Association of uropodid, prodinychid, polyaspidid, antennophorid, sejid, microgynid, and zerconid mites with ants

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The obligatorily myrmecophilous fauna of North Europe include one species of *Antennophorus* (Antennophoridae) and about 20 species of Uropodidae, representing the subfamilies Oplitinae (*Oplitis* and *Urodiscella*), Trachyuropodinae (*Urotrachytes* and *Urojanetia*), and a few species in other subfamilies (*Phaulodinychus* in Uropodinae and *Uroobovella*, *Oodinychus*, and *Trematurella* in Trematurinae). Polyaspidid taxa are represented only by deviating populations of *Dipolyaspis testaceus*, while various generally non-myrmecophilous prodinychids have invaded ant nests locally (*Prodinychus flagelliger, Dinychus carinatus, D. arcuatus*), and in some case formed huge populations (*Trachyxenura pyriformis, Dinychus septentrionalis*).

Many zerconids are numerous in ant nests, but only *Prozercon traegardhi* and a new species from SW Finland show a distinct preference.

Morphological adaptations concerning mouthparts and larval design for ant symbiosis are found in Antennophoridae and in the uropodid subfamilies Oplitinae and Trachyuropodinae. These two subfamilies share only a few parallel adaptations, and they have evolved from different uropodid groups. Most myrmecophilous mite species of North Europe prefer a single ant host. Nests of Formicinae, esp. *Lasius* (*Chthonolasius, Cautolasius* & s.str.), *Dendrolasius, Camponotus,* and *Formica* are distinctly preferred to Myrmicinae (except *Tetramorium*).

Both ants and mites have seemingly isolated populations, which could be classified as *species in statu nascendi*. Many of these mite populations with different ant hosts are also allopatric and here treated as subspecies. All European species of the *Oplitis ovatula*-group live in myrmicine nests (*Tetramorium, Messor,* and *Myrmica*). A detailed analysis of the taxonomy of the uropodid guests of different populations of *Formica exsecta* most probably will help in the taxonomic reevaluation of the latter.

The names used in this paper are based on a recent revision of these groups, including also the checking of all Berlese types.

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Introduction

The presence of a rich mite fauna in the nests of various European ants was well documented by numerous authors ca. 100 years ago and first mentioned by Forel (1874) without identification of the mites. Michael (1894b) and Wasmann (1899) suggested that many of these mites are dependent on certain ant species or at least strongly prefer their nests as the microhabitat.

Basic data for myrmecophilous Uropodoidea was presented by Haller (1877 & 1882), Lubbock (1881), Berlese (1881, 1882–1892, 1904 a & b), G. Canestrini & R. Canestrini (1882), G. Canestrini & Berlese (1884), G. Canestrini (1884), Michael (1891 & 1894 a & b), Karpelles (1891), Moniez (1892 & 1894), Wasmann (1894, 1897 a–b, 1898, 1899 & 1902), Leonardi (1895 & 1896), Trouessart (1896 & 1902), Janet (1897 a & b), Karawaiew (1906), and Kneissl (1907, 1908).

Although myrmecophilous species of mites were described by many acarologists, the main opus is Berlese's Acari Mirmecophili (1904b), at least as far as the Uropodina is concerned – the main group discussed here. Later, Donisthorpe

(1927: British Isles), Balogh (1938: Hungary), Štorkan (1940) and Pecina (1980: Czechoslovakia), Greim (1952: S Germany) and Wisniewski (1979c: Poland), have published local lists of myrmecophilous mites. North European myrmecophilous uropodids and polyaspidids have been recently described by Greim (in Hirschmann 1957), Hirschmann & Zirngiebl-Nicol (1961), Wisniewski (1979a, 1980a & b), Pecina (1980), and Hirschmann (1984). Krasinskaya (1961) studied the life histories of some of the species discussed here.

The European uropodids have not been taxonomically revised so far. Names used here are based on a recent, as yet unpublished revision that also includes checking of all Berlese types of the mite groups discussed here.

The published information about North European myrmecophilous mites is scanty, and the majority of the common widespread species were never reported from any of the North European countries. Thor (1900) described a new species, *Uropoda formicarum* from Norway. It has not been cited by Central European authors and it is here synomymized with *Oodinychus ovalis* (C. L. Koch). Trägårdh (1942) described a new uropodid species, *Trematurella stylifera*, and stated (1945) that it is associated with a species of the *Formica rufa*-group from Sweden. He also proposed a new family, Trematurellidae (1944), for the species. Trägårdh (1943) also presented a review, where the family Antennophoridae was discussed in more detail, however, with most examples from tropical and other non-European genera. He mentioned the phoretic dispersal of uropodid deutonymphs, but exemplified from other insects, mainly Coleoptera. No mesostigmatid mite from ant nests is previously known from Finland.

The evaluation of the descriptions of the associations between different species of mites with the ant species were affected by the obscurity of both mite and ant taxonomy at the time of the pioneers of this field (Leonardi 1896, Wasmann 1899, Donisthorpe 1927). The current specific concepts of the *Formica rufa* group date back only to Yarrow (1955), and, in my opinion, there are still many unsolved problems. The yellow species of *Lasius* have quite often been misidentified, not only by acarologists, but also by myrmecologists.

There are also two additional sources of error in the published data about the association between mite and ant species. First, a sample from under a single stone or any other limited area may include small nests of many *Myrmica, Leptothorax*, and *Lasius* spp. In this way, the guests of different ant species may become mixed in the sample.

Secondly, many authors have listed the host species of different mites without any quantitative information. Let's take an illuminating example. If we have an old large anthill of *Formica exsecta*, throughout crowded with the very striking, nice red uropodid *Urojanetia coccinea* (500–1500 specimens per liter), it is likely that single specimens are accidentally transported by the ants to the neighbourhood. When we then find single specimens of *U. coccinea* within the closeby anthill of *Formica aquilonia* or under the stones, where *Formica fusca* or *Lasius niger* happen to have their nests, these observations don't prove that the species belong to the local host species of *U. coccinea*. Third, dead specimens of many arthropod species are actively transported to the nest by the ants.

Dispersal and feeding of myrmecophilous mites

The mode of living and dispersal of myrmecophilous mites is realized according to three different strategies.

1. **Phoretic dispersal of adult specimens.** Adult specimens of *Oplitis* and *Urodiscella* are regularly attached to the protibial comb of their host ant, both workers and alates. This behaviour was first depicted by Janet (1897a). Adult specimens of *Antennophorus* are regularly attached below or on the head of the ants, and are dispersed in this way. Both the oplitine species and *Antennophorus* make use of this close attachment for their feeding and are more generally classified as commensals. What they eat is subject to opinions, but *Oplitis* spp. are usually regarded mainly as feeding of the minute skin particles and other organic debris combed by their brushlike, strongly specialized mouth parts.

2. **Phoretic dispersal by deutonymphs.** Many adults of myrmecophilous and non-myrmecophilous species of the uropodid subfamilies Uropodinae and Trematurinae and the nominate polyaspidid subfamily are never attached to insects. Most of them, however, have a phoretic deutonymph that is firmly attached to a flying insect to secure an effective dispersal. *Phaulodinychus hamulifer*, the odd-looking guest of *Lasius niger*, throughout covered by club-

shaped strong setae, can easily be collected by sweep-netting at the swarming of its host. Workers, most probably, play no role in the dispersal of this species. The mode of dispersal of the myrmecophilous populations of *Dipolyaspis testaceus* and *Oodinychus spatuliferus* has not been observed, but most probably their deutonymphs are phoretic on swarming *Camponotus herculeanus*. These specialized populations most likely represent evolving new taxa, although no undisputed morphological differences are present.

Many species of these subfamilies have two types of deutonymphs, phoretic and sessile. The common uropodid species of various special habitats, *Oodinychus ovalis*, uses various insects for dispersal by its phoretic deutonymphs, but sessile deutonymphs are often found in large numbers together with adults and protonymphs in a suitable habitat.

A special group consists of the myrmecophilous species of the genus *Uroseius*. Adults of this genus are rarely collected on mammal carcasses, while phoretic deutonymphs are relatively common in some of the non-myrmecophilous species. For *Uroseius koehleri* Wisniewski, 1979, only a few deutonymphs are known from an anthill of *Formica polyctena* in Poland and from two anthills of *F. rufa* in southern Finland.

3. **Neither adults nor deutonymps of obligatory myrmecophilous groups are regularly attached to ants.** *Uroobovella obovata* is an example of this strategy, other can be found in the subfamily Trachyuropodinae.

Species of *Urotrachytes, Urojanetia*, and *Uroobovella obovata* are often found in huge numbers within ant nests, while solitary specimens are found in the surroundings outside the nests. Most probably they are accidentally attached to the workers of ants, and this is sufficient for their dispersal. The same is true for all zerconid, sejid, and prodinychid species, present in ant nests.

Categories of myrmecophilous mites

Wasmann (1894) first classified myrmecophilous arthropods into *synoects, synocoets, symphiles* (= *myrmecoxenes*), and *ectoparasites*. These categories were discussed in detail by Donisthorpe (1927: xv–xxiii). The first and last categories are not represented in the mite groups discussed here, although uropodids as parasites were still listed by Sellnick (1939).

Synocoets were originally defined as guests tolerated by ants, while symphiles as guests actively and friendly treated by ants. Much additional data about reciprocal relations of different arthropod groups have been accumulated since Wasmann's time, and the relationships are best described in general terms of coevolution.

The term *myrmecophilous* is now used as a general term for organisms distinctly preferring ant nests, but this term doesn't describe the mode of association in detail. All authors that have made exact observations about the habits of mites in ant nests, have regarded most of them as *commensals*. Our knowledge today is not sufficient for the final classification of symbionts and pure commensals among the myrmecophilous mites, but most probably all groups of mites that are obligatory myrmecophilous (*Antennophorus, Oplitis, Urodiscella, Urotrachytes, Urojanetia* and *Phaulodinychus* (*Uropolyaspis*) spp., *Oodinychus spatuliferus* & *Uroobovella obovata*) are symbionts. A part of the facultative myrmecophilous species may also belong to this category.

All zerconids, preferring to live in or regularly present in ant nests live there probably simply because these microhabitats are rich in organic debris or afford an optimal microclimate for hibernation. Many of these mites most probably are fungivores as many other debris living ones. Hyphae of numerous species of fungi are regularly present in ant nests, and they are most probably as important to the myrmecophilous mites as the ants themselves are.

The mite fauna of different ant species

Most Finnish species of myrmecophilous mites are associated with only one or two host species (Tab. 1). Their more detailed distribution will be discussed elsewhere (Lehtinen, in preparation). Old observations from other European countries were summarized without revision of neither ant nor mite species by Bernard (1968). These data cannot be compared with the data in Tab. 1.

Members of *Lasius* s.lat. have the highest number of mites associated with a single species of ant. In addition, the genus *Antennophorus* with five European species is completely restricted to nests of *Lasius*, and the oplitine genera *Oplitis* and *Urodiscella* are nearly so restricted. The nests of *Lasius* (*Chthonolasius*) are quite difficult to find, as they are 30–60 cm deep in the ground (*L. mixtus*

Tab. 1. Checklist of Finnish myrmecophilous mites: Antennophorina, Uropodina, Sejina & Zerconina. The column A gives the type of relationship as: (1) dependent on one/two closely related ant speices, (2) abundant in ant nests, but several common hosts, (3) occasionally very abundant in anthills, (4) myrmecophilous populations of non-myrmecophilous species, and (5) common non-myrmecophilous species, also regular in anthills. In column B, (1) denotes species with parthenogenetic populations only in northern Europe, and (2) specialists of decaying wood, often in nests of ants. The C column gives distributional data as: (1) not previously recorded from continental northern Europe, (2) recorded from Finland, and (3) not previously recorded from Finland. The column to the right lists the host species, the ones with distinct correlations are given in bold types.

Mite species	A	B	C	Host species
Antennophorina Camin & Gorirossi, 1955				
Antennophoridae Berlese, 1892				
Antennophorus pubescens Wasmann, 1897	1		1	**Lasius umbratus**
Uropodina Kramer, 1881				
Uropodidae Kramer, 1881				
Oplitinae Hirschmann & Zirngiebl-Nicol, 1962				
Oplitis pandata (Michael, 1894)	1		1	**Lasius niger**
O. pandata (Michael, 1894) ssp. n. "A"	1		1	*Formica rufa* (inland), *F. exsecta* (inland bogs)
O. pandata (Michael, 1894) ssp. n. "B"				*Camponotus herculeanus* (SW)
O. villosella (Berlese, 1904)	1		1	**Lasius flavus** (Ostrobothnia)
O. villosella ssp. n.	1		1	**Lasius meridionalis**
O. ovatula (Berlese, 1903)	1		1	**Tetramorium caespitum**
O. stammeri Greim in Hirschmann 1957	1		1	**Dendrolasius fuliginosus**
Urodiscella (*Uropectinia*) *philoctena* (Janet, 1897)	1		1	**Lasius mixtus**
U. (*Uropectinia*) *wasmanni* (Kneissl, 1907)	1		1	**Lasius flavus** (S Finland)
U. (*Urodiscella*) *alophora* (Berlese, 1903)	1		1	**Dendrolasius fuliginosus** & **Lasius mixtus**
Trachyuropodinae Berlese, 1917				
Urotrachytes formicaria (Lubbock, 1881)	1		1	**Lasius flavus**
Urojanetia coccinea (Michael, 1891)	1		3	**Formica exsecta** (meadows & archipelago), *F. sanguinea*, *F.* (*Serviformica*) spp.
U. excavata (Wasmann, 1899)	1		1	**Tetramorium caespitum**
U. wasmanniana (Berlese, 1903)	1		1	**Lasius mixtus**
U. hirschmanni (Pecina, 1980)	1		1	**Lasius meridionalis**
Uropodinae Kramer, 1881				
Uroseius koehleri Wisniewski, 1979 (D only)	1		1	*Formica rufa*
Microcylliba minima (Kramer, 1882)	4	1	1	*Lasius mixtus*
Phaulodinychus (*Phaulodinychus*) sp. n.	1		1	**Camponotus herculeanus**
P. (*Uropolyaspis*) *hamulifer* (Michael, 1894)	1		1	**Lasius niger**
P. (*U.*) *spinosulus* (Kneissl, 1916)	1		1	**Lasius mixtus**
Trematurinae Berlese, 1917				
Oodinychus spatuliferus (Moniez, 1892) ssp. *beckwithi* Wisniewski, 1979	4		1	**Camponotus herculeanus** & *C. vagus*
O. ovalis (C. L. Koch, 1839)	2	2	2	*Formica*, *Camponotus*, *Lasius* spp.
Ipiduropoda dialveolata (Hirschmann & Z.-Nicol, 1961)	2	2	1	*Dendrolasius fuliginosus*, *Lasius meridionalis* & *L. flavus*
I. interstructura (Hirschmann & Z.-Nicol, 1961)		?2	1	*Formica pratensis*
Trematurella elegans (Berlese, 1916)	2		3	*Formica polyctena*, *L. niger*
Urodiaspis tecta (Kramer, 1876)	5	1	2	
Uroobovella obovata (Canestrini & Berlese, 1884)	1		1	**Formica fusca, Lasius niger**
Dinychopsis catula (Hull, 1918)		2	1	*Formica polyctena*
Prodinychidae Berlese, 1917				
Trachyxenura pyriformis (Berlese, 1920)	3		1	*Formica exsecta*, *F. aquilonia*, *D. fuliginosus*
Prodinychus (*Allodinychus*) *flagelliger* (Berlese, 1910)	3	2	3	*Formica fusca*
Dinychus arcuatus (Trägårdh, 1943)	3		3	*Formica polyctena*
D. septentrionalis (Trägårdh, 1943)	3	2	3	*Formica polyctena*
D. carinatus Berlese, 1903		2	1	*Lasius* & *Myrmica* spp.

Mite species	A	B	C	Host species
Polyaspididae Berlese, 1913				
Discourella (*D.*) *modesta* (Leonardi, 1899)	4	1	2	*Camponotus ligniperda, Formica fusca, Lasius*
Trachytes aegrota (C. L. Koch, 1841)	5	1	2	all ants
T. minima Trägårdh, 1910	5	1	2	*Formica rufa*-group, *Myrmica*
Dipolyaspis testaceus (C. L. Koch, 1836) spp. *criocephali* Wisniewski, 1979	4	2	1	**Camponotus herculeanus**
Sejina Trägårdh, 1938				
Sejidae Berlese, 1895				
Sejus togatus C. L. Koch, 1836	3	2	2	*Formica polyctena*
Microgynidae Trägårdh, 1942				
Microsejus truncicola Trägårdh, 1942		2	3	*Formica aquilonia, F. rufa, F. fusca, Leptothorax* spp.
Zerconina Trägårdh, 1946				
Zerconidae Canestrini, 1891				
Parazercon (*Parazercon*) *radiatus* (Berlese, 1910)	5	1	2	all ants
Prozercon traegardhi (Halbert, 1915)	2		3	*Lasius flavus, L. niger*
P. kochi Sellnick, 1943	5		2	all ants
Zercon solenites Haarløv, 1942	5		3	*Formica* spp.
Z. lindrothi Lundqvist & Johnston, 1986	5		3	*Lasius* spp., *Formica fusca*
Z. spatulatus (C. L. Koch, 1939)	3	2	1	all southern ants
Z. sp. n. (aff. *Z. spatulatus*)	2		1	*Camponotus ligniperda, Lasius niger, L. flavus*
Z. curiosus Trägårdh, 1910	5		3	*Formica, Lasius, Camponotus, Myrmica* & *Leptothorax* spp.

& *L. umbratus*) or the species itself is rare (*L. meridionalis*). Only one nest of each of these species was checked in Finland for this study, resulting in four taxa present only in the nest of *L. mixtus*: namely *Urodiscella philoctena, Phaulodinychus spinosulus, Urojanetia wasmanniana*, and a parthenogenetic population of *Microcylliba minima*. The single nest of *L. umbratus* yielded the only northern European species of Antennophoridae, *Antennophorus pubescens*, and the nest of *L. meridionalis* the second known locality of *Urojanetia hirschmanni*, a new subspecies of *Oplitis villosella*, and the only myrmecophilous *Ipiduropoda, I. dialveolata* that was also found in a closeby nest of *Dendrolasius fuliginosus*. The nests of the latter species are always founded through a previously existing nest of a *Chthonolasius*. This seems to explain the presence of *I. dialveolata* and *Urodiscella alophora* in nests of both subgenera. *Oplitis stammeri* is confined to nests of *D. fuliginosus*, and most probably some old records of *Urodiscella ricasoliana* (Wasmann, 1899, Donisthorpe 1927) refer to this species.

The common species of *Lasius* also have several specialized mites. Nests of *L.* (*Cautolasius*) *flavus* in southern Finland are inhabited by *Urotrachytes formicarius* and *Urodiscella wasmanni*, but a few isolated populations of *L. flavus* in the small islands of the Bothnian Gulf have *O. villosella* as the oplitine guest. *U. wasmanni* may be dependent also on *U. formicarius*, as it has never been found as the single uropodid guest of an *L. flavus*-nest. The only zerconid species that could be classified as a guest of mainly one species of ants is *Prozercon traegardhi*, found sparingly mostly with *L. flavus*. Large, old nests of *Lasius* (*L.*) *niger* are regularly inhabited by *Oplitis pandata* and *Phaulodinychus hamulifer* within the more or less continuous range of this ant in southern Finland, often also by *Uroobovella obovata*.

In Finland, nests of *Camponotus herculeanus* are richer in specialized uropodid species than those of *C. ligniperda*, especially when the common central European guest of the latter, *Urojanetia cristiceps* obviously is lacking in Finland. However, the majority of younger nests of *C. herculeanus* are poor in uropodid mites, except *Oodinychus ovalis*. The list of its guest was markedly increased through examination of two very old nests, both quite exceptional in regard to their arthropod fauna. The first nest was found in the floor of a since long unused barn in the Seitseminen National Park, central Finland. The barn had been used to store grass from the surrounding fields. A new species of *Phaulodinychus* was found in this nest together with the only Finnish inland population of *Ephippiochthonius tetrachelatus,* a pseudoscorpionid common in the outer and middle zones of the SW archipelago. The second nest was found in the Saaristomeri National Park (SW archipelago). This huge nest included the remaining specialist species of *C. herculeanus*: *Oplitis pandata* n.ssp. "B", *Oodinychus spatuliferus beckwithi* and *Dipolyaspis testaceus criocephali*. Wisniewski & Hirschmann (1983) described a species *Dinychus camponoti* based only on larval stage. As long as most larvae of the *Dinychus* spp., preferring decaying wood, have never been described, it is impossible to know with which species it will be synonymized, but the strongest candidate is *D.carinatus* Berlese, a regular but not abundant species in SW-Finland.

Old records from other parts of Europe are the least reliable among *Formica* spp.. The most interesting species is *F.* (*Coptoformica*) *exsecta*. It is the main host of *Urojanetia coccinea* for the island and coastal populations and for the meadow populations with flat anthills in the inland. The inland bog populations of *F. exsecta* usually have quite rich populations of a new subspecies of *Oplitis pandata*. These populations of *F. exsecta* often build high, relatively narrow anthills, and the possibility does exist that we are dealing with different ant taxa, as is now generally accepted for the traditional *F. rufa*. Several local non-myrmecophilous species of Uropodidae and Zerconidae and numerous other mesostigmatid, prostigmatid, tarsonemid, astigmatid, and oribatid mites are often present in old anthills of the southern type of *F. exsecta*. This seems to be the most common "natural" habitat of *Trachyxenura pyriformis*, a common species in man-made habitats rich in organic debris.

Nests of the other species of the *F. exsecta*-group have not been sufficiently investigated. Most of them may exceptionally be accepted as the host of *U. coccinea*. Apart from this group, nests of *F.* (*Raptiformica*) *sanguinea* and its slaves (*Serviformica* spp.) sometimes have a rich population of *U. coccinea*.

Most nests of *Formica aquilonia, F. rufa, F. polyctena,* and *F. pratensis* are very rich in a few common species of Laelaptidae, especially *Hypoaspis myrmecophilus* and *Cosmolaelaps cuneifer*. Locally common zerconids (*Prozercon kochi, Parazercon radiatus, Zercon curiosus, Z. spatulatus* and *Z. solenites*, the latter only in northern and central Finland) may be abundant. Uropodids are most often represented only by the non-hostspecific *Oodinychus ovalis*. In E Finland, however, *Oplitis pandata* ssp. "A" may be locally abundant in anthills of *F. rufa*, and the Finnish deutonymphs of *Uroseius koehleri* are all from nests of that species. An anthill of *F. polyctena* from Kankaanpää, inland of W Finland, had the highest density of uropodid mites, almost 7000 specimens in a sample of less than two liters. The species composition was quite exceptional, with *Dinychus septentrionalis* and *Sejus togatus* in huge numbers, *Dinychus arcuatus* and *Dinychopsis catula* among the abundant species, together with the very abundant myrmecophilous *Oplitis pandata* spp. "A", and a few *Oodinychus ovalis* and *Urojanetia coccinea*. A rich sample of *Trematurella elegans* was collected from an anthill of *F. polyctena*.

Anthills of *F. polyctena* have been thoroughly investigated in Poland (Wisniewski 1979a, b, etc), and most Polish uropodid species are recorded from these. Unfortunately, the nests of other species of the *F. rufa* group are practically uninvestigated in the same area, and generally no information has been given as concerns numbers of specimens of different mites. A direct comparison of the guests of this species becomes difficult also because the concept of *F. polyctena* may be slightly different in these two countries.

Nests of *Formica* (*Serviformica*) *fusca* under stones and in the soil mostly share the myrmecophilous species *Uroobovella obovata* and common zerconids with nests of *Lasius niger* in similar habitats. The nests of *F.* (*Serviformica*) in decaying tree stumps are preferred localities for the rare *Prodinychus flagelliger* in E Finland. This is repeatedly confirmed from nests of *F. fusca*, but apparently many of the tree trunks were inhabited by *F. gagatoides*. *P. flagelliger* and *Serviformica* spp. prefer decaying tree trunks of birch, willow, aspen, and alder in virgin forests, and it is hard to decide whether the association is due to common preference of this special habitat of decaying wood or of true reciprocal dependence.

The mite fauna of the nests of Finnish Myrmicinae is generally poor, with the exception of *Tetramorium caespitum*. Large nests of this species are normally inhabited by both of its specialists, *Urojanetia excavata* and *Oplitis ovatula*.

A large number of nests of *Leptothorax acervorum, Myrmica scabrinodis, M. rubra, M. ruginodis*, and many nests of other Finnish species of *Myrmica* and *Leptothorax* have been investigated by Dr. Michael Saaristo and the author. They regularly include specimens of common mesostigmatid species from their surroundings (*Prozercon kochi, Parazercon radiatus, Trachytes aegrota, Zercon* spp.). Uropodid species are, however, exceptional, and if so, in low numbers (*Oodinychus ovalis, Uroobovella obovata, Trematurella elegans*).

A reliable comparison of the ant hosts of different mite species in different parts of Europe is possible only when verified data from other parts of Europe have become available.

The species composition of the mite groups discussed here in ant nests is now relatively well known in Finland and, obviously, also for the whole of northern Europe, but we know very little about the relationships of these species with their ant hosts.

Taxonomic position of Oplitinae and Trachyuropodinae

Trachyuropodinae is often united with the Oplitinae (Hirschmann & Zirngiebl-Nicol 1962, etc) to a single subfamily. The reason for this is their similar, brushlike mouthparts and common reductions of the dorsal larval plates. Apart from these similarities, however, most of their structures are quite dissimilar and they can be independently derived from two non-myrmecophilous groups of Uropodidae. These are the Oplitinae which are minute, semiglobular, with smooth non-sculptured plates as found in *Uroobovella* and *Urosternella*, and the Trachyuropodinae which are large, flattened oval, brightly red, and with extremely distinct sculptured plates as in *Trachycylliba* (= *Discopoma* auct.). *Trachyuropoda* and *Discopoma* auct. were also placed in the same group by Baker & Wharton (1952) and Athias-Binche (1980). In my opinion, the similarities in the mouth parts are simply due to parallel adaptions to similar feeding habits, and the larval reduction is merely a parallel evolution between advanced groups.

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Sammanfattning

En checklist över myrgäster inom kvalsterfamiljerna Uropodidae, Prodinychidae, Polyaspididae, Antennophoridae, Sejidae, Microgynidae och Zerconidae i Finland presenteras (Tab. 1). I Tab. 1 listas även värdarter bland myrorna och typen av förhållande anges som: (tabellkod A1) beroende av en eller två närbesläktade myrarter, (A2) vanlig i myrbon, men med flera vanliga värdarter, (A3) enstaka mycket individrik förekomst i myrstackar, (A4) myrmekofila populationer av annars ej myrmekofila arter, (A5) vanlig ej myrmekofil art som även påträffas reguljärt i myrstackar, och (B2) specialist på förmultnande ved som ofta förekommer i myrbon. Flera arter anges här för första gången från Nordeuropas fastland (tabellkod C1), resp. Finland (C3). Flertalet arter föredrar en enda myrart som värd, och underfamiljen Formicinae föredras framför Myrmicinae.