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**PHYTOSEIID MITES (PARASITIFORMES, PHYTOSEIIDAE) OF  
“MYKHAYLIVS’KA TSELINA” BRANCH OF THE UKRAINIAN STEPPE  
NATURE RESERVE, NAS OF UKRAINE**

**L.A. Kolodochka, V.Yu. Bondarev**

*I.I. Schmalhausen Institute of Zoology, NAS of Ukraine, Kyiv, Ukraine  
e-mail: leon@izan.kiev.ua; bondaref@i.ua*

Faunistical studies are a priority in protected areas because these ecosystems can be considered the richest and the least disturbed, and provide invaluable data for comparison. It is particularly important in the case of predatory animals, such as mites of the family Phytoseiidae. They are highly important in the ecosystems as the plant pest regulators. However, the data on phytoseiid mites of protected areas are scanty, especially these of the steppe zone of Ukraine. The present publication contributes to the ecological and faunistical studies of Phytoseiidae mites of plant associations in the Ukrainian Steppe Nature Reserve. Herein, the new data on the species composition and distribution of predatory phytoseiid mites of the reserve's branch “Mykhaylivs'ka Tsylyna” are given. The material was collected by authors in August, 2017. A total of 677 specimens were identified as belonging to 14 species of eight genera of Phytoseiidae. According to the ecological preferences, the mites represent three groups: herbabionts, arboreal mites and eurybionts. The most common species was *Amblydromella pirianykae*, according to occurrence index (with maximum index value of 41.29 %). This species also was the most prevalent by the number of collected specimens. The rarest species in the studied complex were *Bawus subsoleiger*, *Neoseiulus bicaudus*, and *Typhlodromus rodovae*. The value of occurrence index for those species was 0.65%. Other species were characterized by intermediate values of occurrence index. The domination structure of the studied species complex was characterized using Paliy-Kovnatsky index. The community structure was as follows: two eudominant and two dominant species, no subdominant species, and 10 secondary community members.

**Key words:** Phytoseiidae, phytoseiid mites, species composition, Mikhailovskaya tselina, Ukraine.

**Кліщі-фітосеїди (Parasitiformes, Phytoseiidae) відділення «Михайлівська цілина» Українського степового природного заповідника НАН України**

**Колодочка Л.О., Бондарев В.Ю.**

Отримано перші відомості про видовий склад і розподіл кліщів-фітосеїд (Parasitiformes, Phytoseiidae) в рослинних асоціаціях відділення “Михайлівська цілина” Українського степового природного заповідника. Виявлено 14 видів з 8 родів родини. Встановлено видовий склад кліщів-фітосеїд на заповідній території та за її межами, їх трапляння та приуроченість до певних типів рослинності, виконаний аналіз отриманих даних.

**Ключові слова:** Phytoseiidae, кліщі-фітосеїди, видовий склад, Михайлівська цілина, Україна.

**Клещи-фитосейиды (Parasitiformes, Phytoseiidae) отделения «Михайловская Целина» Украинского степного природного заповедника НАН Украины**

**Колодочка Л.А., Бондарев В.Ю.**

Получены первые сведения о видовом составе и распределении клещей-фитосейид (Parasitiformes, Phytoseiidae) в растительных ассоциациях отделения “Михайловская целина” Украинского степного природного заповедника. Вывявлено 14 видов из 8 родов семейства. Установлены видовой состав клещей фитосейид на заповедной территории и за ее пределами, их встречаемость и приуроченность к определенным типам растительности, выполнен анализ полученных данных.

**Ключевые слова:** Phytoseiidae, клещи-фитосейиды, видовой состав, Михайловская целина, Украина.

### Introduction

In stable ecosystems, mites of the family Phytoseiidae function as plant pest regulators. Thus, faunistical surveys at nature conservation territories, which are untouched by humans, produce etalon data for comparisons with findings obtained in disturbed ecosystems. Recently, several ecological-faunistical works were published on phytoseiid mites of nature conservation territories in the steppe zone of Ukraine (Kolodochka, 2004; Kolodochka, 2011; Kolodochka, Bondarenko, 1993; Kolodochka and Omeri, 2006; Kolodochka and Bondarev, 2013; 2016; Bondarev, 2018, Kolodochka and Bondarev, 2017). The current publication adds to the body of literature on mites of plant associations of Ukrainian nature conservation territories. It presents new data on the species composition and distribution of predatory mites of the family Phytoseiidae living on plants of the Ukrainian Steppe Nature Reserve, in the branch “Mykhaylivska Tsylyna”, Sumy region, Ukraine.

### Material and methods

Material used in this publication was collected by authors in the Ukrainian Steppe Nature Reserve “Mykhaylivska Tsylyna” in August 2017. Mites were gathered by shaking off plants on black paper, fixed in 70 % ethanol, and later mounted on permanent slides in Hoyer's liquid. Altogether 60 plants species were examined, 157 samples were collected, and 677 phytoseiid specimens were found. Occurrence index ( $P_1$ , %) was calculated according to Chernov, 1975. Domination structure of the mite community was characterized with Paliy-Kovnatsky index. All species were then evaluated according to Shitikov et al., 2003 in one of four ranks: eudominant (the most common species), dominant, subdominant species and secondary member of community (the rarest species). All statistical processing was carried out using Ms Excel software.

### Research results and discussion

In total, 14 species of eight genera of Phytoseiidae mites were identified in the material collected in the “Mykhaylivska Tsylyna” branch of the Ukrainian Steppe Nature Reserve.

The species are listed below (the procedure for compiling a list of species names is adopted according to Kolodochka, 2006).

*Amblyseius rademacheri* (Dosse, 1958) populates *Arctium lappa*.

*Neoseiulus astutus* (Beglarov, 1960) was found on *Salix alba*.

*Neoseiulus bicaudus* (Wainstein, 1962) was detected on *Aster* sp., *Calamagrostis* sp., *Arctium lappa*, *Phragmites australis*, *Cichorium intybus*.

*Neoseiulus reductus* (Wainstein, 1962) populates *Cirsium* sp., *Origanum vulgare*, *Phlomis pungens*, *Acer saccharum*, *Lamium album*, *Urtica dioica*, *Arctium lappa*, *Rubus idaeus*, *Echinops sphaerocephalus*, *Symphytum* sp., *Clinopodium* sp., *Leonurus* sp., *Agrimonia eupatoria*, *Phragmites australis*, *Cichorium intybus*, *Stachys* sp., *Salvia tesquicola*, *Malus* sp., *Lamium* sp.

*Euseius finlandicus* (Oudemans, 1915) was detected on *Aster* sp., *Betula* sp., *Crataegus* sp., *Sambucus nigra*, *Centaurea* sp., *Quercus robur*, *Origanum vulgare*, *Salix alba*, *Salix elaeagnos*, *Caragana* sp., *Acer platanoides*, *Acer tataricum*, *Urtica dioica*, *Corylus avellana*, *Tilia cordata*, *Arctium lappa*, *Symphytum* sp., *Juglans cinerea*, *Plantago major*, *Artemisia absinthium*, *Leonurus* sp., *Agrimonia eupatoria*, *Cornus alba*, *Prunus* sp., *Prunus spinosa*, *Prunus domestica* subsp. *insititia*, *Achillea millefolium*, *Cichorium intybus*, *Prunus padus*, *Stachys* sp., *Malus* sp., *Fraxinus excelsior*.

*Kampimodromus aberrans* (Oudemans, 1930) was assembled with *Juglans cinerea*, *Malus* sp.

*Dubininellus echinus* (Wainstein et Arutunjan, 1970) was found on *Betula* sp., *Phlomis pungens*, *Salix elaeagnos*, *Acer saccharum*, *Urtica dioica*, *Arctium lappa*, *Artemisia absinthium*, *Agrimonia eupatoria*, *Prunus spinosa*, *Achillea millefolium*, *Cytisus* sp., *Cichorium intybus*, *Malus* sp., *Fraxinus excelsior*.

*Dubininellus juvenis* (Wainstein et Arutunjan, 1970) was detected on *Salix myrtilloides*, *Rubus idaeus*, *Salix elaeagnos*, *Arctium lappa*.

*Bawus subsoleiger* (Wainstein, 1962) was found on *Pinus sylvestris*.

*Amblydromella* (s. str.) *pirianycae* (Wainstein, 1972) populates *Aster* sp., *Cirsium* sp., *Centaurea* sp., *Inula britannica*, *Origanum vulgare*, *Phlomis tuberosa*, *Phlomis pungens*, *Odontites vulgaris*, *Salix elaeagnos*, *Caragana* sp., *Verbascum thapsus*, *Lamium album*, *Urtica dioica*, *Senecio vulgaris*, *Calamagrostis epigeios*, *Arctium lappa*, *Echinops sphaerocephalus*, *Daucus carota*, *Juglans cinerea*, *Oenothera biennis*, *Artemisia absinthium*, *Leonurus* sp., *Agrimonia eupatoria*, *Eryngium* sp., *Prunus spinosa*, *Achillea millefolium*, *Cytisus* sp., *Cichorium intybus*, *Stachys* sp., *Salvia tesquicola*.

*Amblydromella* (*Litoseia*) *spectata* (Kolodochka, 1992) was found on *Phragmites australis*.

*Amblydromella* (*Aphanoseia*) *verrucosa* (Wainstein, 1972) populates *Corylus avellana*, *Pinus sylvestris*.

*Typhlodromus cotoneastri* Wainstein, 1961 was identified on *Gleditsia triacanthos*, *Quercus robur*, *Fraxinus excelsior*.

*Typhlodromus rodovae* Wainstein et Arutunjan, 1968 was found on *Pinus sylvestris*.

The species list of phytoseiid mites recorded at “Mykhaylivs’ka tselina” Reserve was compared with lists of other protected areas of different natural zones. In the result, the greatest similarity was observed with the reserves of the forest-steppe zone.

Thus, despite the fact that “Mykhaylivs’ka tselina” is a protected area with steppe vegetation, mainly the forest-steppe species of predatory mite family Phytoseiidae are registered here (Kolodochka, 2011).

According to the type of habitat, the identified phytoseiid mites can be divided into three ecological groups: inhabitants of herbaceous plants (3 species), inhabitants of tree-shrub vegetation (6 species) and the eurybionts. The latter group includes remaining 5 mites species, which do not give preference to a certain type of vegetation. It should be noted that the degree of biotopic confinement to life forms of plants is different (Table 1). Such a gradation makes it possible to speak more objectively

**Table 1**

Phytoseiid mites on the types of life forms of plants and the frequency of their occurrence in the “Mykhaylivs’ka tselina” branch of the Ukrainian Steppe Nature Reserve

Mite species	Life forms of plants	
	Herbs	Trees and shrubs
<i>Amblyseius rademacheri</i>	+	—
<i>Neoseiulus astutus</i>	—	+
<i>N. bicaudus</i>	+	—
<i>N. reductus</i>	++	+
<i>Euseius finlandicus</i>	++	+++
<i>Kampimodromus aberrans</i>	—	++
<i>Dubininellus echinus</i>	++	++
<i>D. juvenis</i>	+	+
<i>Bawus subsoleiger</i>	—	+
<i>Amblydromella pirianycae</i>	+++	+
<i>A. spectata</i>	+	—
<i>A. verrucosa</i>	—	+
<i>Typhlodromus cotoneastri</i>	—	++
<i>T. rodovae</i>	—	+

+ — rare (1–9 specimens); ++ — common (10–99 specimens); +++ — frequent (over 99 specimens)

about the preference of a particular species over various life forms of plants.

Maximum value of occurrence index,  $P_1 = 41.29\%$ , was recorded for *A. pirianykae*. This species was also most prevalent in the studied sample by the number of collected specimens. In contrast, *Bawus subsoleiger*, *Neoseiulus bicaudus*, *Typhlodromus rodovae* were represented only by one specimen each and thus were the rarest species at the studied territory. For those species,  $P_1$  equaled to only 0.65%. For other species that we've found, intermediate values of occurrence index were observed (Fig. 1).

Domination structure of the studied species complex of phytoseiid mites in the examined plant associations was as follows. Only three of four ranks of domination were filled, with two eudominant, two dominant species and 10 secondary members of community. No subdominant species were found. The domination structure of the studied complex of phytoseiid mites in "Mykhaylivs'ka Tsylyna" department is given in Table 2.

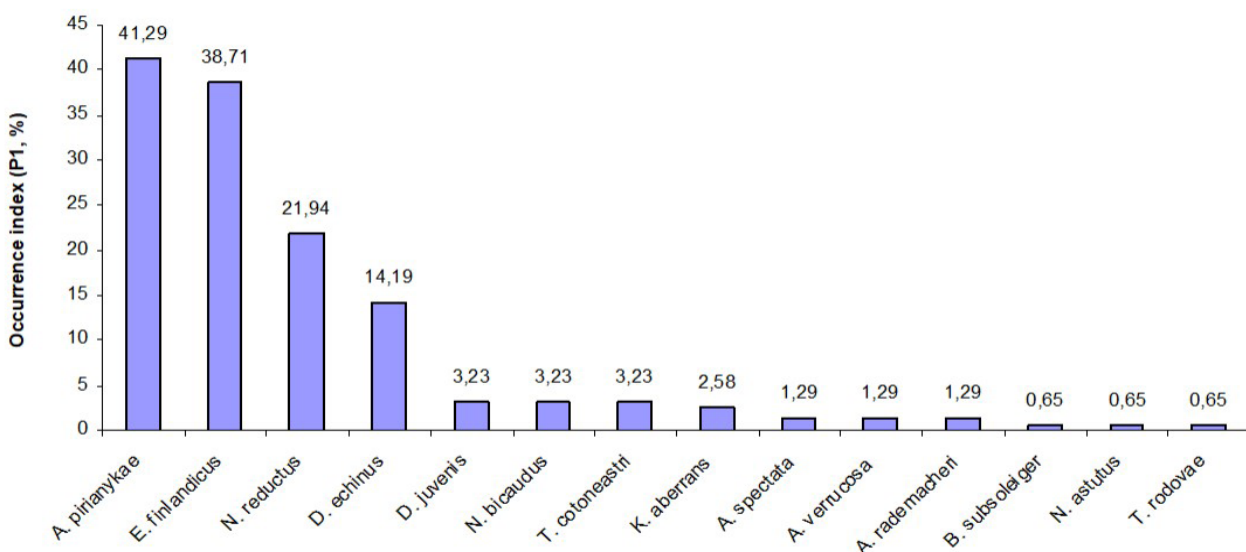


Fig. 1. Occurrence of phytoseiid mites on plants of the "Mykhaylivs'ka tselina"

### Conclusion

For the first time at the territory of "Mykhaylivs'ka Tsylyna" department of the Ukrainian Steppe Nature Reserve, 14 species of mites were found that belong to eight genera of the family Phytoseiidae. The found taxa represented three ecological groups: herbabionts (three species), arboreal (six species) and eurytopic mites (five species). The most common species was a herbabiont *Amblydromella* (s. str.) *pirianykae* ( $P_1, \% = 41.29\%$ ), the rarest species were *B. subsoleiger*, *N. bicaudus*, and *T. rodovae* ( $P_1, \% = 0.65\%$ ), according to the occurrence index. The domination structure of studied complex of Phytoseiidae in examined plant associations included two eudominant and two dominant species, and 10 secondary members of community. Notably, there were no subdominant species.

Table 2

Status and dominance degree (in brackets) of phytoseiid mite species on plants of the "Mykhaylivs'ka tselina" branch of the Ukrainian Steppe Nature Reserve

Eudominant	<i>E. finlandicus</i> (13,32), <i>A. pirianykae</i> (11,7)
Dominant	<i>N. reductus</i> (4,21), <i>D. echinus</i> (1,11)
Subdominants of I order	Absent
Secondary members of community	<i>D. juvenis</i> (0,07), <i>K. aberrans</i> (0,05), <i>T. cotoneastri</i> (0,05), <i>N. bicaudus</i> (0,02), <i>A. rademacheri</i> (0,01), <i>A. spectata</i> (0,004), <i>A. verrucosa</i> (0,004), <i>N. astutus</i> (0,002), <i>B. subsoleiger</i> (0,001), <i>T. rodovae</i> (0,001)

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## ORCID

Bondarev V.Yu: <https://orcid.org/0000-0002-2265-1192>

Kolodochka L.A.: <http://orcid.org/0000-0002-2626-0463>

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