, 1970), i.e. olive, walnut and mulberry trees in Italy (CASTAGNOLI, 1984), and apple trees in Dublin (MOMEN, 1987). It has also been collected from stored wheat at Treherne, Manitoba (MOMEN unpublished), and from soil in Egypt (EL-BAGOURY, 1978). KULCZYCKI (1992) recorded the species from Ukraine.

NOTES: We observed irregularity in the number of genital setae in one female (6 ge on one side, 5 on the other). Similar anomalies have been reported by KAZMIERSKI (1989, 1990) in *Lorryia inconstans* Kazmierski, 1989 and *Eotydeus mirabilis* Kuznetzov, 1973. MOMEN & LUNDQVIST (1995) reported different numbers of dorsal setae *ps* in the species *Tydeus maga* (Kuznetzov, 1973).

Orthotydeus kochi (Oudemans),
sensu Castagnoli, 1984

Tydeus kochi OUDEMANS, 1928.
Tydeus (*Tydeus*) *kochi* Oudemans; BAKER, 1970.

6 males were found on leaves from *Rubus idaeus* and *Pteridium aquilinum*, and from forest litter at

Ransvik, Kullaberg (Loc. 14); 1 male from *Juniperus communis* at Lahibiagrottan, Kullaberg (Loc. 10); 1 female, 2 males from whole plants (including roots) of *Fragaria X ananassa* at Alnarp (Loc. 1); 3 females, 1 male from *Fragaria X ananassa* at Borrby tuvor (Loc. 3); 2 females, 1 tritonymph from moss and lichens on the soil surface at Falsterbo kanal (Loc. 6).

This species has a world-wide distribution and has been found in most climatic zones (BAKER, 1970). It has been collected from Italy (CASTAGNOLI, 1984), Dublin (MOMEN, 1987), Poland (KAZMIERSKI, 1990), and Ukraine (KULCZYCKI, 1992).

Orthotydeus maculatus n. sp.

(Figs. 11–19)

ADULT FEMALE (Fig. 11): Length of body $257 \pm 3 \mu\text{m}$; width $185 \pm 3 \mu\text{m}$. Opisthosoma: striae of dorsum forming a basket-weave pattern over the entire dorsum (Fig. 12), but covers only a small posterior marginal section of venter near the setae *ps* (Fig. 18). Under SEM the pattern turns out to be formed by numerous papillae (Fig. 19, tritonymph). Dorsal body setae p_1-p_3 and d_1, d_2, l_1 are slightly lanceolate and serrate; trichobothrium filiform; $d_3, d_4, d_5, l_4, l_5, h_2$ are spatulate distally and serrate. Setal measurements: p_1 18 μm , p_2 and p_3 subequal 20 μm s 35 μm , d_1 and d_2 subequal 13 μm , d_3, d_4 and l_5 subequal 11 μm , d_5 and l_4 subequal 15 μm , l_1 19 μm , h_2 and *ps* subequal 14 μm .

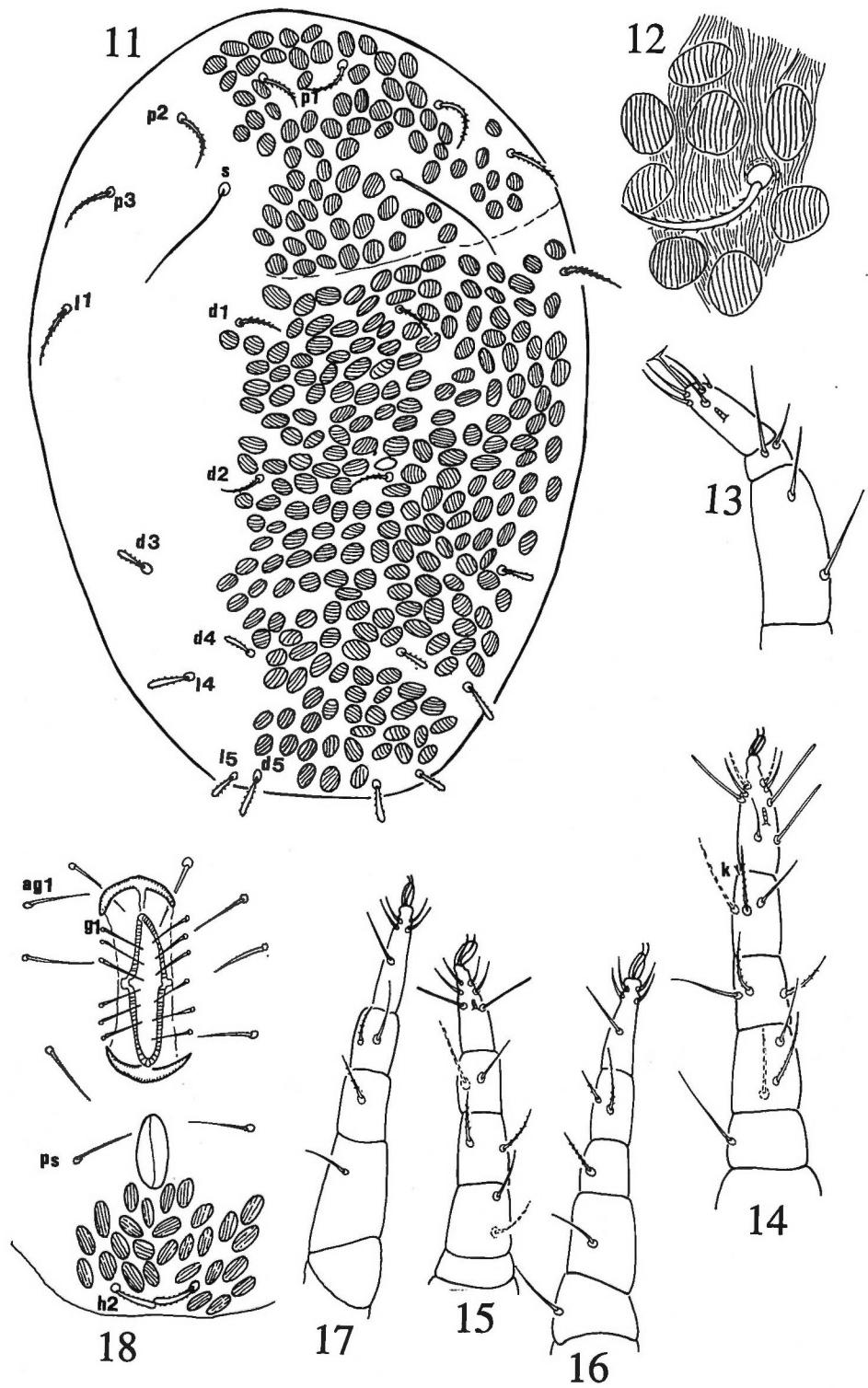
Genital setae (Fig. 18) and leg chaetotaxy (Figs. 14–17) are typical for the genus. Each apotele has two claws and an empodium. Solenidion on tarsus I short, seta *k* on tibia I divided (Fig. 14).

Setal pattern of palp as for the genus. Terminal eupathidium bidentate, and seta *d* simple (Fig. 13).

Moveable digit of chelicera as long as palptarsus (15 μm).

ADULT MALE: Unknown.

TYPE DATA: Holotype, female, slide no. 5812, 1 tritonymph paratype: Dörröd (Loc. 5), ex decaying wood in a tree-hole, *Salix fragilis*, leg. LUNDQVIST.



Figs. 11-18: *Orthotydeus maculatus* n. sp., adult female.

11. — Dorsal view. 12. — Basket-weave pattern of dorsum. 13. — Palp. 14. — Leg I. 15. — Leg II. 16. — Leg III. 17. — Leg IV.
18. — Genital region.

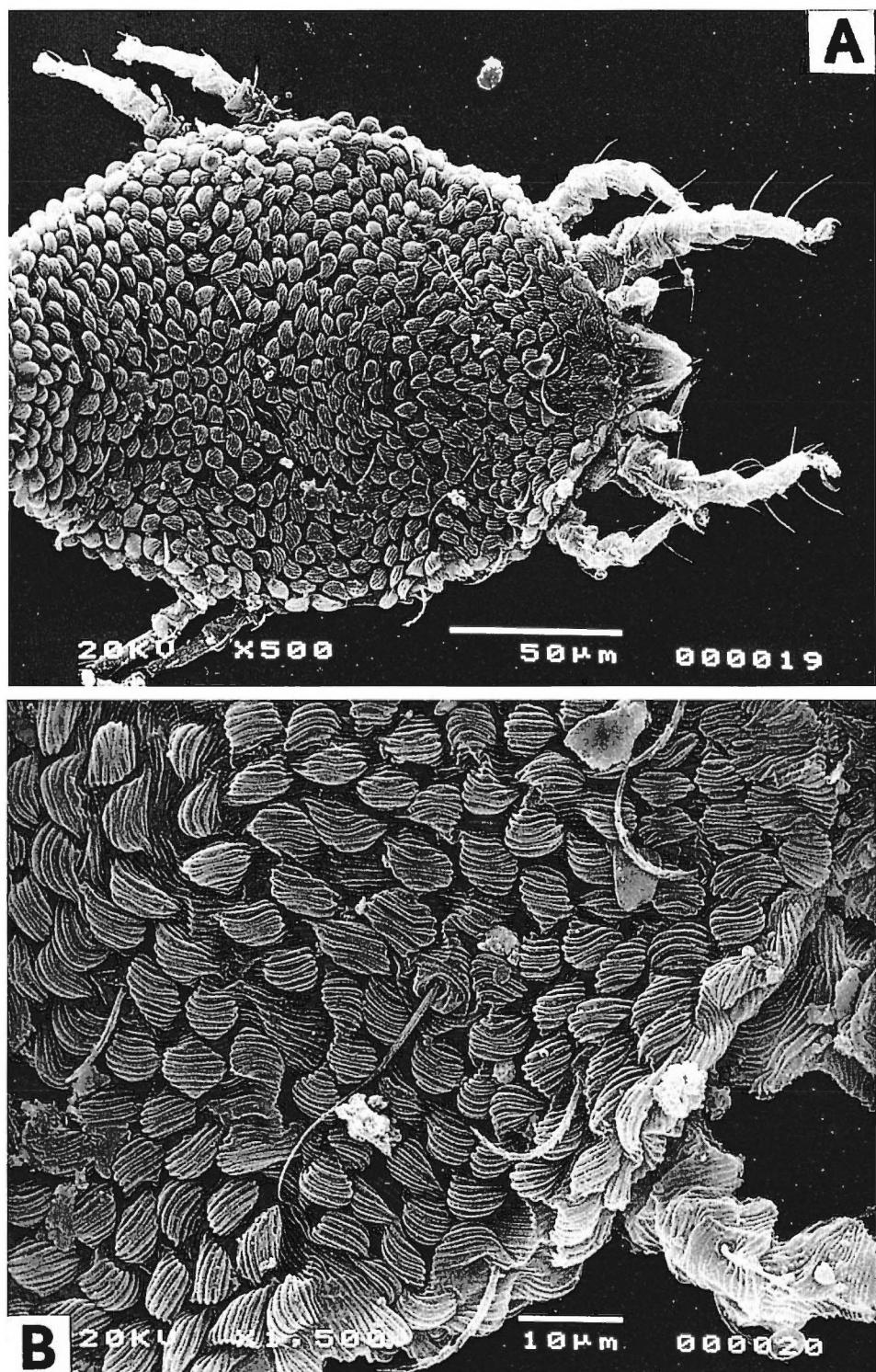


FIG. 19: *Orthotydeus maculatus* n. sp., SEM photograph, tritonymph. A: Dorsal view. B: Details of A, with setae p_1-p_3 , trichobothrium, and d_1 .

ETYMOLOGY: The specific trivial name refers to the spotted (*macula* Lat. = spot) pattern of the dorsum.

REMARKS: *Orthotydeus maculatus* n. sp. is characterised by the striae forming a basket-weave pattern over the entire dorsum. This pattern separates the species from all other *Orthotydeus* species known so far.

BAKER (1965) created the genus *Tydulosus* for the two species *Tydeus granulosus* Canestrini, 1886 (type species by original designation) and *Tydulosus lolitae* Baker, 1965. Later KUZNETZOV & LIVSHITZ (1973) described and included another two species in the genus, viz. *T. dumosus* Kuznetzov, 1973 and *T. visendus* Kuznetzov, 1973. All four species have the same type of dorsal sculpturing, called basket-weave pattern (BAKER, 1965), similar to that of *Orthotydeus maculatus* n. sp.

ANDRÉ (1980) synonymized the genus *Tydulosus* with *Tydeus* since species of the two genera have identical leg chaetotaxy. The species described by us has one seta less on femur II and III, respectively, compared to species of *Tydeus* sensu ANDRÉ, 1980.

The adult complement of setae on leg segments of mites of the family Tydeidae varies greatly (ANDRÉ, 1980). The lowest total number of setae on the legs, 2×37 , is found in the genus *Apolorryia* André, 1980 and the highest, 2×76 , in the genus *Pseudotydeus* Baker & Delfinado, 1974. Intergeneric variation is found in all leg segments among the 49 valid genera of the family (ANDRÉ, 1980, 1985b, c; SCHIESS, 1981; EL-BAGOURY & ABOU-AWAD, 1986; EL-BAGOURY & MOMEN, 1990; NOTI & ANDRÉ, 1990; and MOMEN & SINHA, 1991). The adult complement of all setae on trochanter I–IV is either 0 or 1, and on tibia III and IV the number varies between 1 and 2. In all other leg segments the adult complement varies between genera with 3 up to 6 setae. On femur II and III, the adult complement varies between 1–4 and 1–3, respectively. There are 14 genera where the adults have 1 seta on femur III (as in *O. maculatus* n. sp.) and 17 genera with 2 setae (as in the other species with basket-weave pattern). Seven genera have 2 setae on femur II (all of which also have 1 seta on femur III) and 21 have 3 setae.

Considering that the number of setae on femur II and III varies greatly between genera, and that the number of setae on each leg segment can vary unilaterally, at least in two species (MOMEN & LUNDQVIST, 1993), it is likely that the loss of one or even two particular setae is not an unique event during the evolution of modern tydeid mites. The duplicated loss of particular leg setae is probably more likely, than that the basket-weave pattern would appear twice (provided of course that the basket-weave pattern is a true homology, and not just a superficial similarity; something that has to be verified). If homologous the basket-weave pattern could be regarded as a synapomorphy indicating a monophyletic origin of the five species mentioned above.

However, for the sake of taxonomic stability we have decided, for the time being, to assign our species to the genus *Orthotydeus*, rather than reviving and redefining BAKER's genus *Tydulosus*.

Orthotydeus lambi (Baker), new combination

Tydeus (Tydeus) lambi BAKER, 1970.

2 tritonymphs from leaves of *Fraxinus excelsior* and *Pteridium aquilinum* at Ransvik, Kullaberg (Loc. 14).

BAKER (1970) collected *O. lambi* in galls found on *Mycoporum laetum*, Auckland, New Zealand.

Genus *Pseudolorryia* Kazmierski, 1989

Type species: *P. edwardbakeri* Kazmierski, 1989, by original designation.

Prodorsum: recurved. Opisthosoma: dorsal chaetotaxy: 10 (l_2 , and h_1 missing); genital organotaxy (Ad): (0,4 - 6 - 4); poroidotaxy: 3.

Epimeral formula (Ad): (3 - 1 - 4 - 2); leg chaetotaxy (Ad): I (8 - 4 - 3 - 3 - 1), II (6 - 2 - 2 - 3 - 0), III (5 - 2 - 1 - 1 - 1), IV (5 - 2 - 1 - 1 - 0); solenidiotaxy: 2; palp (6 - 2 - 2) + ω with a double eupathidium at the tip of tarsus.

Pseudolorryia striatus n. sp.

(Figs. 20–28)

ADULT FEMALE (Fig. 20): Length of body $315 \pm 5 \mu\text{m}$; width $230 \pm 6 \mu\text{m}$. Dorsal body striae with lobes (Fig. 21). Dorsal body setae simple and smooth; trichobothrium filiform.

Setal measurements, see table 1.

seta	females			n	males			n		
	length (μm)		\bar{x}		length (μm)		\bar{x}			
	min.	max.			min.	max.				
p_1	16	17		2	16	18	17.0	5		
p_2	16	16		2	16	18	17.0	5		
p_3	26	26	26.0	3	25	27	26.5	4		
s	60	61	60.5	4	60	65	62.8	4		
d_1	17	18		2	17	17	17.0	4		
d_2	17	18		2	17	19	17.6	5		
d_3	17	18		2	19	20	19.7	3		
d_4	17	18		2	17	18	17.3	3		
d_5	18	18		2	20	33	23.8	6		
l_1	21	30	25.3	4	27	35	31.0	6		
l_4	27	28		2	23	30	25.3	4		
l_5	51	51		2	50	51	50.2	5		
h_2	40	40		2	40	44	41.7	6		
ps	16	16		2	17	18	17.3	3		

TABLE 1: Setal measurements (μm) of 4 females and 4 males of *Pseudolorryia striatus* n. sp. from Sweden. If more than two observations were made, minimum (min.), maximum (max.) and mean (\bar{x}) values are given; n = number of observations.

Each apotele with two claws and an empodial hook (Figs. 23–26). Solenidion on tarsus I slender; seta k on tibia I divided (Fig. 23).

Setal pattern of palpus: 6(1) - 2 - 2. Terminal eupathidium thick and rounded distally; seta d slender (Fig. 22). Moveable digit of chelicera (41 μm), longer than palptarsus (14 μm).

Aggenital and genital setae setiform (Fig. 27).

ADULT MALE: Similar to female except for genital area. Setae on eugenital flaps feathered (Fig. 28).

TYPE DATA: Holotype, female, slide no. 5813, Gödeslövsskogen (Loc. 7), ex moss on soil surface, 1 male and 2 tritonymphs paratypes, Stenshoffa (Loc. 20), ex bark of apple tree, 3 females, 3 males paratypes, Dörröd (Loc. 5), ex bark of the trunk of *Salix fragilis*, leg. LUNDQVIST.

ETYMOLOGY: The specific trivial name *striatus* (Lat. = striped) indicates that the species lacks reticulated elements on the dorsum.

REMARKS: The genus *Pseudolorryia* includes six previously known species: *Lorryia taurica* Kuznetzov, 1971, *Paralorryia andreae* Ueckermann & Meyer, 1979, *Pseudolorryia edwardbakeri* Kazmierski, 1989, *Melanotydeus chapultepecensis* Baker (1943) 1944, *Paralorryia nikitensis* Livshitz, 1973, and *Tydeus spinea* Livshitz, 1973. The first three species have at least reticulated areas on the dorsum, whereas the latter ones lack reticulation. The new species, *Pseudolorryia striatus* n. sp. and *P. spinea* (Livshitz) are the only two among the striated species that have transverse striation between the setae d_2 . The dorsal setae of *P. striatus* n. sp. are all simple, and l_5 and h_2 are longer than the rest of the other dorsal setae as opposed to the other three striated species.

The type of striation and the length of seta l_5 in *P. striatus* match those of *Paralorryia bipilis* (André, 1984) (new combination, see KAZMIERSKI, 1989 for synonymy.). *P. striatus* n. sp. has setae h_2 long and the moveable digit of chelicera three times longer than the palptarsus. Whether or not these characters differ from *P. bipilis* is not known, since ANDRÉ (1984) did not mention these characters in his description, and type material of *P. bipilis* has not been to our disposal.

Genus *Eotydeus* Kuznetzov, 1973

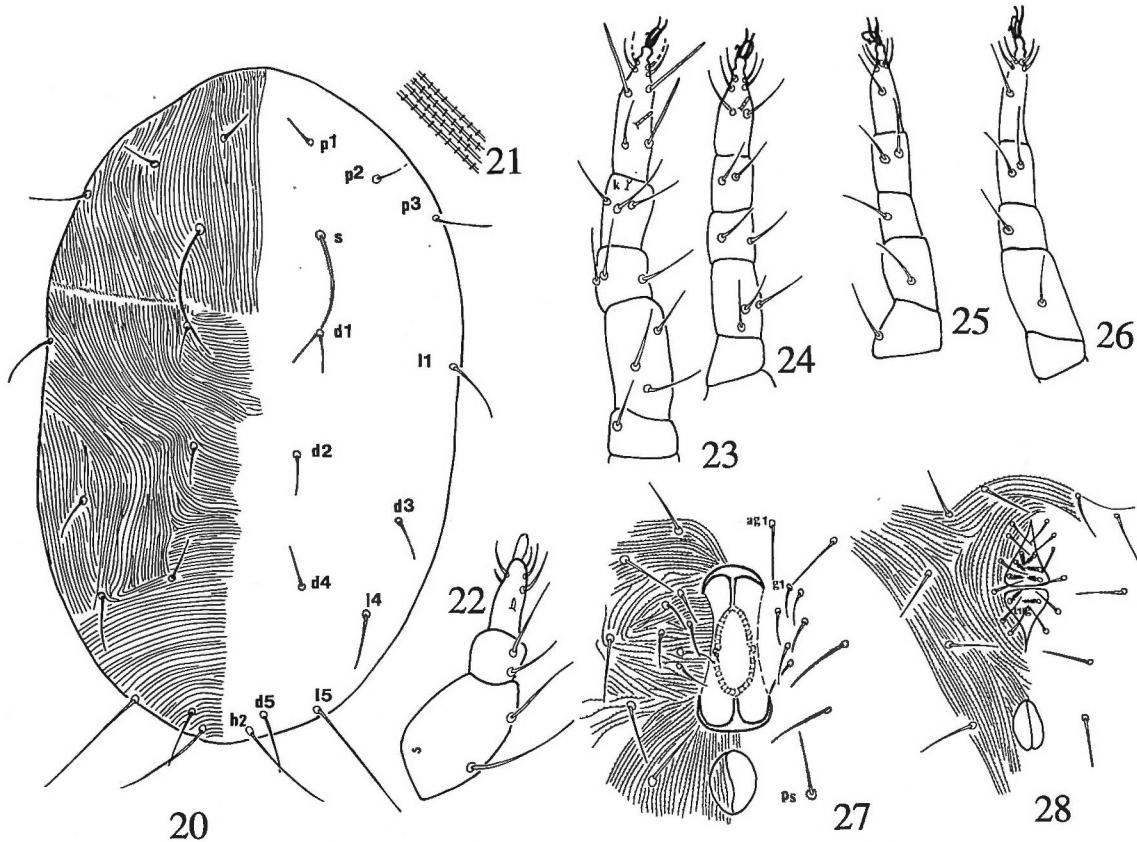
Type species: *Tydeus (Eotydeus) mirabilis* Kuznetzov, 1973 by original designation.

Prodorsum: recurved. Opisthosoma: dorsal chaetotaxy: 10 (l_2 , and h_1 missing); genital organotaxy Ad (female): (0 - 2 - 4); poroidotaxy: 3.

Epimeral formula (Ad): (3 - 1 - 4 - 2); leg chaetotaxy (Ad): I (8 - 4 - 3 - 3 - 1), II (6 - 2 - 2 - 3 - 0), III (5 - 2 - 1 - 2 - 1), IV (5 - 2 - 1 - 1 - 0); solenidiotaxy: 2; palp (6 - 2 - 2) + ω with a double eupathidium at the tip of tarsus.

Eotydeus mirabilis Kuznetzov, 1973

4 females from moss on the soil surface at Gödeslövsskogen (Loc. 7), 2 females from moss on tree-stump at Stenshuvud (Loc. 19), 1 female from moss on tree-trunk at Slätteröd (Loc. 18).



Figs. 20–28: *Pseudolorryia striatus* n. sp., adult female (20–27), male (28).

20. — Dorsal view. 21. — Striation pattern of dorsum. 22. — Palp. 23. — Leg I. 24. — Leg II. 25. — Leg III. 26. — Leg IV. 27. — Genital region. 28. — Male. Genital region.

NOTES: *Eotydeus mirabilis* Kuznetsov has 2 g and 4 ag setae (KUTZNETZOV, 1973). ANDRÉ's (1980) diagnosis of the genus *Eotydeus* was based on 1 female only, with the genital organotaxy (0 - 2 - 3).

2 specimens in our collection of *E. mirabilis*, have 3 g and 3 ag setae on one side of the body, and 2 g and 4 ag on the other. A similar asymmetry in the species has been observed by KAZMIERSKI (1989).

Prodorsum: recurved; 3 eyes; no bothridia. Opisthosoma: dorsal chaetotaxy: 11 (l_2 missing); genital organotaxy (Ad): (2,6 - 6 - 5); poroidotaxy: 4.

Epimeral formula (Ad): (3 - 1 - 3 - 3); leg chaetotaxy (Ad): I (10 - 6 - 4 - 5 - 1), II (6 - 3 - 2 - 4 - 1), III (5 - 2 - 2 - 2 - 1), IV (5 - 2 - 3 - (1 - 1) - 0); solenidiotaxy: 4; femur IV divided; palp (6 - 2 - 2) + ω with a triple eupathidium at the tip of tarsus.

SUBFAMILY MEYERELLINAE ANDRÉ, 1980

Genus *Pseudotriophtydeus* André, 1980

Type species: *Pseudotriophtydeus vegei* André, 1980 by original designation.

Pseudotriophtydeus vegei André, 1980

5 females, 1 male from Stensoffa (Loc. 20) on bark of apple tree; 7 males from Lahibiagrottan, Kullaberg (Loc. 10), on bark of *Pinus* sp. and from lichens on *Prunus spinosa*; 1 female, 1 male from

Alnarp (Loc. 1) on bark of apple trees; 2 males from Nyteboda (Loc. 12) on lichens on twigs; 1 female from Vomb (Loc. 21) on lichens on trunk of pine trees.

Pseudotriophydeus vegei was described by ANDRÉ (1980) from Belgium and sampled on the bark of different trees. It is known also from Dublin on bark of apple trees (MOMEN, 1987), and from Poland (KAZMIERSKI, 1990).

SUBFAMILY TRIOPHTYDEINAE André, 1980

Genus *Stenipedis* n. gen.

Type species: *Stenipedis quadrisetosus* n. sp.

Prodorsum: recurved; 3 eyes. Opisthosoma: dorsal chaetotaxy: 11 (l_2 missing); genital organotaxy (Ad): (2,6 - 6 or 4 - 5 or 4); poroidotaxy: 4.

Epimeral formula (Ad): (3 - 1 - 3 - 3); leg chaetotaxy (Ad): I (10 - 5 or 4 - 3 - 5 - 1), II (6 - 2 - 2 - 4 - 1), III (5 - 1 - 2 - 1 - 1), IV (5 - 2 - 2 - (1 - 2) - 0); femur IV divided (Ad); solenidiotaxy: 2; palp (6 - 2 - 2) + ω with a triple eupathidium at the tip of tarsus.

REMARKS: The new genus is close to the genus *Triophydeus* Thor, but can be separated by the following combination of characters: 4 setae on tibia I as opposed to 5 in *Triophydeus*, and 4 genital and aggenital setae, whereas *Triophydeus* has 6 and 5 or 4 respectively.

ETYMOLOGY: The genus *Stenipedis* is named after Dr Sten RUNDGREN, who has been a great help to us by reading numerous drafts to several manuscripts, and who thinks our illustrations look like dance-charts (*pedis* Lat. = feet). The name is masculine in gender.

Stenipedis quadrisetosus n. sp.

(Figs. 29–35)

ADULT FEMALE (Fig. 29): Length of body (excluding gnathosoma) $188 \pm 3 \mu\text{m}$; width $90 \pm 3 \mu\text{m}$.

Dorsal body stria longitudinal on prodorsum, transverse on mid-opisthosoma, stria with lobes. Opisthosoma: dorsal body setae serrate; setal measurements: p_1 and p_2 subequal $6 \mu\text{m}$, p_3 $9 \mu\text{m}$, s $23 \mu\text{m}$, d_1 and d_2 subequal $6 \mu\text{m}$, d_3 $8 \mu\text{m}$, d_4 $10 \mu\text{m}$, d_5 $18 \mu\text{m}$, h_1 $15 \mu\text{m}$, h_2 $11 \mu\text{m}$, l_1 $12 \mu\text{m}$, l_4 $15 \mu\text{m}$, l_5 $22 \mu\text{m}$, ps $6 \mu\text{m}$.

Aggenital and genital setae serrate (Fig. 35).

Epimeral formula and leg chaetotaxy as for the genus (Figs. 31–34). Solenidion I longer than solenidion II; seta k on tibia I forked.

Gnathosoma visible in dorsal view; setal pattern of palpus as for the genus, seta v forked (Fig. 30).

ADULT MALE: Unknown.

TYPE DATA: Holotype (slide no. 5614), female; 2 females, paratypes, Prästtorpaspjön (Loc. 13), ex bark of fallen tree on ground, leg. LUNDQVIST; 5 females, paratypes, Kaffatorp (Loc. 9), ex bark of apple tree, leg. LUNDQVIST; 1 female, paratype, Häckeberga (Loc. 8), ex moss and bark of *Quercus robur*, leg. LUNDQVIST.

ETYMOLOGY: The specific name is an adjective, derived from *quattuor* (Lat. = four) referring to the triplet combination of four setae on the mite.

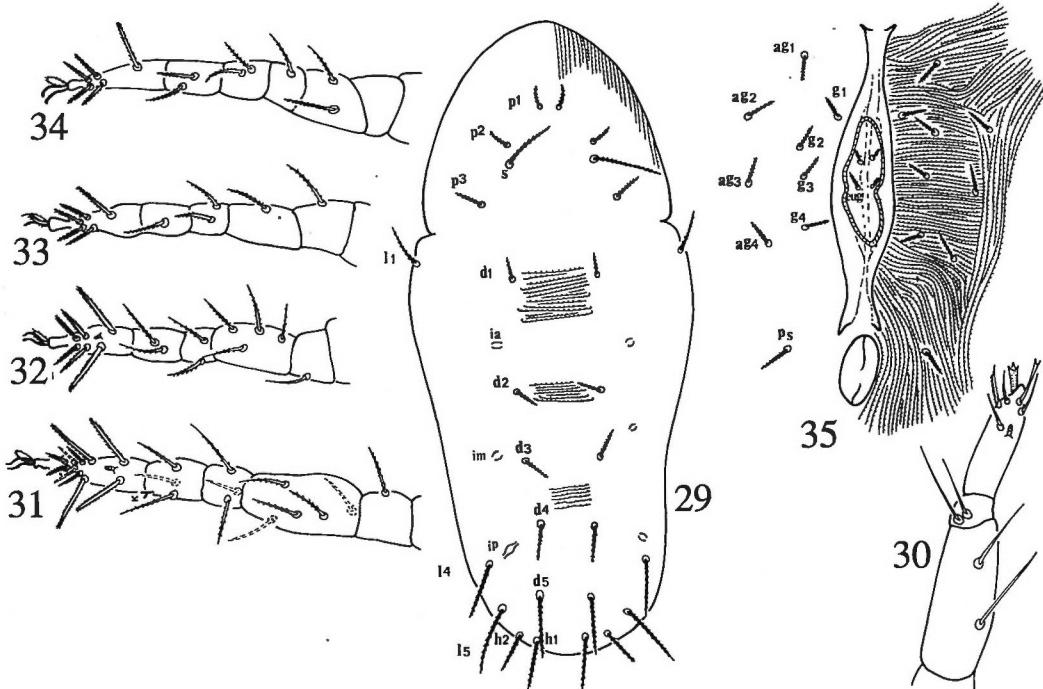
REMARKS: The new species is unique in its genus. It superficially resembles *Triophydeus craveni* Wood, 1965 but can be separated from this species on the generic level.

Genus *Triophydeus* Thor, 1932

Type species: *Tydeus triophthalmus* Oudemans, 1929 by original designation.

Prodorsum: recurved; 3 eyes. Opisthosoma: dorsal chaetotaxy: 11(l_2 missing); genital organotaxy (Ad): (2,6 - 6 - 5 or 4); poroidotaxy: 4.

Epimeral formula (Ad): (3 - 1 - 3 - 3); leg chaetotaxy (Ad): I(10 - 5 - 3 - 5 - 1), II (6 - 2 - 2 - 4 - 1), III (5 - 1 - 2 - 1 - 1), IV (5 - 2 - 2 - (1 - 2) 0); femur IV divided (Ad); solenidiotaxy: 2; palp (6 - 2 - 2) + ω with a triple eupathidium at the tip of tarsus



Figs. 29–35: *Stenipedis quadrisetosus* n. gen., n. sp., adult female.

29. — Dorsal view. 30. — Palp. 31. — Leg I. 32. — Leg II. 33. — Leg III. 34. — Leg IV. 35. — Palp.

Triophydeus triophthalmus (Oudemans, 1929)

?*T. lebruni* André, 1980 (ANDRÉ, 1985c).

10 specimens (females and males) from *Picea abies* at Skogaby (Loc. 17).

NOTES: This species is known from Germany (THOR, 1933), and Belgium (?) (ANDRÉ, 1980).

Triophydeus craveni Wood, 1965

2 females from leaves of *Acer platanoides* at Stensoffa (Loc. 20).

NOTES: WOOD (1965) described this species from mosses (*Camptothecium sericeum* and *Tortella tortuosa*) in the U.K.

SUBFAMILY TYDAEOLINAE ANDRÉ, 1980

Genus *Paratydaeolus* André, 1980

Type species: *Paratydaeolus lukoschusi* André, 1980 by original designation.

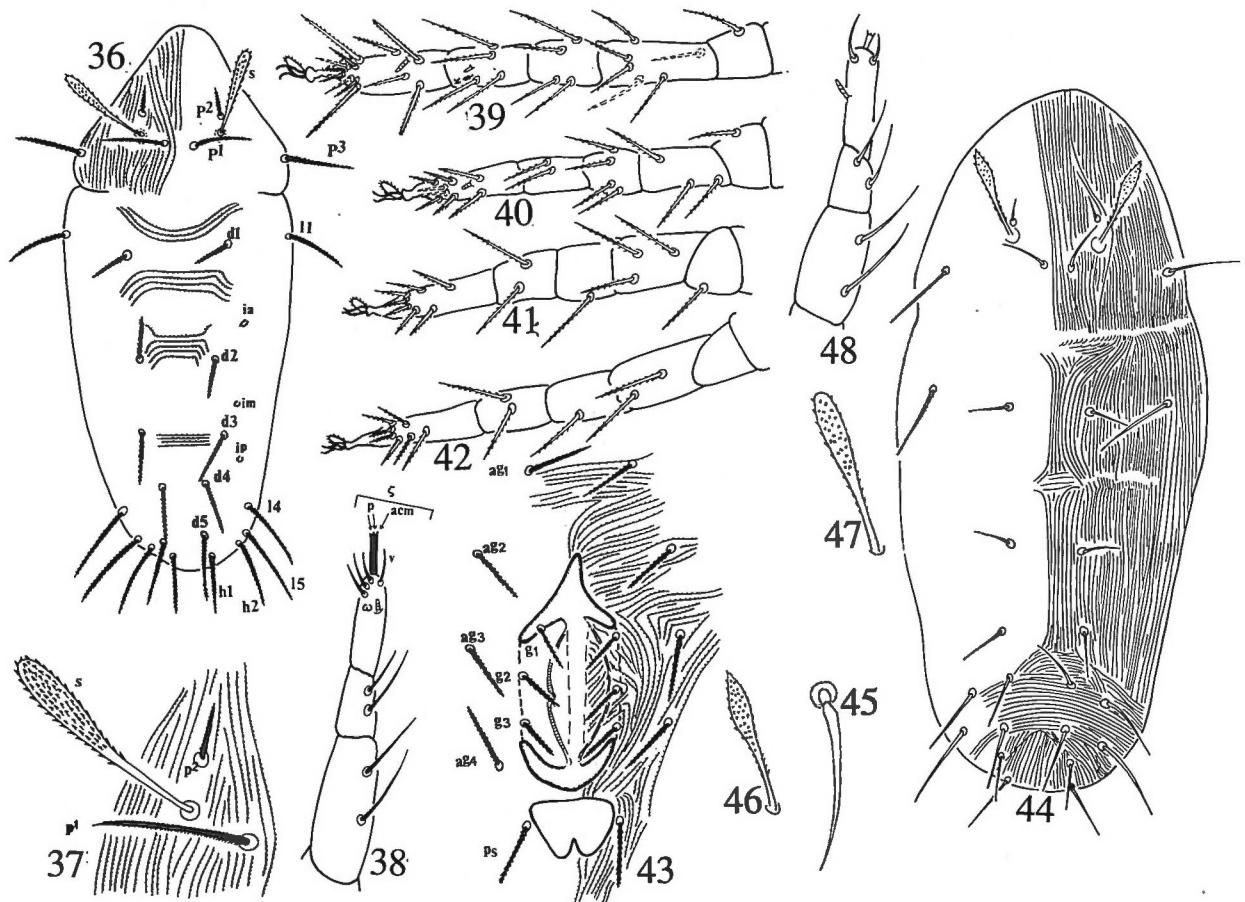
Prodorsum: procurved; trichobothrium (sensilla) club-like. Opisthosoma: dorsal chaetotaxy: 11 (l_2 missing); genital organotaxy (Ad): (0,4 or 5 - 3 - 4); poroidotaxy: 4.

Epimeral formula (Ad): (3 - 1 - 4 - 3 or 2); leg chaetotaxy (Ad): I (12 - 5 - 4 - 6 - 1), II (8 - 2 - 4 - 3 - 1), III (7 - 2 - 1 - 3 - 1), IV (7 - 2 - 1 - 2 - 0); Solenidiotaxy: 3; Palp (5 - 2 - 2) + ω with a triple eupathidium at the tip of tarsus.

Paratydaeolus clavatus n. sp.

(Figs. 36–43)

ADULT FEMALE (Fig 36): Length of body (excluding gnathosoma) $173 \pm 3 \mu\text{m}$; width $81 \pm 1 \mu\text{m}$. Opisthosoma: Body setae strongly serrate except for trichobothrium, which is clavate with many small bristles (Fig. 37); setal measurements: p_1 17 μm ; p_2 6 μm ; p_3 19 μm ; s 30 μm ; d_1 and d_2 subequal 13 μm ; d_3 and d_4 subequal 17 μm ; d_5 20 μm ; h_1 17 μm ; h_2 19 μm ; l_1 17 μm ; l_4 and l_5 subequal 23 μm ; ps 8 μm .



FIGS. 36–43: *Paratydaeolus clavatus* n. sp., adult female.

36. — Dorsal view. 37. — Sensillum. 38. — Palp. 39. — Leg I. 40. — Leg II. 41. — Leg III. 42. — Leg IV. 43. — Genital region.

FIGS. 44–48: *Tydaeolus* cf. *tenuiclaviger* Thor, adult female.

44. — Dorsal view. 45. — Dorsal seta l_5 . 46. — Sensillum (pointed type). 47. — Sensillum (rounded type). 48. — Palp.

Four pairs of aggenital and three pairs of genital setae (Fig. 43).

Epimeral formula (3 - 1 - 4 - 3). Leg setal patterns as for the genus (Figs. 39–42):

Solenidion I slender, longer than solenidion II, seta k on tibia I feathered (Figs. 39–40).

Gnathosoma visible in dorsal view; setal pattern of palpus as for the genus (Fig. 38).

ADULT MALE: unknown.

TYPE DATA: Holotype (slide no. 5445), female, 1 female paratype, Nyteboda, Loc. (12), ex moss on soil surface, leg. LUNDQVIST.

ETYMOLOGY: The trivial name is an adjective. The

world is Latin for club-shaped and refers to the shape of the trichobothrium.

REMARKS: Seven species of *Paratydaeolus* have previously been described. *P. clavatus* n. sp. and *P. loadmani* (Wood, 1965) are distinguished from the rest by having strong and pilose dorsal body setae. The new species can be separated from *P. loadmani* by having the trichobothrium clavate rather than globose as in *P. loadmani*, the seta k on tibia I is feathered as opposed to slender in *P. loadmani*, and the solenidia ω_1 and ω_2 are slender rather than club-like. Further, setae p_3 , l_4 and l_5 are twice as long as those of *P. loadmani*.

Paratydaeolus lukoschi André, 1980

2 females from Prästtorpasjön (Loc. 13) from lichens on twigs.

Genus *Tydaeolus* Berlese, 1910,
sensu Baker 1965

Type species: *Tydaeus atomus* Berlese, 1908 by original designation.

Prodorsum: procurved; trichobothrium (sensilla) club-like. Opisthosoma: dorsal chaetotaxy: 11 (l_2 missing); genital organotaxy (Ad): (0,? - 2 - 4); poroidotaxy: 4.

Epimeral formula (Ad): (3 - 1 - 4 - 3); leg chaetotaxy (Ad): I (11 - 5 - 4 - 6 - 1), II (8 - 2 - 4 - 4 - 1), III (7 - 2 - 2 - 3 - 1), IV (7 - 2 - 1 - 2 - 0); solenidiotaxy: 3; palp (? - 2 - 2) + ω with a triple eupathidium at the tip of tarsus.

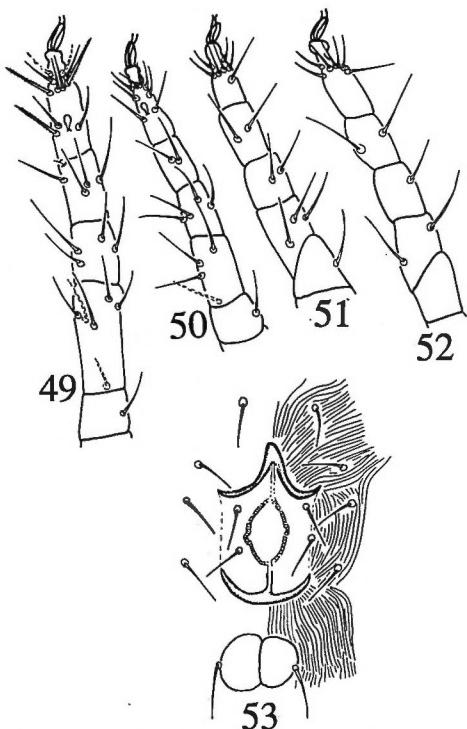
Tydaeolus cf. *tenuiclaviger* (Thor, 1931)

(Figs. 44–53)

ADULT FEMALE (Fig. 44): Length of body (excluding gnathosoma) $176 \pm 6 \mu\text{m}$; width $82 \pm 3 \mu\text{m}$. Dorsal body setae simple, smooth and sharp distally (Fig. 45) except for trichobothrium (Figs. 46–47) which is clavate with many small bristles (in most specimens the tip is pointed, Fig. 46, but sometimes rounded, Fig. 47). Setal measurements: p_1 12 μm , p_2 7 μm , p_3 20 μm , s 24 μm , d_1 and d_2 subequal 9 μm , d_3 11 μm , d_4 13 μm , d_5 15 μm , l_1 16 μm , l_4 19 μm , l_5 22 μm , h_1 11 μm , h_2 14 μm , ps 9 μm .

Genital organotaxy (Fig. 53), epimeral formula, and leg chaetotaxy (Figs. 49–52) as for the genus. Solenidion I and II club-like, seta k on tibia I simple (Figs. 49–50). Setal pattern of palp (3 - 2 - 2) + ω (Fig. 48).

COLLECTION DATA: 6 females from Nyteboda (Loc. 12), ex moss on soil surface; 2 females from Norrekås (Loc. 11), ex moss and lichen on tree, *Pinus* sp.



Figs. 49–53: *Tydaeolus* cf. *tenuiclaviger* Thor, adult female.
49. — Leg I. 50. — Leg II. 51. — Leg III. 52. — Leg IV. 53. — Genital region.

REMARKS: The type of *T. atomus* Berlese was studied by BAKER (1965). Obviously the type was in bad condition, and many details were impossible to discern. In addition to the type, three other taxa have been assigned to the genus *Tydaeolus* (ANDRÉ, 1980). Of these *T. sphaeroclaviger* Kuznetzov, 1972, has serrate dorsal body setae (KUTZNETZOV & LIVSHITZ, 1972, their figure 2,5 [erroneously marked 3,5]), the other two species both have simple, pointed setae. BAKER (1965) was able to identify *T. tenuiclaviger* (Thor) from *T. frequens* (Grandjean, 1938) (called *T. frequans* by BAKER) by differences in the number of body divisions; *T. tenuiclaviger* having the “body divided into three distinct regions by transverse sutures”, a character not mentioned by THOR (1931, 1933). BAKER (1965) also mentioned differences in leg chaetotaxy between the two species, *T. tenuiclaviger* having four setae on tibia I as opposed to 5 in *T. frequens*.

In his description, THOR (1931) pointed out that the trichobothrium of *T. tenuiclaviger* is

club-like, "thin, longish (elliptic), pointed..." (our translation). GRANDJEAN (1938) depicted a much more rounded, but still elliptic, trichobothrium (his figure 3 A), as compared to the one THOR described.

In our material from South Sweden, we have six specimens with pointed trichobothrium (Fig. 46) and two specimens with rounded tip (Fig. 47).

We conclude that the specimens we have all represent one species, with intraspecific variation in the shape of the trichobothrium, which might be the same as THOR's species *T. tenuiclaviger*. THOR's type material is no longer available for study. Thus, we cannot establish if and, if so, how *T. tenuiclaviger* and *T. frequens* differ. The species called *T. tenuiclaviger* (from Mexico) by BAKER (1965) is probably another species.

KUTZNETZOV & LIVSHITZ (1972) reported five setae on the palp tarsus in the genus. ANDRÉ (1980), however, observed only two (plus solenidion). In our material there are three setae on the palp tarsus plus a solenidion.

Genus *Microtydeus* Thor, 1931 sensu Baker, 1965

Type species: *Microtydeus constans* Thor, 1931 by original designation.

Prodorsum: procurved. Opisthosoma: dorsal chaetotaxy: 11 (l_2 missing); genital organotaxy Ad (female): (0, ? - 2 - 3); poroidotaxy: 4.

Epimeral formula (Ad): (3 - 1 - 4 - 3); leg chaetotaxy (Ad): I (11 - 5 - 4 - 6 - 1), II (8 - 2 - 4 - 4 - 1), III (7 - 2 - 1 - 3 - 1), IV (7 - 2 - 1 - 2 - 0); solenidiotaxy: 3; palp (6 - 2 - 2) + ω with *ba* vestigial and a triple eupathidium at the tip of tarsus.

Microtydeus bellus Livshitz & Kuznetzov, 1973

4 females, Nyteboda (Loc. 12) from moss on the soil surface.

NOTES: *M. bellus* was described from Crimea, on cornelian cherries (LIVSHITZ & KUZNETZOV, 1973).

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