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THE PREDATORY MITES (PHYTOSEIIDAE, PARASITIFORMES) IN THE FAUNA OF UKRAINE: A NEW SPECIES AND A NEW SUBGENUS OF THE GENUS *GRAMINASEIUS*

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The Predatory Mites (Phytoseiidae, Parasitiformes) in the Fauna of Ukraine: a New Species and a New Subgenus of the Genus *Graminaseius*. Kolodochka, L. A. — The predatory mites of the genus *Graminaseius* Chant & McMurtry, 2004 (Phytoseiidae, Parasitiformes) of the Ukrainian fauna are reviewed. Information on the species of the genus previously known from Ukraine is summarized and supplemented. *Alustoseius* Kolodochka, subgen. n. (type species: *Amblyseius alustoni* Livschitz & Kuznetzov, 1972) is established to include *Graminaseius* (*Alustoseius*) *altimontanus* Kolodochka, sp. n. described based on a female collected in the Crimean Mountains, and *Graminaseius* (*Alustoseius*) *alustoni* (Livschitz et Kuznetzov, 1972), comb. n. previously assigned to *Amblyseius* and *Neoseiulus*. Two species are added one the list, one of which, *Graminaseius* (s. str.) *lituatus* (Athias-Henriot, 1961), comb. n. was previously assigned to *Amblyseius* and *Typhlodromips*, is recorded from Ukraine for the first time. All the species are redescribed and illustrated based on the study of exhausting material, with diagnoses, depositaries of type material, distribution in Ukraine and world, types of habitats, as well as a key to subgenera and species occurring in Ukraine are provided.
Key words: taxonomy, phytoseiid mites, diagnoses, new subgenus, new species, new records.

Introduction

The predatory mites of the family Phytoseiidae (Parasitiformes) are constantly attracting attention of researchers as natural enemies of pest phytophagous mites and small insects. Effective species of phytoseiids known and already used in practice maintain this interest, and as a result, the knowledge of the family is increasing markedly. The number of nominal species in the world fauna exceeds 2400 (Chant, McMurtry, 2007; Denmark and Evans, 2019) and is constantly growing.

This publication is a first in the series of articles on the study of the current species composition of phytoseiid mites of the Ukrainian fauna. It presents the results of a review of four species of the genus *Graminaseius* Chant & McMurtry, 2004, one of which was found to be previously unknown and undescribed. The data used for the complex characterization of the genus are given, namely, description and diagnosis of the genus and subgenus, key to species and subgenera, detailed species essays with drawings, morphological and measurement data, differential diagnoses, information on distribution in the world and Ukraine, depositaries of the type material, habitats, assessment of abundance and occurrence. An analysis of the structural features of species of the genus is resulted in establishing a new subgenus to include two species.

Material and methods

Material was collected in different natural zones of Ukraine on terrestrial vegetation of various types. The mites were shaken by beating the trunks or branches with stick from vegetation onto a black paper or plastic beat sheet. Herbaceous plants of the same species were first gathered in open-fan bunches to minimize the destruction of mites when shaken off. Mites were picked from the black sheet with a needle and placed into 70 % ethanol. To separate field samples in the laboratory and prepare slides, mites were placed into water for a short time, and then mounted in the Hoyer's liquid on glass slides. In the case of mass collecting, mites in the one slide were arranged in one, rarely in two rows. Prepared slides were placed in a thermostat at 60° C for 2–3 weeks until the Hoier's liquid becomes dry.

Slides were examined using an MBI-3 (LOMO) compound microscope with the KF-4 phase-contrast attachment objectives with 10–90× magnification and camera lucida PA-6 (LOMO), 1.5× to make drawings and measurements.

The type of new species is deposited in the collection of I. I. Schmalhausen Institute of Zoology, National Academy of Sciences of Ukraine, Kyiv (SIZK).

Descriptions, measurements and illustrations are based on non-type specimens from Ukraine compared with the types from B. A. Wainstein collection deposited at the Department of Acarology (SIZK) or with illustrations of species in the publications of others authors. Measurements are given in micrometers (μm).

Terminology of idiosomal setae follows Wainstein (1973 a) with minor changes or adopted from Wainstein (1973 b) and Kolodochka (1990) for describing the reproductive system of phytoseiids to. The new species was described, measured, and depicted from the holotype. The other species were redescribed based on non-type specimens from Ukraine deposited in the author's and Wainstein collection (SIZK), as well as N. N. Kuznetzov's collection deposited in the Nikitsky State Botanical Garden, Yalta (SNBG) after comparison with descriptions and illustrations of these species in the literature.

Results

Subfamily Amblyseiinae
Tribe Amblyseiini
Subtribe Amblyseiina

Genus *Graminaseius* Chant & McMurtry
graminis complex: Athias-Henriot, 1966: 181;
Graminaseius Chant & McMurtry, 2004: 215.
Type species: ***Amblyseius graminis*** Chant, 1956.

The genus *Graminaseius* was established for a group of 16 species of the world fauna by Chant & McMurtry (2004). Their main diagnostic character is a peculiar connection of the atrium of spermatheca with the main duct of the inseminating system of the female. The duct is divided into two parallel continuing short and thinner ducts, which soon after separation merge into one. Otherwise, one unusually thick main duct (approximately twice as wide as one duct in other species having two thin ducts) leaves the atrium and then narrows to a thickness common to other species.

Dorsal side of body with 19 pairs of dorsal setae: AD1, AD2, AD3, AD4; PD2, PD4; AM1, AM2; AL1, AL3, AL4; PL1, PL2, PL3; PM1, PM3, PM4; AS, PS; and with 7 (*it, iv, id, isc, il, is, ic*) or 4 (*it, isc, il, ic*; missing *iv, id, is*) pairs solenostomes. Dorsal shield of female and male entire, well sclerotized, smooth, with dark marginal border, broadly oval with slight lateral notches, or elongate-oval, moderately sclerotized without compacted marginal strip, with fine reticulate or reticulate-squamous sculpture in posterior half of shield. Dorsal setae smooth, except for slightly serrate PM4, varying in length from short, sometimes miniature, to moderately long, not exceeding half the distance between the thecae of setae PM3. Ventrianal shield mostly pentagonal, somewhat narrowing caudally, with shallow notches along lateral margins; transversely striated with fine sculpture, anal pores clear, round. Chelicera is proportional to body size. *Graminaseius* species occurring in Ukraine have little teeth on fingers of the chelicera — on Df 2–3 and on Dm 1–2. Spermathecal funnel is moderately thick-walled, elongated, goblet-shaped; atrium is large, sessile; large duct, either bifurcated or single, doubled for a short distance. Leg IV with 3 macrosetae,

knee of III and II with short macroseta or without them. Spermatodactyl of male T-shaped, unequal armed (ramus longer than antiramus).

Graminaseius* (s. str.) *graminis (Chant, 1956) (fig. 1)

Amblyseius graminis Chant, 1956: 34; Karg, 1971: 211, 1993: 184; Kolodochka, 1978: 21, 2006: 228; Kolodochka, Skliar, 1981: 183; Moraes et al., 2004: 26; Kolodochka, Omeri, 2011: 39.
Typhlodromus (*Amblyseius*) *graminis*: Chant, 1959: 89.
Amblyseius (*Typhlodromopsis*) *graminis*: Muma, 1961: 287.
Typhlodromus (*Typhlodromus*) *graminis*: Westerboer, Bernhard, 1963: 636.

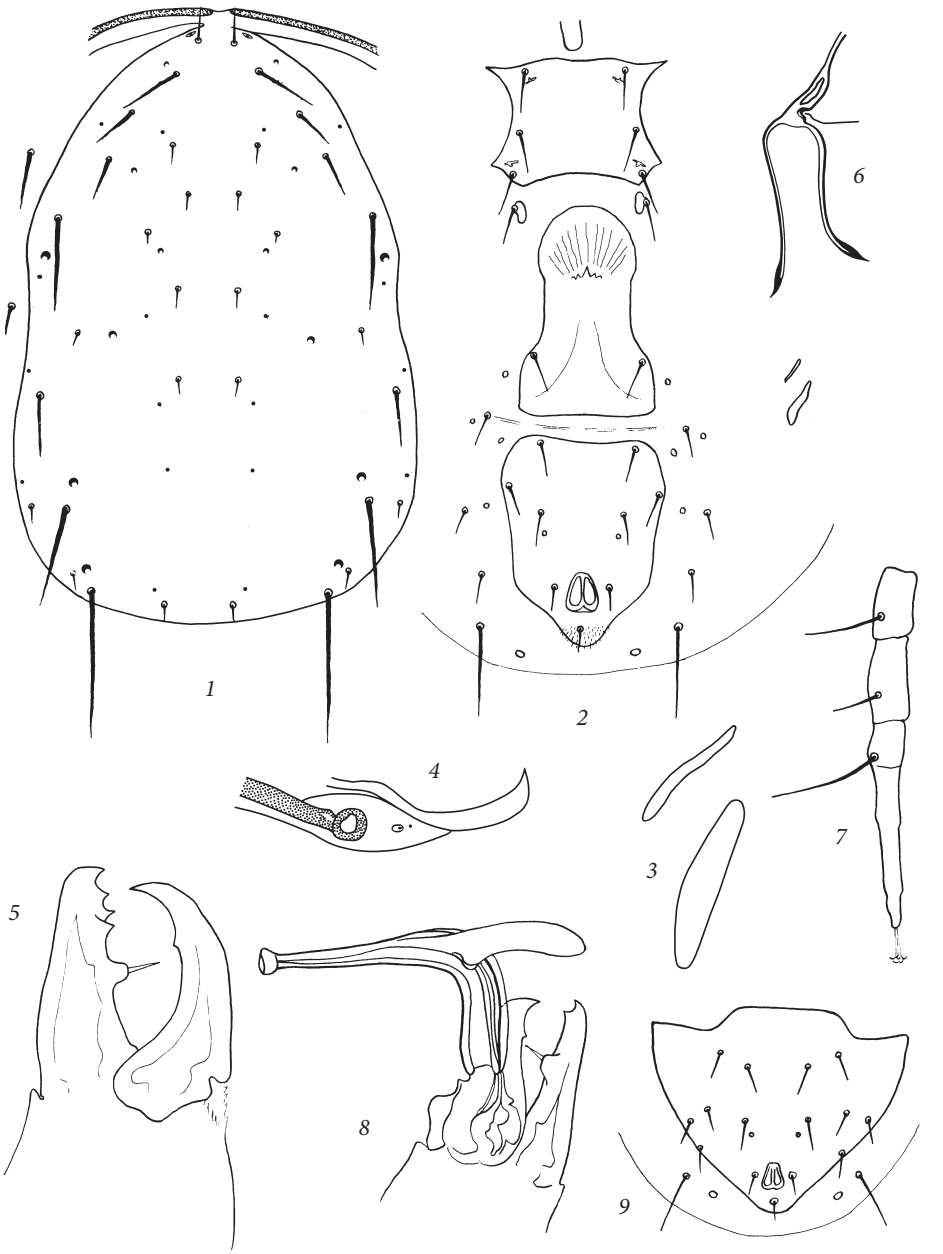

Fig. 1. *Graminaseius graminis* (Chant, 1956) ♀ (*1–7*), ♂ (8, 9): *1* — dorsal shield; *2* — ventral body surface; 3 — metapodal plates; *4* — posterior part of peritremal schield; *5* — chelicera; *6* — spermatheca; *7* — fragment of leg IV; *8* — chelicera with spermatodactyl; *9* — ventrianal shield.

Amblyseius (*Amblyseius*) *graminis:* Wainstein, 1975: 920; Arutunjan, 1977: 36.
Neoseiulus graminis: Moraes et al., 1986: 81.
Graminaseius graminis: Chant & McMurtry, 2007: 854.
Typhlodromus (*Typhlodromus*) *exiguus* Westerboer in: Westerboer & Bernhard, 1963: 628 (synonymy by Athias-Henriot, 1966: 218).

Material. **Type**. Holotype ♀: England, Kent, East Malling, on grass (No. of the slide unknown), (Natural History Museum London) (not examined).

Non-type. Ukraine: Autonomous Republic of Crimea, Cherkasy, Chernihiv, Donetsk, Kherson, Luhansk, Mykolaiv, Poltava, Rivne, Ternopil, Transcarpathian Regions, 276 specimens (244 ♀, 32 ♂) (SIZK).

Female. Dorsal shield (fig. 1, *1*) well sclerotized, with dark marginal border, smooth, broadly oval, with lateral notches, 7 pairs of solenostomes (it, iv, id, isc, il, is, ic). Dorsal setae contrasting in length, smooth, except for slightly serrated PM4. Seta AM1 equal to or slightly longer than distance to theca AL1. Seta PL1 three times as long as PM1. Setae PL2 and PL3 almost equal in length and three times shorter than PL1. Perithremes slightly extending beyond the theca of setae AD1. Ventrianal shield with transverse striation, slightly concave anterior margin, and small lateral emarginations; anal pores distinct, round (fig. 1, *2*). The posterior metapodal shield is expanded caudally, the anterior one is linear (fig. 1, *3*). The posterior part of the peritremal shield is curved (fig. 1, *4*). On Df chelicera 2 teeth, on Dm 1 (fig. 1, *5*). The funnel of the spermatheca is narrow, goblet-shaped, with a slight constriction; the atrium is sessile (fig. 1, *6*). Leg of IV pair has three macrosetae: the longest one is on the basitarsus (fig. 1, *7*). Genu of III and II pairs of legs with short macroseta.

Measurements: Lds 350, Wds 205, Lvas 110, Wvas 95, Lian 42; Ltar IV 117. Setae length: AD1 22; AD2 11; AD3 8; AD4 8; PD2 8; PD4 8; AM1 33; AM2 6; AL1 22; AL3 25; AL4 53; PL1 33; PL2 10; PL3 8; PM1 11; PM3 60; PM4 80; AS 33; PS 16; PV 63. MCh IV: ge 47, ti 33, ta 70; MCh III: ge 22; MCh II: ge 22.

Male. Preanal setae 6 pairs; anal pores large (fig. 1, *8*). The spermatodactyl massive, T-shaped (fig. 1, *9*). Lds 275.

Diagnosis. *Graminaseius graminis* is similar habitually to *Amblyseius begljarovi* Abbasova and *A. jailensis* Kolodochka, but differs from them (besides of genus features in structure of the spermatheca), by the shape of ventrianal shield tapering caudally, goblet funnel of the spermatheca, and smaller number of teeth on chelicera (on Df 2 teeth, on Dm 1), whereas in *A. begljarovi* and *A. jailensis* the ventrianal shields are expanded caudally, the cone-shaped funnel of the spermatheca expands monotonously towards the sacculus, the fingers of the chelicerae have a significantly larger number of teeth (the first species has 8–9 teeth on Df and 3 teeth on Dm, the second one has 2 large distal teeth and 11 small teeth on Df, and 3 teeth on Dm).

Distribution, habitat, occurrence. North Africa, Southern Australia, North and South America, Caucasus, Europe, Middle East. In Ukraine: all natural zones, herbs, rarely shrubs; frequent.

Graminaseius* (s. str.) *lituatus (Athias-Henriot, 1961) comb. n. (fig. 2)

Typhlodromus graminis sensu Westerboer & Bernhard, 1963 — misidentification (see Karg, 1993: 184).
Amblyseius lituatus Athias-Henriot, 1961: 440.
Typhlodromips lituatus: Moraes et al., 1986: 142.
Amblyseius (*Typhlodromips*) *lituatus*: Karg, 1991: 215: 184;

Material. **Type**. Holotype ♀: Spain: Pontevedra, Isla Cies Sur, litter under *Armeria langeana* on a slope to the open sea, IB: specimen #Sp 411 (Laboratoire d'Acarologie de l'École Pratique des Hautes Études, Paris) (not examined).

Non-type. Ukraine: Crimea, Sudak Distr., env. of Gromovka village, litter from leaves of pear [specimen #S–243 (51–54 in H. Sherbak's manuscript catalog)], 19.06.1975, 1 ♀ (Kolodochka) (SIZK).

Female. Dorsal shield (fig. 2, 1) well sclerotized, with dark marginal border, smooth, broadly oval, without lateral emarginations; 7 pairs of small, poorly visible solenostomes (*it, iv, id, isc, il, is, ic*). Dorsal setae sharply contrasting in length from long (50–100 μm)

to miniature (4–6 μm), while the thickness of the long setae does not interfere with their flexibility. All setae are smooth. Seta AM1 equal to or somewhat longer than distance to theca AL1. Seta AL1 longer than distance to theca of seta AL3, which in turn reaches theca

Fig. 2. *Graminaseius lituatus* (Athias-Henriot) ♀ (1–7), ♂ (*8–10* from Athias-Henriot, 1961): *1* — dorsal shield; *2* — ventral body surface; *3* — metapodal plates; *4* — posterior part of peritremal schield; *5* — chelicera; *6* — spermatheca; *7* — fragment of leg IV; *8* — ventrianal shield; *9, 10* — chelicera with spermatodactyl.

AL4. Seta PL1 longer than the distance to theca PL2 and theca PM3. Perithreme long, almost reaching the theca of seta AD1. Ventrianal shield with transverse striation, slightly concave anterior margin and small side notches; anal pores distinct, small, round (fig. 2, 2). The posterior metapodal shield is 1.8 times as long as the linear anterior one (fig. 2, 3). Posterior part of peritremal shield curved, narrow, blunt (fig. 2, 4). On Df chelicera 2 teeth, on Dm 1 (fig. 2, 5). The funnel of the spermatheca is narrow, goblet-shaped, with a distinct asymmetrical constriction; the atrium is sessile (fig. 2, 6). The leg of the fourth pair with three macrosetae: the longest one is on the basitarsus (fig. 2, 7). Genu of III and II pairs of legs with short macroseta.

Measurements: Lds 375, Wds 215, Lvas 120, Wvas 110, Lian 45; Ltar IV 140. Setae length: AD1 29; AD2 4; AD3 5; AD4 6; PD2 6; PD4 9; AM1 50; AM2 4; AL1 39; AL3 50; AL4 80; PL1 80; PL2 8; PL3 8; PM1 6; PM3 90; PM4 100; AS 40; PS 20; PV 68. MCh IV: ge 63, ti 60, ta 84; MCh III: ge 27; MCh II: ge 27.

Male. Preanal setae 6 pairs; anal pores small, round (fig. 2, 8). The spermatodactyl is massive, T-shaped (fig. 2, 9). Lds 275.

Diagnosis. *Graminaseius lituatus* is similar to *G. graminis* in topography of idiosomal setae and a small number of teeth on the chelicerae (both have 1 tooth on Dm, but the first has 2 teeth on Df, and the second has 3 teeth), but differs well in the much sharper differentiation of dorsal setae along length and thickness, the shape of the spermatheca, also goblet-shaped, as in the second species, but with a much more pronounced median constriction.

Distribution, habitat, occurrence: Europe: Italy, Spain; Ukraine (first record). In Ukraine: Crimea, soil; litter; rarely.

Subgenus *Alustoseius* Kolodochka, **subgen. n.**

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Type species: ***Amblyseius alustoni*** Livschitz & Kuznetzov, 1972.

The new subgenus differs from the nominative subgenus by the dorsal setae aligned in length in the range of 20–70 μm, dorsal shield moderately sclerotized, without dark border and smooth in anterior half, but in its posterior part with fine reticulate sculpture and 4 pairs of solenostomes on dorsal shield. In *Graminaseius* s. str., the dorsal setae contrast in length in the range of 4–100 μm, idiosomal shields strongly sclerotized and smooth with dark border and 7 pairs of solenostomes on dorsal shield.

Etymology. The name of the new subgenus is combined from *alusta* (a Qırımlı name Aluşta of one of the main Crimean cities) and *–seius,* the second half of the names *Amblyseius, Graminaseius*, etc.

Graminaseius* (*Alustoseius*) *alustoni (Livschitz & Kuznetzov, 1972), **comb. n.** (fig. 3)

Amblyseius alustoni Livschitz & Kuznetzov, 1972: 25.
Amblyseius (*Neoseiulus*) *alustoni* Karg, 1993: 188.
Neoseiulus alustoni: Kolodochka, 2004: 300, 2006: 231; Döker et al., 2016: 513.

Material. **Type**. Syntypes 2 ♀: Ukraine, AR Crimea, Yalta, Nikitsky State Botanical Garden, *Avena ludoviciana,* [No. of the slide unknown], 21.06.1968 (Kuznetzov) (SNBG).

Non-type. Ukraine: Crimea, Karadag, plateau on the south-southwest slope of the Mount Karagach, env. of Biological Station, on *Pistacea vera*, specimen #1382, 11.06.1975, 1 ♀ (Kolodochka); idem, on *Pyrus elaegnifolia*, specimen #1388a, 13.06.1975, 1 ♀ (Kolodochka).

Female. Dorsal shield (fig. 3, *1*) moderately sclerotized, oval; 4 pairs of small solenostomes (*it, id, il, ic;* missing *iv, isc, is*). Dorsal setae bristle-shaped, moderately long, smooth, except for slightly serrated PM3 and PM4. Setae PM4 are the longest. Peritremes reach level of setae AM1, which slightly extend beyond AL1 theca. Seta AL1 somewhat shorter than AL3 which does not reach the theca AL4. Setae in rows AL and PL are shorter than the distance to the next setae. Seta PM1 almost reaching the theca PL1, which is longer than PL2 and PL3. Ventrianal shield elongated, with convex lateral margins, transversely

striated (fig. 3, *2*); anal pores distinct, small, round, slightly contiguous. Anterior metapodal shield small and narrow; posterior metapodal shield 3.5 times as long as the anterior one, narrow, curved (fig. 3, *3*). On Df 3 closely spaced distal teeth, Dm has 2 widely spaced teeth: distal and basal (the latter located at the base of finger) (fig. 3, *4*). Spermatheca funnel with

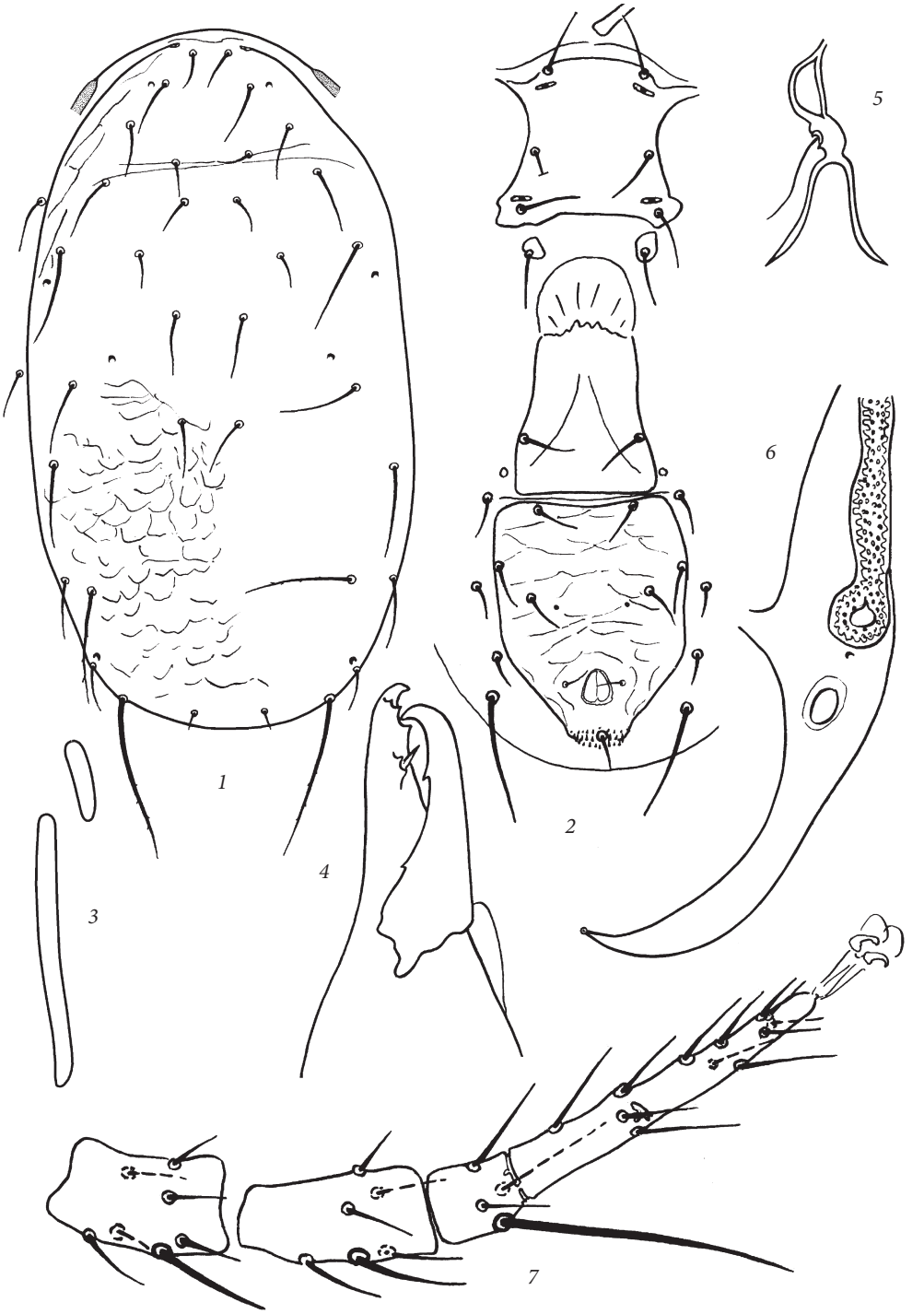

Fig. 3. *Graminaseius alustoni* (Livschitz et Kuznetzov, 1972) comb. n. ♀: *1* — dorsal shield; *2* — ventral body surface; *3* — metapodal plates; *4* — chelicera; *5* — spermatheca; *6* — posterior part of peritremal shield; *7* — fragment of leg IV.

thickened walls, bell-shaped; atrium large, sessile (fig. 3, 5). Posterior end of peritremal shield is narrow, curved, pointed, with a pore at end (fig. 3, 6). There are three pointed macrosetae on leg of pair IV: the longest one on basitarsus, on genu and tibia along a short macroseta of equal length (fig. 3, 7). Other legs without macrosetae.

Measurements: Lds 340, Wds 185; Lvas 117, Wvas 97, Lian 29; Ltar 103. Setae length: AD1 19, AD2 17, AD3 20, AD4 26, PD2 28; PD4 12, AM1 30, AM2 19; AL1 28; AL3 30, AL4 45, PL1 45; PL2 36; PL3 17; PM1 33; PM3 55; PM4 78; AS 30, PS 23; PV 60; MCh IV: ge 26, ti 25, ta 68.

Male unknown.

Diagnosis. With characters of the subgenus.

Distribution, habitat, occurrence: Turkey; Ukraine: AR Crimea; trees (*Pistacea mutica*, *Pyrus elaeagnifolia*), herbs (*Avena ludoviciana*); rare.

Note. One of the syntypes is illustrated here by the author.

Graminaseius* (*Alustoseius*) *altimontanus Kolodochka, **sp. n.** (fig. 4)

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Material. **Type**. Holotype ♀: [Ukraine, Crimean Autonomous Republic, southern slope of the Main Ridge of the Crimean Mountains, 1350 m a. s. l., env. Yalta, Krasnyy Kamen tract, on grass], specimen #2110, on *Verbascum* sp., 9.06.1976, 44°30'55.0" N 34°05'47.0" E (Kolodochka) (SIZK).

Description. Female (partly damaged). Dorsal shield (fig. 4, *1*) moderately sclerotized, oval, with small lateral notches, smooth in anterior half, covered with reticulate sculpture in posterior half, with 4 pairs of small solenostomes (*it, isc, il, ic;* missing *iv, id, is*). Dorsal setae elongated, thin, flexible, smooth, of moderate length. Setae PM4 are broken off. Presumably, they may be similar in size to the setae of closely related species and have serrations. Setae AM1, AL1, AL3 extend beyond the thecae of subsequent setae. Seta PM3 noticeably longer than distance to theca PL3. The peritrema shortened and extend only beyond level of theca of seta AL1. Seta PL1 longer than PL2 and PL3. Ventrianal shield elongated, with convex lateral margins, transversely striated (fig. 4, *2*); anal pores distinct, small, round, located close. Anterior metapodal shield short, narrow; the posterior metapodal shield is twice as long as the anterior one, narrow, asymmetrical (fig. 4, *3*). The chelicerae are located in an inconvenient foreshortening, so only 3 distal teeth on Df could see. Spermatheca funnel with thickened walls, bell-shaped, elongated; atrium large, sessile (fig. 4, *4*).

Measurements: Lds 422, Wds 190; Lvas 131, Wvas 110, Lian 18; Ltar 112. Setae length: AD1 18; AD2 30, AD3 30–38, AD4 41, PD2 45; PD4 11, AM1 39, AM2 25; AL1 41; AL3 48, AL4 57, PL1 52; PL2 47; PL3 22, PM1 57; PM3 61; PM4 (broken off); AS 36, PS 36; PV 63; MCh IV: ge 43, ti 40, ta 82.

Male is unknown.

Diagnosis. The new species similar to *G.* (*A.*) *alustoni* differing by the dorsal setae much longer and flexible (see fig. 3 and 4), setae of two pair AD4 41 μm and PM1 57 μm long, whereas in *G.* (*A.*) *alustoni* dorsal setae bristle-shape; AD4 26 μm (Δ = 15 μm) and PM1 33 μm long (Δ = 24 μm), respectively, in *G.* (*A.*) *alustoni* demonstrate the most contrast.

Additional differences in the length of other setae can be seen from comparing the results of their measurements for both species in the corresponding places in the text and drawings. Furthermore, some distinctive characters are in form and size of metapodal shields, namely, the posterior metapodal shield is twice as long as the anterior one, narrow, asymmetrical in the new species, whereas in *G.* (*A.*) *alustoni* the posterior metapodal shield 3.5 times as long as the anterior one, narrow and curved.

Distribution, habitat, occurrence. Europe. In Ukraine: type locality only; rare (single specimen).

Etymology. The species name is a compound adjective derived from Latin adjectives *altus* (“high”) and *montanus* (“mountainous”).

Fig. 4. *Graminaseius altimontanus* Kolodochka, sp. n., holotype ♀: *1* — dorsal shield; *2* — ventral body surface; *3* — metapodal plates; *4* — spermatheca; *5* — posterior part of peritremal shield; *6* — fragment of leg IV.

Key to the subgenera and species of the genus *Graminaseius* of the Ukrainian fauna

1 Dorsal shield well sclerotized, with dark marginal border, smooth; solenostomes 7 pairs (*it, iv, id, isc, il, is, ic*) subgenus *Graminaseius* (s. str.) 2

— Dorsal shield moderately sclerotized, without dark marginal border, smooth in its anterior half but covered with fine reticulate sculpture in posterior half, 4 pairs of solenostomes (*it, isc, il, ic;* missing *iv, id, is*). subgenus *Alustoseius* subgen. n. 3

2 Seta PL1 half as long as distance to the theca of seta PM2. ..... *G.* (s. str.) *graminis* (Chant)

— Seta PL1 longer than distance to the theca of seta PM2. ..... *G.* (s. str.) *lituatus* (Athias-Henriot)

3 Length of seta AD3 half as long as distance from its theca to theca AM2; macroseta on basitarsus of leg

IV 2.6 times longer than macroseta on genu. ..... *G.* (*A.*) *alustoni* (Livschitz & Kuznetzov) comb. n.

— Length of seta AD3 approximately equal to distance from its theca to theca AM2; macroseta on basitarsus of leg IV 1.9 times longer than macrosetae on genu. ..... *G.* (*A.*) *altimontanus* Kolodochka sp. n.

References

Athias-Henriot, C. 1961. Mesostigmates (Urop. excl.) edaphiques Mediterreneens (Acaromorpha, Anactinotrichida). *Acarologia*, 3, fasc. 4, 381–509.

Athias-Henriot, C. 1966. Contribution a l'etude des *Amblyseius* palearctiques (Acariens anactinotriches, Phytoseiidae). *Bulletin Scientifique de Bourgogne*, 24, 181–226.

Arutunjan, E. S. 1977. *Identification manual of phytoseiid mites of agricultural crops of the Armenian SSR*. Izdatelstvo Acad. Sci. Armenian SSR, Erevan, 1–177 [In Russian].

Chant, D. A. 1956. Some mites of the subfamily Phytoseiinae (Acarina: Laelaptidae) from Southeastern England, with description of new species. *Canadian Entomologest*, **88** (1), 26–37.

Chant, D. A. & McMurtry, J. A. 2004. A review of the subfamily Amblyseiinae Muma (Acari: Phytoseiidae): Part III. The tribe Amblyseiini Wainstein, subtribe Amblyseiina n. subtribe. *Internatiional Journal of Acarology*, **30** (3), 171–228.

Chant, J. A. & McMurtry, J. A. 2007. *Illustrated keys and diagnosis for the genera and subgenera of the Phytoseiidae of the world* (*Acari: Mesostigmata*). Indira Publishing House, West Bloomfield, Michigan, USA, 1–220.

Denmark, H. A. & Evans, G. A. 2019. *Additions to the world fauna of the family Phytoseiidae* (*Acari: Mesostigmata*) *with an illustrated key to the subfamilies, tribes, subtribes and genera of Phytoseiidae of the World.* Indira Publishing House, West Bloomfield, Michigan, USA, 1–315.

Döker, I., Kazak, C. & Karut, K. 2016. Contributions to the Phytoseiidae (Acari: Mesostigmata) fauna of Turkey: morphological variations, twelve new records, re-description of some species and a revised key to the Turkish species. *Systematic & Applied Acarology*, **21** (4), 505–527. http://doi.Org/10.11158/saa.21.4.10

Karg, W. 1971. *Acari* (*Acarina*) *Milben Unterordnung. Anactinochaeta* (*Parasitiformes*). *Die freilebenden Gamasina,* (*Gamasides*)*, Raubmilben*, *Teil 59.* VEB Gustav Fischer Verlag, Jena, 1–475.

Karg, W. 1993. *Acari* (*Acarina*)*, Milben Parasitiformes* (*Anactinochaeta*)*, Cohors Gamasina Leach, Raubmilben*, *Teil 59.* Gustav Fischer Verlag, Jena, 1–523.

Kolodochka, L. A. 1978. *Guidelines for the identification of plant-dwelling phytoseiid mites.* Naukova dumka, Kyiv, 1–78 [In Russian].

Kolodochka, L. A. 1990. New in the structure of spermateca of female phytoseiid mites (Parasitiformes, Phytoseiidae). *Vestnik Zoologii*, 1, 74–75 [In Russian].

Kolodochka, L. A. 2004. Species composition and some aspects of the biotopic distribution of plant-dwelling mites of the family Phytoseiidae (Parasitiformes, Gamasina) of the Karadag State Reserve. Karadag. History, geology, botany, zoology. *In*: *Sat. Scientific Works Dedicated to the 90th Anniversary of the Karadag Scientific Station named after E. I. Vyazemsky and the 25th Anniversary of the Karadag Natural Reserve*. Book 1. SONAT, Simferopol, 300–306 [In Russian].

Kolodochka, L. A. 2006. *Phytoseiid mites of the Palaearctic Region* (*Parasitiformes Phytoseiidae*)*: faunistics, taxonomy, ecology, evolution*. *Vestnik Zoologii*, Supplement 21, 1–250 [In Russian].

Kolodochka, L. A., Omeri I. D. 2011. *Predatory mites of the family Phytoseiidae* (*Parasitiformes*) *of arboretums and botanical gardens of the Forest-Steppe of Ukraine*. Kyiv, 1–192 [In Russian].

Kolodochka, L. A., Sklyar V. E. 1981. Phytoseiid mites (Phytoseiidae, Parasitiformes) from the soil, litter, and nests of rodents in the steppe and forest-steppe zones of Ukraine. *Problem of the soil zoology*. *VII All-Union Meeting* (*Kyiv, 1981*). *Proceeding Reports*, 102–103 [In Russian].

Livschitz, I. Z., Kuznetzov, N. N. 1972. To the knowledge of Crimean phytoseiids (Parasitiformes, Phytoseiidae). *In*: *Pests and diseases of fruit and ornamental plants*. Yalta, 1972, 13–64. (Proceedings of the State Nikitsky Botanical Garden, 61) [In Russian].

Moraes, G. J., McMurtry J. A., Denmark, H. A. 1986. *A catalog of the mite family Phytoseiidae. References to taxonomy, synonymy, distribution and habitat*. EMBRAPA-D.D.D., Brasilia, Brazil, 1–353.

Muma, M. H. 1961. Subfamilies, genera and species of Phytoseiidae (Acarina: Mesostigmata). *Florida State Museum Bulletin*, **5** (7), 267–302.

Wainstein, B. A. 1973 a. On the position of the genus *Evansoseius* Sheals in the system of the family Phytoseiidae (Parasitiformes). *Zoologicheskiy zhurnal,* 52(2), 274–277 [In Russian].

Wainstein, B. A. 1973 b. On the structure of some taxonomically important organs of Phytoseiidae (Parasitiformes). *Zoologicheskiy zhurnal*, **52** (12), 1871–1872 [In Russian].

Westerboer, I., Bernhard, F. 1963. Die Familie Phytoseiidae Berlese 1916. *In:* Stammer, H., ed. *Beitrage zur Systemstik und Ökologie mitteleuropaisher Acarina. Band II. Mesostigmata I*. Germany, 451–791.

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