

?p) Genitalsaugnäpfe sind bei Männchen der Gattungen *Bonomoia*, *Rhopalanoetus*, *Spinanoetus* und *Wichmannia*, die zusammen offensichtlich kein Monophylum bilden, vorhanden und möglicherweise denen der Acariden-Männchen homolog.

a) Bakteriensuspension dient als Nahrungsquelle.

Die Funktionsweise des Gnathosomas dieser Gruppe ist noch nicht genau untersucht. Die aus meinen Beobachtungen entwickelte Vorstellung der funktionalen Zusammenhänge ist daher hypothetisch. Die nahe verwandten Acaridae, deren Cheliceren mit *Digitus fixus* und *Digitus mobilis* ein Greiforgan bilden, können damit gezielt Nahrungspartikel greifen. Da die Histiostomatidae Bakterienfresser sind, wird die Nahrungsaufnahme weniger selektiv erfolgen. Vermutlich schieben die abgeknickten Palptarsen bei der Vorwärtsbewegung des Tieres aus der Suspension Mikroorganismen zu einem Häufchen zusammen. Die Palpalmembran könnte dabei wie ein Scheibenwischer agieren. Der *Digitus fixus* der Chelicere, die muskulär in das Gnathosoma eingezogen werden kann, befördert dann die Nahrung zur Mundöffnung.

DEUTONYMPHE

p) Die Kutikula ist verdickt und bildet einen Austrocknungsschutz.

p) Der vordere Propodosomaabschnitt ist mit dem Gnathosoma zu einer rüsselförmigen Struktur verwachsen, mit der keine Nahrung aufgenommen werden kann (ABB. 15).

p) Die dorsale Beborstung ist gegenüber den Adulten verkürzt.

? p) Auf dem dorsalen Hysterosoma fehlt ein Borstenpaar vergleichend gesehen in der 5. Reihe.

a) Die Beinpaare 3 und 4 sind in Ruhestellung nach vorn gerichtet (ABB. 16).

p) Die Saugnäpfe und Conoids sind angeordnet wie in ABB. 6.

p) Die Coxenrudimente existieren in Form ventraler Apodeme.

a) Das Sternalapodem verläuft von den Trochanteren des Beinpaars 1 bis zur Genitalöffnung (ABB. 6, 9).

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RECENT DATA TO THE KNOWLEDGE OF THE ARBOREAL MITE FAUNA IN HUNGARY (ACARI: MESOSTIGMATA, PROSTIGMATA, AND ASTIGMATA)

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ACARI
ORNAMENTALS
FAUNISTIC
SURVEY
HUNGARY

SUMMARY: Authors give a report on the partial results of the regular collections of mites made between 1990 and 2000 on ornamental trees and shrubs, in streets, parks, green spaces of housing estates, private gardens, and arboreta in various locations of Hungary. A total of 218 mite species were found belonging to 25 families. *Neoseiulus graminis*, *Typhloseiulus simplex*, *Charletonia singularis*, *Vasates quadripedes*, *Lorryia paraobliqua*, *Tarsonemus primus*, and *Acotyledon paradoxa* are new for the Hungarian fauna.

ACARIEN
PLANTES
ORNEMENTALES
FAUNISTIQUE
RECENSEMENT
HONGRIE

RÉSUMÉ : Les auteurs mentionnent dans cette publication les résultats obtenus jusqu'à présent lors de collectes régulières d'acariens effectuées de 1990 à 2000 sur des arbres et buissons ornementaux, dans les rues, parcs, espaces verts, jardins privés et arboreta dans diverses localités de Hongrie. Un total de 218 espèces d'acariens appartenant à 25 familles ont été trouvés. *Neoseiulus graminis*, *Typhloseiulus simplex*, *Charletonia singularis*, *Vasates quadripedes*, *Lorryia paraobliqua*, *Tarsonemus primus*, et *Acotyledon paradoxa* sont nouveaux pour la faune de Hongrie.

INTRODUCTION

A considerable number of mites representing many families in several suborders live on trees (mega and mesophanerophytes) and shrubs (micro and nanophanerophytes). Noteworthy papers of LINDQUIST (1979), LAING & KNOP (1983), SMILEY & KNUTSON (1983), WELBOURN (1983), GERSON (1985), MOMEN (1987), FISHER-COLBRIE & EL-BOROLOSSY (1990),

EVANS (1992), EVANS & KAZMIERSKI (1999), PETANOVIC & STANKOVIC (1999), as well as other authors, testify the richness of mite fauna of woody plants.

Arboreal mites have been already reported in Hungary by FARKAS (1966), BOZAI (1980, 1987, 1996, 1997), KOMLOVSZKY (1980, 1984), KOMLOVSZKY and JENSER (1992).

LUCZA *et al.* (1996), RIPKA & DE LILLO (1997), RIPKA *et al.* (1997), RIPKA (1998a,b, 1999), RIPKA &

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KAZMIERSKI (1998a,b) reported the presence of species of cheyletid, eriophyoid, tarsonemid, phytoseiid, tetranychid and tenuipalpid, tydeid and stigmatid mite on ornamental trees and shrubs in Hungary, respectively. FAIN & RIPKA (1998a,b,c) reported new hemisarcoptid, erythraeid and trombidid mite species from woody ornamentals. RIPKA *et al.* (1999) summarized the results of the survey of corticolous mite fauna. RIPKA (2000) gave a survey of the tree-dwelling and shrub-dwelling predatory and indifferent mites. Thus the aim of the present paper was to complete data on mites of ornamentals.

MATERIALS AND METHODS

Between 1990 and 2000, a mite survey was made on ornamental trees and shrubs of streets, squares,

parks, botanical gardens, private gardens, and green areas of housing estates in all districts of Budapest (also herbaceous plants were occasionally examined in some other localities in Hungary, Croatia and Yugoslavia). The majority of the results of this survey on tarsonemid, eriophyoid, stigmatid, tydeid, phytoseiid, cheyletid, tetranychid and hemisarcoptid mites was reported in the papers of the present authors and other co-authors in 1996, 1997, 1998, 1999, 2000. Plant samples from 304 woody species (minimum 5 shoots, branches or bark/plant or 25 leaves/plant) were collected in plastic bags between

MESOSTIGMATA PHYTOSEIIDAE

	Mite species	Plant species	Sampling place	Sampling date		
M E S O S T I G M A T A	<i>Bawus talbii</i> (Athias-Henriot, 1960)	<i>Acer saccharinum</i>	Mesteri (Vas c.)	15.08.1997		
	<i>Euseius finlandicus</i> (Oudemans, 1915)	<i>Acer platanoides</i>	Orosháza (Békés c.)	14.07.1998		
		<i>Acer platanoides</i>	Törökvész		06.07.1999	
		<i>Acer saccharinum</i>	Mesteri (Vas c.)		15.08.1997	
		<i>Populus x canescens</i>	Óbuda		10.04.2000	
		<i>Quercus robur</i>	Rákoskeresztúr		25.07.1997	
		<i>Rhus typhina</i>	Rákoskeresztúr		04.08.1997	
		<i>Tilia platyphyllos</i>	Zirc (Veszprém c.)		21.05.1997	
	<i>Kampimodromus aberrans</i> (Oudemans, 1930)	<i>Catalpa bignonioides</i>	Víziváros		23.10.1998	
	<i>*Typhloseiulus simplex</i> (Chant, 1956)	<i>Quercus cerris</i>	Vászoly (Veszprém c.)		05.07.1998	
	<i>Neoseiulus aurescens</i> (Athias-Henriot, 1961)	<i>Geum urbanum</i>	Mesteri (Vas c.)		16.08.1997	
	<i>*Neoseiulus graminis</i> (Muma, 1967)	<i>Geum urbanum</i>	Mesteri (Vas c.)		16.08.1997	
	<i>Phytoseius juvenis</i> Wainstein et Arutunjan, 1970	<i>Salix elaeagnos</i>	Rákoskeresztúr		25.07.1997	
	T O S E I D E S	<i>Typhlodromus (Anthoseius) involutus</i> Livshitz et Kuznetsov, 1972	<i>Euonymus europaeus</i>	Gellérthegey		15.07.1997
			<i>Euonymus europaeus</i>	Rákoskeresztúr		17.08.1997
<i>Euonymus europaeus</i>			Rákoskeresztúr		05.08.1998	
<i>Juniperus scopulorum</i>			Orosháza (Békés c.)		11.07.1998	
<i>Juniperus scopulorum</i>			Orosháza (Békés c.)		14.07.1998	
<i>Picea pungens</i>			Orosháza (Békés c.)		14.07.1998	
<i>Typhlodromus (Typhlodromus) phialatus</i> Athias-Henriot, 1960	<i>Picea pungens</i>	Orosháza (Békés c.)		14.07.1998		
<i>Typhlodromus (Typhlodromus) pyri</i> Scheuten, 1857	<i>Tilia platyphyllos</i>	Zirc (Veszprém c.)		21.07.1997		

TABLE 1 (A). — Arboreal mite species collected from ornamental trees, shrubs, and some herbs (new species for the Hungarian fauna)

MESOSTIGMATA PHYTOSEIIDAE

	Mite species	Plant species	Sampling place	Sampling date		
P R O S T I G M A T A	<i>Lorryia ferula</i> Baker, 1944	<i>Populus x canescens</i>	Óbuda	25.08.1998		
		<i>Populus x canescens</i>	Óbuda	15.08.1999		
	<i>Lorryia ocellata</i> (Kuznetsov, 1972)	<i>Acer platanoides</i>	Orosháza (Békés c.)		14.07.1998	
		<i>Acer pseudoplatanus</i>	Orosháza (Békés c.)		14.07.1998	
		<i>Juniperus scopulorum</i>	Orosháza (Békés c.)		14.07.1998	
		<i>Ligustrum vulgare</i>	Tabán		08.05.1991	
		<i>Phellodendron amurense</i>	Margitsziget		21.02.1991	
		<i>Thuja occidentalis</i>	Budaörs (Pest c.)		03.03.1993	
	<i>*Lorryia paraobliqua</i> Panou et Emmanouel, 1996	<i>Tilia tomentosa</i>	Széphalom (Borsod-A.-Z. c.)		14.08.1994	
	<i>Lorryia reticulata</i> (Oudemans, 1928)	<i>Celastrus orbiculatus</i>	Gellérthegey		02.09.1998	
		<i>Picea pungens</i>	Orosháza (Békés c.)		14.07.1998	
		<i>Tydeus californicus</i> (Banks, 1904)	<i>Acer campestre</i>	Orbánhegy		16.08.1999
			<i>Acer platanoides</i>	Orosháza (Békés c.)		14.07.1998
			<i>Acer platanoides</i>	Törökvész		06.07.1999
			<i>Acer pseudoplatanus</i>	Orosháza (Békés c.)		14.07.1998
<i>Catalpa bignonioides</i>			Orosháza (Békés c.)		14.07.1998	
<i>Catalpa bignonioides</i>			Víziváros		23.10.1998	
T Y D E I D E S		<i>Juniperus scopulorum</i>	Orosháza (Békés c.)		14.07.1998	
		<i>Prunus cerasifera</i>	Orosháza (Békés c.)		14.07.1998	
	<i>Quercus ilex</i>	Lanterna (Croatia)		05.07.1996		
	<i>Tydeus caudatus</i> (Duges, 1834)	<i>Geum urbanum</i>	Törökvész		12.05.1998	
A E I D E S	<i>Triophytodeus immanis</i> Kuznetsov, 1973	<i>Acer campestre</i>	Orbánhegy		16.08.1999	
		<i>Celastrus orbiculatus</i>	Gellérthegey		07.08.1998	
		<i>Juniperus scopulorum</i>	Orosháza (Békés c.)		14.07.1998	
	<i>Triophytodeus triophthalmus</i> (Oudemans, 1929)	<i>Fraxinus angustifolia</i>	Lipótváros		17.08.1998	
		<i>Populus x canescens</i>	Óbuda		25.08.1998	
		<i>Populus x canescens</i>	Óbuda		07.05.1999	
		<i>Populus x canescens</i>	Óbuda		15.08.1999	
<i>Quercus ilex</i>	Lanterna (Croatia)		05.07.1996			
<i>Sophora japonica</i>	Víziváros		17.08.1998			

TABLE 1 (B).

January and late November. During all the plant examination with binocular stereomicroscope (upper and lower surfaces of the leaves, petioles, buds, bark, flowers, galls, etc.), the mites found were put into AGA (alcohol, glycerol, acetic acid, sorbitol) solution (JEPPSON *et al.*, 1975) or directly into lactic acid. After the clearing of mites in the lactic acid (for 2-4 weeks in room temperature to the desired extent/degree), they were placed (for 1/2-2 hours) into Keifer's medium "2" following the Keifer's mounting method for eriophyoid mites (KEIFER, 1952). Finally the cleaned and dyed mites were then embedded into Keifer's medium "3". The Hoyer's medium with sorbitol (KEIFER, 1975), and Heinze's polyvinyl alcohol

(PVA) medium (SCHMUTTERER, 1959) were used alternatively for mounting the specimens. The slide preparations were dried (2-4 weeks) in thermostat at 32 C° and then sealed with commercial nail varnish (UPTON, 1991). Specimens were examined with a phase contrast microscope. For tarsonemid, and eriophyoid mite identification, the keys of KALISZEWSKI (1993), LINDQUIST (1978), and MAGOWSKI (unpublished), as well as AMRINE (1996) were used, respectively. Nomenclature used in the mite morphology is derived from LINDQUIST (1986). For acarid mite determination the key of FAIN (1982), as well as several original species descriptions and other available reports were used. For tydeid mite identification

P	Mite species	Plant species	Sampling place	Sampling date
R	Anystidae			
O	<i>Anystis baccharum</i> (Linnaeus, 1758)	<i>Cornus sanguinea</i>	Törökvész	29.07.1994
S		<i>Corylus colurna</i>	Törökvész	21.05.1994
T		<i>Crataegus laevigata</i>	Krisztinaváros	26.05.1992
I		<i>Euonymus europaeus</i>	Gellérthegy	08.06.1997
G		<i>Juglans nigra</i>	Budafok	15.09.1997
M		<i>Laburnum anagyroides</i>	Békásmegyér	11.06.1992
A		<i>Populus x berolinensis</i>	Kispest	11.07.1993
T		<i>Pyrus pashia</i>	Gellérthegy	07.06.1994
A		<i>Rhamnus catharticus</i>	Törökvész	10.07.1992
		<i>Salix alba</i>	Kőbánya	12.05.1993
A		<i>Salix alba</i>	Rákospalota	30.08.1993
N		<i>Salix alba</i>	Rákospalota	08.09.1993
Y		<i>Salix babylonica</i>	Gellérthegy	08.06.1994
S		<i>Salix caprea</i>	Rákospalota	08.09.1993
T		<i>Salix 'Mesuneco'</i>	Gellérthegy	24.05.1995
I		<i>Sophora japonica</i>	Pasarét	08.06.1993
D		<i>Staphylea pinnata</i>	Gellérthegy	02.06.1994
A		<i>Syringa vulgaris</i>	Budafok	04.08.1993
E		<i>Ulmus scabra</i>	Pasarét	11.06.1992

TABLE 1 (C).

the keys, and generic concepts of ANDRÉ (1980), and KAZMIERSKI (1989, 1996) were applied.

RESULTS

Neoseiulus graminis (Muma, 1967), *Typhloseiulus simplex* (Chant, 1956), *Charletonia singularis* (Oudemans, 1910), *Vasates quadripedes* Shimer, 1869, *Lorryia paraobliqua* Panou et Emmanouel, 1996, *Tarsonemus primus* Suski, 1967, and *Acotyledon paradoxa* Oudemans, 1903, were found new for the Hungarian fauna.

Several mite species parasitizing insects were found associated with aphids. *Podothrombium pannonicum* Fain et Ripka was collected from a larva of *Hyadaphis foeniculi* (Passerini) (Homoptera: Aphidoidea) found on *Symphoricarpos orbiculatus*, and *Podothrombium exiguum* Fain & Ripka was found to be associated with *Roepkea marchali* (Börner) (Homoptera: Aphidoidea) on *Prunus mahaleb* (for more data on dendrophilous Aphidoidea see reports of RIPKA et al., 1993, 1998). *Charletonia singularis* was collected on an aptera of *Aphis fabae* Scopoli (Homoptera: Aphidoidea) on *Populus alba*. *Ch. singularis* speci-

men was also found on *Alebra albostriella* Fallén (Homoptera: Cicadellidae) from *Tilia tomentosa*. The reddish-orange-coloured larva bit into the abdomen of leafhopper. An other *C. singularis* larva was collected on the leg III. of an unidentified leafhopper nymph (Homoptera: Cicadellidae) from *Prunus serulata*. The mite also bit into the femur of nymph. *Allothrombium pulvinum* Ewing was collected from aphid infested trees and shrubs, viz. *Aphis ruborum* (Börner) on *Rubus fruticosus*; *A. fabae* on *Ficus carica*, *Fontanesia fortunei*, *Maclura pomifera*, *Morus alba*, *Ptelea trifoliata*, *Rhodotypos scandens*, *Symphoricarpos albus* var. *laevigatus*, *Vitis vinifera*; *Hyadaphis foeniculi* (Passerini) on *Symphoricarpos orbiculatus*; and *Roepkea marchali* on *Prunus mahaleb*. *A. fabae* was the most frequent host species. *Erythraeus budapestensis* Fain & Ripka was also collected from *Ptelea trifoliata* infested with *A. fabae*.

Anystis baccharum (Linnaeus) was frequently present on the leaves of willow species. This predaceous species prefers the rich foliage-dwelling fauna of *Salix* sp. The fast-moving *A. baccharum* co-occurred with *Aphis cytisorum* Hartig, *A. fabae*, *Aphis farinosa* Gmelin, *Aphis pomi* De Geer, *Aphis versicolor* (Börner), *Cavariella aegopodii* (Scopoli), *Dysaphis*

	Mite species	Plant species	Sampling place	Sampling date
	Trombidiidae			
	<i>Allothrombium pulvinum</i> Ewing, 1917	<i>Ficus carica</i>	Törökvész	30.05.1994
		<i>Fontanesia fortunei</i>	Gellérthegy	28.05.1994
		<i>Maclura pomifera</i>	Törökvész	01.06.1993
		<i>Morus alba</i>	Törökvész	22.05.1993
		<i>Populus alba</i>	Óbuda	10.06.1993
		<i>Prunus mahaleb</i>	Törökvész	19.05.1993
		<i>Ptelea trifoliata</i>	Törökvész	10.06.1992
		<i>Rhodotypos scandens</i>	Gellérthegy	29.05.1995
		<i>Rubus fruticosus</i>	Széchenyihegy	15.06.1994
		<i>Symphoricarpos albus</i> var. <i>laevigatus</i>	Lágymányos	28.05.1994
		<i>Symphoricarpos orbiculatus</i>	Gellérthegy	13.06.1994
		<i>Vitis vinifera</i>	Törökvész	26.05.1993
		<i>Podothrombium exiguum</i> Fain et Ripka, 1998	<i>Prunus mahaleb</i>	Törökvész
	<i>Podothrombium pannonicum</i> Fain et Ripka, 1998	<i>Symphoricarpos orbiculatus</i>	Gellérthegy	03.06.1994
	Erythraeidae			
	* <i>Charletonia singularis</i> (Oudemans, 1910)	<i>Prunus serrulata</i> Óbuda	Krisztinaváros	10.06.1993
		<i>Populus alba</i>		26.05.1992
		<i>Tilia tomentosa</i>	Tabán	26.05.1992
	<i>Erythraeus budapestensis</i> Fain et Ripka, 1998	<i>Ptelea trifoliata</i>	Törökvész	07.06.1996
	<i>Balaustium</i> sp.	<i>Geum urbanum</i>	Törökvész	12.05.1998
	Stigmaeidae			
	<i>Mediostoma mariaefrancae</i> André, 1977	<i>Celastrus orbiculatus</i>	Gellérthegy	02.09.1998
		<i>Populus x canescens</i>	Óbuda	25.08.1998
		<i>Populus x canescens</i>	Óbuda	07.05.1999
		<i>Populus x canescens</i>	Óbuda	15.08.1999
	<i>Zetzellia mali</i> (Ewing, 1917)	<i>Acer pseudoplatanus</i>	Csongrád (Csongrád c.)	26.05.1998
		<i>Malus domestica</i>	Érd (Pest c.)	09.08.1999
	Tenuipalpidae			
	<i>Pentamerismus oregonensis</i> Mc Gregor, 1949	<i>Juniperus scopulorum</i>	Orosháza (Békés c.)	07.07.1998
		<i>Juniperus scopulorum</i>	Orosháza (Békés c.)	14.07.1998
	<i>Brevipalpus californicus</i> (Banks, 1904)	<i>Phoenix dactylifera</i>	Budapest	04.01.1995
	<i>Cenopalpus</i> sp.	<i>Salix elaeagnos</i>	Rákoskeresztúr	25.07.1997
		<i>Salix elaeagnos</i>	Rákoskeresztúr	20.08.1998

TABLE 1 (D).

pyri (Boyer de Fonscolombe), *Eriosoma ulmi* (Linnaeus), and *Rhopalosiphoninus staphyleae* (Koch), all Homoptera: Aphidoidea, also with eriophyoid mites.

Czenspinksia transversostriata (Oudemans) was collected from underside of the leaves, especially in leaf domatia (pocket and tuft domatia). It was frequently present on leaves infested with eriophyoid mites, near leaf galls and erineae of the following eriophyoids: *Aceria ilicis* (Canestrini), *Cecidophyes caliquerici* (Keifer), *Cecidophyes tristernalis* (Nalepa)

on *Quercus ilex*, *Aceria cephaloneus* (Nalepa) and *Aceria macrochelus* (Nalepa) on *Acer campestre*, *Eriophyes emarginatae* Keifer on *Prunus domestica*, *Eriophyes tiliae* (Pagenstecher) on *Tilia cordata*, *Aculus argenteae* (Farkas) on *Tilia tomentosa*. In winter time *C. transversostriata* was collected on cortex infested with scale insects.

Typhloseiulus simplex, was discovered on *Fagus sylvatica* in England in 1956. Subsequently, this species was observed in numerous countries such as Iran,

	Mite species	Plant species	Sampling place	Sampling date
P R O S T I G M A T A E E R I O P H Y S I D A E	Phytoptidae			
	<i>Phytoptus abnormis</i> Garman, 1883	<i>Tilia tomentosa</i>	Tahi (Pest c.)	03.06.1999
	<i>Phytoptus stenoporus</i> (Nalepa, 1918)	<i>Tilia platyphyllos</i>	Zirc (Veszprém c.)	21.05.1997
	Eriophyidae			
	<i>Aceria</i> sp.	<i>Quercus robur</i>	Széchenyihegy	28.07.1999
	<i>Aceria cephaloneus</i> (Nalepa, 1922)	<i>Acer campestre</i>	Vászoly (Veszprém c.)	24.06.2000
		<i>Acer campestre</i>	Bajót (Komárom-E. c.)	02.07.2000
	<i>Aceria macrochelus</i> (Nalepa, 1891)	<i>Acer campestre</i>	Bajót (Komárom-E. c.)	02.07.2000
	<i>Aceria salicis</i> (Murray, 1877)	<i>Salix aegyptiaca</i>	Gellérthegy	02.11.1999
	<i>Cecidophyes gymmaspis</i> (Nalepa, 1892)	<i>Acer campestre</i>	Kelenföld	16.08.1999
		<i>Acer platanoides</i>	Törökvesz	06.07.1999
	<i>Cecidophyes nudus</i> Nalepa, 1891	<i>Geum urbanum</i>	Mesteri (Vas c.)	16.08.1997
		<i>Geum urbanum</i>	Törökvesz	12.05.1998
	<i>Cecidophyes psilonotus</i> (Nalepa, 1897)	<i>Euonymus europaeus</i>	Gellérthegy	07.08.1998
	<i>Eriophyes eupadi</i> (Newkirk, 1984)	<i>Prunus spinosa</i>	Pilisszentlászló (Pest c.)	28.05.2000
	<i>Eriophyes exilis</i> (Nalepa, 1892)	<i>Tilia platyphyllos</i>	Zirc (Veszprém c.)	21.05.1997
		<i>Tilia tomentosa</i>	Törökvesz	30.07.1993
	<i>Eriophyes leiosoma</i> (Nalepa, 1892)	<i>Tilia cordata</i>	Mesteri (Vas c.)	21.08.1994
		<i>Tilia tomentosa</i>	Törökvesz	08.06.1995
	<i>Eriophyes similis</i> (Nalepa, 1890)	<i>Prunus spinosa</i>	Pilisszentlászló (Pest c.)	28.05.2000
	<i>Shevtchenkella serrata</i> (Nalepa, 1892)	<i>Acer platanoides</i>	Törökvesz	22.05.2000
<i>Stenacis palomaris</i> Keifer, 1970	<i>Salix aegyptiaca</i>	Gellérthegy	02.11.1999	
	<i>Salix elaeagnos</i>	Rákoskeresztúr	07.04.2000	
<i>*Vasates quadripedes</i> Shimer, 1869	<i>Acer saccharinum</i>	Herend (Veszprém c.)	21.05.1997	
	<i>Acer saccharinum</i>	Mesteri (Vas c.)	15.08.1997	
Diptilomiopidae				
<i>Rhyncaphytoptus cerrifoliae</i> Farkas, 1963	<i>Quercus robur</i>	Széchenyihegy	28.07.1999	
<i>Diptacus gigantorhynchus</i> (Nalepa, 1892)	<i>Prunus spinosa</i>	Pilisszentlászló (Pest c.)	28.05.2000	

TABLE 1 (E).

Israel, Italy (on *Quercus* sp.) and Russia (MORAES *et al.* 1986; RAGUSA *et al.*, 1995). This species, which was known from oak species was found in Hungary on *Quercus cerris*. *Neoseiulus aurescens* and *N. graminis* are frequent phytoseiid mite on perennial herbaceous plants (BOZAI, 1996). In Hungary, they were both collected on *Geum urbanum*.

Cecidophyes psilonotus (Nalepa) caused silvery erineum on leaves of *Euonymus europaeus*. In Transdanubian counties *Vasates quadripedes* caused bladder (pouch) galls on leaves of *Acer saccharinum*. *Eriophyes eupadi* (Newkirk) and *Eriophyes similis* (Nalepa) caused also pouch galls on leaves of *Prunus spinosa*. *Aceria salicis* (Murray) and *Stenacis palomaris* Keifer were found on the leaves of *Salix aegyptiaca*, which is a new host for these species.

Lorryia paraobliqua was found on the leaves of *Tilia tomentosa*. It was reported from *Prunus cerasus*

and *Cornus* sp. in Greece. *Lorryia ocellata* (Kuznetsov) was collected from both foliage and bark of deciduous and evergreen plants. *Lorryia ferula* Baker was found on branches and twigs of grey poplar infested with *Chionaspis salicis* (Linnaeus) (Homoptera: Coccoidea).

Tarsonemus primus Suski was basically described from shoots and fruits of apple in Poland. It was collected from twigs of *Populus x canescens* infested with *Chionaspis salicis* and from bud scales of *Quercus robur* in Hungary.

Cecidophyes nudus Nalepa and a *Balaustium* sp. were also found on the perennial rosaceous plant *Geum urbanum*. *C. nudus* caused galls and erineum on the leaves.

Mediolata mariaefrancae André was present on branches of *Celastrus orbiculatus* and *Populus x canescens* infested with *Unaspis euonymi* (Comstock)

	Mite species	Plant species	Sampling place	Sampling date
P R O S T I G M A T A E T A R S O N E M I D A E	<i>Tarsonemus karli</i> Sharonov et Mitrofanov, 1986	<i>Magnolia soulangeana</i>	Celldömölk (Vas c.)	10.08.1998
	<i>Tarsonemus lobosus</i> Suski, 1965	<i>Phyllostachys viridiglaucescens</i>	Törökvesz	23.07.1997
		<i>Picea pungens</i>	PrmezO11]	13.02.1995
		<i>Picea pungens</i>	Orosháza (Békés c.)	14.07.1998
		<i>Prunus cerasifera</i>	Orosháza (Békés c.)	14.07.1998
		<i>Sophora japonica</i>	Víziváros	17.08.1998
		<i>Thuja occidentalis</i>	Budaörs (Pest c.)	03.03.1995
		<i>Celastrus orbiculatus</i>	Gellérthegy	02.09.1998
	<i>Tarsonemus nodosus</i> Schaarschmidt, 1959	<i>Juniperus scopulorum</i>	Orosháza (Békés c.)	14.07.1998
		<i>Malus domestica</i>	Érd (Pest c.)	09.08.1999
		<i>Quercus robur</i>	Széchenyihegy	28.07.1999
		<i>Acer platanoides</i>	Orosháza (Békés c.)	14.07.1998
	<i>*Tarsonemus primus</i> Suski, 1967	<i>Acer pseudoplatanus</i>	Csongrád (Csongrád c.)	26.05.1998
		<i>Acer saccharinum</i>	Mesteri (Vas c.)	15.08.1997
		<i>Celastrus orbiculatus</i>	Gellérthegy	09.09.1997
		<i>Diospyros</i> sp.	Zimony (Yugoslavia)	31.07.1997
		<i>Elaeagnus umbellata</i>	Gellérthegy	22.07.1997
		<i>Euonymus europaeus</i>	Rákoskeresztúr	17.08.1997
		<i>Euonymus europaeus</i>	Rákoskeresztúr	05.08.1998
		<i>Prunus cerasifera</i>	Orosháza (Békés c.)	14.07.1998
		<i>Prunus</i> sp.	Budaörs (Pest c.)	10.02.1995
	<i>Rhamnus utilis</i>	Gellérthegy	17.07.1997	
	<i>Thuja occidentalis</i>	Budaörs (Pest c.)	03.03.1993	
	<i>Tilia cordata</i>	Keszthely (Zala c.)	25.07.1994	
	<i>Populus x canescens</i>	Óbuda	25.08.1998	
<i>Tarsonemus</i> sp.	<i>Quercus robur</i>	Széchenyihegy	28.07.1999	
	<i>Quercus ilex</i>	Lanterna (Croatia)	05.07.1996	
<i>Tarsonemus</i> sp. near <i>confusus</i> s. Schaarschmidt	<i>Geum urbanum</i>	Mesteri (Vas c.)	16.08.1997	
<i>Tarsonemus smithi</i> Ewing, 1939	<i>Salix elaeagnos</i>	Rákoskeresztúr	25.07.1997	
<i>Tarsonemus stammeri</i> Schaarschmidt, 1959	<i>Acer campestre</i>	Zirc (Veszprém c.)	26.05.1997	
<i>Tarsonemus waitei</i> Banks, 1912	<i>Tilia platyphyllos</i>	Zirc (Veszprém c.)	21.05.1997	
	<i>Euonymus europaeus</i>	Rákoskeresztúr	11.10.1997	
<i>Dendroptus</i> sp.	<i>Juniperus scopulorum</i>	Orosháza (Békés c.)	14.07.1998	
	<i>Malus domestica</i>	Érd (Pest c.)	09.08.1999	
	<i>Salix elaeagnos</i>	Mesteri (Vas c.)	15.08.1997	
<i>Dendroptus</i> sp. 2. (in RIPKA <i>et al.</i> 1997)	<i>Acer pseudoplatanus</i>	Rózsadomb	08.10.1993	
<i>Dendroptus</i> sp. near 4. (in RIPKA <i>et al.</i> 1997)	<i>Celastrus orbiculatus</i>	Gellérthegy	02.09.1998	
<i>Dendroptus</i> sp. near <i>willmanni</i> s. Suski	<i>Acer campestre</i>	Németvölgy	20.07.1993	
	<i>Acer campestre</i>	Keszthely (Zala c.)	25.07.1994	
	<i>Acer campestre</i>	Lágymányos	16.08.1999	
	<i>Acer pseudoplatanus</i>	Zirc (Veszprém c.)	21.05.1997	
	<i>Prunus cerasifera</i>	Kurucles	23.07.1993	
Pyemotidae				
<i>Pyemotes</i> sp.	<i>Acer pseudoplatanus</i>	Rózsadomb	13.10.1993	

TABLE 1 (F).

ASTIGMATA

	Mite species	Plant species	Sampling place	Sampling date
Winterschmidtidae	<i>Czenspinksia transversostriata</i> (Oudemans, 1927)	<i>Acer campestre</i>	Keszthely (Zala c.)	25.07.1994
		<i>Acer campestre</i>	Vászoly (Veszprém c.)	24.06.2000
		<i>Ligustrum vulgare</i>	Tabán	06.02.1991
		<i>Populus x canescens</i>	Óbuda	10.04.2000
		<i>Prunus domestica</i>	Vásárosmiske (Vas c.)	13.06.1992
		<i>Pyrus betulifolia</i>	Gellérthegey	18.01.1995
		<i>Quercus ilex</i>	Lanterna (Croatia)	05.07.1996
		<i>Tilia cordata</i>	Mesteri (Vas c.)	21.08.1994
	<i>Tilia tomentosa</i>	Széphalom (Borsod-Abaúj-Zemplén c.)	14.08.1994	
Acaridae	* <i>Acotyledon paradoxa</i> Oudemans, 1903	<i>Elaeagnus angustifolia</i>	Vérmező	26.09.1994
	<i>Tyrophagus putrescentiae</i> (Schrank, 1781)	<i>Juniperus</i> sp.	Kamaraerdő	19.05.1993

TABLE 1 (G).

(Homoptera: Coccoidea) and *Chionaspis salicis*, respectively.

DISCUSSION

Some mite families, such as the predatory Phytoseiidae and Stigmaeidae, and the phytophagous Tetranychidae and Tenuipalpidae are relatively well known in Hungary compared to several other families e.g. Winterschmidtidae, Anystidae, Erythraeidae and Trombididae. However, the species composition of arboreal fauna is still incompletely known.

Some foliage-dwelling species of three mite families: Acaridae, Winterschmidtidae, Pyemotidae were found. *Czenspinksia transversostriata* lives on the underside of the leaves near the midribs (HUGHES, 1962, GROSTAL & O'DOWD, 1994, RIPKA, 2000). This mite prefers the trees with pubescent leaves (FISHER-COLBRIE & EL-BOROLOSSY, 1990). *C. transversostriata* coexists with gall-inducing and refuge-inhabiting eriophyoid mites. The fungivorous winterschmidtiiid species utilizes leaf domatia and leaf tissues modified by eriophyoid mites (e.g. galls, erineae) for breeding (egg-laying and moulting) also for protection from environmental stresses. *Acotyledon paradoxa* was known from Russia. OUDEMANS (1903) described its hypopus from a bat. FAIN & PHILIPS (1978) described the protonymph, tritonymph, hypopus, female and

male of *A. paradoxa* from USA. These stases were found in large numbers in the nests of screech owl (*Otus asio*), horned owl (*Bubo virginianus*), as well as in nest box used by *Otus asio* and red squirrels (*Tamiasciurus hudsonicus*). Hypopodes were also collected from nests of *Peromyscus leucopus*. In Hungary a female of *A. paradoxa* was collected from the underside of the leaf of *Elaeagnus angustifolia*. The species of the genus *Pyemotes* Amerling (Pyemotidae) are not regular foliage dwellers, as they are known to parasitize insects. Thus, it can be inferred that they were originally parasitizing some indetermined arboreal insect species, most probably beetles (MAHUNKA, 1972).

Anystis baccharum was found on the foliage of 17 plant species belonging to 12 families. The predaceous whirligig mite (*A. baccharum*) was reported with high population densities on bark and twigs of *Olea europaea*, *O. europaea* sub. *oleaster*, *Pyrus amygdaliformis* and *Pyrus communis* in Greece (EMMANOUEL & PANOU, 1991).

KOMLOVSZKY (1980, 1984) found 62 denrophilous mite species in various habitats. Based on this and previous surveys of the present authors in Hungary the arboreal mite fauna consists of following numbers species per family: Phytoseiidae — 31, Tetranychidae — 19, Tenuipalpidae — 3, Phytoptidae — 4, Eriophyidae — 82, Diptilomiopidae — 6, Tydeidae — 23, Stigmaeidae — 5, Eupalosellidae -1, Camerobii-

dae -1, Cheyletidae — 3, Cunaxidae — 1, Anystidae — 1, Trombididae — 3, Erythraeidae — 3, Tarsoneimidae — 24, Acaridae — 3, Hemisarcoptidae — 1, Glycyphagidae — 1, Winterschmidtidae — 1, Microremidae — 1, Oribatulidae — 1, Cymbaeremacidae — 1, Ceratozetidae — 1, and Scheloribatidae — 1. Tydeid mites are the most numerous foliage-dwelling mites. They were found on 107 woody ornamental species. Tydeids prefer the leaf domatia e.g. pubescent main ribs and vein axils, also leaf galls and erineae of eriophyoid mites (RIPKA, 2000). *Tydeus californicus* (Banks) was the most common species (RIPKA & KAZMIERSKI, 1998a), as well as in Turkey (EVANS & KAZMIERSKI, 1999).

The family Eriophyidae was found the richest in number of species.

The highest number of mite species, 26 was present on *Acer campestre*. On both *Prunus spinosa* and *Salix alba* 20 mite species were identified.

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