

A REVIEW OF STUDIES ON ORIBATID MITES (ACARI, ORIBATIDA) IN THE CAUCASUS

ОБЗОР ИССЛЕДОВАНИЙ ПАНЦИРНЫХ КЛЕЩЕЙ (ACARI, ORIBATIDA) НА КАВКАЗЕ

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Key words: Oribatida, Caucasus, systematic, faunistic

Ключевые слова: Oribatida, Кавказ, систематика, фаунистика

ABSTRACT

A review of systematic, faunistic, biological and ecological research on oribatid mites (Acari-formes, Oribatida) in the Caucasus is provided.

РЕЗЮМЕ

Дан обзор исследований по систематике, фаунистике, биологии и экологии панцирных клещей (Acari-formes, Oribatida), проведенных на территории Кавказа.

The Caucasus is a region with a high level of biological diversity, one of the world speciation centers. The fauna of the Caucasus was of interest for researchers for quite a long period of time. The studies on Caucasian invertebrates are dated back as far as two hundred years ago. The literature covering systematics, faunistics and ecology of insects, myriapods and arachnids embraces thousands of titles. At the same time, even the fauna of major taxonomic groups of invertebrates was not studied sufficiently. This is well supported by the fact that new taxa are being regularly described at the level higher than the species one.

First data on the Caucasus oribatid mites were published only in 1941, when the Georgian acarologist Rekk [1941] published the results of the soil fauna inventory in the Lagodekhsy natural reserve.

Following research on oribatid mites of the Caucasus were initiated in mid-50s of the XX century as the practical role of oribatids as intermediate hosts of anoplocephalid tape-worms has become known. The infestations of mites in natural and laboratory conditions were checked, the spectrum of intermediate hosts, the abundance

and seasonal changes of mite populations were studied in pastures of various types. The recommendations to minimize tapeworm infestations were developed.

The first research on this subject was done by Rukhlyadev [1956a, b] in Daghestan. He provided the results of oribatid mite studies in the pastures of Daghestan: species diversity, abundance, population dynamics. Fourteen species were reported as the tapeworm hosts. Rukhlyadev suggested the procedure to reduce tapeworm infestations, which were tested in six sheep farms. This research work has made it possible to propose the best time and locations for dehelminthization of sheep. Also Rukhlyadev [1962] studied the fauna of helminthes in relation to geographic distribution of their intermediate hosts, oribatid mites among them. In the published works of Svadzhyan [1961, 1962] the results of experimental infestation and the following dissections of oribatid mites were given as well as the list of intermediate hosts of *Moniezia expansa* and *M. benedeni* in Armenia. The author provided data on the development of larva cysts to invasive stages inside the mite bodies, on spontaneous infestation of mites in nature and the sources of infestations, on species richness and abundance of oribatid mites in various biotopes. Gaibov published data on species composition and abundance of oribatid mites in the pastures of Azerbaijan [Gaibov, 1957; Gaibov, Svatikov, 1956]. The role of oribatid mites in the ontogenetic development of *Anoplocephala perfoliata* was discussed in the work of Kuliev [1962a]. The study of oribatid mites as the intermediate hosts of pasture animals in the Kuba-Kachmas zone was done by Alieva [1966]. Bocharova [1973] studied epizooties of helminth

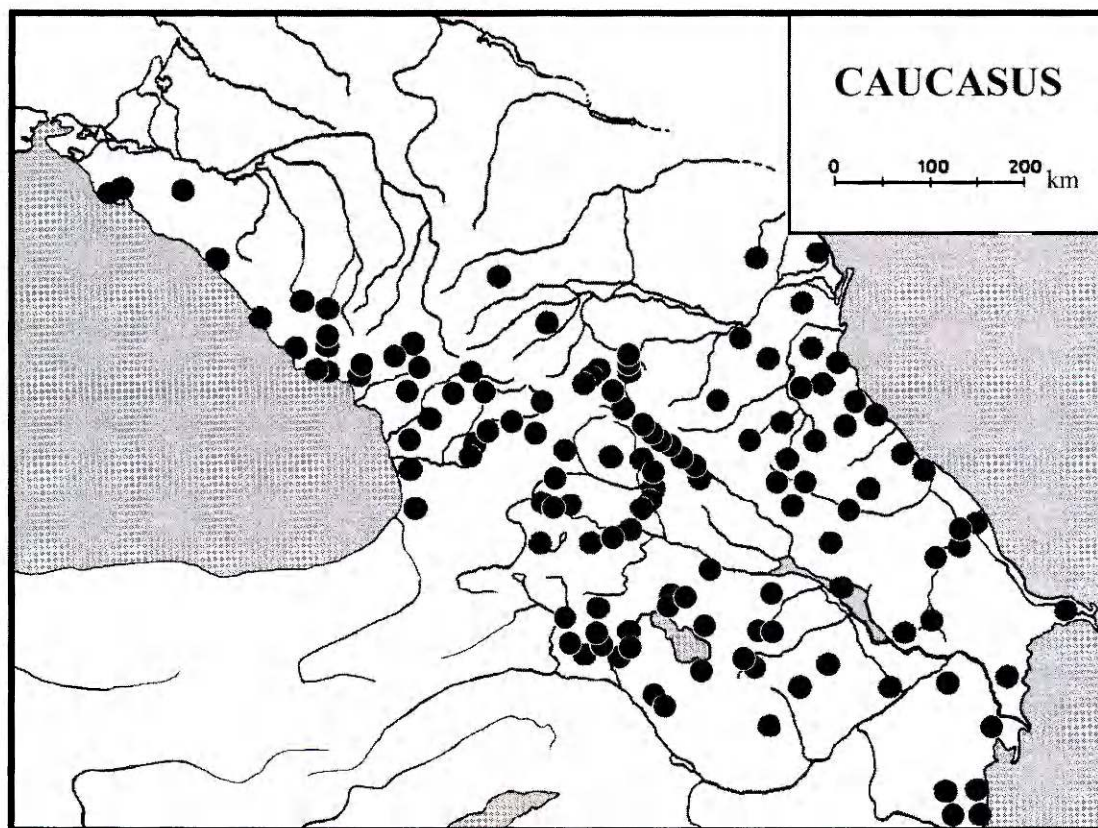


Fig. 1. Localization sites of the oribatid mites in the Caucasus.

invasions in Northern Ossetia. Recommendations on the prophylaxis of moniezirosis of pasture animals were given by Gazaliev [1994b].

The early studies on oribatid mites in the Caucasus have demonstrated that the Caucasian fauna was significantly different from that of the European part of Russia. It included many new species. Bulanova-Zakhvatkina [1957, 1960b, 1962, 1965, 1967], Krivolutsky [1967, 1974], Lange [1972a, b], Subbotina [1981, 1987, 1989], Sitnikova [1973, 1975, 1980], Shaldybina [1969a, 1969b, 1970, 1971, 1973, 1979] and Niedbala [1983a, b, 1984] described new species from the Caucasus, mostly from the Black Sea coast and the Northern Caucasus.

Several new taxa both genera and species were described from Abkhazia [Golosova, Tarba, 1974; Gordeeva, Tarba, 1990; Tarba, 1985, 1990], Georgia [Dzhaparidze, 1973, 1974a, 1980, 1983b, 1985b, 1990a, b, c, Weigmann, Murvanidze, 2003a, b, Murvanidze, Weigmann, 2003], Armenia [Khanbekyan, Gordeeva, 1991; Iordansky, 1991], Dagestan [Shtanchaeva, 1984, 1986, 1993, 2004; Karppinen, Shtanchaeva, 1987], Azerbaijan [Kuliev, 1961b, 1962b, c, d, 1967a, b, d, 1968, 1977a, b, 1978a, b, 1979a, b]. In total in the course of faunistic inves-

tigation of the Caucasian fauna of oribatid mites 12 genera and 169 new species of oribatid mites were described. Localization of the oribatid mites collection sites are shown on the map-scheme (Fig. 1).

Taxonomy of the oribatid mite families Liacaridae, Tectocepheidae, Oribatellidae, Epilohmanniidae, Oribatulidae, Scutoverticidae, Carabodidae was studied by Dzhaparidze [1983a, 1985b, 1989] and Shtanchaeva [Shtanchaeva, 1996a, 1996b, 2004; Stancaeva, Koshchanova, 1987; Shtanchaeva, Netuzhilin, 2003].

The greatest contribution to the knowledge of oribatid mites of the Caucasus was made by Kuliev. He published the species lists for several regions of Azerbaijan [Kuliev, 1961a, b] as well as many taxonomic works [Kuliev, 1963, 1965, 1966a, b, c, e, 1967c]. In total about 50 species were described by Kuliev, many of which were later synonymized. His descriptions and illustrations of oribatids are in many cases not sufficient for valid identifications. However, his works made a significant basis to identify oribatid mites of the Caucasus and adjacent territories. One of his species has become a type species of the genus *Kulievia* Vasiliu et Ivan, 1999 named after him by the Romanian researchers [Vasiliu, Ivan, 1999]. Alieva [1964a, b] studied the

species composition of oribatid mites, their biotopic distribution, seasonal dynamics of abundance in the Kuba-Kachmas zone. The species richness and abundance of oribatids of Azerbaijan were also studied in the Kura-Araksinskaya lowland [Kulagina, 1984] and the Karabakh steppe [Kulagina, 1985].

Comparing with other regions of the Caucasus the Georgian fauna of oribatid mites was studied much better. In addition to Rekk [1941] the data on species diversity of oribatid mites can be found in works of Dzhaparidze [1963, 1966, 1974b, 1979, 1985a, 1986, 1989], Dzhaparidze, Gomelauri [1986], Daredzhanashvili [1964, 1967, 1976, 1979, 1983, 2000], Krivolutsky [1966], Krivolutsky, Tarba [1971, 1973], Lagidze [1981], Murvanidze [2000], Murvanidze, Ratiani, 2000, Murvanidze, Arabuli, 2003, Murvanidze, Weigmann, Tsiklauri, 2003], Tarba [1974b, 1976, 1978, 1992, 1997, 2000c, d], Tarba, Eshba [1988]. Many papers provide data on the mite abundance and its seasonal dynamics, as well as on the distribution of mites in the soil and litter profile [Rekk, 1941; Daredzhanashvili, 1965, 1976; Tarba, 2000f].

The fauna of oribatid mites in Armenia is not yet well studied. The species lists of oribatid mites were included in the papers of Svadzhyan [1961, 1962] and Khanbekyan [1987]. The last author has found genera and species new for science [Khanbekyan, Gordeeva, 1991], including the genus *Deserthozetes* with the type species *D.metsamoricus* and *Ghilarovus armenicus*. Descriptions of the latter species are not known to the author of this paper. Their drawings are available in the Laboratory of Bioindication of the Institute for Problems of Ecology and Evolution named after A.N. Severtsov in Moscow.

The research on the oribatid mite fauna of lichen barren lands and alpine meadows and their community structure as well as on the regularities of the spacial distribution of mites was done by Grechanichenko, Petrova-Nikitina and Netuzhilin [Grechanichenko, Gordeeva, Petrova, 1985; Petrova, Grechanichenko, 1987] in the high mountains of the Teberdinsky reserve. The species lists of the Abrau peninsula and the vicinities of Novorossiysk were presented by Zaitsev, Krivolutsky, Netuzhilin, Seliverstova, 1995 and Seliverstova, 2002. The species composition and abundance of oribatid mites of the Northern Ossetiya were provided in the papers of Bocharova [1973] and Medoeva [Medoeva, 1976; Medoeva, Kalabekov, Kudakhtin, 1987]. The fauna of oribatid mites of Dagestan was

studied rather extensively. The seasonal dynamics of abundance and the vertical distribution of microarthropods were studied by Gazaliev for semi-arid lands and mountain areas of Dagestan [Gazaliev, 1978a, 1982, 1988, 1997a, 1989a, 2000, Gazaliev, Gazalieva, 1988]. The species lists of oribatid mites from various localities are published by Shtanchaeva [1987, 2003]. Chistyakov and Bulatkhonov [1983] provided data on oribatid mites of five biotopes in the vicinities of Dylm. Tarba [2000e, 2001] published data on the oribatid mite fauna of Adygea. No data are available for Chechnya, Kabardino-Balkariya and Ingushetiya.

Most publications on oribatid mites of the Caucasus include species lists for various biotopes, data on abundance and its seasonal changes. Only a few publications include the faunistic analysis of oribatid mites of the whole Caucasus or particular regions [Daredzhanashvili, 1976, 1983; Dzhaparidze, 1974b; Tarba, 1993, 1994, 1999, 2000a, b, Shtanchaeva, 1987]. Rekk [1976] has made an attempt of inventarization of the Georgian acarofauna. His catalog was a significant contribution to make inquiries on many groups and species of mites, and was a good reference source of the literature. The latest version of such list was recently published by Murvanidze and Daredzhanashvili [2000].

There are only a few works available on biology and physiology of oribatid mites. Tarba [1974b] and Tarba and Semenova [1976] studied the oribatid mite resistance to moisture deficit and higher temperatures as well as their hydro- and thermopreferenda in relation to ecological specifics of particular species of oribatid mites and their morphological and anatomical features.

Most ecological studies were undertaken to reveal the impact of various human-coursed perturbations of soil such as melioration, for example, the Kolkhida lowland drying out [Lagidze, 1981], pasturing [Gazaliev, 1993, 1994a], technogenic [Gazaliev, 1978b; Tarba, 1997] and recreational [Grechanichenko, Gordeeva, Petrova-Nikitina, 1985] pressure, fertilizer usage [Kulagina, 1987; Gazaliev, 1997c], heavy metal pollution [Gazaliev, 1997b; Gazaliev, Zagidova, 1997], etc. The role of microarthropods in humus production in arid soil ecosystems was demonstrated by Gazaliev [1999]. He also discussed the bioindication significance of soil inhabiting microarthropods [Gazaliev, 1989b, 1999b].

A zoogeographic analysis of the regional faunas of oribatid mites, including that of the Cauca-

sus, is not extensively discussed as there is an evident lack of data on the distribution of many species. Only a few authors made an attempt to describe the faunistic complexes of oribatid mites [Shtanchaeva, 1987; Tarba, 1999].

For a long time there were no any species lists for the Caucasus. Krivolutsky [1978] made a preliminary estimate of 400 species of oribatid mites in the region. The first species list of the Caucasian oribatids published included 622 species [Karppinen, Krivolutsky, Tarba, Shtanchaeva, Gordeeva, 1987]. Tarba [2001b] mentioned 770 species. The catalog of oribatid mites of the Caucasus [Shtanchaeva, 2001] embraced 886 species and 248 genera or oribatid mites found in 190 geographic localities and more than 400 various biotopes.

Presently the species list of oribatid mites of the Caucasus with added unpublished data on the Northern Caucasus includes more than 900 species.

ACKNOWLEDGEMENTS

The present research is supported by the Russian Fund for Basic Research, grants no 03–04–49255 and 04–04–63047.

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