

***Amblyseius fennicus* sp. n. (Acarina, Gamasina: Phytoseiidae) from Finland, with a key to the *A. americanus* group**

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Karg, W. & Huhta, V. 2012: *Amblyseius fennicus* sp. n. (Acarina, Gamasina: Phytoseiidae) from Finland, with a key to the *A. americanus* group. — Entomol. Fennica 23: 193–198.

A new species is described belonging to the *Amblyseius* (*s. str.*) *americanus* group (Denmark & Muma, 1989). It was collected regularly from trunks of old trees in Finland. A key is given including the known species of the *A. americanus* group.

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Received 6 March 2012, accepted 21 May 2012

1. Introduction

Denmark and Muma (1989) described the *Amblyseius americanus* group in the genus and subgenus *Amblyseius s. str.* Eight species were included in this group, which appears to be worldwide in distribution (North and South America, Asia; see the key), but no species was hitherto reported from Europe despite active investigations (Karg 1991, Karg 1993, Gwiazdowicz & Gulvik 2005, Karg & Huhta 2009). Here we describe a new species that was regularly collected on tree trunks in southern Finland, and we therefore name it as *A. fennicus*.

After the description we present a key that includes the new and previously known species of the *americanus*-group.

2. Material and methods

The specimens described were collected in southern Finland in connection of a study on the role of

dead wood in the diversity of mite communities in old-growth forests. For comparison, bark samples from old living trees [spruce (*Picea abies*), birch (*Betula pendula*) and aspen (*Populus tremula*)] were taken. Animals were extracted using Tullgren funnels, and after preliminary identification mounted in Heinze PVA. Descriptions and drawings are based on slide-mounted samples.

We follow the setal nomenclature of Christian and Karg (2008) (Fig. 1), because this system is based on ontogenetic and phylogenetic investigations and is universally applicable (see also discussion by Karg & Schorlemmer 2011).

However, since controversial opinions on the chaetotaxy exist, we present in Figs. 2 and 3 the optional nomenclature based on Lindquist and Evans (1965), as applied by Chant and Yoshida-Shaul (1989, 1991).

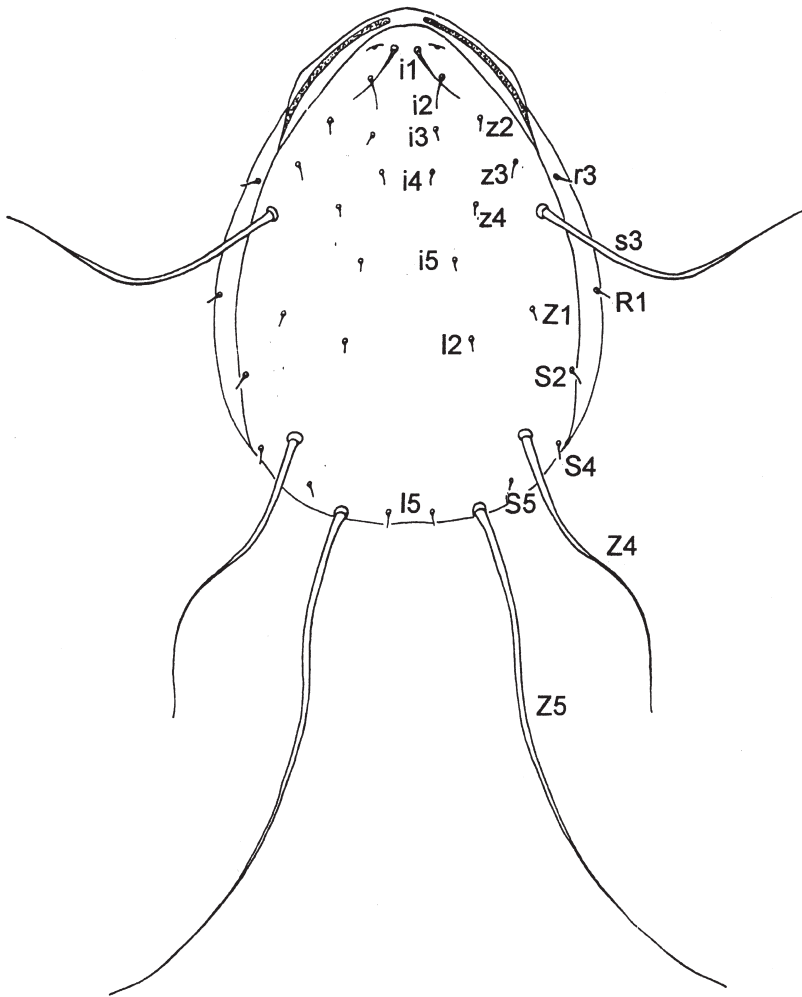


Fig. 1. *Amblyseius euvertex* Karg, 1983, dorsum of female.

3. Taxonomy and description

Genus *Amblyseius* Berlese, 1914, subgenus *Amblyseius sensu stricto* (Karg 1991)

Amblyseius americanus group *sensu* Denmark and Muma (1989)

Diagnosis. Number of dorsal setae reduced, especially those of the anterior lateral setae: only z2, z3 and s3 developed; on the post-dorsum only Z1, Z4, Z5, S2, S4 and S5 existent, caudal setae Z4 and Z5 remarkably long, setae Z5 longer than $\frac{1}{2}$ width of dorsum, from the inner setae of the post-dorsum only I2 and I5 developed. Ventrianal shield of female pentagonal, somewhat longer than wide or as long, with four pairs of setae.

Macrosetae in leg IV conspicuous and graded in length, longest to shortest from genu to tarsus. Calyx of spermatheca saccular-flared and mostly with a c-shaped atrium, spermatodactyl with a distinct terminal process nearly forming a right angle.

Amblyseius (Amblyseius) fennicus sp. n.

Type locality and material. Holotype and paratypes, 3 ♀: Lammi biological Station, southern Finland (61°03' N, 25°02' E), 15.X.2010, on trunks of old spruce (deposited at the Zoological Museum, University of Helsinki). Other material: 5 ♀, same site, 26.VIII.2011, on aspen trunks (Zoological Museum, University of Turku, Finland); 3 ♀, Lammi, Evo (61°14' N, 25°04' E),

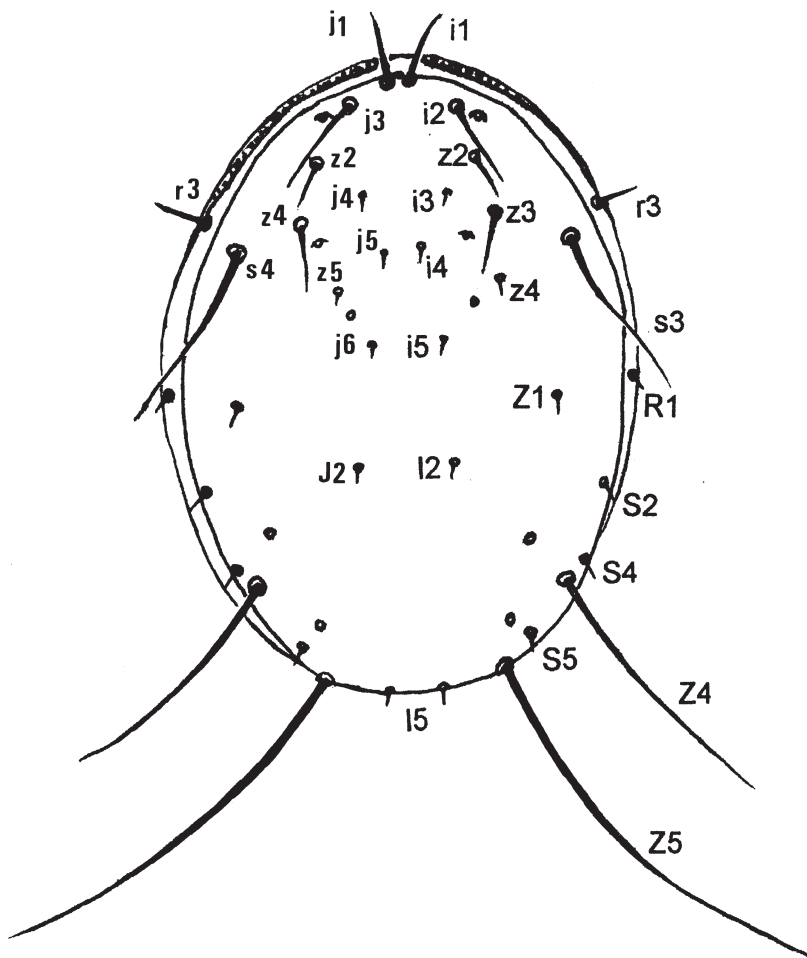


Fig. 2. *Amblyseius fennicus* sp. n., dorsum of female. On the right side the setal nomenclature by Christian and Karg (2008), on the left that of Lindquist and Evans (1965) and Chant and Yoshida-Shaul (1989) (on the post-dorsum the nomenclature is identical except that I2 is used instead of J2, etc.).

28.VIII.2011, aspen trunk (Senckenberg Museum of Natural History, Görlitz, Germany); 1 ♀, same site, 15.X.2010, spruce trunk; 2 ♀, Sipoo (60°27' N, 25°12' E), 12.IX.2011, aspen trunk; 16 ♀ and 2 ♂, Jyväskylä (62°15' N, 25°42' E), 23.IX.2010, spruce trunks (Zool. Mus. Helsinki).

Diagnosis. On the dorsum, both pairs of anterior lateral setae z2 and z3 are longer than the strongly reduced setae on the middle area of dorsum (i3, i4, i5). However, z3 are distinctly longer than z2. The caudal setae are remarkably long, Z5 (260–280 µm) is equal in length with the width of the idiosoma. The ventrianal shield is slender, distinctly longer than wide. Calyx of spermatheca is goblet-shaped, 2 × as long as wide.

Description. Female (Figs. 2, 3): Idiosoma 392–426 µm long and 260–287 µm wide. Dorsum (Fig. 2) smooth, with 5 pairs of pores, setae

of dorsum smooth, needle-like; however with unusual differences in length. Setae in middle area of dorsum (i3, i4, i5) only 5 to 7 µm long, similarly 9–10 µm long marginal setae z4, Z1, R1, S2, S4, S5, and I5. Shoulder setae s3 (119 µm), caudal setae Z4 (150–157 µm) and Z5 (260–280 µm) remarkably long. Setae i1 (32 µm), i2 (60 µm), z2 (18 µm), z3 (35 µm), and r3 (19 µm) of middle length. Peritremes extend to setae i1. Venter (Fig. 3a) with a smooth sternal shield, nearly as wide as long, bearing three pairs of setae and two pairs of pores. First sternal setae st1 considerably longer (39–50 µm) than st2 (27 µm) and st3 (31 µm). Posterior part of genital shield 88 µm wide, length: width of the shield nearly 3: 2. Genital setae 32 µm long. Ventrianal shield approximately pentagonal with rounded corners, broadest anteriorly (length 122–133 µm, width 95–109

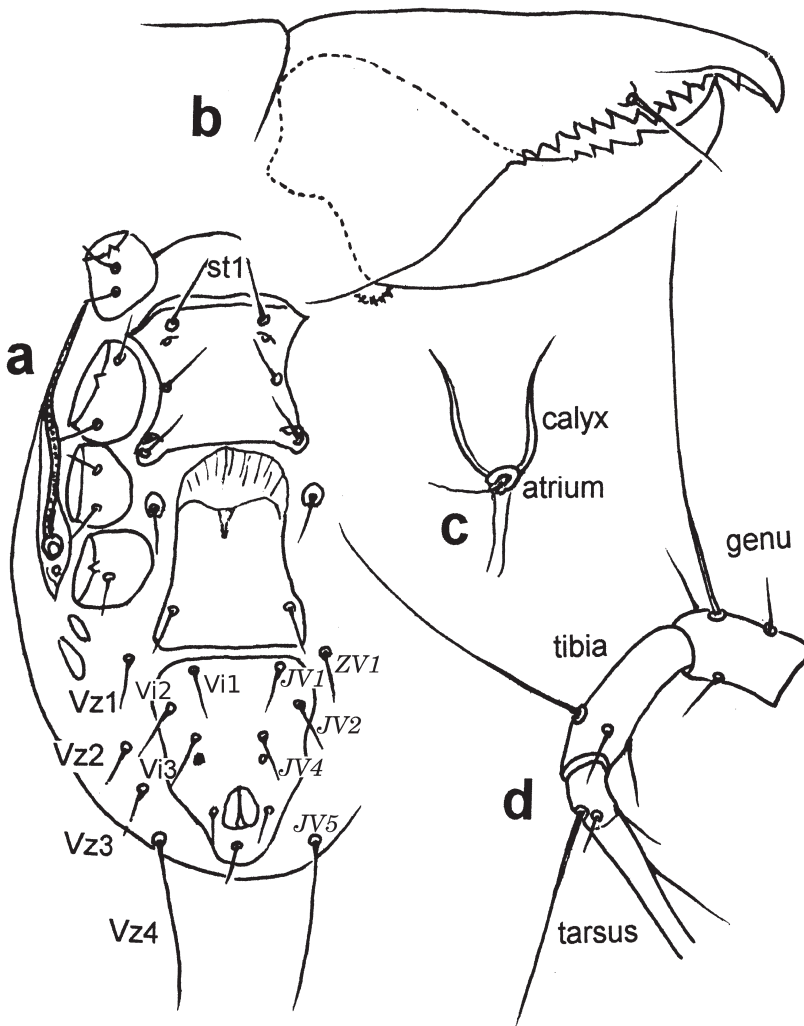


Fig. 3. *Amblyseius fennicus* sp. n. female. – a. Venter. – b. Chelicera. – c. Spermatheca. – d. Macrosetae of leg IV. On the left side the setal nomenclature by Christian and Karg (2008), on the right that of Lindquist and Evans (1965) and Chant and Yoshida-Shaul (1991).

µm). Setae of ventrianal shield 19–27 µm long, circular pores located at a short distance behind setae Vi3. Caudal setae Vz4 remarkably long (116 µm), Vz1 = 19–20 µm, Vz2 and Vz3 = 14–15 µm. Spermatheca with a goblet-shaped calyx, 5–6.8 µm wide at middle and 10–15 µm long, atrium c-shaped (Fig. 3c). [Concerning the spermatheca by Denmark and Muma (1989), the calyx was named as cervix. This is not correct, since the cervix (= neck) is a tubular section between calyx and atrium. Begljarov (1981) and Karg (1991) have explained and pictured the sections of the spermatheca. In the species of the *Amblyseius americanus* group the cervix section is not developed.]

Chelicerae (Fig. 3b) with a polydont digitus

fixus: 12 teeth, digitus mobilis with 4 teeth, digitus mobilis 32 µm long.

Legs remarkably long, leg formula = 4123: legs I = 435–444 µm, legs IV = 479–487 µm, legs II = 357–374 µm, legs III = 348–356 µm. Macrosetal chaetotaxy = 2, 1, 2, 3. Legs VI with remarkable macrosetae: in genu 154–161 µm, in tibia 119–124 µm, in tarsus 81–90 µm long (Fig. 3d), relevant chaetotactic patterns of genu II having formula 2–2/0, 2/0–1; of genu III formula 1–2/0, 2/1–1.

Male: Idosoma 365 µm long and 232 µm wide, long caudal setae Z5 = 193 µm, Z4 = 123 µm. Spermatodactyl, with the terminal process nearly forming a right angle, conforms to the type of the group which shows little differences. The

ventrianal shield also conforms to the other species of the group.

Taxonomy. The new species is similar to *A. americanus* (Garman, 1948). In both species the anterior lateral setae *z3* are longer than *z2* and the ventrianal shield is distinctly longer than wide. However the caudal setae *Z5* of *A. americanus* (220 µm) are shorter than the width of the idiosoma. Also the macrosetae in legs IV are shorter; *A. fennicus* sp. n.: genu 154–161, tibia 119–123, tarsus 81–90 µm, *A. americanus*: genu 141, tibia 94, tarsus 55 µm. A relevant further distinction is found in the shape of calyx: in *A. fennicus* sp. n. it is goblet-shaped, length : width = 2 : 1, in *A. americanus* slender goblet-shaped, length : width = 3 : 1.

Biology. The new species is obviously common on trunks (bark) of old trees in southern Finland, as it was found in all five old forests where samples were taken, on spruce and aspen trunks. As the canopies were not sampled, we do not know whether it is a truly corticolous species or also (or mainly) occurs in foliage. It was never found on dead wood and forest floor which were also sampled at the same sites.

4. Key for identification of females of the *A. americanus* group

1. Anterior lateral setae *z2* and *z3* reduced, as the very short setae on the middle area of dorsum (Fig. 1) 2
 - At least one pair of the anterior lateral setae *z2* and *z3* distinctly longer than the very short middle dorsal setae (Fig. 2) 6
2. Setae *i2* remarkably long, longer than the vertex setae *i1* 3
 - Setae *i2* distinctly shorter than the vertex setae 5
3. Ventrianal shield remarkably large, nearly as wide as long, shoulder setae *s3* (=60 µm) only slightly longer than *i2* (47 µm). Caudal setae *Z5* (= 157 µm) shorter than the width of idiosoma (220 µm)
 - A. kalandadzei* Gomelauri, 1968 – Russia, Georgia
 - Ventrianal shield distinctly longer than wide, shoulder setae *s3* remarkably long (71 to 143

µm), distinctly longer than *i2* (41 to 58 µm). Caudal setae *Z5* as long as the width of idiosoma (220 µm) 4

4. Shoulder setae *s3* = 143 µm long, calyx of spermatheca 3 × as long as wide
 - A. nicola* Chant, 1971 – Canada
 - Shoulder setae *s3* = 71 µm long, calyx of spermatheca only 2 × as long as wide
 - A. januaricus* Wainstein and Vartapetov, 1973 – Russia
5. Setae *i2* as strongly reduced as the setae on the middle area of dorsum, ventrianal shield remarkably large, nearly as wide as long, caudal setae *Z5* = 266 µm
 - A. pritchardellus* Athias-Henriot, 1967 – Argentina
 - Setae *i2* (20–25 µm) distinctly longer than the reduced setae, ventrianal shield distinctly longer than wide, caudal setae *Z5* on the dorsum remarkably long (560 µm)
 - A. euvertex* Karg, 1983 – Brazil
6. Only setae *z2* longer than the reduced very short setae on the middle area, shape of the ventrianal shield nearly triangular, length : width = 4 : 3
 - A. mazatlanus* Denmark and Muma, 1989 – Mexico
 - Both anterior lateral setae *z2* and *z3* longer than the very short setae on the middle area, however *z3* distinctly longer than *z2* (Fig. 2) 7
7. Ventrianal shield remarkably large, nearly as wide as long, sternal setae equal in length, caudal setae *Z5* (230 µm) shorter than the width of idiosoma
 - A. duncansonii* Specht and Rasmy, 1970 – Canada
 - Ventrianal shield distinctly longer than wide 8
8. Caudal setae remarkably long: length of *Z5* (260–280 µm) equal to the width of idiosoma, *Z4* = 150–157 µm, the first sternal setae *st1* (39–50 µm) remarkably longer than *st2* and *st3* (27 to 31 µm), calyx of spermatheca 2 × as long as wide
 - A. fennicus* sp. n. – Finland
 - Caudal setae shorter: *Z5* (220 µm) shorter than the width of idiosoma, *Z4* = 117 µm, sternal setae equal in length, calyx of spermatheca 3 × as long as wide
 - A. americanus* (Garman, 1948) – USA

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