

Typhlodromips jurmoensis (Acari: Mesostigmata: Amblyseiinae),
a new species from the archipelago of SW Finland

Typhlodromips jurmoensis (Acari: Mesostigmata: Amblyseiinae),
новый вид с архипелага Юго-Западной Финляндии

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КЛЮЧЕВЫЕ СЛОВА: клещ, новый вид, Phytoseiidae, Amblyseiinae.

ABSTRACT. A new species belonging to the genus *Typhlodromips* De Leon, 1965 is described. It was collected from *Calluna* moorland soil on Jurmo, a remote island in the SW archipelago of Finland. *Typhlodromips herbarius* (Wainstein, 1960) is considered a senior synonym of *T. tenuis* (Westerboer, 1963), syn.n. A key is given to related species with a similar spermathecal structure.

РЕЗЮМЕ. Описан новый вид рода *Typhlodromips* De Leon, 1965, собранный на вересковой пустоши на удалённом острове Юрмо в Юго-Восточном Архипелаге Финляндии. Приведен ключ для близких видов со сходной структурой сперматеки. Установлено, что *Typhlodromips herbarius* (Wainstein, 1960) является старшим синонимом *T. tenuis* (Westerboer, 1963), syn.n. Предложен ключ для определения видов со сходным типом сперматеки.

Introduction

The phytoseiid fauna of northern Europe is still poorly known, since new species can be found with only moderate effort. In Finland, Tuovinen [1993] reported 20 species in apple plantations and their surroundings. A comprehensive study on the soil fauna of Finland [Huhta *et al.*, 2010] resulted in 11 new species for the country, 3 of which were previously undescribed [Karg & Huhta, 2009]. A small sample of material collected from tree trunks [Huhta *et al.*, 2012] included one more [Karg & Huhta, 2012], and further collecting in the Finnish archipelago in 2012 yielded one more undescribed species. The latter species is described in the present paper.

Unlike in most other families of Gamasina, members of the family Phytoseiidae mainly occur in vegetation [Karg, 1993]. Similar to most new species detect-

ed in the above studies, the type locality of the present species represents an unusual habitat for the family: soil of *Calluna* moorland.

According to the key of Karg [1993], the new species should be placed into the genus *Amblyseius* Berlese, 1904, subgenus *Typhlodromips* De Leon, 1965, but following the revision by Chant & McMurtry [2006] we regard *Typhlodromips* as a separate genus. The shape of the female spermathecae was considered essential for the classification and identification of the species. Following the description of the new species, we present a key to distinguish it from related species with the same type of spermatheca, which we call the “*herbarius* species group” (despite the fact that neither *herbarius* nor *tenuis* were regarded as *Typhlodromips* by Chant & McMurtry [2007])

Material and methods

We follow the nomenclature by Christian & Karg [2008] in the chaetotaxy of the idiosoma, but since controversial opinions on the chaetotaxy exist, we present in Figs. 1 and 2 the optional nomenclature based on Lindquist & Evans [1965], as applied by Chant & Yoshida-Shaul [1989, 1991].

Taxonomic survey

Typhlodromips jurmoensis sp.n.
Figs 1–2, 3h.

TYPE. Holotype ♀: FINLAND, Jurmo (59°50'N, 21°13'E), *Calluna* moorland soil, August 2012 (V. Huhta), deposited in the Senckenberg Museum für Naturkunde Görlitz (SMNG), Germany.

DIAGNOSIS. Caudal setae of the dorsum remarkably short (Z5 = 77 µm, Z4 = 67 µm), shorter than ½ the width of the idiosoma. Both anterior lateral setae z2 and z3 longer than the reduced very short setae on the

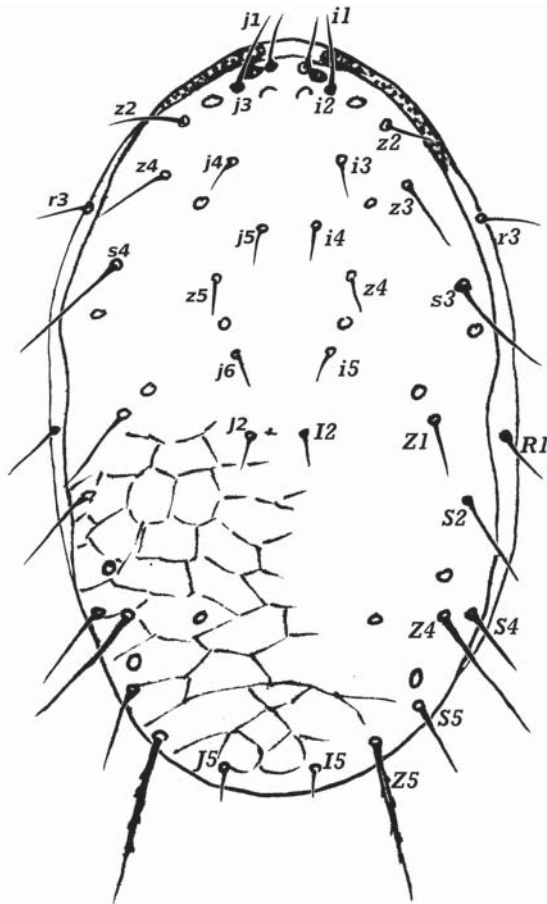


Fig. 1. Idiosomal dorsum of *Typhlodromips jurmoensis* sp.n. (holotype). On the right side the setal nomenclature by Christian & Karg [2008], on the left that of Lindquist & Evans [1965] and Chant & Yoshida-Shaul [1989] (on the post-dorsum the nomenclature is identical except that I2 is used instead of J2, etc.).

Рис. 1. Дорзум *Typhlodromips jurmoensis* sp.n. (голотип). Справа терминология щетинок по Christian & Karg [2008], слева — по Lindquist & Evans [1965] и Chant & Yoshida-Shaul [1989] (на пост-дорзуме обозначения идентичные, кроме J2, вместо которого использовано обозначение I2, и т.п.).

middle area of the dorsum, however z3 a little shorter than z2. Ventrianal shield slender, distinctly longer than wide. Spermatheca with saccular bell-shaped calyx (width : length = 3 : 2) and distinctly developed cervix (= 1/3 the length of the calyx). Digitus mobilis of female chelicerae with one tooth, digitus fixus with four teeth.

DESCRIPTION (Figs 1, 2). Idiosoma 444 μ m long and 278 μ m wide.

Dorsum (Fig. 1) with 19 pairs of setae (r3, R1 on soft cuticle), dorsal shield without prominent waist, bearing 9 pairs of pore-like structures, prodorsum smooth, postdorsum with a net-like pattern, most setae of dorsum smooth and needle-like, only Z4 and Z5 finely feathered. Setae on the middle area of the dorsum (i3, i4, z4, i5, I2) remarkably short, only I1 to I4 μ m long, marginal setae 25 to 56 μ m long, in detail: i1 = 25 μ m, i2 = 46 μ m, z2 = 39 μ m, z3 = 35 μ m, r3 = 25 μ m, R1 = 28 μ m, shoulder setae s3 = 56 μ m, Z1 = 42

μ m, S2 = 53 μ m, S4 = 35 μ m, S5 = 32 μ m, caudal inner setae I5 = 12 μ m long, the caudal intermediate (in German: Zwischen-) setae Z4 = 67 μ m and Z5 = 77 μ m long. Peritremes extending to setae i1.

Venter (Fig. 2a) with a smooth sternal shield, a little broader than long, bearing three pairs of setae and two pairs of lyrifissures, first and second sternal setae st1 and st2 = 32 μ m, st3 = 28 μ m long. Posterior part of the genital shield 87 μ m wide, length : width of the shield nearly 4 : 3, genital setae = 30 μ m long. Ventrianal shield approximately pentagonal with rounded corners, broadest part at the level of setae Vi1; its width 119 μ m, length 143 μ m, surface with a net-like pattern, behind setae Vi3 circular pores developed, preanal setae (3 pairs) = 32 μ m, paranal setae and postanal seta ca. 22 μ m long, beside the ventrianal shield 3 pairs of setae: = 25–28 μ m long, caudal setae Vz4 = 60 μ m long.

Spermatheca with bell-shaped calyx, 10 μ m long, at the opening 17 μ m wide, a distinctly visible tubular-shaped cervix and a nodular-shaped atrium (Fig. 2c).

Chelicerae: digitus fixus with four teeth, digitus mobilis with one tooth, digitus mobilis = 34 μ m long.

Legs remarkably long, leg formula = 4123, legs I = 440 μ m, legs II = 357 μ m, legs III = 340 μ m, legs IV = 444 μ m long, macrosetal chaetotaxy = 2, 2, 2, 3. Legs IV with remarkable macrosetae: at genu 49 μ m, at tibia 46 μ m, at tarsus 77 μ m long (Fig. 2b), macrosetae on

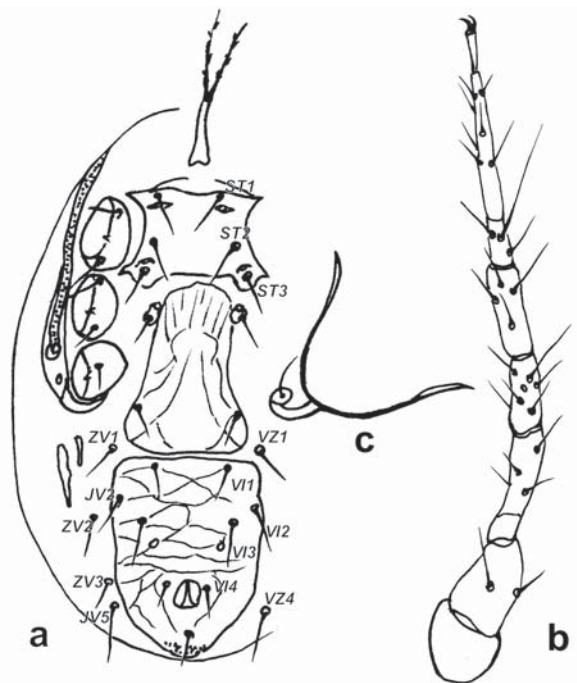


Fig. 2. *Typhlodromips jurmoensis* sp.n., female: a — idiosomal venter, b — leg IV, c — spermatheca. On the right side the setal nomenclature by Christian & Karg [2008], on the left that of Lindquist & Evans [1965] and Chant & Yoshida-Shaul [1991].

Рис. 2. *Typhlodromips jurmoensis* sp.n., самка: а — вентральная поверхность идиосомы, б — нога IV, с — сперматека. Справа терминология щетинок по Christian & Karg [2008], слева — по Lindquist & Evans [1965] и Chant & Yoshida-Shaul [1991].

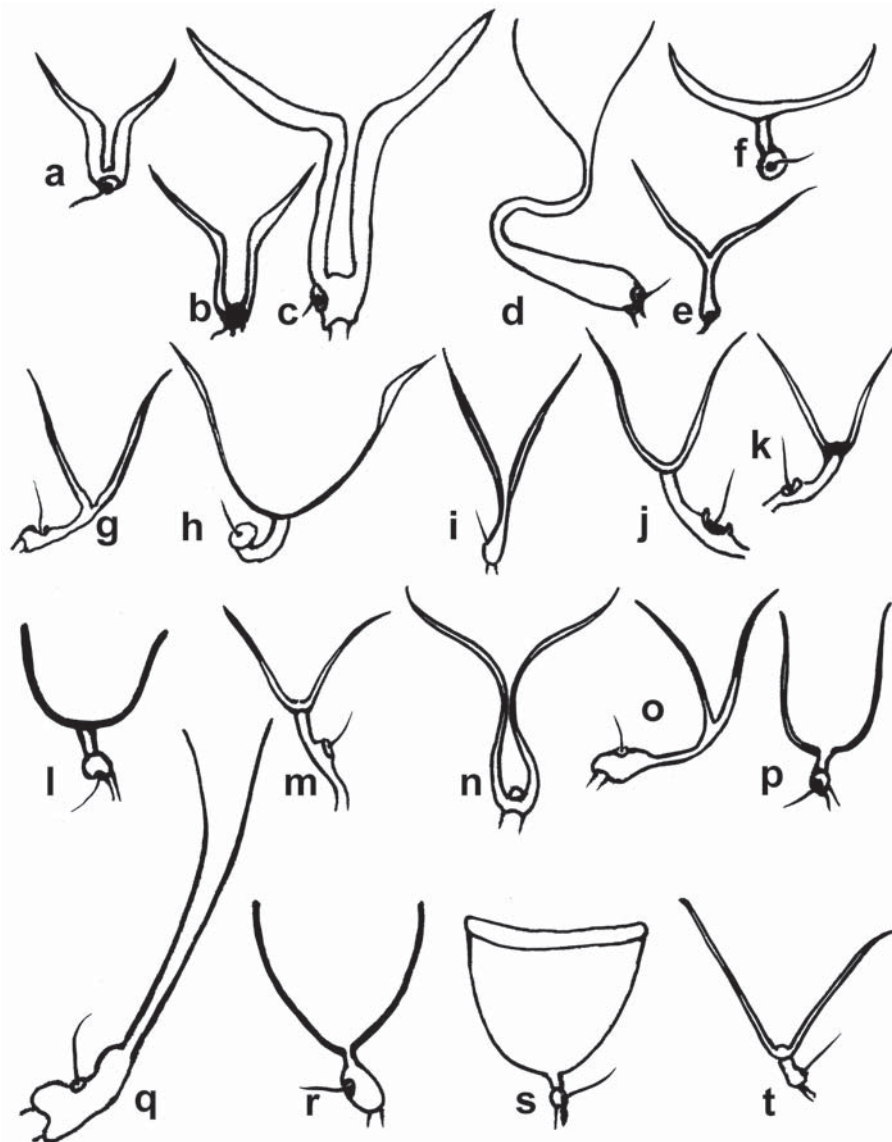


Fig. 3. Spermathecae of the *Typhlodromips herbarius*-group: a — *T. herbarius*, b — *T. fragilis*, c — *T. pseudoherbarius*, d — *T. lutezhicus*, e — *T. hirotae*, f — *T. mangleae*, g — *T. provectus*, h — *T. jurmoensis* sp.n., i — *T. haimatus*, j — *T. conterminus*, k — *T. extricatus*, l — *T. bicaudus*, m — *T. certus*, n — *T. tervus*, o — *T. cinctus*, p — *T. perspectus*, q — *T. arutuniani*, r — *T. swirskii*, s — *T. kodryensis*, t — *T. muganicus*. After Begljarov [1981], De Leon [1967], Ehara [1985], Ehara & Amano [1998], Karg [1993], Kolodochka [1980, 1990, 1991, 1992], Kolodochka & Bondarenko [1993], Meshkov [1994].

Рис. 3. Сперматеки группы видов *Typhlodromips herbarius*: a — *T. herbarius*, b — *T. fragilis*, c — *T. pseudoherbarius*, d — *T. lutezhicus*, e — *T. hirotae*, f — *T. mangleae*, g — *T. provectus*, h — *T. jurmoensis* sp.n., i — *T. haimatus*, j — *T. conterminus*, k — *T. extricatus*, l — *T. bicaudus*, m — *T. certus*, n — *T. tervus*, o — *T. cinctus*, p — *T. perspectus*, q — *T. arutuniani*, r — *T. swirskii*, s — *T. kodryensis*, t — *T. muganicus*. По: Begljarov [1981], De Leon [1967], Ehara [1985], Ehara & Amano [1998], Karg [1993], Kolodochka [1980, 1990, 1991, 1992], Kolodochka & Bondarenko [1993], Meshkov [1994].

legs II: at genu 31 μ m, at tibia 27 μ m, at tarsus 36 μ m long, on legs III: at genu 36 μ m, at tibia 34 μ m, at tarsus 36 μ m long, relevant chaetotactic patterns of genu II have the formula: 2 – 2/0, 2/0 – 1; of genu III the formula: 1 – 2/0, 2/1 – 1.

ETYMOLOGY. We name the new species *Typhlodromips jurmoensis* after Jurmo, a remote island in the SW archipelago of Finland. This island is well known to naturalists and represents the outmost end of the ridge Salpausselkä, a formation created by melting ice at the end the Ice Age and extending from the SW across the south of Finland.

Taxonomy

We have placed the new species into the genus *Typhlodromips*, following the definition of De Leon [1965], not of Karg [1993], Chant & McMurtry [2006, 2007], namely: dorsal setae needle-like, setae on the

middle region of the dorsum distinctly reduced in length, caudal setae Z5 relatively short, length not more than approximately $\frac{1}{2}$ the width of the dorsum, setae Z4 and Z5 finely feathered, ventrianal shield pentagonal or more triangular, anterior region broader than the posterior region or equal in width, with four to five pairs of setae.

In our opinion, the key of Chant & McMurtry [2006] contains uncertain formulations, such as “GeIII rarely with a macroseta”, “fixed digit of chelicerae usually with more than 6 teeth” etc. Moreover, in Chant & McMurtry [2007]: “Genu II and III, and often genu I with macroseta,...” and “fixed digit of chelicerae with 8–11 or more teeth...”. These features vary from species to species and are therefore unsuitable as differential diagnoses of taxonomic groups above the species level. In the following key we include the species of *Typhlodromips* sensu De Leon, 1965, with “complete” spermatheca: distinctly developed cervix (neck), calyx

and atrium (Fig. 5a–t), as distinct from those species with no visible cervix. This is done without regard to the fact that Chant & McMurtry [2006] placed these species into several different genera. We call this group the “herbarius species group”.

NOTE. For spermatheca terminology we follow Begljarov [1981] and Karg [1991]. Muma & Denmark [1970] and Denmark & Muma [1989] did not distinguish between the calyx and cervix.

KEY TO THE “HERBARIUS SPECIES GROUP”

- 1 (6) Neck of spermatheca remarkably broad (Figs 3a,b,c).
- 2 (5) Neck nearly as long as calyx or shorter (Figs 3a,b).
- 3 (4) Neck shorter than calyx (Fig. 3a): *T. herbarius* (Wainstein, 1960), **Syn.n.:** *T. tenuis* (Westerboer, 1963)* — Europe, on litter, grass, herbs and shrubs.
- 4 (3) Neck nearly as long as calyx (Fig. 3b): *T. fragilis* Kolodochka et Bondarenko, 1993 — Ukraine, on herbs of steppes.
- 5 (2) Neck = 1 ½ x as long as calyx (Fig. 3c): *T. pseudoherbarius* (Meshkov, 1994) — Tuva, on herbs.
- 6 (1) Neck of spermatheca slender, not remarkably broad.
- 7 (8) Neck remarkably long, as long as calyx (Fig. 3d), length of Z5 : Z4 = 3 : 2: *T. lutezhicus* (Wainstein, 1972) — Ukraine, Armenia, on the ground.
- 8 (7) Neck not so long.
- 9 (12) Neck = ½ the length of calyx (Fig. 3 e, f), caudal setae Z5 = 2 x the length of Z4.
- 10 (11) Setae Z4, S2, S4 and S5 nearly equal in length: *T. hirotae* Ehara, 1985 — Japan, on grass of sand-dunes
- 11 (10) Setae S2, S4 and S5 extremely reduced in length, 1/3 the length of Z4: *A. mangleae* De Leon, 1967 — Caribbean area, Brazil, Peru, on mangroves.
- 12 (29) Neck = 1/5 to 1/3 the length of calyx.
- 13 (22) Neck = approximately 1/3 the length of calyx (Fig. 3g–k).
- 14 (15) Caudal setae Z5 remarkably long, 2 x the length of Z4: *T. provectus* Kolodochka, 1991 — Ukraine, Russia, on reed, vine shoots and shrubs.
- 15 (14) Caudal setae Z5 not remarkably longer than Z4.
- 16 (17) Caudal setae Z5 = 77 µm, Z4 = 67 µm long: *T. jurmoensis* sp.n. — Finland, in moorland soil.
- 17 (16) Caudal setae Z5 and Z4 shorter.
- 18 (21) Caudal setae Z5 and Z4 of medium length (34 to 58 µm).
- 19 (20) Caudal setae Z5 = 58 µm, Z4 = 47 µm long: *T. haimatus* Ehara, 1967 — Japan, on conifers.
- 20 (19) Caudal setae Z5 = 46–51 µm, Z4 = 34–37 µm long: *T. conterminus* Kolodochka, 1990 — Ukraine, Uzbekistan, Israel, Arabia, alpine Caucasus.
- 21 (18) Caudal setae Z5 and Z4 remarkably short: Z5 = 40, Z4 = 27–29 µm. long: *T. extricatus* Kolodochka, 1991 — Ukraine, Armenia.

* The authors of *T. herbarius* and *T. tenuis* did not investigate the spermathecae. Karg [1971] was the first to publish a drawing of the spermatheca of *T. tenuis*, Begljarov [1981] was the first to publish a drawing of the spermatheca of *T. herbarius*. The present extensive comparisons resulted in the conclusion that the spermathecae of both these species are identical. Furthermore, both species show the same proportions of dorsal setae length and shape of the ventrianal shield. Hitherto, the species were documented as separate taxa, in Middle Europe by Karg [1991, 1993] and Tuovinen [1993], in East Europe by Kolodochka & Bondarenko [1993] and Meshkov [1994].

- 22 (13) Neck = 1/5 to 1/4 the length of calyx (Fig. 3l–o), caudal setae Z5 remarkably long, 1 ½ to 2 times the length of Z4 or slightly longer.
- 23 (24) Spermatheca cup-like: *T. bicaudus* Wainstein, 1962 — Europe, Middle Asia, in litter, on herbs and deciduous trees.
- 24 (23) Spermatheca shaped like a funnel (Fig. 3m–o).
- 25 (26) Neck and calyx separated distinctly: *T. certus* Kolodochka, 1990 — Ukraine, Uzbekistan, soil of steppe and alpine Caucasus.
- 26 (25) Neck gradually proceeding to calyx (fig 3n, o).
- 27 (28) Calyx remarkably wide (Fig. 3n): *T. tervus* (Meshkov, 1994) — Russia, steppe.
- 28 (27) Calyx nearly as long as wide (Fig. 3o): *T. cinctutus* Livshitz et Kuznetsov, 1972 — Russia, on ivy and bindweed.
- 29 (12) Neck very short, length of neck: length of calyx = 1 : 12 to 1 : 10.
- 30 (33) Calyx longer than wide (Figs 3p, q).
- 31 (32) Calyx twice as long as wide: *T. perspectus* Kolodochka, 1992 — Ukraine, grass and herbs of steppes.
- 32 (31) Calyx four times as long as wide (Fig. 3q): *T. arutuniani* Wainstein et Begljarov, 1971 — Russia, on grass and shrubs.
- 33 (30) Calyx shorter than wide.
- 34 (37) Calyx cup-like and somewhat shorter than wide (Fig. 3r, s).
- 35 (36) Digitus fixus with 7 to 10 teeth, digitus mobilis with 3 teeth, caudal setae Z5 = 102–118 µm long: *T. swirskii* Athias-Henriot, 1962 — Italy, Turkey, Egypt, Israel, Yemen, Georgia, Azerbaijan, deciduous trees (*Prunus*).
- 36 (35) Digitus fixus with 4 teeth, digitus mobilis with one tooth, caudal setae Z5 = 80 µm long: *T. kodryensis* Kolodochka, 1980 — Moldova, on herbs and grass.
- 37 (34) Calyx funnel-like and nearly 1 ½ x as wide as long (Fig. 3t): *T. muganicus* Abbasova, 1970 — Azerbaijan, nest of vole.

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