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A CONTRIBUTION TO THE FAUNA OF TIDEIDAE MITES (ARCARIFORMES, TYDEIDAE) OF ARMENIA

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This paper presents the results of Tideid mites' study in Armenia, based on the data of our collections during 2019–2022. We contributed to the Tideid fauna of Armenia with four species of mites as a first record for Armenian fauna: *Tydulosus granulosus* Canesrtini 1886; *Lorryia instignita*, Kuznetcow, 1971; *Pronematus rapidus*, Кузнецов,1972; *Brachytydeus mali* Oudemans, 1929 belonging to four genera -*Tudulosus* Baker,1965; *Pronematus* Baker,1965; *Lorryia*, Oudemans, 1925; *Brachytydeus* Oudemans, 1929. Their role and importance in the orchard ecosystem are given. The material presented in this article are stored in the collections of the Laboratory of Experimental Zoology of the Institute of Zoology of the Scientific Center of Zoology and Hydroecology of the National Academy of Sciences of the Republic of Armenia.

Armenia – Tideid mites – new records – fauna

Աշխատանքում ներկայացված են 2019-2022 թվականներին Հայաստանում տիդեիդ տզերի վերաբերյալ ուսումնասիրությունների արդյունքները, որոնք հիմնված են մեր սեփական հավաքածուների տվյալների վրա: Նյութը համարվում է Հայաստանի ֆաունայի վերաբերյալ մեր հետազոտության շարունակությունը: Առաջին անգամ Հայաստանի ֆաունայի համար նկարագրվել է տիդեիդ տզերի չորս նոր տեսակ – *Tydulosus granulosus* Canesrtini 1886; *Lorryia instignita*, Kuznetcow, 1971; *Pronematus rapidus*, Кузнецов,1972; *Brachytydeus mali* Oudemans, 1929 չորս ցեղերից – *Tudulosus* Baker, 1965; *Pronematus* Baker,1965; *Lorryia*, Oudemans, 1925; *Brachytydeus* Oudemans, 1929: Ցույց են տրված դրանց դերն ու նշանակությունը պտղատու այգիների էկոհամակարգում: Հայտնաբերված տեսակները պահվում են ՀՀ ԳԱԱ կենդանաբանության և հիդրոէկոլոգիայի գիտական կենտրոնի կենդանաբանության ինստիտուտի փորձարարական լաբորատորիայի հավաքածուներում:

Հայաստան – տիդեիդ տզեր – նոր տեսակ – ֆաունա

В работе представлены результаты исследований по клещам-тидеидам Армении, проведенных за период 2019–2022 гг., в основу которых положены данные собственных сборов. Сообщение является продолжением наших исследований по фауне тидеид Армении. Впервые для фауны Армении отмечены четыре новых вида клещей – *Tydulosus granulosus* Canesrtini 1886; *Lorryia instignita*, Kuznetcow, 1971; *Pronematus rapidus*, Кузнецов,1972; *Brachytydeus mali* Oudemans, 1929 из четырех родов – *Tudulosus* Baker, 1965; *Pronematus* Baker,1965; *Lorryia*, Oudemans, 1925; *Brachytydeus* Oudemans, 1929. Показана их роль и значение в экосистеме плодового сада. Типы выявленных видов хранятся в коллекциях лаборатории экспериментальной зоологии Института зоологии Научного центра зоологии и гидроэкологии Национальной академии наук Республики Армения.

Армения – клещи тидеиды – новый виды – фауна

Tideidae family [8] mites belong to the order Acariformes. The family was first recorded in 1877 by the German arachnologist Matthias Paul Kramer [6, 8].

These are small, oval or elongated animals, colored in pale yellow, brown, pink or green.

The integuments of the body are soft, elastic, in linear folds or mesh. The propodosome is separated from the hysterosome by a transverse suture. They are found on trees and shrubs, herbaceous plants, on fungi, in moss and lichens, in forest litter and humus [13, 18, 19].

Being one of the dominant groups of mites on plants, tideids are represented by predators, myco-, phyto-, sapro-, and mixophages. Soil tideides accelerates the processes of humification and mineralization.

Species living in the nests of Hymenoptera help to clean the host brood from parasitic fungi.

Most species of plant-dwelling tideids are involved in the regulation of the abundance of such phytophages as flatworms, gall and spider mites, mealybugs. At the same time, tideids serve as an alternative food source for useful predatory inhabitants of agrocenoses: mites, beetles and Diptera [5, 14].

Other plant-dwelling phytophagous tideids can be harmful to horticulture and viticulture.

The importance of these group makes it expedient to study the species composition of the Armenian fauna's Tideids, with their morphological and ecology characters, since their diversity and practical significance have been neglected in Armenia until the recent few studies by K. Dilbaryan and friends [20] where 11 species have been recorded for the fauna of Armenia

In addition, it should be noted that the study of mites - the tideid of Armenia, of course, is part of the knowledge of the biological diversity of the country.

Materials and methods. The work was carried out in the laboratory of experimental zoology of the Scientific Center for Zoology and Hydroecology of the National Academy of Sciences of the Republic of Armenia during 2019-2022. The material was mites - tideids collected from different physical and geographical zones of Armenia (Ararat, Armavir, Kotayk, Tavush region and environs of Yerevan city) (map1). More than 9 collecting trips were made (more than 300 specimens of tideids were identified). It should be noted that some of the species of tideids presented in the work, are described for the first time in the fauna of Armenia. Samples of leaves, bark and branches of plants were collected and placed in plastic bags for subsequent stereomicroscopic examination.

For transportation, analysis and accounting, well-known methods adopted in acarology were used [1, 3, 4].

The collection of mites was carried out by examining the substrate, shaking and photoeklektor [2]. The material was analyzed manually using Binocular microscope MBS-10. Species identification was carried out under an MBI-3 microscope with a KF-4 phase contrast instrument and an Amplival Carl Zeiss Jena microscope using the appropriate references and key tables [9-13, 17].

Microscopic preparations were prepared from live or dead mites, previously maintained in 70 % ethanol. Individuals collected in spring and autumn, in the body of which there are a lot of fat reserves, and individuals with highly developed cuticular covers, were kept for 2-3 days in a 10 % solution of caustic potassium or in a solution of chloral hydrate and phenol (in one ratios)

These solutions soften the integument and remove fat from the body. After washing the mites in distilled water, they were fixed in preparations by placing them in the Goyer-Berlese medium. More successful preparations have been obtained from live mites.

Results and Discussion. As a result of this study, for the first time for the fauna of Armenia 4 new species of tideid mites were recorded. The mites are small, oval or elongated, but usually colored pale yellow, brown, pink, or green. It should be noted that the body of mites consists of a gnathostoma (chelicerae, palps, and hypostoma) and an idiosoma (legs, aspidosoma, opisthosoma, and podosoma). The outer cover is soft, in some species it forms a dotted or reticulated pattern, the propadosoma and hysterosoma are usually separated by a distinct suture. The legs end in two claws and an empodium of hairs, with the exception of Pronematus, which lacks claws and empodium. Some species do not have eyes, others have two or three eyes.

The list of tideid ticks in Armenia

Tydulosus dumosus, **Kuznetcow, 1973.**
Tydulosus visendus**, Kuznetcow, 1973.**
Pronematus anconai**, Baker, 1944.**
Tydeus placitus **Livshitz, 1973.**
Tydeus kochi **Oudemans, 1928.**
Tydeus caudatus **(Duges,1836)**
Lorria sp. ориг, 2021
****Tydulosus granulosus*** **Canesrtini, 1886.**
****Pronematus rapidus*****, Кузнецов, 1972**.
****Brachytydeus mali*** **Oudemans, 1929**
****Lorryia instignita*****, Kuznetcow, 1971.**
*****first record for Armenian fauna

Tydulosus granulosus **Canesrtini 1886-** Distribution in Armenia: (Map 1)
1.Erevan region- Cherry leaf, 05.09.2020, 850-1300 m.a.s.l., 40°44’27" N 44°51’45"E.
2.Dilijan region- Apple leaf, 23.08.2020, 1100-1510 m.a.s.l, 40°10’49" N 44°51’47"E.

Description:

The mites are broadly oval in shape, with large oval tubercles on the dorsal and partially on the ventral side, covered with longitudinal and transverse folds. Hysterosome with 9 pairs of setae. All legs with ambulacral claws and empodium. Femur 4 is not divided into 2 parts. Striae of hysterosoma longitudinal, basketweave pattern covers entire venter. Propodosoma sensory setae not as long as distance between them, all other dorsal body setae short, strong, serrate. Anal plates small, anus far removed from posterior margin of body, with a pair of small simple setae not approximate to plates. Gnathosoma covered by body, chelicerae long, palpus short and strong as figured, terminal palpal tarsal seta forked distally. Empodia hooked ventrally.

Pronematus rapidus**, Кузнецов,1972**.- Distribution in Armenia: (Map 1)
1.Garni village- plum leaf, 01.05.2021, 1400 m.a.s.l., 40°06’43" N 44°43’44"E.
2.Hacavan village- apple leaf, 26.04.2021, 1730 m.a.s.l, 39°27’46" N 45°58’23"E.
3.Goght village- apple leaf, 25.10.2021, 1500-1700 m.a.s.l., 40°08’22" N 44°46’46"E.
4.Jrvej village - apple leaf, 11.10.2021, 1360 m.a.sl., 40°11’08" N., 44°35’13"E.
Description:

The body of mites is elongated or ovoid. The hysterosoma has 9 pairs of setae. Dorsal setae not longer than distance between their bases. Tarsus 1 lacks empodium and ambulacral claws and bears four long setae at apex. Femur 4 is not divided. Ticks were found in orchards on the bark of an apple tree in a colony of tetranychoid mites, which confirms the data of a number of authors who are considered their predators. From tetranychoid mites in whose colonies tideids were found were: *Tetranychus urticae* Koch 1836, *T. vienensis Zacher,* 1921.

Brachytydeus mali Oudemans, 1929-Distribution in Armenia: (Map 1)

1. Hankavan region- pear branch, 31.03.2021, 2000 m.a.s.l., 40°38’39" N.,44°28’53"E.
2 Aghavnadzor region - plum leaf, 31.09.2021, 1450-1600 m.a.s.l., 39°47’01" N.,45°13’41"E
3. Mkhchyan village- pear branch, 01.09.2022, 845 m.a.s.l., 40°01’12" N.,44°29’28"E.

Description:

The mites are broadly oval, widening towards the anterior part of the hysterosome. The hysterosome has 9 pairs of setae.

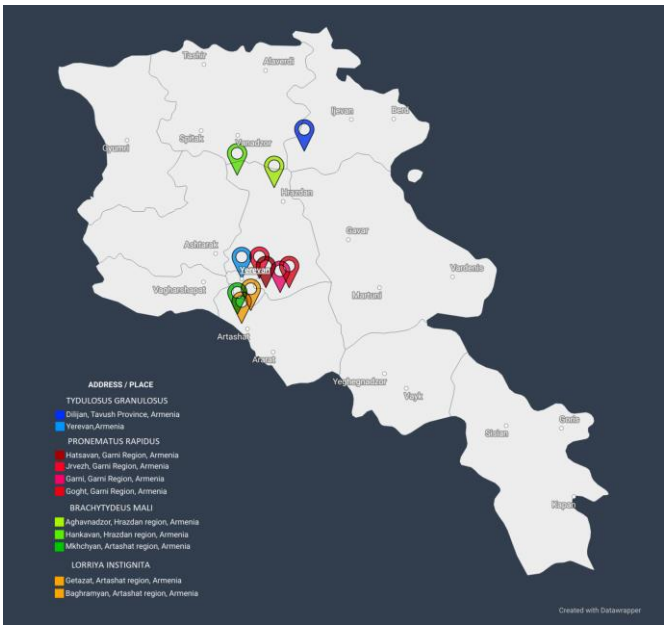
Body surface in linear folds. All legs with ambulacral claws and empodium. Femur 4 is not divided. Found on the branches of cherry plum, apple, pear trees.

***Lorryia instignita*, Kuznetcow, 1971 -** Distribution in Armenia: (Map 1)

Getazat village-thorn leaf ,13.07.2022, 930 m.a.s.l. 40°02’17" N., 44°33’50"E.
Baghramyan village-thorn leaf , 02.06.2022, 1080 m.a.s.l., 40°11’N., 35°50’E.

Description:

Body broadly oval. Hysterosome with 9 pairs of dorsal setae: 5D and 4L Dorsal setae elongate club-shaped, strongly serrated. Proximal seta on tarsus 1 smooth. The folds of the dorsal surface, intersecting, form a mesh pattern. All tarsi have a pair of ambulacral claws and empodium.



Prevalence of Tydeid mites (map .1)

It is important to note that a number of phytoseiid mites were found with the above-mentioned tideids, among which *Amblyseius finlandicus*, Oudemans, 1915 and *Phytoseius plumifer*, Canestrini et Fanzago, 1876 were most frequently encountered. This once again confirms what was said above that tideids are alternative food sources for predatory mites and insects.

Therefore, for the first time for the fauna of Armenia, four species of mites recorded with note of the studied regions.

New micro- and macro-habitats (species and life forms of plants, plant communities) are noted. The biotopic confinement of species to plant communities of orchards was revealed.

The theoretical and practical significance of the work lies in the reduction of the species composition and ecology of tideid mites, which can be used for taxonomy, zoogeography, population ecology, ethology, preparation and compilation of keys.

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