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## The predatory Actinedid mites (Acariformes: Actinedida) of Khachmaz region of Azerbaijan

**Alizade GA****Abstract**

In article is adduced information about 19 species of predatory actinedid mites from 9 families are found on the Khachmaz region of Azerbaijan. In orchards are found 5 species from 3 families, in settlements – 2 species from family Cheyletidae, in lowland forests – 12 species from 7 families. First in the world discovered the male of *Spinibdella tenuirostris*. This is the first generalized about predatory actinedid mites of Khachmaz region.

**Keywords:** Khachmaz district, predatory, mites, actinides, Azerbaijan

**Introduction**

Actinedid mites- are a large group that merge over 150 families and contain more 26000 species [2]. We can see their members everywhere. In the soil, on the floor, in the plant residues, tree remnants, manure, algae, moss, lichen, mushrooms, grass and -bushes, in the crown of the tree and bushes, in the crack of the tree pods and the holes, in the buds and seeds of the conifers, in the grain plants, in the roots, in the water, inside the ice, in the nest of the birds, little mammals and insects, under the shield of the coccids, in the access of the bark beetles, over the arthropods, in the gills of the cancers, two-sided cockles that live in the fresh water, in the mantle gap of the cockles and the ascidia, over the marine animals which have a silent manner of life (sponge, coral etc.), in the skin cover of the snakes and lizards, on the body of the mammals and birds, in the feather of the birds, in the feather follicles and skin sermons of the mammals, in the visceral organs of the vertebrate and invertebrate animals, in the subcutaneous tumor of a person (*Harpyrynychus nidulans*) [3].

They are encountered in the highest places of the mountains (in the Himalayas until the height of 5200 m from the sea level), and in the depth of the abyssal (up to 8000 meters), in the hot deserts and in the Antarctic ice, in the thermal springs and tundra, in the ever-freezing, in the salinities, in the bare rocks that have a lack of flora and land, in the caves, wells and different pools (both sweet and salt watered), in the scattered sandy places, in the littoral areas and interstitial of the beaches (among the sand crumbs filled with water).

Among them there are microphages, phytophagy, predatory, commensal of the insects, amphibian cancer and cockles, ecto and endo-parasites of the arthropods, amphibians, reptiles, birds and mammals.

Some actinedid mites (rigidified and kunaxide) present in the process of land formation. Many of actinedid mites have medical and veterinary importance. *Tydeus molestus*, some tetranixid mites, some members of the Cheyletus and Cheyletiella species, the maggots of trombiculid mites, *Balaustium murorum* mites create dermatitis-cheininosis seriously even in the domestic mammals (cat, dog, rabbits).

Among the wild actinedid mites there are many species fed with pests and other little arthropods. Some of them (*Bdellodes lapidaria*, *Spinibdella depressa*, *Neomolgus capillatus* which include in the Bdellidae family) are used for the fighting of the cultivated plants with the pests by the biological method.

The actinedid mites lived in the soil can be used as the indicators of the condition of soil and the environment generally. Despite of the theoretical and practical importance, actinedid mites were not studied in some regions or studied barely. The lack of the needed books or finding them difficultly, also confusion of the particular taxon in the different levels or taxon classified poorly do not have an united system.

Poor study of the actinedid mites makes difficulty of using of their members in the biological

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and integration programs of the plant protection, as well as, as the indicator of the ecological condition of the landscape. 19 species of 9 families of the actinedid mites were found in Khachmaz district [4-9]. It is the first generalized article about the actinedid mites of Khachmaz district.

### Material and Methods

Material has been collected as following methods. Actinedid mites are collected from the plants with the flapping method or by examining their parts individually. 10 examples are collected from each species. Wild actinedid mites are collected under the stones, from the land surface, from the bunch of tree and bushes with the help of thinner, fluffy, little brush. Collecting the actinedid mites occurred in the land, on the floor, in the autumn leaves, moss, lichen and in the tree remnants is carried out by photo-electret or sifter (Vinkler device). Also, in order to collect the wild actinedid mites lived in the land, the hunting vessels (Barber baits) that have fixating water inside are used. In conclusion, the exhauster is used in collecting of some mites (such rigidified) lived in the grain plants and oil. All collected material is detected (fixated) in ethyl and is labelled. Also 10-20% of milk acid is used in order to keep the mites.

In order to define the mites and to study their morphological factors, the certain drugs are prepared from them in Phorate. The microscopes named MBS-1, MBÍ-3, Olympus CX-41, MBI-15U4.2 are used in the preparation of the drugs and prescription of their material. The prescription of the species is carried out by means of modifier tables. When working with MBÍ-3 and MBI-15U4.2 microscopes, the phased contrast, oil and water immersion are used. The predators actinedids were measured under ocular-micrometres. The drawings were drawn on a drawing machine-5 and the photos were taken with the help of a camera Sony DSC-P8.

### Results and Discussion

19 wild species of 9 families of the actinedid mites were found in Khachmaz district. 3 species of them are not numerous. The species of *Tydeus californicus*, *Anystis baccarum*, *Bdella muscorum* are found entirely. 5 species (*Lorryia mali*, *Tydeus californicus*, *Cheyletus eruditus*, *Ch. Malaccensis*, *Leptus ignatus*) were found in only residences of Khachmaz district. 1 species (*L. ferulus*) was found in the industrial fruit gardens. 1 species (*Zetzelia mali*) was proliferated both in the residences, and in the industrial fruit gardens. The rest of the species were found in the plain oak-hornbeam forests.

This article is the first consolidated work on actinedid mites of the Khachmaz region. Here we provide brief information about the found species.

Family Tydeidae Kramer, 1877  
Genus Koch, 1836

#### 1. *Tydeus californicus* (Banks, 1904).

Was found in Guba, Khachmaz, Gazakh, Shamkir, Goy-Gol and Aghdam regions, in Absheron peninsula and Ganja city. Occurs in meadows, forests, artificial forests, parks, gardens, vineyards and forest belts. Dwells in soil, litter and on various flowering plants. It is an egg-vivifying specie. There matured 10-12 eggs simultaneously in female. Adult mites feed on gall mites and flat mites, but the larvae and protonymph mainly feed on honeydew produced by aphids [9]. It is found all year round. Cosmopolitan.

Genus Lorryia Oudemans, 1925

#### 2. *Lorryia mali* (Oudemans, 1929).

Was found on the blackthorn - in the alley at the cemetery in Guba city, on walnut – in the street in Hudat and under quince bank- in the square in Baku. It feeds on mosses and powdery mildew on trees infected with armored scale insects [8].

Occurrence: Europe; Caucasus (Krasnodar region); North Africa (Egypt); North America (Canada).

#### 3. *L. ferulus* (Baker, 1944).

Was found on the plum - in an industrial garden in Khachmaz region and on the blackthorn - in the alley at the cemetery in Guba city.

Occurrence: Europe; Caucasus (Krasnodar region); North Africa (Egypt); North America.

Family Bdellidae Duges, 1834

Genus Spinibdella Thor, 1930

#### 4. *Spinibdella tennirostris* (Ewing, 1914).

Was found in the litter of lowland oak-hornbeam forest (with Pedunculate Oak) in Khachmaz district and in a tea plantation at the place of a mixed relict lowland ironwood forest in the night, in Lankaran district. So far, only males of this species have been found in Azerbaijan [1].

Occurrence: Central Asia; North America (USA); Hawaiian Islands; Australia (probably, was carried there).

Genus Bdella Latreille, 1795

#### 5. *Bdella muscorum* (Ewing, 1909)

Was detected in Balakan, Zagatala, Gakh, Gabala, Ismayilli, Shamakhi, Guba, Gusar, Khizi, Khachmaz, Aghdash, Lankaran, Astara, Masalli, Kurdamir, Gadabay, Goy-Gol, Aghdara, Shahbuz districts and in Absheron peninsula. Found in all zones and altitudinal zonation (up to 2300 m. above sea level). It dwells in all types of forests, on the rocks, in the secondary thickets of Caucasian juniper at the place of destroyed mountain beech forests, on prickly astragalus, in arid places with sparse growth of trees, on beavers and in subalpine thyme-fescue steppes, in subalpine forests of *Betula raddeana* and on earthen pyramids in subalpine pine-cowberry forests, in gardens, artificial forests, vineyards, grain fields and tea plantations, in karst caves. Occurs in moss, lichen, soil, litter, under the bark of trees, in rodents' nests, tree crowns and bushes, in the flowers of thyme (only in the subalpine zone). It reaches a significant number in wet hornbeam forests with an admixture of wingnuts and alder of the Ganikh-Aghrichay intermountain basin, where up to 200 and more individuals of this species occur in 1 sample on mosses covering tree trunks. At the same time, in the semi-arid zone, this specie is very rare, it lives only in artificial forests, in vineyards, and in homestead gardens, as well as in tugai forests, occurring in single specimens in the soil, litter and under stones. It feeds on mites of *Nanorchestes* genus, tetranychidae (spider mite) and springtails [11]. Breeds in April-July (Greater Caucasus). There matured eggs from 1 to 20 or more developing in the body of the female. In the mountain forest zone occurs year round, in the semi-arid-from September to June. Females and nymphs hibernate in cracks of stones. Lifetime coloring is red.

Occurrence: Europe; Caucasus (Krasnodar region and Georgia); Central Asia; North America (USA).

### 6. *B. iconica* (Berlese, 1923)

Was detected in Zagatala, Guba, Khachmaz, Khizi, Aghdash, Fuzuli and Ordubad districts. It dwells in all types of forests, prickly astragalus, in juniper-oak (with Georgian oak) places with sparse growth of trees, in karst caves, and occasionally in settlements. Occurs in soil, litter, in moss, under stones, under bark, in dry leaf litter, in wood dust, on grasses, in the crowns of trees and shrubs, in burrows of rodents. Found at altitudes up to 3774 m<sup>[12]</sup>. First time was discovered by us in the low altitude zone (Khachmaz district, Lajat village, lowland oak-hornbeam forest, 20 meters above sea level). It feeds on springtails<sup>[13]</sup>. There mature eggs from 1 to 50 and more simultaneously in the body of female<sup>[12]</sup>.

Occurrence: Europe, Caucasus (Krasnodar region and Georgia); Central Asia; North Africa, New Zealand (probably, was carried there)

Family Cunaxidae Thor, 1902  
Genus Cunaxa Von Heyden, 1826'

### 7. *Cunaxa setirostris* (Hermann, 1804)

Was detected in Khachmaz, Shamakhi, Khizi, Guba, Aghdash, Lankaran, Aghdara districts, Nakhchivan AR (Babak district and Ordubad city) and in Absheron peninsula (Baku city and Mardakan settlement). Occurs in foothill relict ironwood-boxwood and oak (with chestnut-leaf oak) forests of Talish mountains, mountain beech forests of the Lesser and Greater Caucasus, in the bottom oak-hornbeam forests (with Pedunculate Oak) of Samur-Davachi lowland, in the juniper and juniper-oak (with Georgian oak) places with sparse growth of trees, in citrus and tea plantations, gardens, artificial forests, parks, in barns and granaries. It is found in soil, litter, in moss, in grain, on ivy, cypress, tea bushes, carcass, tangerine trees, under the bark of pine stumps. Males are very rare. Breeds in early July (Guba district). There mature 1 large spherical egg in the body of female. Cosmopolitan.

Genus Pulaeus Den Heyer, 1980

### 8. *Pulaeus americanus* (Baker et Hoffmann, 1948)

Was detected in Gakh, Khizi and Khachmaz districts and Absheron peninsula (Baku city and locality of Nardaran and Balakhani settlements). Occurs in pistachio- oak (long-skinned oak) and juniper forests (tomillo juniper) with sparse growth of trees, in bottom oak and hornbeam (with Pedunculate Oak) forests of Samur- Davachi lowland, in the foothill wormwood-ephemeris deserts and artificial forests. Dwells in soil, on Gum Tragacanth. Astragalus (locoweed), in moss and under bark. In Absheron peninsula it breeds at the end of March - beginning of April, in Gakh district (Ganikh-Aghrichay intermountain basin, 2 km to the west from the village of Gipchak) - in May, in the bottom forests of Samur-Davachi lowland - in late May - early June. Eggs are small and spherical.

Occurrence: Eastern Europe (Ukraine: Crimea); Middle Asia; North America (Canada and USA).

Family Cryptognathidae Oudemans, 1902  
Genus Favognathus Luxton, 1987

### 9. *Favognathus rugosus* (Livshitz, 1974)

Was detected in Khachmaz district in soil of bottom oak – hornbeam forests (with Pedunculate Oak) and in Aghdash

district (Turancahy reserve) in moss from the oak in juniper-oak forests (with Georgian oak) with sparse growth of trees.

Occurrence: Eastern Europe (Ukraine: Crimea)

### 10. *F. cucurbita* (Berlese, 1916)

Was found in Khizi district in leaf litter in low - mountain dry oak forest, in Khachmaz district in soil of bottom oak – hornbeam forests (with Pedunculate Oak) and in Aghdash district (Turancahy reserve) in soil of juniper-oak forests (with Georgian oak) with sparse growth of trees.

Occurrence: Eastern Europe; Sardinia island; Great Britain island; Asia Minor (Turkey)

Family Caligonellidae Grandjean, 1944  
Genus Caligonella Berlese, 1910

### 11. *Caligonella humilis* (Koch, 1838)

Was found in Zagatala, Aghdash and Khachmaz districts. Dwells in the low-mountain riverside hornbeam – gloriosa forests and middle – mountain (1600 – 1650 m. above sea level) landslide, so-called “drunk” aspen forests, in the bottom oak-hornbeam (with Pedunculate Oak) forests of Samur-Davachi lowland and in juniper - oak (with Georgian oak) ащкыуы. Occurs in soil, litter, in moss.

Occurrence: Europe; Asia Minor (Turkey); North America.

Family Stigmaeidae Oudemans, 1931  
Genus Zetzelia Oudemans, 1927

### 12. *Zetzelia Mali* (Ewing, 1917)

Was detected in Nakhchivan AR (Babak district: Babak settlement), Guba, Khachmaz, Barda districts and Absheron peninsula (Baku city and Mardakan settlement). It is found in the lowland forests of the Garabakh plain (Sultanbud Forest), in gardens, parks, vineyards, in avenues in cemeteries and in botanical gardens. Also was found on various flowering plants. Resistant to organophosphate drugs. It attacks to all stages of development of spider mites, flatfish, theideidae, eriophyidae, phytoseiidae, and small lepidopteran pests; eats oak leaf phylloxera eggs, coccid, own eggs, larvae, nymphs. Especially willingly feeds on eggs of red and brown fruit mites, as well as Schlechtendal's mite. It also feeds on apple pollen and apple leaf tissue. In the absence of food, it can fast for 18-24 days<sup>[14, 15]</sup>. In case of feeding on eggs of *Panonychus ulmi* it lays 1 egg per day<sup>[14]</sup>. Coccinellid larvae and thrips prey on *Zetzelia mali*<sup>[14]</sup>.

Fertilized females hibernate in cracks of the bark and under its exfoliating areas on the uterine branches and prunings, as well as in the soil at the base of trees. During the year gives 2-4, sometimes 5 generations<sup>[16, 17]</sup>.

Occurrence: Europe; Caucasus (Krasnodar region); Asia (Middle Asia, Iran, Israel, Lebanon (only in the mountains, in desolate apple orchards); North America (USA and Canada).

Genus Storchia Oudemans, 1923

### 13. *Storchia robustus* (Berlese, 1885)

Was detected in Khizi, Khachmaz and Lankaran districts. Occurs in foothill relict ironwood-boxwood and oak (with chestnut-leaf oak) forests of Talish mountains, in the bottom oak - hornbeam (with Pedunculate Oak) forests of Samur-Davachi lowland and in low - mountain dry oak forests of North - East hill of the Greater Caucasus. Dwells in soil, litter and dry leaf litter.

Occurrence: Europe (Italy, Corsica Island, Greece, Ukraine: Southern Crimea); South (RSA and Swaziland) and South-West (Namibia) Africa; New Zealand; Solomon Islands (Guadalcanal Island).

Genus Eustigmaeus Berlese, 1910

#### 14. *Eustigmaeus anauniensis* (Canestrini, 1889)

Was detected in Aghdash, Khizi, Khachmaz districts. Dwells in juniper forests with sparse growth of trees (friganoid juniper), in low - mountain dry oak forests and bottom oak – hornbeam forests (with Pedunculate Oak) of Samur – Davachi lowland. Occurs in dry leaf litter and in soil.

Occurrence: Europe; Middle Asia; North America.

Family Cheyletidae Leach, 1815

Genus Cheyletus Latreille, 1796

#### 15. *Cheyletus eruditus* (Schrank, 1781)

Was detected in Nakhchivan AR, in Fuzuli, Aghdara, Gadabay, Astara, Lankaran, Lerik, Ismayilli, Shamakhi, Khachmaz, Guba, Gusar districts and in Absheron peninsula. Dwells in the mountain beech forests of the Lesser Caucasus, in buildings of various types (houses, food depots, granaries, chicken coops etc.). It was found in hay, halm, rotting onions, wheat, litter from the granary, in food stocks, in rodents' nests, in soil, under the bark, in the litter of the chicken coop and in the litter of the forest. It feeds on thyroglyphid (granary) mites. The female protects the brood until larvae appear [18]. Cosmopolitan.

#### 16. *Ch. Malaccensis* (Oudemans, 1903)

Was detected in Nakhchivan AR, in Fuzuli, Yevlakh, Guba, Gusar, Khachmaz districts and in Absheron peninsula (Baku and Khirdalan cities). Occurs in n food depots, granaries, chicken coops, poultry farms. Also it was found in the nests of house sparrow and pigeons, in hay, straw, in the underground of granary, in litter from chicken coop, depots, in seeds of cereals and soybeans, on plants. Cosmopolitan

Genus Hemicheyletia Volgin, 1969

#### 17. *Hemicheyletia bregetovae* (Volgin, 1969)

Was detected in Khachmaz district in soil under the hybrid poplar in the bottom oak – hornbeam forest (with Pedunculate Oak) and in Absheron peninsula (Mardakan settlement) in soil under the laurel in arboretum.

Occurrence: South - East (Bulgaria) and Eastern (Ukraine: Crimea) Europe; Caucasus.

Family Anystidae Oudemans, 1902

Genus Anystis v. Heyden, 1826

#### 18. *Anystis baccarum* (Linnaeus, 1758). – **Анистис ягодный**

Was detected in Gakh, Gusar, Khachmaz, Siyazan, Shabran, Ismayilli, Shamakhi, Khizi, Aghdash, Lankaran, Lerik, Astara, Tovuz, Goy – Gol, Shamkir, Fuzuli districts and in Absheron peninsula. Dwells in subalpine hayfields, in the subalpine thyme-fescue steppes, in subalpine oak parks (with eastern oak), in mid-mountain hornbeam and riverside ash-tree forests with undergrowth of hazel and black elder (1600–1650 m. above sea level) of the Lesser Caucasus, in foothill forest - steppes, in lowland meadow steppes, in lowland oak forests of Greater Caucasus, in tugai forests, in sagebrush –

ephemeris, one year old shank, sagebrush – genghis and genghis small shrub deserts, in the secondary thickets of Caucasian juniper at the place of destroyed mountain beech forests, in forests of willow pears with sparse growth of trees, in artificial forests, wastelands, gardens, vineyards, alfalfa and potato fields, tea plantations, vegetable gardens, botanical gardens, occasionally in caves. Occurs on the crown of trees and shrubs, on Gum Tragacanth. Astragalus (locoweed), on leaves of grass and dwarf shrubs, in flowers of tall grasses of Umbelliferae family (for example, angelica) and thyme (only in the subalpine zone), in the soil, litter, under stones, in birds' nests, in the nest of voles, under the bark of prunings of apple tree. Sometimes enters into the house. There is rarely observed foresia in small mammals, for example, on *Apodemus agrarius* and *Microtus arvalis* [19]. Reproduction is predominantly parthenogenetic. Males are rare. During the year it has 3 generations. Eggs laid under stones and litter hibernate. In summer, eggs are laid on the leaves of plants. There mature eggs up to 14 in the body of the female. It feeds on small arthropods, in particular, aphids, springtails, Mite *Panonychus ulmi*. Takes place of cannibalism. It is one of the main regulators of the number of sucking pests of the grapevine in the vineyards of the Absheron peninsula. On *A.baccarum* parasitize the larvae of mites of the genus *Leptus* (family Erythraeidae), in particular, the larvae of *L. trimaculatus* (Hermann, 1804) [20]. Lifetime coloring - red or red - fulvous. Cosmopolitan

Family Erythraeidae Robineau- Resvoidy, 1826

Genus Leptus Latreille, 1776

#### 19. *Leptus ignotus* (Oudemans, 1903)

The larvae of this specie were found in the Khachmaz district (village Murshudova) in a fruit garden on the foot of a haymaker. Larvae parasitize also on insects, as well as, on the European red - headed vole [21]. Occurrence: Europe; North America: USA.

### Conclusion

19 predatory species of 9 families of the actinedid mites were found in Khachmaz district. 5 species of 3 families were found in fruit gardens; 2 species of Cheyletus genus of Cheyletidae family - in residential areas; 12 species of 7 families – in plain forests. The specie of *Tydeus californicus* (Banks, 1904) belongs to the fruit gardens of Khachmaz district. The specie of *Cheyletus eruditus* (Schrank, 1781) is mostly spread in residential areas. The specie of *Bdella muscorum* (Ewing, 1909) is spread in plain forests. The species of *Tydeus californicus* and *Zetzelia Mali* (Ewing, 1917) are regulators of the number of sucking pests in the fruit gardens of Khachmaz district.

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