Advances in Arachnology and Developmental Biology.
Papers dedicated to Prof. Dr. Božidar Ćurčić.
S. E. Makarov & R. N. Dimitrijević (Eds.) 2008.
Inst. Zool., Belgrade; BAS, Sofia; Fac. Life Sci., Vienna;
SASA, Belgrade & UNESCO MAB Serbia.
Vienna — Belgrade — Sofia, **Monographs, 12,** 297-309 .

UDC 595.42(497.11):574/575

SPECIES DIVERSITY OF ERIOPHYOID MITE SPECIES (ACARI: PROSTIGMATA) IN SERBIA – STATUS AND PERSPECTIVES OF RESEARCH

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Abstract — In the fauna of Eriophyoidea of Serbia, 287 species have been determined within three families and 46 genera. Species richness is highest in the following genera: *Aceria, Aculus, Eriophyes, Epitrimerus, Aculops,* and *Phyllocoptes*. From the territory of Serbia, two new genera - *Rhinotergum* Petanovic, 1988 and *Boczekiana* Petanovic, 2000 - and 37 new species have been described. Approximately 40 species of eriophyoids are considered to be pests in agriculture, urban horticulture, and forest cultures. Twelve species of eriophyoids widely distributed in Serbia have been used as agents in classical biological control of weeds. About 20 species of alien eriophyoid species, mostly from the Nearctic region, have been recorded in Serbia and could be dangerous for autochthonous ecosystems. Besides research in the field of α taxonomy, population studies within the congeneric complex of Aceria species have been initiated during the last decade in order to improve systematics on the species level and lay the foundations for phyllogenetic considerations.

Key words: Eriophyoid mites, fauna, species diversity, Serbia

PREFACE

The Acari, or mites, are unique among Arachnida in that they have succeeded in exploiting a wide range of nonpredatory life styles. A considerable number of mites feed on higher plants. The eriophyoids (Acari: Prostigmata: Eriophyoidea) are among the most diverse and an economically very important group of phytophagous mites. They are the most highly adapted of the plant-feeding mites and have evolved extremely intimate associations with their plant hosts. Evidence of a long and intimate parasitic association of eriophyoids and plants is implicit in the phenomenon of deuterogyny, in which a morphologically and physiologically modified adult female population is produced for overwintering on the host. An intimate ssociation with their hosts is also implied by the fact that no second nymphal instar occurs in eriophyoids, which means that functional adulthood is attained in the second postlarval instar. Eriophyoids usually are highly host-specific, a factor that may limit niche exploitation and promote rapid speciation (Krantz and Lindquist, 1979).

As obligately phytophagous arthropods, eriophyoids exhibit specific morphological, physiological, and behavioral traits that allow them to specialize on particular host plants. Such interactions between mites and hosts (ecological specialization) greatly enhance evolutionary diversity, e.g., they frequently specialize in host plant use and evolve into host-specific populations. Genetically determined host specialization can lead to genetic substructuring of host-associated populations, to host race formation, and potentially to speciation (Via, 1990, loc. cit. Skoracka, 2007). Such genetic substructuring may be accelerated by the expression of preference for different hosts, since these traits can decrease movement of individuals to alternative hosts and increase host fidelity. In organisms that mate on their hosts, like eriophyoids, host plant fidelity can contribute to assortative mating, and thus to reproductive isolation between populations adapted to particular hosts (Johnston et al., 1996, loc. cit. Skoracka, 2007). Certainly far more species are known for the Eriophyoidea than for other groups of phytophagous mites that display considerably less pronounced host speciality.

A remarkable, major secondary adaptive radiation occurred in the Acari during the late Mesozoic and early Cenozoic eras. This was also a period of extensive radiation of angiosperm plants and of insects that exploited them. Lindquist (1975) has suggested that acarine radiation during this period may have been stimulated by an «evolutionary synergism» generated by the flourishing of higher plants and of insects, with which the Acari have close ecological ties. Some mite groups, even at the family level, continue to undergo diversification, whereas others (e.g., Eriophyoidea as plant parasites) became locked orthoselectively into one way of life long ago (Lindquist, 1984). Since a fossil rust mite has been found in the 37,000,000-year-old North Maslin Sands in Australia, and since this mite is essentially the same as present-day variants of eriophyoids, it is not overemphasizing to estimate that this mite group originated more than 50,000,000 years ago (Jeppson et al., 1975).

Adaptive radiation of this group of mites was stimulated not only by monophagy, but also the specific exploitation of different aboveground plant organs or parts of the same plant organ modified by these mites into galls or different distortive and/or undistortive alterations, which are considered as specific microhabitats for distinct mite species.

Eriophyoids possess a number of structural modifications unique among plant-feeding Prostigmata. They have lost legs II and IV, along with the true paired claws of pretarsi I and II. In addition, they lack a discrete respiratory system and have retained few setae on the body and appendages. Perhaps the most important basic factors contributing to the success of the superfamily as a whole are their minute size, their vermiform annulate body structure, and their unusual mouthparts based on five stylets.

Inasmuch as eriophyoids are obligately phytophagous mites that exist under conditions of plentiful food resources, they consequently invest little energy in a competitive strategy of life (they are multivoltine and reach high population density thanks to high fecundity and/or short generation time) and can be characterized as r-strategy organisms (Petanović and Stojnić, 1995).

Currently, 3690 species are known, of which 3442 are valid (Amrine et al., 2003). Most of them are highly host-specific, i.e., they feed on a single host or on a few hosts within a single genus. Few species are known to have extremely broad host ranges (Oldfield, 1996).

In recent years, there is a growing awareness of the economic relevance of eriophyoids as pests of agricultural crops, as vectors of plant viruses, as alternative food for predators of plant pests, and as potential weed control agents. Moreover, eriophyoid mites are of profound scientific interest for providing insight into the selective factors molding the life of plants (Sabelis and Bruin, 1996).

Research on the eriophyoid fauna has to date been neither systematic nor regular. Conservative estimates place the eventual eriophyoid world fauna at from 35,000 to 50,000 species - and some researchers make estimates as high as 250,000 species. On the basis of rough estimates, it is believed that only 10% of the world fauna is described (15-20% of the temperate fauna and fewer than 5% of tropical species have been described) (Amrine, 1996; Amrine and Stasny, 1994; Amrine et al., 2003). The relatively widest and most systematic research on the eriophyoid fauna has been done in certain European countries (Austria, Italy, Poland, Finland, Sweden, Hungary, Russia, Bulgaria, Serbia), the USA, India, Australia and New Zealand, South Africa, Brazil, and China. More than 635 eriophyoid species are known in the United States of America (Baker et al., 1996), while in the fauna of Europe 1009 species are known (de Lillo, 2004). At the beginning of the 1990's, the number of eriophyoids described by world regions was: Europe 890, the Middle East 63, N. America 703, East Asia 136, Southeast Asia 172, South Asia 389 (India = 386), Central Asia 32, Australia and New Zealand 121 (N. Z. = 98), Africa 230 (S. Africa 181), the Neotropics 137, the Caribbean 20, and Oceania 28 (Amrine and Stasny, 1994). The rate at which new species have been described has increased over the decades from 0.6 per annum in the period 1836-1880 to 73.3 per annum in the period 1990-1992 (Amrine and Stasny, 1994). During the last decade, the number of described species or species split off from the complex of sibling, cryptic species greatly increased. Using r DNA molecular markers (the ITS1 region), workers have separated new species of eriophyoids from known species within the genera *Cecidophyopsis* and *Colomerus*, pests of *Ribes* spp. and *Vitis vinifera*, respectively (Fenton, 2002; Carew et al., 2004).

However, investigations on the eriophyoid fauna to date are insufficient to serve as a basis for the zoogeographical approach. The distribution of most taxa is practically unknown. Consequently, chorological studies are absent and ranges are not known for any one taxon. Knowledge of the host plant's distribution can be extrapolated onto eriophyoids. However, the distribution of mites remains hypothetical until evidence is obtained proving the biogeographical relationship between a plant and an eriophyoid species (Petanović and Stojnić, 1995).

Morphological traits of developmental stages in both sexes and all seasonal forms are known for only a few of the mostly economically important species. The ontogenetic development and idioecology of eriophyoid species are also very poorly known.

During the last decade of the 20th century, a great effort was made by acarologists to combine and generalize disparate knowledge about this interesting group of arachnids, their external anatomy, systematics, nomenclature, internal anatomy, physiology, morphogenesis, biology, ecology (especially life forms, reproduction, trophic relationships, feeding, vectors in transferring plant pathogens, etc.), evolution, and phylogeny. Other topics covered include study techniques (sampling, preparation, rearing, toxicological tests, etc.), natural enemies of eriophyoid mites, injurious species, kinds and levels of injury, control, host plant resistance, resistance of eriophyoids to pesticides, and beneficial effects of eriophyoid mites as biological control agents and competitors with other phytophagous mites and alternative food for predatory mites (Lindquist et al, 1996).

Despite of the great improvement and increasing interest in research on almost all aspects of diversity and functional biology of the Eriophyoidea in many regions of the world (especially in China during the last decade), knowledge of the eriophyoid fauna is limited and taxonomy is in the so-called α phase. Accumulation of a great number of newly described species and the absence of revisions still characterize taxonomy of the Eriophyoidea. In particular, the current classification of the Eriophyoidae is merely artificial and does not correspond to the patterns of evolution and adaptation of these mites to their hosts (Nuzzaci and de Lillo, 1996). As a result, the classification of eriophyoids has little predictive power and is nearly useless for biogeographical or evolutionary considerations (Lindquist and Amrine, 1996).

The structures used in systematics of eriophyoid mites are from all parts of the body and appendages. However, these structures are relatively few compared to those on most acariform mites because of considerable reduction and simplification in the body plan of eriophyoids. Another limitation of some structures available for systematics of eriophyoid mites is their lack of ontogenetic diversity. For example, setation of the body and appendages is completely expressed in the first postembryonic instar, the larva, while other characters are evident or fully expressed only in the adult male and protogyne female. Yet another notable limitation to available characters among eriophyoids is the lack of any useful ones found to date peculiar to the adult male. However, these limitations can also be viewed as advantages: virtually all anatomical characters useful in diagnosis and identifying eriophyoid taxa are present on one sex of one instar, the protogyne adult female (Lindquist et al., 1996).

A central problem in using these characters and their states to define genera is that nearly all authors to date have considered and used the states phenetically rather than cladistically. To be specific, the states of characters have not been polarized and the plesiomorphic or „primitive“ state has been accorded value equal to an apomorphic or derivative state (Lindquist, 1996).

Despite the presence of few seta and few taxonomic characters, this group is proving to be surprisingly diverse. Considering that over 250 character states have been observed for phenetic analysis, the eventual number of genera could become enormous (Amrine et al., 2003).

Lindquist (1996) placed considerable emphasis on the need for revisional systematic studies, including cladistic analyses, which may clarify the phylogenetic relationships among eriophyoid mites and produce a classification consistent with them. At the same time, as Lindquist and Amrine (1996) emphasized: „the continuing need for so-called alpha taxonomy must be supported, and its image not eroded as a simpler or lesser science. Collection, recognition, adequate description, and classification of the great many undescribed taxa of Eriophyoidae must continue if we are ever to approach completion of an adequate species inventory and thereby obtain an idea of the present species diversity of this group".

DIVERSITY OF THE ERIOPHYOID SPECIES OF SERBIA

The latest analysis of the eriophyoid fauna of Serbia indicates that there are 287 species assigned to 46 genera belonging to three families: Phytoptidae (15 species, six genera), Eriophyidae (263 species, 35 genera), and Diptilomiopidae (12 species, five genera).

Species arrangement within higher taxa compared with the Eriophyoid fauna of Europe is presented on Table 1. The number of species and genera assigned to families in comparison with the data available from countries where catalogs or checklists have been published are presented in Tables 2 and 3. Comparing the data obtained from Italy, Poland, and Hungary - where 235, 238, and 336 species were determinated, respectively (Bernini et al., 1995; de Lillo, 1997; Skoracka et al., 2005; Ripka, 2007) – we see that to date the number of species is similar. Bearing in mind that initial investigations of local faunas in certain European countries were conducted from related or the same host plant species of wider distribution or from plants of economic importance in agriculture and forestry rather than from characteristic or endemic plant species of local floras, we can only draw general conclusions about the diversity of those faunas.

Inasmuch as the territory of Serbia represents one of the leading parts of Europe with respect to floristic diversity (Stevanovic et al., 1995), significant diversity of the eriophyoid fauna could be expected.

Actual knowledge of the eriophyoid fauna in Serbia is almost at the same level as in countries with a longer tradition in the field of acarology. The first records on the eriophyoid fauna in Italy or Hungary date from the last two decades of the 19^{th} century, while investigations in Poland started in the second half of the 20^{th} century. In Serbia only a few species from a small number of plant species were recorded by Italian or Czech zoologists at the beginning of the 20^{th} century (Trotter, 1903; Baudyš, 1928), while more intensive investigations started at the end of the 1970's (Petanović, 1988a; Petanović and Stanković, 1999).

Analysis of the species richness of certain higher taxa shows that in Serbia – as in the case of the eriophyoid fauna of Europe - the family Eriophyidae is the most species-rich, while Phytoptidae and Diptilomiopidae are much less so.

In the eriophyoid fauna of Serbia, 16 genera are represented by one species only,

Table 1. Diversity of species of the Eriophyoid mite fauna in Serbia compared with Fauna Europae (de Lillo, 2004; Petanovic, this paper).

Taxon	Europe	Serbia
Superfamily Eriophyoidea	1009	287
1. Family Phytoptidae	56	15
1.1. Subfamily Nalepellinae	34	6
1.1.1. Tribe Nalepellini	9	3
Nalepella	7	2
Setoptus	2	1
1.1.2. Tribe Trisetacini	25	3
Boczekella	1	0
Trisetacus	24	3
1.2.Subfamily Novophytoptinae	4	2
Novophytoptus	4	2
1.3. Subfamily Phytoptinae	16	6
Phytoptus	16	6
1.4. Subfamily Sierraphytoptinae	2	1
1.4.1. Tribe Sierraphytoptini	2	1
Genus *Fragariocoptes*	1	0
Sierraphytoptus	1	1
2. Family_Eriophyidae	892	260
2.1. Subfamily Cecidophyinae	48	12
2.1.1.TribeCecidophyini	45	11
Achetocoptes	2	1
Bariella	1	0
Cecidophyes	25	6
Cecidophyopsis	14	3
Coptophylla	2	1
Glyptacus	1	0
2.1.2. Tribe Colomerini	3	1
Colomerus	2	1
Cosetacus	1	0
2.2. Subfamily Eriophyinae	382	115
2.2.1. Tribe Aceriini	291	94
Acalitus	13	4
Acaralox	1	0
Aceria	270	88
Cymoptus	1	0
Paraphytoptus	6	2
2.2.2. Tribe Eriophyini	91	21
Brachendus	1	0
Eriophyes	87	19
Stenacis	3	2
2.3. Subfamily Phyllocoptinae	462	133

Table 1. Continued.

Taxon	Europe	Serbia
2.3.1. Tribe Acaricalini	16	2
Acaphylla	2	0
Acaphyllisa	2	0
Acaricalus	10	2
Dichopelmus	1	0
Tumescoptes	1	0
2.3.2. Tribe Anthocoptini	213	63
Abacarus	8	2
Aculochetus	1	0
Aculodes	7	2
Aculops	48	16
Aculus	103	28
Anthocoptes	22	6
Ditrymacus	1	0
Mesalox	1	1
Neooxycenus	1	0
Pentamerus	1	0
Reckella	1	1
Tegolophus	2	1
Tegoprionus	1	1
Tetra	12	4
Tetraspinus	2	1
Thamnacus	1	0
2.3.3. Tribe Calacarini	3	0
Calacarus	2	0
Liroella	1	0
2.3.4. Tribe Tegonotini	31	16
Boczekiana	1	1
Neotegonotus	1	1
Oxycenus	1	0
Shevtchenkella	16	9
Tegonotus	12	5
2.3.5. Tribe Phyllocoptini	199	52
Acareliptus	1	0
Acaritonotus	1	0
Aequsomatus	1	0
Calepitrimerus	20	9
Callyntrotus	5	1
Criotacus	1	0
Cupacarus	2	0
Epitrimerus	76	16

Table 1. Continued.

Taxon	Europe	Serbia
Gilarovella	1	0
Keiferella	3	0
Leipothrix	3	5
Neoleipothrix	0	1
Monochetus	2	1
Phyllocoptes	69	13
Phyllocoptruta	2	0
Platyphytopus	4	4
Vasates	7	2
3. Family Diptilomiopidae	61	12
3.1. Subfamily Diptilomiopinae	15	2
Asetacus	2	0
Bucculacus	1	0
Diptacus	11	2
Trimeroptes	1	0
3.2. Subfamily Rhyncaphytoptinae	46	10
Brevulacus	1	0
Cheiracus	1	0
Quadracus	3	1
Rhinophytoptus	8	2
Rhinotergum	3	2
Rhyncaphytoptus	30	5

19 genera have 2-5 species, five genera have 6-10 species, four genera have 11-20 species, and only two genera have more than 20 species. The genera *Aceria* (with 88 species), *Aculus* (28), *Eriophyes* (19), *Epitrimerus* and *Aculops* (16 each), and *Phyllocoptes* (13) are the most species-rich.

Two new genera have been described from the territory of Serbia: *Rhinotergum*, with the type species *Rhinotergum schestovici* (Petanović, 1988b); and *Boczekiana*, with the type species *Boczekiana celtidis* (Petanović, 2000). *Rhinotergum schestovici* was later recorded from Hungary (Ripka and de Lillo, 1997; Ripka et al., 1997) and from Greece (Malandraki, personal communication), while *B. celtidis* was recorded from Montenegro (Petanović, 2000) and in Turkey (Monfreda and de Lillo, personal communication).

New species from the territory of Serbia are listed in Table 4. Several of the species described from autochthonous plant species (some of which are endemic) can on the basis of information about their ecology and chorology be considered to be characteristic of this territory: *Eriophyes septemlineatus* Pet., *Aceria jovanovici* Pet., *Shevtchenkella pseudoobtusa* Pet., *Shevtchenkella stevanovici* Pet., *Phyllocop-*

Table 2. Number of species per family in the superfamily Eriophyoidea (Ripka, 2007; Soracka et al., 2005; Petanović, this paper).

Country/Region	Phytoptidae	Eriophyidae	Diptilomiopidae
Hungary	12	303	21
Italy	13	214	8
Poland	18	303	21
Serbia	15	263	12
Europe	56	892	61

Table 3. Number of genera within the superfamily Eriophyoidea (de Lillo, 2004; Ripka, 2007; Skoracka, 2005; Petanović this paper).

Country/Region	Phytoptidae	Eriophyidae	Diptilomiopidae
Hungary	5	30	7
Poland	6	38	7
Serbia	6	35	5
Europe	8	61	10

tes lakusici Pet., *Aculops euphorbiae* Pet., *Aculops glabriflorae* Pet. & de Lillo, and *Epitrimerus lythri* Pet.

Eriophyoids are obligately phytophagous mites and can be considered from the applied point of view to be plant pests in agriculture (approximately 20 species), pests of decorative plants in urban horticulture (approximately 20 species), pests in forest cultures, and pests of medicinal plants or wild plant species because of the direct injuries they cause by feeding or owing to their indirect action as vectors of plant pathogens, mostly viruses. Harmful eriophyoid species are widely distributed, well-known, and not particularly characteristic of the fauna of Serbia.

In addition to these aspects of applied acarology, eriophyoids in the last decades have been used as important agents in so-called classical biological control of weeds, primarily owing to their stenotopic monophagy. Twelve species of eriophyoids widely distributed in Serbia have been applied elsewhere for this purpose, including *Aceria chondrillae* and *Aculops hyperici* (in Australia); and *Cecidophyes galii, Aceria tamaricis,* and *A. malherbae* (in North America). Others have been intensively investigated as potential biocontrol agents, for example *Aceria anthocoptes, A. drabae,* and *Leipothrix dipsacivagus* (in the USA). During the last decade, investigations of these species were intensively conducted in Serbia (Petanović et al., 1997; Rančić et al., 2006; Magud et al., 2007; Petanović and Rector, 2007).

Moreover, during the last decade the problem of invasive plant and animal species became pressing all over the world. In connection with this, it should be noted that about 20 species of alien eeriophyoid species, mostly from the Nearctic region, were recorded in Serbia. Most of these alien species were registered as pests of cultivated plants and could be dangerous for the autochthonous ecosystems into which they were inadvertently introduced (Petanović, 1997).

Table 4. List of new species of Eriophyoidea described from type localities in Serbia.

Genus	Species	Reference
Aceria Keifer, 1944	*Aceria cichorii* Pet., B. & Shi	Petanović et al., 2000
	Aceria matricarie Pet., B. & Shi	Petanović et al., 2000
	Aceria cirsii Pet., B. & Shi	Petanović et al., 2000
	Aceria carduui Pet., B. & Shi	Petanović et al., 2000
	Aceria jovanovici Pet.	Petanovic, 1993
	Aceria tosichella K.	Keifer, 1969
	Aceria dissecti Pet.	Petanovic et al., 1993
	Aceria inulae Pet. & B.	Petanovic and Boczek, 2000
	Aceria lini Pet.	Petanović et al., 1995
Aculops Keifer, 1966	*Aculops euphorbiae* (Pet.)	Petanović, 1990
	Aculops glabriflorae (Pet. & de Lillo)	Petanović and de Lillo, 1992
	Aculops kostai Pet.	Petanović, 1987
	Aculops platani B.	Petanović et al., 1995
Aculus Keifer, 1959	*Aculus viburni* Pet., B. & Shi	Petanović et al., 2002
	Aculus marinkovici Pet.	Petanović, 1987
Boczekiana Petanović, 2000	*Boczekiana celtidis* Pet.	Petanović, 2000
Calepitrimerus Keifer, 1938	*Calepitrimerus buxi* Pet.	Petanović, 2000
Calepitrimerus	*Calepitrimerus crataegi* Malandraki, Pet. & Emmanouel	Malandraki et al., 2004
Epitrimerus Nalepa, 1898	*Epitrimerus serbicus* Pet.	Petanović, 1999
	Epitrimerus lythri Pet.	Petanović et al., 1995
	Epitrimerus phaseoli Pet.	Petanović,1988a
Eriophyes von Siebold, 1851	*Eriophyes septemlineatus* Pet.	Petanović, 1990
Leipothrix Keifer, 1966	*Leipothrix dipsacivagus* Pet. & Raecto	Petanović and Rector, 2007
Neoleipothrix Wei & Kuang, 1993	*Neoleipothrix carexis* (Pet.)	Boczek and Petanović, 1995
Phyllocoptes Nalepa, 1887	*Phyllocoptes pteridii* Pet.	Petanović, 1999
	Phyllocoptes lakusici	Petanović, 1999
Platyphytoptus Keifer, 1938	*Platyphytoptus taxodii* Pet.	Petanović, 1999
	Platyphytoptus juniperi Malandraki, Pet. & Emmanouel	Malandraki et al., 2004
Rhinotergum Petanović, 1988	*Rhinotergum shestovici* Pet.	Petanović, 1988b
Shevtchenkella Bagdasarian, 1978	*Shevtchenkella pseudoobtusa* (Pet.)	Petanović, 1987
	Shevtchenkella stevanovici (Pet.)	Petanovic, 1993
Tegolophus Keifer, 1961	*Tegolophus senecii* Pet., B. & Shi	Petanović et al., 2002
Tegonotus Nalepa, 1890	*Tegonotus fragariae* (Pet.)	Boczek and Petanović, 1995
Tetra Keifer, 1944	*Tetra populi* Pet.	Petanović, 2000
	Tetra sharplaninae B.	Boczek and Petanović, 1995
Tetraspinus Boczek, 1961	*Tetraspinus apiaceaus* Pet.	Petanović, 2000
Vasates Shimer, 1869	*Vasates asteri* Pet. & B.	Petanovic and Boczek, 2000

In the light of current problems in the taxonomy and systematics of Eriophyoidea and results obtained to date in investigating the eriophyoid fauna of Serbia, several directions of future research should be stressed:

• Phenetic and genetic characterization of *Aceria* species inhabiting congeneric taxa of the plant families Asteraceae (19 species), Aceraceae (nine species), Lamiaceae and Fabaceae (five species each), and Oleaceae (four species);

• Morphological characterization of critical species within the genera *Epitimerus, Leipothrix, Aculops, Aculus, Calepitrimerus,* and *Aceria* accompanied by additional description in order to obtain a precise definition of their status;

• Investigations of the life cycles of critical species, description of deutogyne forms, and eventual synonymization.

• Detailed investigations of species characteristic of the Serbian fauna for which information is available on the distribution of their host plants (disjunctive ranges, zoogeographical relationships, centers of ancestry and distribution, endemism, etc);

• Redescription of species described in the past; and

• Development of a computerized database with drawings that will allow vizualization of species and different states of eriophyoid traits, host plants, and symptoms.

CONCLUDING REMARKS

In the fauna of Eriophyoidea of Serbia, 287 species have been determined within three families and 46 genera. The number of higher taxa and species in Serbia is similar to their number in European countries with a longer tradition in this field. Species richness is highest in the following genera: *Aceria, Aculus, Eriophyes, Epitrimerus, Aculops, and Phyllocoptes.* Two new genera - *Rhinotergum* Petanovic, 1988 and *Boczekiana* Petanovic, 2000 - and 37 new species have been described from the territory of Serbia. In addition, research in the field of α taxonomy was carried out during the last decade, and population studies were initiated within the congeneric complex of *Aceria* species in order to improve systematics on the species level and lay the foundations for phyllogenetic considerations.

Acknowledgment — The present work was supported by the Ministry of Science and Technology of Serbia (Contract No. 143006 B).

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