Overview on Phytoseiidae mites (Acari, Mesostigmata, Gamasina) of Latvia

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Abstract: This report gives an overview on Phytoseiidae mites of Latvia, based on data from previous works. Thirty five species collected from diverse habitats, various vegetation, as well as from soil and litter are listed. The widest variety (29 species) of Phytoseiidae was found on different species of trees and bushes. The most widely investigated and the most abundantly inhabited was *Malus domestica* with 16 Phytoseiidae species. Thirteen species were found on *Fragaria* x *ananasa. Amblyseius obtusus* was found to be the most widely distributed Phytoseiidae species in Latvia. Discussion about Latvian, Lithuanian, Estonia, Finland and South Sweden Phytoseiidae fauna was made. Species composition highly differed amongst those sites. Differences can be explained by various methods of collecting and processing of the material, as well as by differences of climate. The highest number of species was found for Lithuania and Latvia.

Key words: Phytoseiidae, predatory mites, Gamasina, fauna, ecology, Latvia.

Introduction

Phytoseiidae mites are widely distributed in most terrestrial ecosystems. They live in the foliage or on bark of trees and bushes, on other vegetation, additionally some species are common litter and soil inhabitants (Evans et all., 1985). Predatory mites belonging to the family Phytoseiidae regulate pest mite populations (Murtry, Croft, 1997), they are especially important controllers of high densities of phytophagous mites. Most of the phytoseiids are able to survive and reproduce on other arthropods like eriophyiid and tarsonemid mites, thrips etc., fungi, pollen and sap of plants (Easterbrook, 1992; Evans et all., 1985; Helle, Sabelis, 1985; Walter, Proctor, 2000).

Some introduced phytoseiids like *Phytoseiulus persimilis* Athias-Henriot, 1957, *Amblyseius barkeri* (syn. *A. mckenziei* Schuster et Pritchard, 1963), *A. cucumeris*, *A.* (*Neoseiulus*) *fallacis* (Garman, 1948) and *Typhlodromus pyri* Scheuten, 1857 have been used as control agents for some pests in greenhouses and outdoor agrocenoses in many countries and some of them are also used in Latvia (Bennison, Jacobson, 1991; Nesbitt, 1951; Petrova, Hramejeva, 1989a; Petrova, Petrov, 1970, 1972, 1977a,b; Steinite et all., 1998).

Investigations of the Phytoseiidae fauna of Latvia were made by N.Kuznetzov and V.Petrov (1978, 1979), V.Petrova (Petrova et all., 1997, 2000a,b), A.Prieditis (1966, 1968, 1971, 1995), A.Prieditis and E.Plise (1975), V.Petrov (1971, 1973), E.Plise (1972, 1974) and I.Salmane (Melecis et all., 1994; Paulina, Salmane, 1996, 1999, Petrova, Salmane, 2000; Salmane, 1996, 1999, 2000a,b, 2001; Salmane, Heldt, 2001; Salmane et all., 1999) in diverse ecosystems, such as woods, inland meadows, orchards, strawberry fields, salty coastal meadows, dunes and littoral zone.

N. Kuznetzov and V.Petrov (1984) made a first review of data on Latvian phytoseiids, where they also included own investigations of 1976-1981. Later I.Lapina included this list of Phytoseiidae in her overview of Latvian Gamasina (Lapina, 1988). I.Salmane (2001) made the third notification of Phytoseiidae mites within a check-list of Latvian Gamasina mites and registered for Latvia 35 species.

Several investigations on ecology, biology and histology of native and introduced Phytoseiidae mites were made (Emeljanov, Petrov, 1973, 1975; Karps et all., 1990; Lapina, Melecis, 1985, 1989; Petrov 1971; Petrova,

1969, 1970; Petrova, Petrov, 1977b; Petrova, Hramejeva, 1989b; Petrova et all., 1990; Prieditis, Plise, 1975). The present paper gives an overview on Latvian Phytoseiidae summarising all data from literature.

Results and discussion

The respective investigations were made on various deciduous and coniferous trees, bushes, diverse plants and mosses, in the soil and litter. According to N.Kuznetzov and V.Petrov, fauna of phytoseiids was intensivelly investigated in 1977-1979 in Latvia. Twenty seven Phytoseiidae species were found in 78 localities from 4 regions of Latvia (Kurzeme, Zemgale, Vidzeme, Latgale) during July-August 1977, June-August 1978 and August 1979. Totally, 12 species registered in orchards (39 locations). Species *Amblyseius finlandicus* (31 locations), *A. subsolidus* (10), *A. rhenanus* (4), *Phytoseius salicis* (17), and *Paraseiulus incognitus* (8) were common in all four regions. *Amblyseius finlandicus* (11 locations), *A. subsolidus* (6), and *Paraseiulus incognitus* (6) were registered as inhabitants of orchards. Four species were found only in some locations: *A. obtusus* (6), *A. cucumeris* (5), *A. rhenanus* (4), and *A rademacheri* (4); other species were relatively rare in orchards.

By I.Salmane fauna of phytoseiids of salty coastal meadow soils was studied for the first time in Latvia and ten species were registered there (Salmane, 1999; Salmane et all., 1999). Thirteen Phytoseiidae species were registered on cultivated strawberry *Fragaria* x *ananasa* by V.Petrova et all. (2000a,b). Amongst them 11 species were found for the first time on strawberries in Latvia.

Altogether 35 Phytoseiidae species were found in Latvia (tab. 1). The highest number of them was registered on the various trees and bushes (29 species). The most widely investigated (amongst trees and bushes) and the most abundantly inhabited was *Malus domestica* with 16 Phytoseiidae species. Twenty-seven phytoseiid species were found on other various plants.

Amblyseius obtusus was found to be the most common Phytoseiidae species in Latvia (tab. 1). *A. marinus* and *A. andersoni* were typical species for coastal dunes and washed ashore material (Salmane, 2000b; Salmane, Heldt, 2001); *A. finlandicus*, *A. subsolidus,* and *A. rhenanus* were common on *M. domestica*. *A. obtusus, A. cucumeris, A. meridionalis* and *A. zwoelferi* were common litter and moss inhabitants (Salmane, 1999, 2000b, 2001; Salmane, Heldt, 2001; Paulina, Salmane, 1996, 1999).

The Phytoseiidae fauna also was investigated in Lithuania and the list of Phytoseiidae included about 42 species (Eitminavichute, 1976; Pauriene, 1968a,b; Kuznetzov, Petrov, 1984; Malov, Begljarov, 1985). According to those authors, the most abundant species in Lithuania were *Anthoseius tortor* Begljarov 1981 and *Kampimodromus aberrans* Oudemans 1930 (both unknown from Latvia) and also some species of the genus *Phytoseius* Ribaga, 1902. On the cultivated berries, the most common species were *Amblyseius finlandicus, A. umbraticus* (both also known from Latvia, tab. 1) and *A. krantzi* (Chant, 1959) (unknown from Latvia). Twelve Phytoseiidae species occur in Estonia (Eitminavichute, 1976; Kuznetzov, Petrov, 1984).

The fauna of Phytoseiidae mites (in total 19 species) was studied in South Sweden by N.Steeghs et all. (1993) strongly differs from that of Latvia. This is mainly due to fact that in South Sweden various trees and bushes were investigated while in Latvia it was a wide range of habitats (tab. 1). Seventeen phytoseiid species for Latvia (tab. 1) and 11 for South Sweden were found on *M. domestica*, however, only 2 of them were common for both sites – *A. finlandicus* and *Anthoseius rhenanus.* The most frequent species in South Sweden is *Typhlodromus pyri* (unknown from Latvia) and *A. finlandicus* (also found in Latvia, tab. 1). On cultivated strawberries, 13 phytoseiid species were found for Latvia, 6 for Finland (Tuovinen, 1995), and 5 for South Sweden (Steeghs et all., 1993). Four of them were common for Latvia, Finland and South Sweden: *A. finlandicus, A. reductus, A. zwoelferi*, and *A. okanagensis*.

Differences in fauna of Phytoseiidae in Baltic States and Scandinavia obviously can be related to the variability of methods used in

collecting and processing of mites. The sampling from foliage of cultivated and wild trees, bushes and plants, also by soil samples, and processing by Tullgren funnels was used in Latvia, Lithuania and Estonia. In Scandinavia, sampling from foliage and processing by method of flotation was used. There are also differences in climate, where it is relatively warmer in South of Baltic (more favorable conditions for phytoseids).

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Kopsavilkums

Tika veikts pārskats par Phytoseiidae grupas Gamasina ērču (Acari, Mesostigmata) pētījumiem un literatūru Latvijā. Kopumā konstatētas 35 fitoseīdu sugas, no tām visvairāk sugu (29) atrastas uz kokiem un krūmiem. Sešpadsmit sugas atrastas uz *Malus domestica* un 13 uz *Fragaria* x *ananasa*. *Amblyseius obtusus* konstatēta kā Latvijā visplašāk sastopamā suga. Phytoseiidae dzimtas ērču fauna salīdzināta ar pārējām Baltijas valstīm, Dienvidzviedriju un Somiju un konstatētas ievērojamas sugu sastāva atšķirības. Daļēji šīs atšķirības izskaidrojamas ar dažādām materiālu ievākšanas un apstrādes metodēm, kā arī klimatisko apstākļu atšķirībām Scandinavijā un Baltijā. Vislielākā sugu daudzveidība ir konstatēta Lietuvā.

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Table 1. List of Phytoseiidae species and habitats investigated in Latvia.

Phytoseiidae species	**Leaf samples from**		**Litter, mosses**	**Soil samples** (coastal habitats)
	Trees, bushes	**Other plants**		
Typhlodromus cotoneastri Wainstein, 1961	*Malus domestica*			
Typhlodromus tiliae Oudemans, 1929	Malus domestica	*Rubus* spp., grasses		
Anthoseius clavatus Wainstein, 1972	*Malus domestica*	grasses		
Anthoseius caudiglans (Schuster, 1959)	*Malus domestica*	*Rubus* spp., grasses		
Anthoseius rhenanus (Oudems, 1905)	*Malus domestica*	*Rubus* spp., grasses		
Anthoseius rapidus Wainstein et Arutunjan, 1967	*Betula* spp., *Quercus* spp.			
Paraseiulus soleiger (Ribaga, 1902)		wild plants		
Paraseiulus incognitus Wainstein et Arutunjan, 1967	*Malus domestica*, various bushes	grasses		
Amblyseius bakeri Garman, 1948	*Juniperus communis, Malus domestica, Pinus sylvestris*	*Rubus* spp.		dunes
Amblyseius obtusus C.L.Koch, 1839	*Malus domestica*, *Acer* spp., *Pinus* spp., *Quercus* spp.	*Rubus* spp., *Vaccinium* spp., grasses	litter (esp. coniferous forests)	washed ashore, dunes, coastal meadows
Amblyseius herbarius Wainstein, 1960	*Corylus avellana*	*Fragaria* x *ananasa*		dunes
Amblyseius rademacheri Dosse, 1958	*Acer* spp., *Alnus* spp., *Betula* spp., *Juniperus communis*	*Fragaria* x *ananasa,* grasses		coastal meadows
Amblyseius graminis Chant, 1956	*Juniperus communis, Malus domestica*	grasses		coastal meadows, dunes
Amblyseius messor Wainstein, 1960	*Alnus* spp.	*Rubus* spp.		coastal meadows, dunes
Amblyseius aurescens Athias-Henriot, 1961	*Sorbus* spp.	*Fragaria* x *ananasa*		coastal meadows, dunes
Amblyseius reductus Wainstein, 1962	*Quercus* spp.	*Fragaria* x *ananasa*		coastal meadows
Amblyseius cucumeris (Oudemans, 1930)	*Betula* spp., *Malus domestica, Sorbus* spp.,	*Fragaria* x *ananasa,* grasses	litter	
Amblyseius meridionalis (Berlese, 1914)	*Pinus* spp., *Juniperus communis*		mosses, litter	coastal meadows, dunes

Continuation of table 1.

Amblyseius begljarovi Abbasova, 1970	*Betula* spp., *Salix* spp.	*Urtica* spp., *Medicago* spp.		
Amblyseius zwoelferi (Dosse, 1957)		*Fragaria* x *ananasa, Trifolium* spp.	litter	coastal meadows, dunes
Amblyseius agrestis (Karg, 1960)		*Fragaria* x *ananasa*	mosses	washed ashore, dunes
Amblyseius subsolidus Begljarov, 1960	*Malus domestica,* various trees	*Fragaria* x *ananasa*, *F. vesca,* various plants		
Amblyseius okanagensis (Chant, 1957)	*Alnus* spp.	*Fragaria* x *ananasa, Rubus* spp.		
Phytoseius salicis Wainstein et Arutunjan, 1970	*Acer* spp., *Malus domestica,* bushes	*Fragaria vesca,* grasses		
Amblyseius finlandicus (Oudemns, 1915)	*Acer* spp., *Malus domestica*, *Ulmus* spp.	*Fragaria* x *ananasa, F. vesca*		
Amblyseius marginatus (Wainstein, 1961)	*Sorbus* spp., *Quercus* spp.			coastal meadows
Amblyseius bicaudus Wainstein, 1962		*Fragaria* x *ananasa,* grasses		washed ashore, dunes, coastal meadows
Amblyseius barkeri (Hughes, 1948)		*Fragaria* x *ananasa*		dunes
Amblyseius umbraticus (Chant, 1956)	*Malus domestica*			
Amblyseius levis Wainstein, 1960	*Juniperus communis*	*Rubus* spp.		
Amblyseius astutus (Begljarov, 1960)	*Juniperus communis*	*Rubus* spp., grasses		
Amblyseius marinus (Willman, 1952)				washed ashore, dunes
Amblyseius andersoni (Chant, 1957)				dunes
Phytoseius macropilis (Banks, 1904)	*Malus domestica*			
Phytoseius juvenis Wainstein et Arutunjan, 1970	*Malus domestica, Prunus* spp., *Salix* spp.	*Rubus* spp.		
Totally: 35	**29**	**27**	**6**	**13**