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NEW SPECIES OF ACULODES (ACARI: ERIOPHYOIDEA) FROM GRASSES IN POLAND

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Two new species of eriophyoid mites associated with grasses in Poland are described and illustrated. *Aculodes calamaabitus* was found in rows of leaves of *Calamagrostis epigeios*, and *A. capillarisi* was found as vagrant on *Agrostis capillaris*.

Key words: Acari, Eriophyoidea, grasses, new species

INTRODUCTION

Eriophyoidea are phytophagous mites occurring widely on flowering and coniferous plants as well as on ferns throughout the world. Many species are of certain economic importance; they are typically pests of perennial and annual plants (LINDQUIST 1996). Over 3000 specific names of eriophyoid mites, assigned to nearly 300 genera, are known in the world fauna (AMRINE 1996, LINDQUIST & AMRINE 1996).

The genus *Aculodes* belongs to the family Eriophyidae NALEPA, 1898, subfamily Phyllocoptinae NALEPA, 1892, tribe Anthocoptini AMRINE et STASNY, 1994 (AMRINE 1996). According to AMRINE (1996) the members of the genus *Aculodes* are vermiform eriophyoids, living on grasses, with frontal lobe of prodorsal shield pronounced, elongate and acuminate, with subequal dorso-ventrally and completely microtuberlate annuli, and with 7–9-rayed empodia. To date, 14 species of this genus have been described. Most of them are grass-inhabiting, however, three species were found on non-poaceaous hosts, i.e. Malvaceae, Salicaceae, Rosaceae (AMRINE 1996, HUANG 1992, KUANG & PANG 1997, SHI & BOCZEK 2000).

This paper is intended to propose two new species of the genus *Aculodes*, collected from grasses in Poland.

MATERIAL AND METHODS

Samples of grasses were collected in western Poland. Specimens of eriophyoid mites were collected from plants by direct examination with a stereo-microscope, mounted on slides in the Hein-

ze medium and studied with a phase-contrast microscope. The identity of the genus was determined using the key of AMRINE (1996). The nomenclature of morphology follows that of AMRINE (1996) and LINDQUIST (1996). Measurements were made according to AMRINE and MANSON (1996); all are given in micrometers. Each measurement of holotype precedes the corresponding range for paratypes. The examined material is kept in the collection of Department of Animal Taxonomy and Ecology, Adam Mickiewicz University, Poznań, Poland.

Aculodes calamaabditus sp. n.
(Figs 1–4)

Female (Figs 1–2) (holotype and 14 paratypes): Body slightly spindleform. Body length 274 (195–287); width 63 (52–71). Gnathosoma 27 (25–30) long; dorsal pedipalpal genual setae *d* 10 (7–10) long; *v* setae (sensory peg) 3 (2–4) long; *ep* setae 4 (3–4) long; cheliceral stylets 22 (21–27) long. Prodorsal shield elongate-triangular, with a pointed frontal lobe over the gnathosoma; 48 (43–51) long, 46 (41–47) wide. Sculpture of prodorsal shield: median line present on rear half of shield; admedian lines from anterior lobe base diverging to rear margin, slightly concave in the middle; submedian lines with conical microtubercles, from anterior 1/4 running toward outer tubercles of *sc* setae, almost subparallel to lateral margin of shield; arched lines in front of the tubercles of *sc* setae present. Numerous, minute, conical microtubercles present on surface near shield. Tubercles of setae *sc* located on rear margin of shield, (3–5) long, (3–4) wide, 30 (25–32) apart; setae *sc* 21 (12–28) long, projecting to rear.

Leg I 39 (35–49) long; femur 10 (9–12) long, with seta *bv* 15 (11–16) long; position of seta *bv* 4 (4–6) from ventral, proximal margin of femur; genu 6 (5–7) long, with seta *l"* 25 (18–29) long, position of seta *l"* 4 (3–4) from dorsal, proximal margin of genu; tibia 7 (6–9) long, with seta *l'* 11 (8–11) long; position of seta *l'* 4 (4–5) from ventral, proximal margin of tibia. Tarsus 9 (7–9) long, with three setae: *ft"* (23–29); *ft'* 19 (19–25) long, *u'* 10 (5–9) long; position of setae *ft"* and *ft'* 3 (2–3) from proximal margin of tarsus; position of seta *u'* 5 (4–6) from proximal margin of tarsus. Tarsal solenidion ω 9 (8–10) long; tarsal empodium simple, 7 (7–8) – rayed, symmetrical, 10 (9–11) long. Leg II 37 (30–45) long; femur 10 (9–13) long, with seta *bv* 17 (15–22) long; position of seta *bv* 5 (4–6) from ventral, proximal margin of femur; genu 5 (4–6) long, with seta *l"* 16 (12–19) long; position of seta *l"* 3 (3) from dorsal, proximal margin of genu; tibia 6 (5–8) long. Tarsus 9 (7–9) long, with three setae: *ft"* 26 (23–27) long, *ft'* 14 (8–14), *u'* 9 (5–8) long; position of setae *ft"* and *ft'* 2 (2–3) from proximal margin of tarsus; position of seta *u'* 5 (4–6) from proximal margin of tarsus. Tarsal solenidion ω 10 (7–10) long; tarsal empodium 7 (7–8)-rayed, symmetrical, 10 (9–12) long.

Coxae with a pattern of numerous long lines with minute, conical microtubercles; on coxae I lines parallel to the length of coxae, on coxae II lines perpendicular to the length of coxae; singular, conical microtubercles and short lines also present. Sternal line slender. Setae *1b* 10 (10–13) apart, 10 (10–11) long; setae *1a* 10 (7–10) apart, 24 (20–29) long; setae *2a* 26 (20–29) apart, (48–60) long; distance between setae *1b* and *1a* 9 (8–11), distance between setae *1a* and *2a* 10 (8–10).

Opisthosoma with 62 (59–79) dorsal annuli, 63 (67–76) ventral annuli, 6 (4–7) coxigenital annuli. Annuli with microtubercles; dorsal microtubercles numerous, minute, set along annuli margins, on telosomal annuli conical; ventral microtubercles not as numerous as dorsal, conical, but with blunted top, set along annuli margins, on telosomal annuli elongated.

Setae *c2* (38–41) long, located on 9th (7th–10th) ventral annulus from coxae II; tubercles *c2* 53 (40–57) apart; ventral setae *d* (62–74) long, located on 22nd (19th–26th) ventral annulus; tubercles *d* 35 (25–43) apart; setae *e* 45 (38–43) long, located on 37th (39th–47th) ventral annulus; tuber-

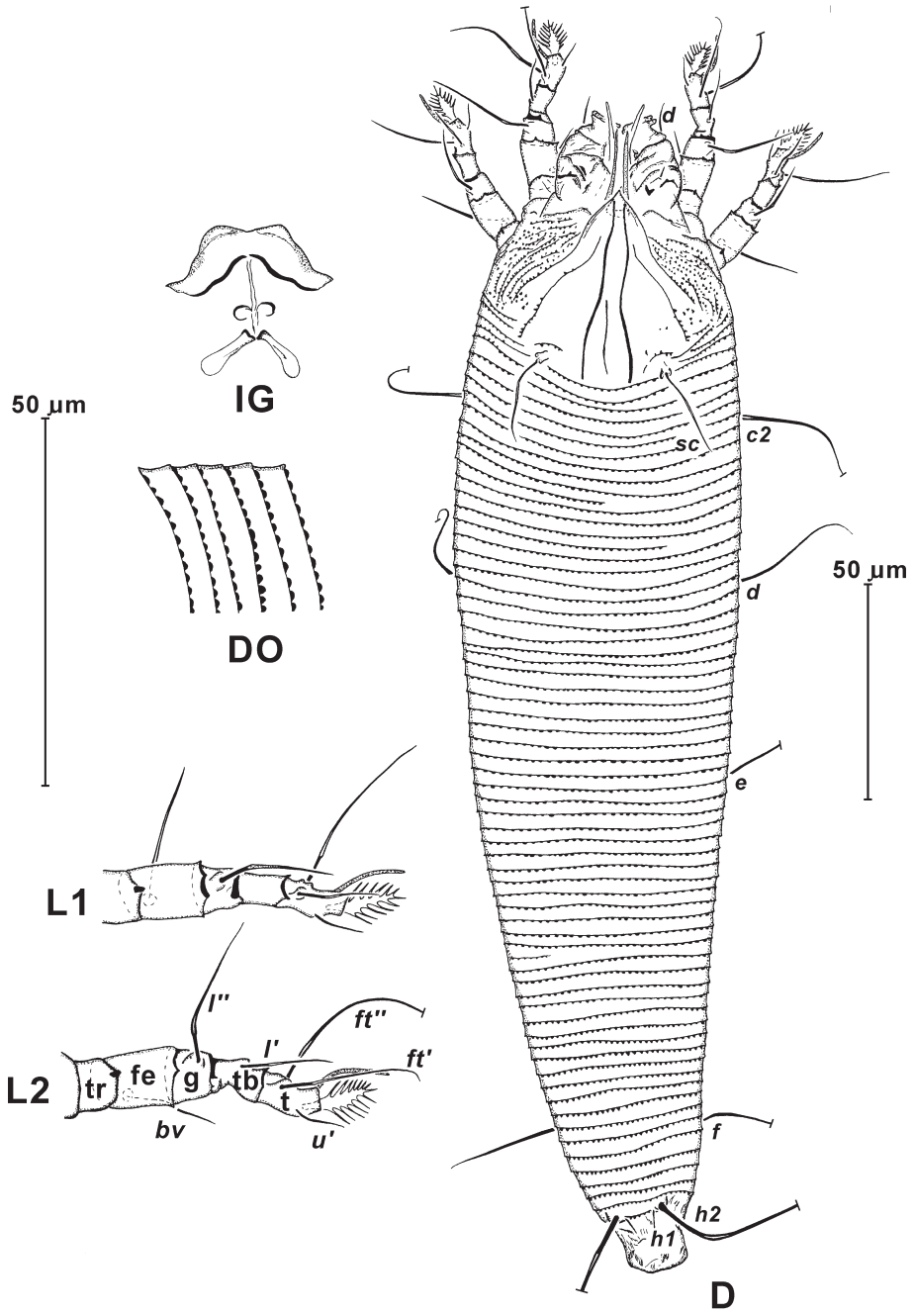

Fig. 1. *Aculodes calamaabditus* n. sp., female: D – dorsal aspect, IG – internal genitalia, DO – dorsal microtubercles, L1, L2 – leg I and II

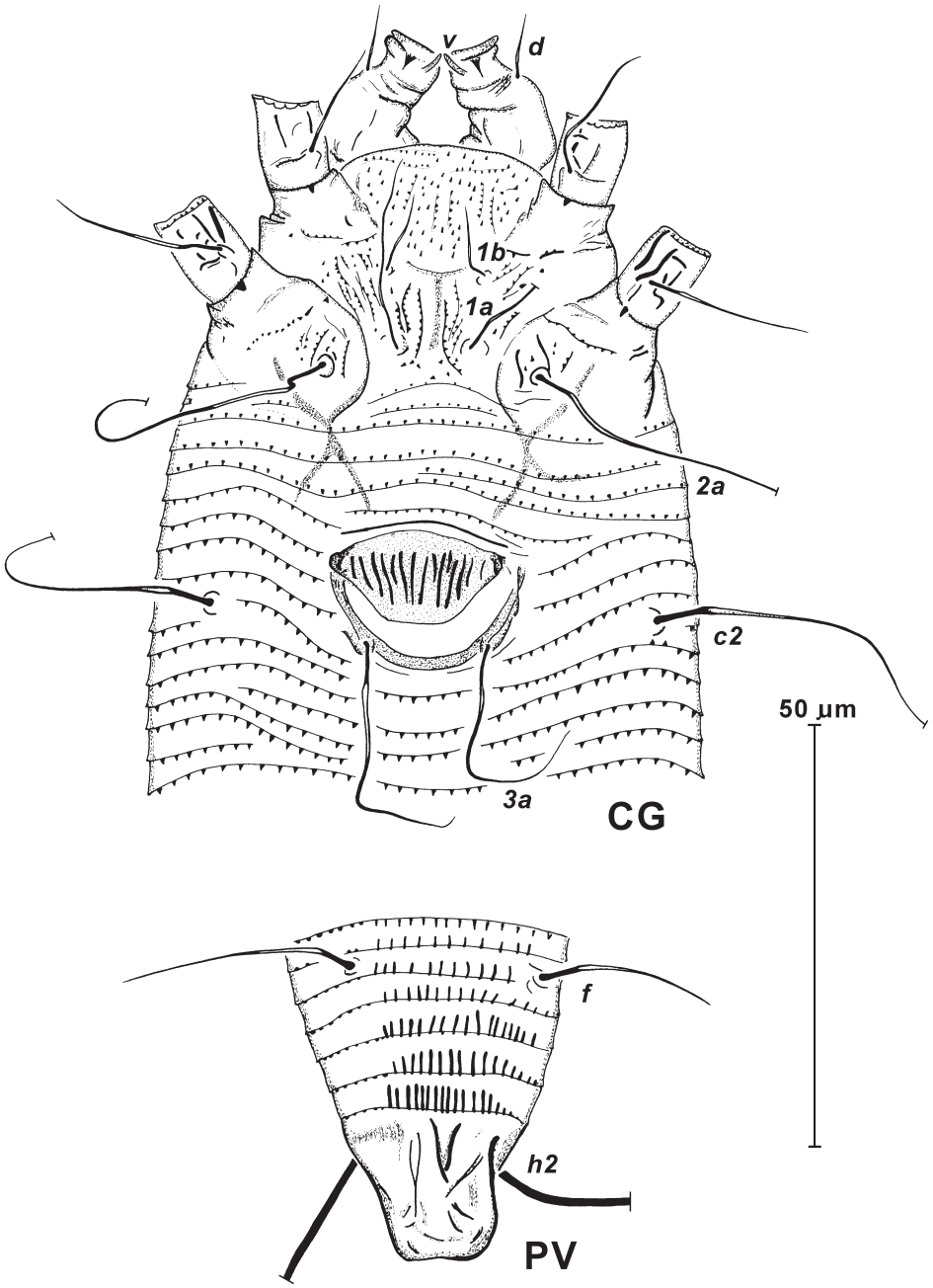

Fig. 2. *Aculodes calamaabditus* n. sp., female: CG – coxigenital region, PV – ventral telosoma

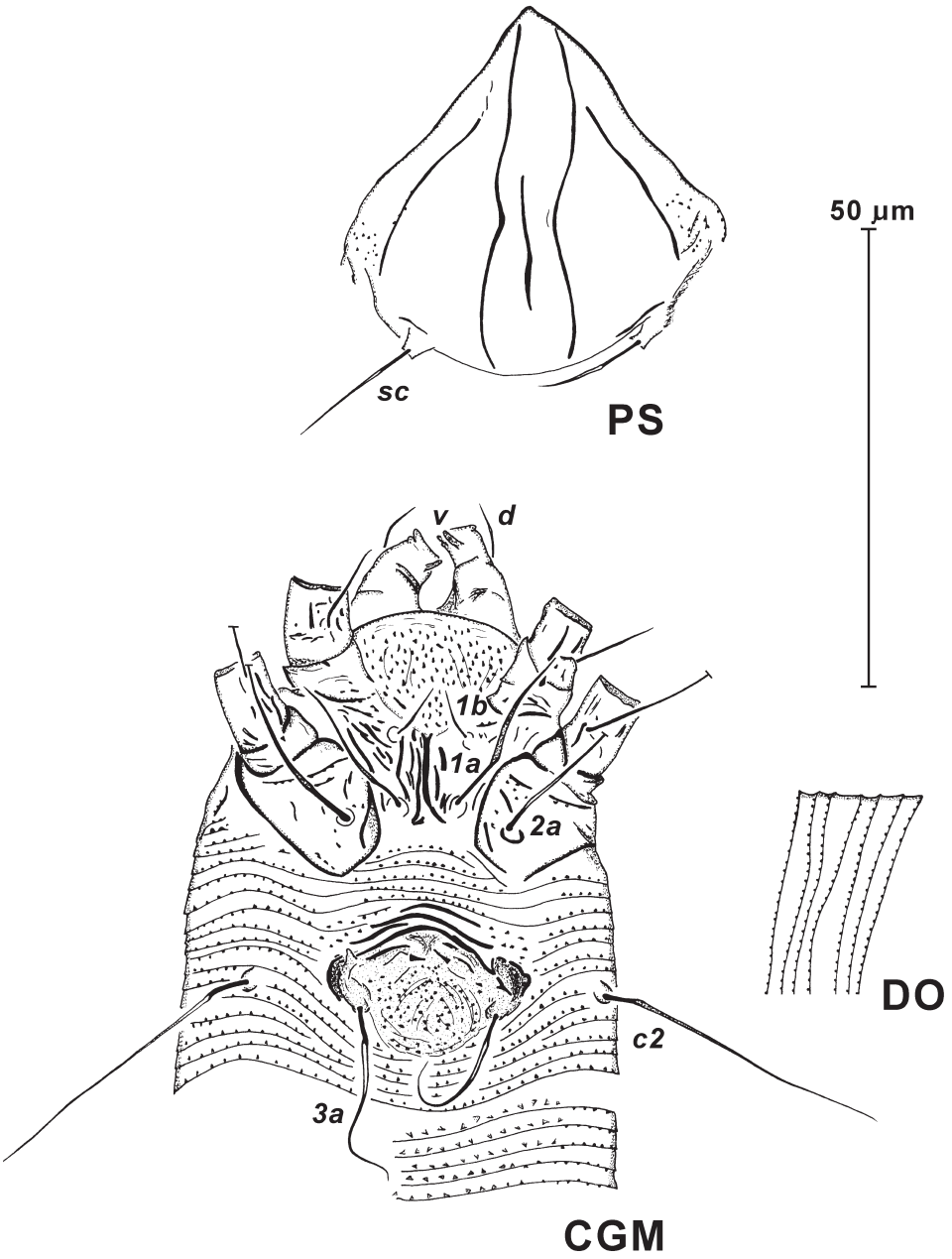

Fig. 3. *Aculodes calamaabditus* n. sp., male: PS – prodorsal shield, CGM – coxigenital region, DO – dorsal microtubercles

cles *e* 18 (11–18) apart; setae *f* 27 (27–35) long, located on 59th (63rd-72nd) ventral annulus, 5th (5th) annulus from rear; tubercles *f* 23 (19–24) apart.

Setae *h1* 4 (4–6) long, 7 (6–8) apart; setae *h2* (73–88) long, 10 (9–11) apart; distance between *h1* and *h2* – 2 (2–3).

Genital parts 17 (15–18) long, 22 (19–28) wide, genital coverflap with 13 (9–14) longitudinal ribs; setae *3a* 25 (23–35) long, 14 (12–18) apart.

Male (Fig. 3) (n=3): Body spindleform. Body length 185; width 47. Gnathosoma 24 long; setae *d* 7–8 long; *v* setae (sensory peg) 3; cheliceral stylets 23–26 long. Prodorsal shield triangular, 40 long, 41 wide, with long, pointed lobe over the gnathosoma. Sculpture of prodorsal shield: like that of female, with one exception: median line present on the rear 1/3. Tubercles of setae *sc* located on rear margin of shield, 3 long, 3 wide, 23–24 apart; setae *sc* 14 long, projecting to rear.

Leg I 29–30 long; femur 8–10 long, with seta *bv* 10–12 long, 3–4 from proximal margin of femur; genu 4–5 long, with seta *l"* 20–21 long, 2–3 from proximal margin of genu; tibia 5–6 long, with seta *l'* 8–9 long, 3–4 from proximal margin of tibia. Tarsus 6–7 long, with three setae: *ft"* 21–24, *ft'* 18–20 long, both 2–3 from proximal margin of tarsus; *u'* 6–7 long, 3–4 from proximal margin of tarsus. Tarsal solenidion ω 7–10 long; tarsal empodium simple, 6–7-rayed, symmetrical, 8–10 long. Leg II 27–29 long; femur 9–10 long, with seta *bv* 12–17 long; 4 from proximal margin of femur; genu 4–5 long, with seta *l"* 11–14 long, 2–3 from proximal margin of genu; tibia 4–5 long. Tarsus 6–7 long, with three setae: *ft"* 20–22 long, *ft'* 10–12 long, both 2–3 from proximal margin of tarsus; *u'* 5–7 long, 4 from proximal margin of tarsus. Tarsal solenidion ω 8 long; tarsal empodium 6-rayed, symmetrical, 9–10 long.

Coxae with a pattern similar to that of female. Setae *1b* 8 apart, 8 long; setae *1a* 6–7 apart; setae *2a* 18–20 apart; distance between setae *1b* and *1a* 7–8, distance between setae *1a* and *2a* 6–7.

Opisthosoma with 56–68 dorsal annuli, 62–68 ventral annuli, 5 coxigenital annuli. Annuli with microtubercles; dorsal microtubercles numerous, minute, beadlike, set along annuli margins; ventral microtubercles minute, conical and acute, not ahead or slightly ahead of annuli margins, on telosomal annuli elongated.

Setae *c2* 27–38 long, located on 6th–7th ventral annulus from coxae II; tubercles *c2* 39 apart; ventral setae *d* 29 long, located on 17th–19th ventral annulus; tubercles *d* 24 apart; setae *e* 40 long, located on 34th–36th ventral annulus; tubercles *e* 11 apart; setae *f* 22–29 long, located on 58th–64th ventral annulus, 5th annulus from rear; tubercles *f* 18 apart.

Setae *h1* 4 long, 5 apart; setae *h2* 10 apart; distance between *h1* and *h2* – 2.

Genital parts 15–16 long, 19–20 wide; surface near the genital parts with lines and minute, beadlike microtubercles; setae *3a* 16–25 long, 13–17 apart.

Nymph (Fig. 4) (n=2): Body slightly spindleform. Body length 202–237; width 61. Gnathosoma 24–27 long; setae *d* 7 long; *v* setae (sensory peg) 2–3; cheliceral stylets 22–25 long. Prodorsal shield triangularly-oval, 39–45 long, 40 wide, with a little, subrounded lobe over the gnathosoma. Sculpture of prodorsal shield: median line absent; admedian and submedian lines like those in female. Surface near the shield with numerous microtubercles. Tubercles of setae *sc* located on rear margin of shield, 3 long, 3 wide, 21 apart; setae *sc* 12–17 long, projecting to rear.

Leg I 36 long; femur 9 long; genu 4–5 long, with seta *l"* 20 long, 2–3 from proximal margin of genu; tibia 5 long, with seta *l'* 6–8 long, 3 from proximal margin of tibia. Tarsus 5–7 long, seta *u'* 5 long, 3–4 from proximal margin of tarsus. Tarsal solenidion ω 6–7 long; tarsal empodium simple, 5–6-rayed, symmetrical, 7–9 long. Leg II 25–35 long; femur 7 long, with seta *bv* 11–12 long; 3–4 from proximal margin of femur; genu 4 long, with seta *l"* 10–11 long, 2 from proximal margin of genu; tibia 4–5 long. Tarsus 5–6 long, with three setae: *ft"* 19–22 long, *ft'* 10 long, both 2 from proximal margin of tarsus; *u'* 5 long, 3 from proximal margin of tarsus. Tarsal solenidion ω 7–8 long; tarsal empodium 5–6-rayed, symmetrical, 8–9 long.

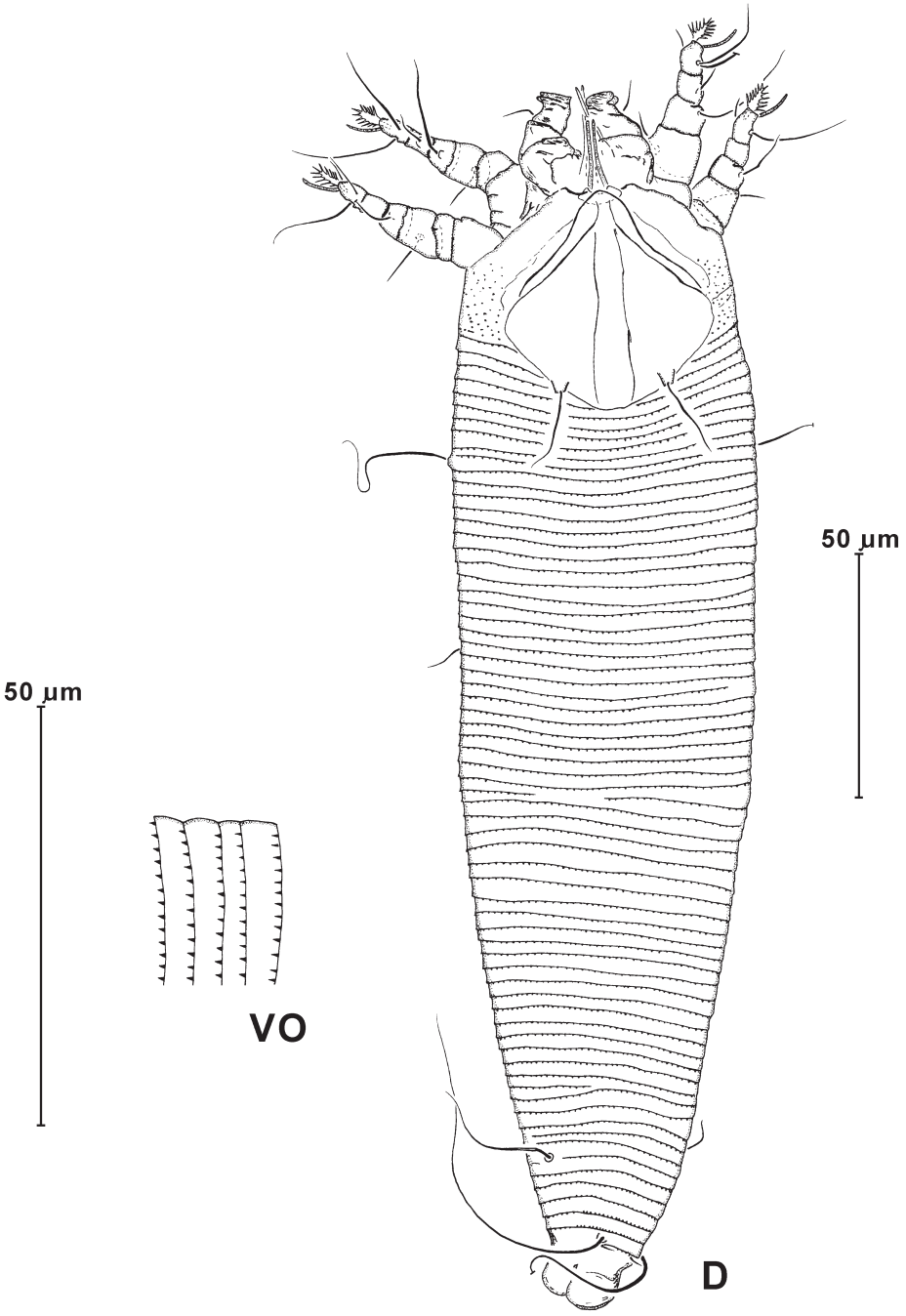

Fig. 4. *Aculodes calamaabditus* n. sp., nymph: D – dorsal aspect, VO – ventral microtubercles

Setae *1b* 8 apart; setae *1a* 9 apart; setae *2a* 27 apart; distance between setae *1b* and *1a* 8, distance between setae *1a* and *2a* 9.

Opisthosoma with 45–50 dorsal annuli, 46–47 ventral annuli, 10 coxigenital annuli. Annuli with microtubercles; dorsal microtubercles minute, beadlike, set along annuli margins, on telosomal annuli more numerous; ventral microtubercles minute, conical, less numerous than dorsal, set along annuli margins, on telosomal annuli elongated.

Setae *c2* 18–27 long, located on 6th–9th ventral annulus from coxae II; tubercles *c2* 53 apart; ventral setae *d* 18 long, located on 16th–17th ventral annulus; tubercles *d* 31 apart; setae *e* 17 long, located on 27th–29th ventral annulus; tubercles *e* 15 apart; setae *f* 19 long, located on 42nd–43rd ventral annulus, 5th annulus from rear; tubercles *f* 17 apart.

Setae *h1* 3–4 long, 6 apart; setae *h2* 9 apart; distance between *h1* and *h2* – 2.

Setae *3a* 11–20 long, 7–10 apart.

Larva (n=1): Body vermiform. Body length 133; width 44. Cheliceral stylets 18 long. Leg I: femur 5 long; genu 3 long, tarsal solenidion ω 7 long; tarsal empodium simple, 5-rayed, symmetrical, 6 long. Leg II: tarsal solenidion ω 6 long; tarsal empodium 5-rayed, symmetrical, 6 long. Setae *c2* 15 long, setae *f* 14 long; setae *h1* 3 long.

Etymology: the specific designation is derived from the combination of *Calamagrostis* – generic name of the host plant, and *abditus* (Latin.) – hide; because specimens of this species were found hidden in deep rows on leaf-surfaces.

Host plant: *Calamagrostis epigeios* (L.) ROTH. (Poaceae).

Relation to host plant: mites are vagrants on the upper leaf surface, often hiding in rows.

Type locality: Western Poland, Głogów – Leśna Dolina (16°12'E, 51°44'N), path in forest; 23.04.200 and 04.04.1999; leg. A. Skoracka, also material from the other locality was used: Modła near Głogów (16°06'E, 51°36'N), pine-wood border, 26.07.1998; leg. A. Skoracka.

Material examined: holotype female (ACU464F6), 14 female paratypes (ACU210F1-ACU210F5, ACU65F7-ACU65F15), 3 male paratypes (ACU65M1-ACU65M3), 3 nymph paratypes (ACU464N1, ACU65N2-ACU65N3), 1 larva paratype (ACU65L1).

Diagnosis: *Aculodes calamaabditus* sp. n. is most similar to *A. agropyronis* (KEIFER, 1960) (*Agropyron smithi*, Poaceae, Texas, USA) (KEIFER 1960) by the shape and dimensions of prodorsal shield, length of median line, number of dorsal annuli (more than 50), and length of opisthosomal *d* setae (more than 62 μm in length). *Aculodes calamaabditus* can be distinguished from *A. agropyronis* by the absence of II submedian lines, location of ventral microtubercles and the appearance of the sternal line. In *A. agropyronis* submedian lines I and II are present, ventral microtubercles are set ahead of margins of annuli, and the sternal line is broad and distinct. In females of the new species only submedian line I is present, ventral microtubercles are set along margins of annuli, and the sternal line is not clearly distinguishable. Those two species differ also in the length of *sc* setae (46 μm in *A. agropyronis*, less than 30 μm in *A. calamaabditus*), and pedipalpal *d* setae (4 μm in *A. agropyronis,* 7 μm or more in *A. calamaabditus*).

Aculodes capillarisi sp. n.
(Figs 5–9)

Female (Figs 5–7) (holotype and 8 paratypes): Body slightly spindleform. Body length 232 (176–257); width 55 (48–52). Gnathosoma 24 (19–22) long; dorsal pedipalpal genual setae *d* 10 (8–11) long; *v* setae (sensory peg) 2 (2) long; *ep* setae (3–4) long; cheliceral stylets 20 (19–22) long. Prodorsal shield triangular-oval, with a distinct, pointed frontal lobe over the gnathosoma; 46 (41–46) long, 41 (38–40) wide. Sculpture of prodorsal shield: median line absent; admedian lines entire, from anterior lobe base diverging to rear margin, submedian lines, with conical microtubercles, present on rear half of shield, almost parallel to lateral margin of shield, its posterior fragment outside the tubercles of *sc* setae. Large, conical microtubercles present on surface near shield. Tubercles of setae *sc* located on rear margin of shield, 4 (3–5) long, 4 (4–5) wide, 26 (22–26) apart; setae *sc* 45 (35–42) long, projecting to rear.

Leg I 45 (36–40) long; femur 10 (10–11) long, with seta *bv* (10–14) long; position of seta *bv* 4 (4–5) from ventral, proximal margin of femur; genu 6 (5–6) long, with seta *l"* 32 (23–29) long, position of seta *l"* 4 (3–4) from dorsal, proximal margin of genu; tibia 8 (7–8) long, with seta *l'* 12 (9–11) long; position of seta *l'* 4 (3–4) from ventral, proximal margin of tibia. Tarsus 8 (7–8) long, with three setae: *ft"* 26 (24–28); *ft'* 22 (18–23) long, *u'* 8 (5–8) long; position of setae *ft"* and *ft'* 3 (2–3) from proximal margin of tarsus; position of seta *u'* 6 (4–5) from proximal margin of tarsus. Tarsal solenidion ω 10 (8–10) long; tarsal empodium simple, 8 (7–8) –rayed, symmetrical, 11 (10–11) long. Leg II 33 (30–36) long; femur 10 (10–11) long, with seta *bv* 15 (11–16) long; position of seta *bv* 4 (4) from ventral, proximal margin of femur; genu 6 (4–6) long, with seta *l"* 16 (11–15) long; position of seta *l"* 4 (2–3) from dorsal, proximal margin of genu; tibia 6 (6) long. Tarsus 8 (7–8) long, with three setae: *ft"* 27 (23–27) long, *ft'* 12 (8–10), *u'* 8 (6) long; position of setae *ft"* and *ft'* 3 (2) from proximal margin of tarsus; position of seta *u'* 4 (4) from proximal margin of tarsus. Tarsal solenidion ω 10 (9–10) long; tarsal empodium 8 (7–8)-rayed, symmetrical, 10 (10–11) long.

Coxae with a pattern of numerous lines (most of them short) and numerous conical microtubercles. Sternal line distinct. Setae *1b* 10 (10) apart; setae *1a* 8 (6–8) apart, 19 (21–24) long; setae *2a* 24 (18–22) apart, (45–46) long; distance between setae *1b* and *1a* 8 (8–10), distance between setae *1a* and *2a* 8 (7–10).

Opisthosoma with 61 (54–60) dorsal annuli, 68 (61–71) ventral annuli, (5–6) coxigenital annuli. Annuli with microtubercles; dorsal microtubercles minute, conical but with blunt top, set along annuli margins, on telosomal annuli more numerous and minute, pointed; ventral microtubercles conical, pointed, set along annuli margins, on telosomal annuli elongated.

Setae *c2* 29 (21–29) long, located on 7th (7th–8th) ventral annulus from coxae II; tubercles *c2* 52 (38–43) apart; ventral setae *d* (29–48) long, located on 20th (18th–21st) ventral annulus; tubercles *d* 30 (26–30) apart; setae *e* 29 (19–36) long, located on 38th (36th–41st) ventral annulus; tubercles *e* 14 (12–15) apart; setae *f* 27 (22–27) long, located on 54th (57th–67th) ventral annulus, 5th (5th) annulus from rear; tubercles *f* 24 (19–27) apart.

Setae *h1* (4–5) long, 8 (6–8) apart; setae *h2* 95 (81–87) long, 12 (10–11) apart; distance between *h1* and *h2* – 2 (2).

Genital parts 12 (11–14) long, 23 (20–24) wide, genital coverflap with 12 (11–13) longitudinal striae; setae *3a* 28 (17–33) long, 16 (13–15) apart.

Male (Fig. 7) (n=5): Body slightly spindleform. Body length 166–218; width 40–48. Gnathosoma 17–23 long; setae *d* 8–9 long; *v* setae (sensory peg) 2 long; *ep* setae 3 long; cheliceral stylets 18–20 long. Shape and sculpture of prodorsal shield like those in female. Prodorsal shield 38–41

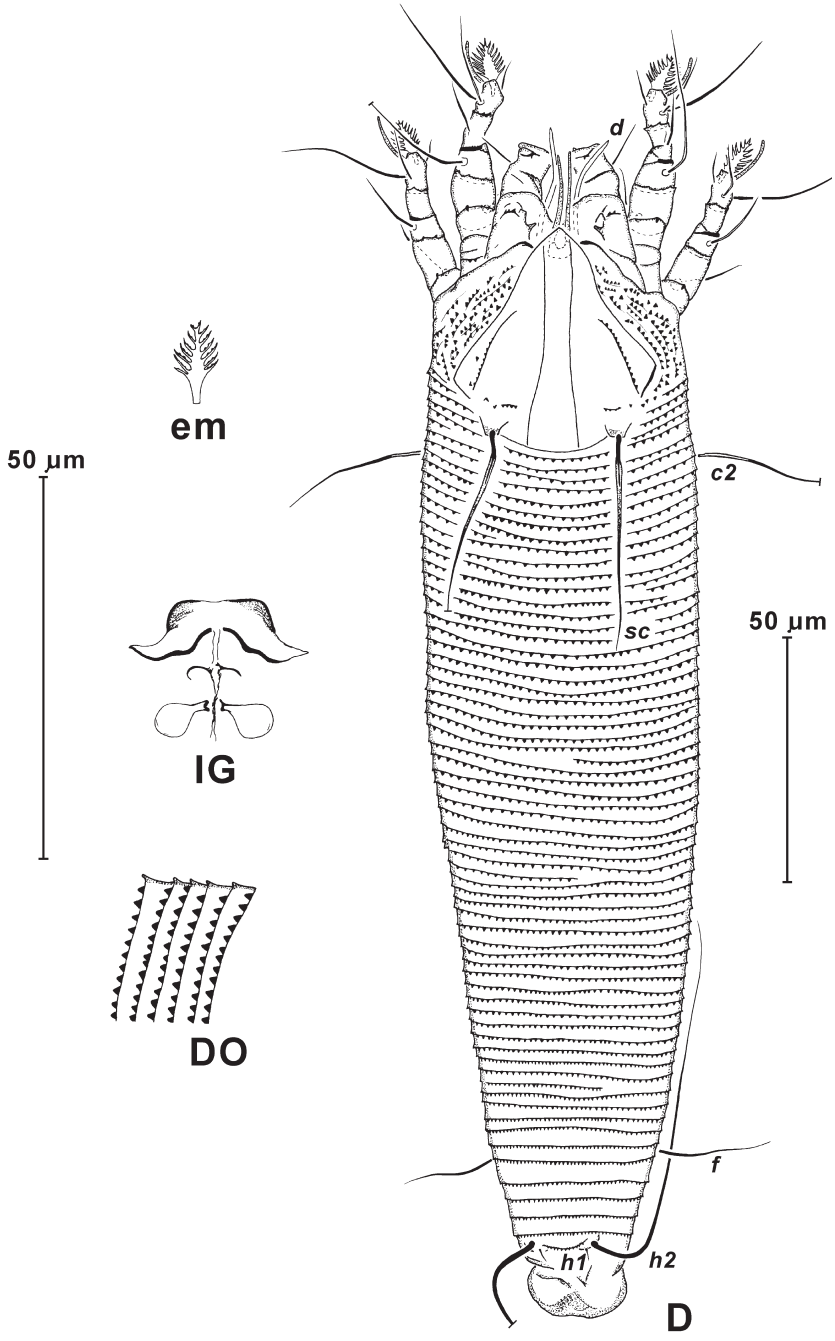

Fig. 5. *Aculodes capillarisi* n. sp., female: D – dorsal aspect, em – empodium, IG – internal genitalia, DO – dorsal microtubercles

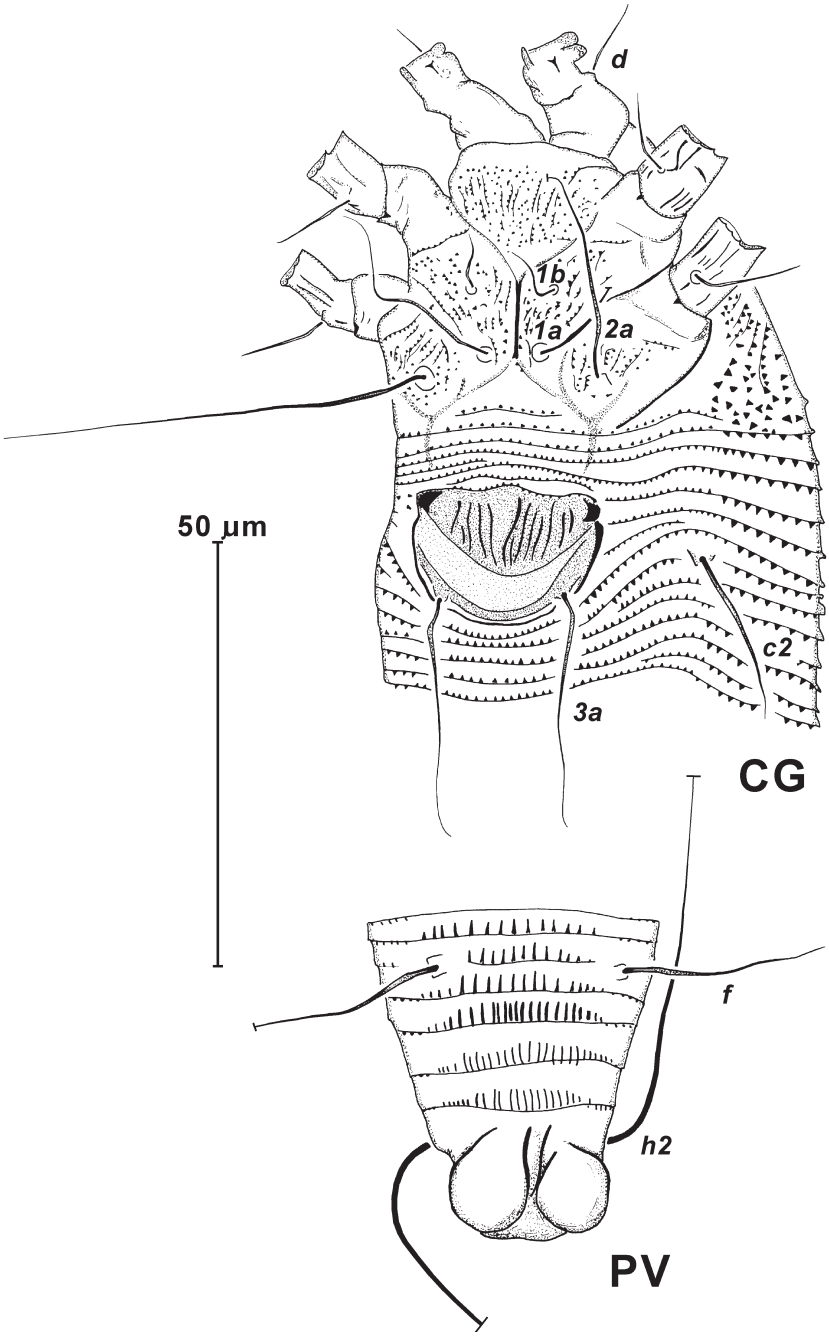

Fig. 6. *Aculodes capillarisi* n. sp., female: CG – coxigenital region, PV – ventral telosoma

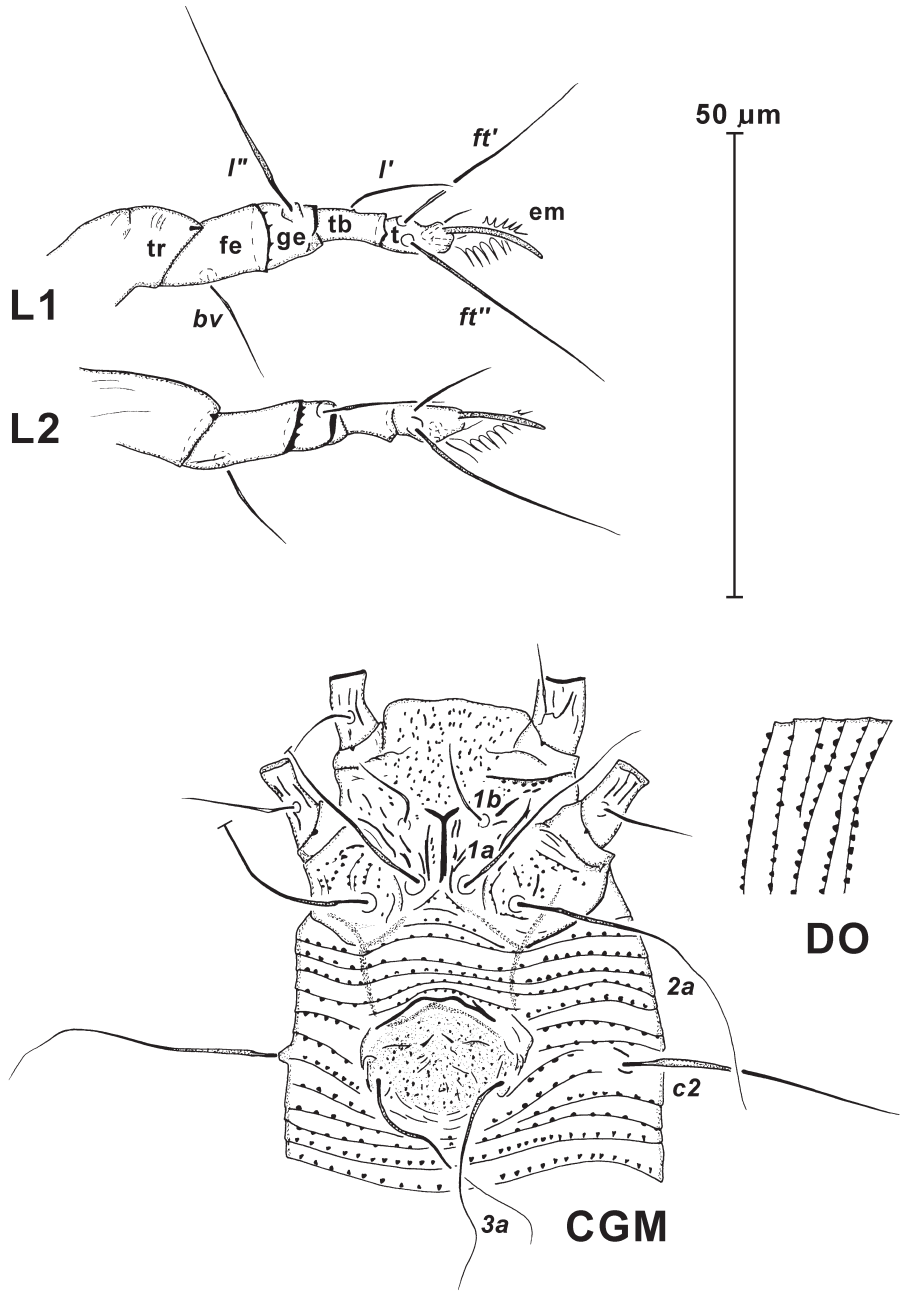

Fig. 7. *Aculodes capillarisi* n. sp.: L1, L2: legs I and II of a female, CGM – coxigenital region of a male, DO – dorsal microtubercles of a male

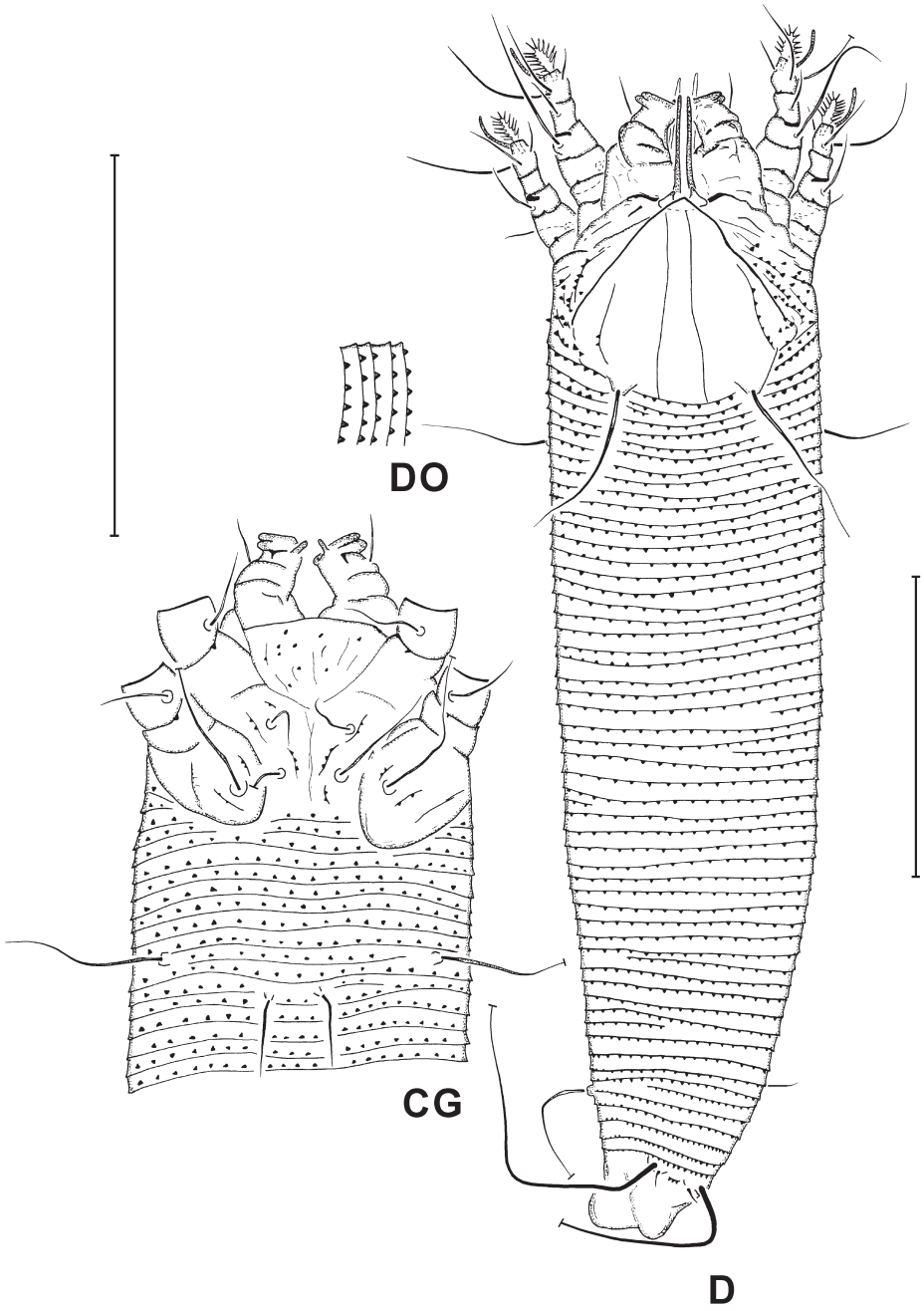

Fig. 8. *Aculodes capillarisi* n. sp., nymph: D – dorsal aspect, DO – dorsal microtubercles, CG – coxigenital region

long, 33–34 wide. Tubercles of setae *sc* located on rear margin of shield, 3 long, 4–5 wide, 21–24 apart; setae *sc* 31–35 long, projecting to rear.

Leg I 27–36 long; femur 8–10 long, with seta *bv* 8–13 long, 3–4 from proximal margin of femur; genu 5 long, with seta *l"* 19–21 long, 3 from proximal margin of genu; tibia 6–8 long, with seta *l'* 6–9 long, 3–4 from proximal margin of tibia. Tarsus 6–8 long, with three setae: *ft"* 21–22, *ft'* 17 long, both 2 from proximal margin of tarsus; *u'* 6–7 long, 3–4 from proximal margin of tarsus. Tarsal solenidion ω 8–9 long; tarsal empodium simple, 7-rayed, symmetrical, 9–10 long. Leg II 25–35 long; femur 8–9 long, with seta *bv* 11–14 long; 3–4 from proximal margin of femur; genu 4–5 long, with seta *l"* 10–13 long, 2–3 from proximal margin of genu; tibia 5 long. Tarsus 6–8 long, with three setae: *ft"* 21–23 long, *ft'* 7–10 long, both 2 from proximal margin of tarsus; *u'* 6–7 long, 4–5 from proximal margin of tarsus. Tarsal solenidion ω 8–10 long; tarsal empodium 6–7-rayed, symmetrical, 8–10 long.

Coxae with a pattern similar to that of female. Setae *1b* 9–10 apart, 8–9 long; setae *1a* 6–7 apart, 15–17 long; setae *2a* 16–20 apart, 30–38 long; distance between setae *1b* and *1a* 7–8, distance between setae *1a* and *2a* 6–8.

Opisthosoma with 47–52 dorsal annuli, 49–60 ventral annuli, 5–6 coxigenital annuli. Annuli with microtubercles; dorsal microtubercles minute, semirounded or conical with blunt top, set along annuli margins, on telosomal annuli more narrow and minute; ventral microtubercles minute, semirounded or conical and acute, slightly ahead of annuli margins, on telosomal annuli elongated.

Setae *c2* 28–34 long, located on 7th–9th ventral annulus from coxae II; tubercles *c2* 37–43 apart; ventral setae *d* 31–43 long, located on 15th–20th ventral annulus; tubercles *d* 23–27 apart; setae *e* 19–22 long, located on 26th–36th ventral annulus; tubercles *e* 11–12 apart; setae *f* 18–27 long, located on 45th–56th ventral annulus, 5th annulus from rear; tubercles *f* 17–18 apart.

Setae *h1* 4–6 long, 6–7 apart; setae *h2* 9–10 apart; distance between *h1* and *h2* – 2.

Genital parts 12–15 long, 16–19 wide; surface near the genital parts with minute microtubercles; setae *3a* 17–24 long, 12–14 apart.

Nymph (Fig. 8) (n=9): Body spindleform. Body length 154–208; width 42–48. Gnathosoma 18–20 long; setae *d* 6–10 long; *v* setae (sensory peg) 2 long; *ep* setae 2 long; cheliceral stylets 15–21 long. Prodorsal shield triangular, 35–40 long, 33–40 wide, with small, subrounded lobe reaching cheliceral base. Sculpture of prodorsal shield and surface near the shield similar to those in female. Tubercles of setae *sc* located on rear margin of shield, 2–3 long, 4 wide, 20–24 apart; setae *sc* 23–30 long, projecting to rear.

Leg I 25–32 long; femur 6–7 long, seta *bv* 7–9 long, 3–4 from proximal margin of femur; genu 4 long, with seta *l"* 17–23 long, 2–3 from proximal margin of genu; tibia 4–5 long, with seta *l'* 6–8 long, 2–3 from proximal margin of tibia. Tarsus 5–6 long, setae *ft"* 16–21 long, *ft'* 14–17 long, both 2–3 from proximal margin of tarsus; seta *u'* 5–6 long, 3–4 from proximal margin of tarsus. Tarsal solenidion ϖ 6–8 long; tarsal empodium simple, 6–7-rayed, symmetrical, 7–8 long. Leg II 24–27 long; femur 6–9 long, with seta *bv* 8–11 long; 2–4 from proximal margin of femur; genu 3–4 long, with seta *l"* 10–12 long, 2–3 from proximal margin of genu; tibia 3–4 long. Tarsus 5–6 long, setae: *ft"* 17–22 long, *ft'* 7–11 long, both 2 from proximal margin of tarsus; *u'* 4–5 long, 3 from proximal margin of tarsus. Tarsal solenidion ω 7–8 long; tarsal empodium 6–7-rayed, symmetrical, 7–9 long.

Coxae with relatively few lines and conical microtubercles. Setae *1b* 8–10 apart, 6–9 long; setae *1a* 7–8 apart, 13–15 long; setae *2a* 18–21 apart, 34 long; distance between setae *1b* and *1a* 6–7, distance between setae *1a* and *2a* 7.

Opisthosoma with 46–55 dorsal annuli, 48–55 ventral annuli, 8–10 coxigenital annuli. Annuli with microtubercles; dorsal microtubercles sparse, well separated, conical with blunt top, set along annuli margins, on telosomal annuli more numerous and pointed; ventral microtubercles conical with blunt top, slightly ahead of annuli margins, on telosomal annuli elongated.

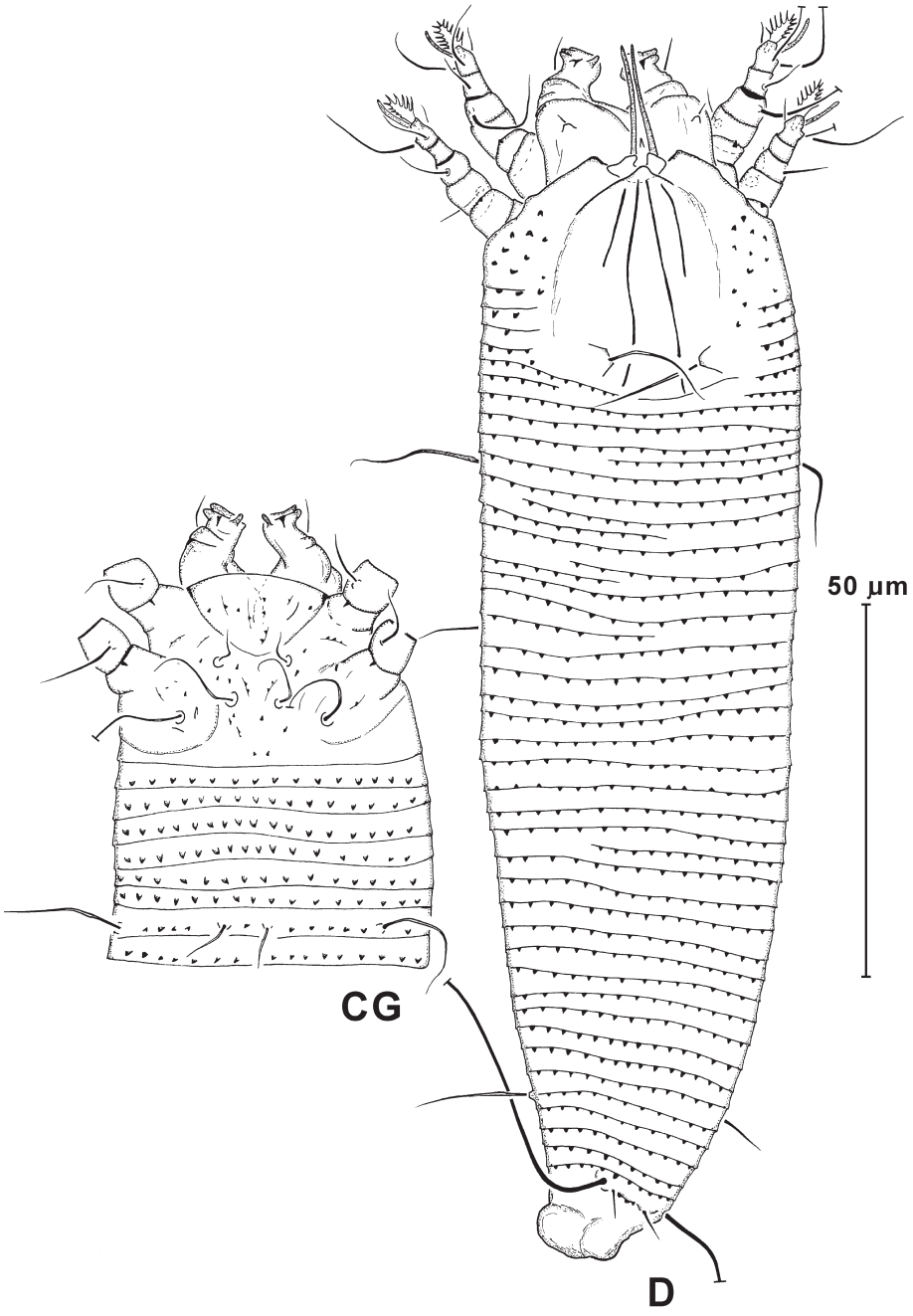

Fig. 9. *Aculodes capillarisi* n. sp., larva: D – dorsal aspect

Setae *c2* 18–24 long, located on 6th–8th ventral annulus from coxae II; tubercles *c2* 35–41 apart; ventral setae *d* 22–37 long, located on 16th–22nd ventral annulus; tubercles *d* 21–27 apart; setae *e* 10–22 long, located on 28th–34th ventral annulus; tubercles *e* 10–14 apart; setae *f* 14–27 long, located on 44th–51st ventral annulus, 5th annulus from rear; tubercles *f* 17–20 apart.

Setae *h1* 3–6 long, 5–6 apart; setae *h2* 8–10 apart; distance between *h1* and *h2* – 2.

Setae *3a* 8–16 long, 7–8 apart.

Larva (Fig. 9) (n=3): Body vermiform. Body length 154; width 42–49. Gnathosoma 19 long; setae *d* 4 long; *v* setae (sensory peg) 2 long; cheliceral stylets 17–18 long. Prodorsal shield triangular-oval, 28–30 long, 28–30 wide, without lobe over gnathosoma. Sculpture of prodorsal shield: median and admedian lines like those in female; submedian lines present on rear 1/3 of shield, subparallel to admedian. Tubercles of setae *sc* ahead from the margin of shield, 2–3 long, 3–4 wide, 14–17 apart; setae *sc* 13–16 long, projecting to center of shield.

Leg I 20–27 long; femur 5 long, seta *bv* 6–7 long, 2–4 from proximal margin of femur; genu 3–4 long, with seta *l"* 16–18 long, 2 from proximal margin of genu; tibia 3–4 long, with seta *l'* 5–9 long, 2 from proximal margin of tibia. Tarsus 4 long, setae *ft"* 15 long, *ft'* 13 long, both 2 from the proximal margin of tarsus; seta *u'* 5 long, 3 from proximal margin of tarsus. Tarsal solenidion ω 5–7 long; tarsal empodium simple, 5–6-rayed, symmetrical, 6–7 long. Leg II 19–22 long; femur 5 long, with seta *bv* 7–8 long; 2–3 from proximal margin of femur; genu 3–4 long, with seta *l"* 8–10 long, 2 from proximal margin of genu; tibia 3–4 long. Tarsus 4–5 long, setae: *ft"* 16–20 long, *ft'* 5 long, both 1–2 from proximal margin of tarsus; *u'* 4–5 long, 3 from proximal margin of tarsus. Tarsal solenidion ⌉ 6 long; tarsal empodium 5-rayed, symmetrical, 6 long.

Coxae with relatively few lines and conical microtubercles. Setae *1b* 8–10 apart; setae *1a* 6–8 apart, 13–20 long; setae *2a* 19–21 apart, 28 long; distance between setae *1b* and *1a* 6, distance between setae *1a* and *2a* 7.

Opisthosoma with 39–40 dorsal annuli, 29–32 ventral annuli, 5–7 coxigenital annuli. Annuli with microtubercles; dorsal microtubercles sparse, well separated, conical, set along annuli margins; ventral microtubercles conical, distinctly ahead of margins of annuli.

Setae *c2* 15–19 long, located on 6th–7th ventral annulus from coxae II; tubercles *c2* 36–43 apart; ventral setae *d* 12–15 long, located on 12th ventral annulus; tubercles *d* 21–24 apart; setae *e* 7–10 long, located on 17th–18th ventral annulus; tubercles *e* 10–13 apart; setae *f* 16–17 long, located on 23rd–28th ventral annulus, 3rd–4th annulus from rear; tubercles *f* 16–19 apart.

Setae *h1* 3 long, 5 apart; setae *h2* 9–10 apart; distance between *h1* and *h2* – 2.

Setae *3a* 5–6 long, 6–7 apart.

Etymology: the specific designation is derived from the specific host plant name – *A. capillaris.*

Host plant: *Agrostis capillaris* L. (Poaceae).

Relation to host plant: mites are vagrants on the upper leaf surface, mostly near the top.

Type locality: Western Poland, Biedrusko near Poznań (16°55' E, 52°29' N), forest path; 12.08.1998; leg. A. Skoracka.

Material examined: holotype female (ACUCAP51F1), 11 female paratypes (ACUCAP51F2-ACUCAP51F11), 7 male paratypes (ACUCAP51M1-ACUCAP51M7), 24 nymphs paratypes (ACUCAP51N1-ACUCAP51N24), 4 larvae paratypes (ACUCAP51L1-ACUCAP51L4).

Diagnosis: *Aculodes capillarisi* sp. n. is most similar to *A. dubius* (NALEPA, 1891) (*Avena pratensis* L., Poaceae, Austria) (NALEPA 1891) by absence of me-

dian line, similar number of dorsal annuli (about 54–64), conical shape of ventral microtubercles and number of empodial rays (7–8 in *A. capillarisi*, 8–9 in *A. dubius*). *Aculodes capillarisi* can be distinguished from *A. dubius* by the sculpture of submedian lines and proportion of prodorsal shield. In *A. dubius* submedian lines are arched, present on ľ posterior part of the shield, and reach admedian lines; the prodorsal shield is wider than long or its length and width are equal. In *A. capillarisi* submedian lines are on the rear half of the shield and do not reach admedian lines; the prodorsal shield is longer than wide. Width of prodorsal shield is less than 45 μm in *A. capillarisi*, while in *A. dubius* it is more than 45 μm. Those two species differ also in the length of setae *sc* (more than 60 μm in *A. dubius*, less than 50 μm in *A. capillarisi*), *c2* setae (more than 50 μm in *A. dubius*, less than 30 μm in *A. capillarisi*), and the location of tubercles of *sc* setae (more than 30 μm apart in *A. dubius*, less than 30 μm apart in *A. capillarisi*). Also, *A. dubius* is more spindleform in shape than *A. capillarisi.*

Remarks – Species belonging to *Aculodes* were found in many geographical regions, mainly in Palaearctic and Nearctic regions, and on various species of plants. Most of them (13 species; 81%) are grass-associated. In addition to the two new species, the following are known to occur on Poaceae plants: *A. agropyronis* (KEIFER, 1960), *A. deschampsiae* (SUKHAREVA, 1972), *A. dubius* (NALEPA, 1891), *A. fulleri* (KEIFER, 1966), *A. koeleriae* SUKHAREVA, 1985, *A. kransnovi* SUKHAREVA, 1994, *A. levis* HUANG, 2001, *A. mckenziei* (KEIFER, 1944), *A. mongolicus* SKORACKA et SHI, 2001, *A. ponticus* SUKHAREVA, 1986, *A. ventricosae* CHANDRAPATYA, 1998 (AMRINE & STASNY 1994, SUKHAREVA 1994, HUANG 2001, SKORACKA *et al.* 2001). Others, like: *A. hibisci* HUANG, 1992, *A. rubivgrans* SHI et BOCZEK, 2000, *A. salicis* KUANG, 1997 were found on non-poaecous hosts (HUANG 1992, KUANG & PANG 1997, SHI & BOCZEK 2001). Various degree of specificity to their hosts was also noticed. Some were found associated with single plant species, others with many hosts (more than 20). *A. dubius* and *A. mckenziei* are the most numerous and frequent species, recorded from about 30 species of grasses in Australia, Europe, Africa, Asia, North America (PROESELER 1972, AMRINE & STASNY 1994, SKORACKA 2002). No *Aculodes* species is known to vector plant disease, and none was reported to be of serious agricultural significance. Feeding of *A. mckenziei* and *A. dubius* can cause rolling and discoloration of leaves, while *A. hibisci* and *A. salicis* are gall-makers (AMRINE & STASNY 1994, SKORACKA & BOCZEK 2000, SKORACKA 2002).

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REFERENCES

AMRINE, J. W. JR. (1996) *Keys to the world genera of the Eriophyoidea (Acari: Prostigmata).* Indira Publishin House, West Bloomfield, Michigan, 187 pp.

AMRINE, J. W. JR. & STASNY, T. A. (1994) *Catalog of the Eriophyoidea (Acarina: Prostigmata) of the World*. Indira Publishing House, West Bloomfield, Michigan, 798 pp.

AMRINE, J. W. JR. & MANSON, D. C. M. (1996) Preparation, mounting and descriptive study of Eriophyoid mites. Pp. 383–396. *In* LINDQUIST , E. E. *et al*. (eds): *Eriophyoid mites – Their biology, natural enemies and control*. Elsevier Science, Amsterdam.

HUANG, K.-W. (1992) Some new eriophyoid mites from Taiwan. *Bull. Nat. Mus. Nat. Sci.* **3**: 227–228.

HUANG, K.-W. (2001) Eriophyoid mites of Taiwan: description of eighty-six species from the Tengchin area. *Bull. Nat. Mus. Nat. Sci.* **14**: 1–84.

KEIFER, H. H. (1960) Eriophyid studies B–1. *Bur. Entomol., Cal. Dept. Agr*. pp. 6–7.

KUANG, H. & PANG, H. (1997) Four new species of the Eriophyinae (Acari: Eriophyidae) from China. *Entomotaxonomia* **19**(3): 232–233. [in Chinese with English summary]

LINDQUIST, E. E. & AMRINE J. W. JR. (1996) Systematics, diagnoses for major taxa, and keys to families and genera with species on plant of economic importance. Pp. 33–87. *In* LINDQUIST, E. E. *et al.* (eds): *Eriophyoid mites – Their biology, natural enemies and control.* Elsevier Science, Amsterdam.

LINDQUIST, E. E. (1996) External anatomy and notation of structures. Pp. 1–30. *In* LINDQUIST, E. E. *et al.* (eds): *Eriophyoid mites – Their biology, natural enemies and control*. Elsevier Science, Amsterdam.

NALEPA, A. (1891) Genera und Species der Familie Phytoptidae. *Anz. Akad. Wiss*. **58**: 867–884.

PROESELER VON, G. (1972) Ein Beitrag zur Morphologie und Ökologie der Gallmilben (Eriophyoidea) an Gramineen. *Biol. Zentr.* **91**(4): 477–492.

SHI, A. & BOCZEK, J. (2000) Studies on Eriophyoid Mites (Acari: Eriophyoidea). XXXIX. *Bull. Pol. Acad. Sci*. **48**(4): 319–331.

SKORACKA, A. & BOCZEK, J. (2000) Eriophyoid mites (Acari: Eriophyoidea) on cereals and the other grasses. *Post. Nauk Roln*. **2**: 53–69. [in Polish with English summary]

SKORACKA, A., SHI, A. & PACYNA, A. (2001) New eriophyoid mites (Acari: Eriophyoidea) associated with grasses from Mongolia. *Zootaxa* **9**: 1–18.

SKORACKA, A. (2002) *Eriophyoid mites (Acari: Eriophyoidea) associated with grasses.* PhD thesis, 432 pp. [in Polish]

SUKHAREVA, S. I. (1994) The four-legged mites (Acariforme,Tetrapodili) on the bamboos in Georgia. *Vestnik Leningradskogo Universiteta* **3**: 33–38. [in Russian with English summary]

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