

New genus and species of the family Rhagidiidae (Acari, Actinedida, Eupodoidea) from Poland

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Abstract. *Janes rafalskii* gen. n., sp. n., inhabiting beech forest litter in the vicinity of Szczecin, Poland, is described as new representative of the family Rhagidiidae.

Key words: Acari, Eupodoidea, Rhagidiidae, new genus, new species, Poland.

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I. INTRODUCTION

Small unusual rhagidiid mites were discovered in the material of eupodoid soil mites collected in the beech forest litter in the vicinity of Szczecin, Poland. The specimens were presented (1986) to Dr. M. ZACHARDA, Institute of Entomology, Czech Academy of Sciences, České Budějovice, who published general world revision of the family Rhagidiidae (1980). Dr. ZACHARDA confirmed representatives of the family Rhagidiidae of a new specific and generic status. The mites were subjected to detailed morphological analysis and the results are presented in this paper.

A c k n o w l e d g m e n t s. I wish to thank Dr. M. ZACHARDA, Institute of Entomology, České Budějovice, for correcting the first manuscript.

II. MATERIAL AND METHODS

Division of the body into aspidosoma, gnathosoma, podosoma and opisthosoma distinguished according to GRANDJEAN (1969) with modifications proposed by the author in earlier papers (JESIONOWSKA 1991, 1996, 2000). Observations, measurements and illustrations were made using a standard light microscope equipped with a phase-contrast optical system. All measurements in micrometers. Points of reference in making measurements given by ZACHARDA (1980). Notations for leg setae according to LINDQUIST & ZACHARDA (1987), *ft*-fastigial, *tc*-tectal, *p*-proral, *u*-unguinal, *pv*-primiventral, *pl*-primilateral, *d*-dorsal, *l*-lateral, *v*-ventral, *bd*-basidorsal, *bl*-basilateral, *bv*-basiventral, the last three types of setae on basifemora. Abbreviations of pedipalp and leg segments are as follows: Tr-trochanter, bF-basifemur, tF-telofemur, G-genu, FG-femorogenu, Tb-tibia, Ts-tarsus. Notation of prodorsal setae: *ro* (=v₁)-rostral, *bo* (=sc₁)-bothridial, *la* (=v₂)-lamellar, *xa* (=sc₂)-anterior exobothridial, "das" furrow - abbreviation of disjugal, abjugal and sejugal furrows

present on dorsal side of idiosoma, between prodorsum and opisthosoma. Type material, mounted in Feaure medium on microslides is deposited provisionally in author's collection.

III. DESCRIPTIONS

Janes gen. nov.

Type species: *Janes rafalskii* n. sp.

D i a g n o s i s. Chelicera robust with strikingly deep and long saddle shaped dorsal depression between two setae, above articulation of movable digit. Fixed digit weakly sclerotized, slender, with distal cheliceral seta inserted laterally. Proximal cheliceral seta inserted proximad of articulation of the movable digit. Movable digit strongly sclerotized, flattened laterally, broad, axe-shaped in lateral aspect, and dentate along masticatory surface. Subcapitulum with free, distal parts of lateral lips forming a membranous funnel. Pedipalps with elipsoidal tarsal segment with 10 strikingly short pubescent setae and 1 recumbent solenidion. Prodorsal setae *ro* on the naso and bothridial *bo* strikingly long, finely filiform, pubescent in proximal part, both placed in sensual bothridia. Coxal regions I, II, III, IV with 2-1-3-2 setae, respectively; sternal formula: 2-0-2-2. Rhagidial organ I consisted of 3 T-shaped solenidia in tandem and lateroproximal stellate famulus in confluent insertion depression. Rhagidial organ II consisted of 3 T-shaped solenidia forming tandem in common depression. Tibia II with dorsodistal T-shaped, and dorsoproximal recumbent banana-shaped solenidion (i.e. no typical lanceolate solenidion on tibia II).

A f f i n i t i e s. *Janes* differs from the other known genera of the Rhagidiidae by the following combination of characters: (1) chelicera with robust, broad in lateral aspect and axe-shaped movable digit and dentate along masticatory surface; (2) fixed digit with deep and long dorsal saddle-shaped depression and 2 setae, proximal seta dorsally, proximad of articulation of movable digit, distal seta laterally; (3) subcapitular lateral lips forming membranous funnel; (4) elipsoidal, on distal part slightly conical profile of pedipalpal tarsus with strikingly short terminal setae; (5) rhagidial organs I and II consisted of 3 T-shaped rhagidial solenidia forming tandem in confluent depressions; (6) normal rhagidial T-shaped dorsodistal solenidion, instead of lanceolate solenidion, on tibia II; (7) long, finely filiform rostral setae, *ro*, and bothridial setae, *bo*, on prodorsum.

R e m a r k s. Because the diversity of taxa constituting the family Rhagidiidae has not been subjected to a comprehensive cladistic analysis (LINDQUIST & ZACHARDA 1987), no phyletic relationships between the *Janes* gen. n. and other genera of the Rhagidiidae can be recognized. However, some characters suggest possible affinities. The cheliceral shears in *Janes* resemble those in *Hammenia* ZACHARDA, 1980, or *Lindquistula* ZACHARDA, 1986, or the movable digit in *Pilorhagidia* STRANDTMANN & GOFF, 1978 from the family Strandtmaniidae as well as the shape of pedipalpal tarsus with short setae; rhagidial organs I and II resemble those in *Kouchibouguacia* ZACHARDA, 1986. These characters are not sufficient to make a full comparison at the genus level within the family, therefore further analysis will be continued elsewhere.

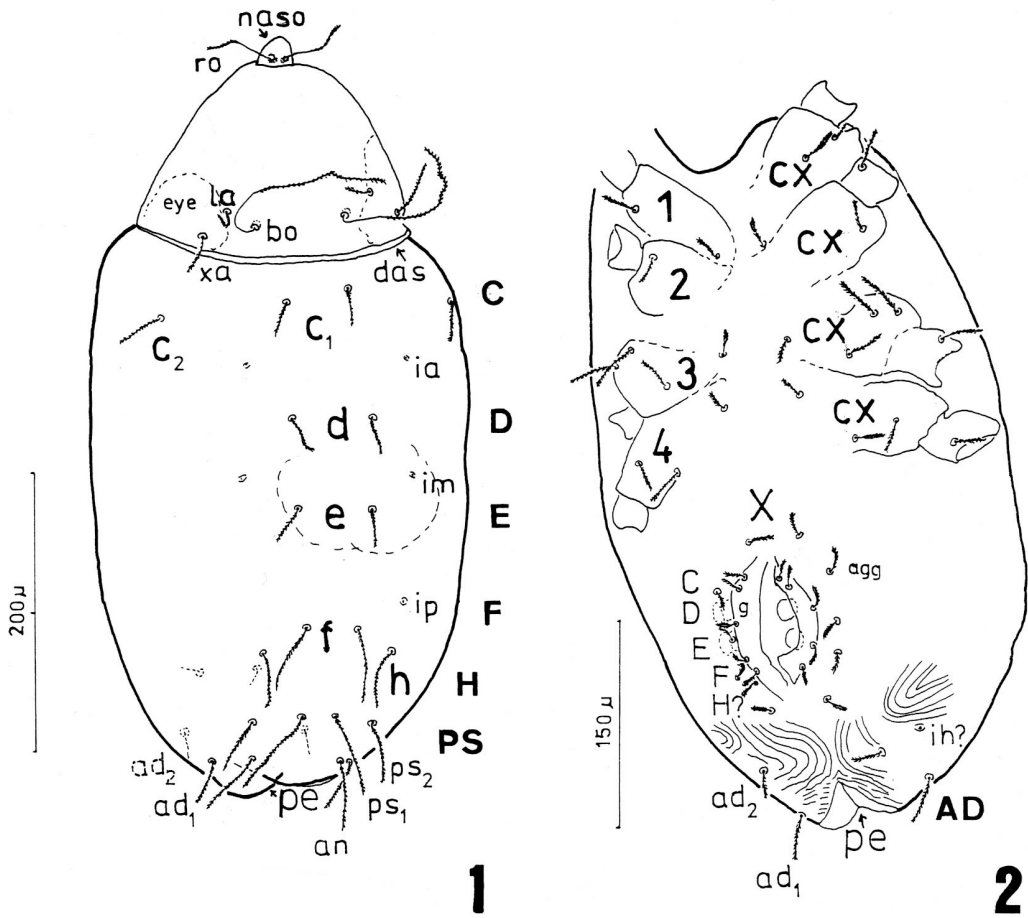
Janes rafalskii n. sp.

(Figs 1-11)

Type material and locality. Holotype: 1 female, Poland, „Puszcza Bukowa” – beech forest between Szczecin-Klęskowo and Szczecin-Kijewko, in detritus and wood dust under rotten trunk; 13 June 1984; leg. K. JESIONOWSKA. In the same place 4 specimens of nymphs 2 and 3 were found. Type material is deposited in author's collection.

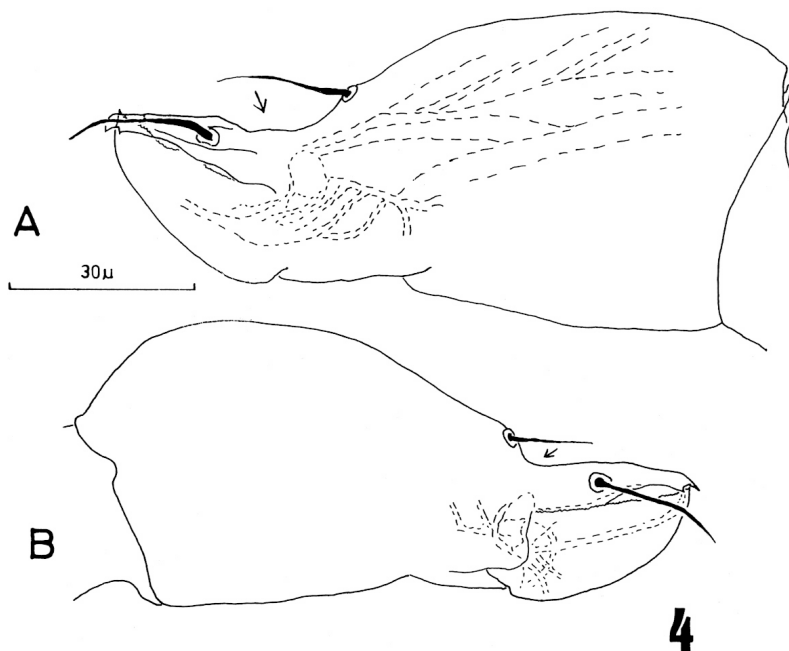
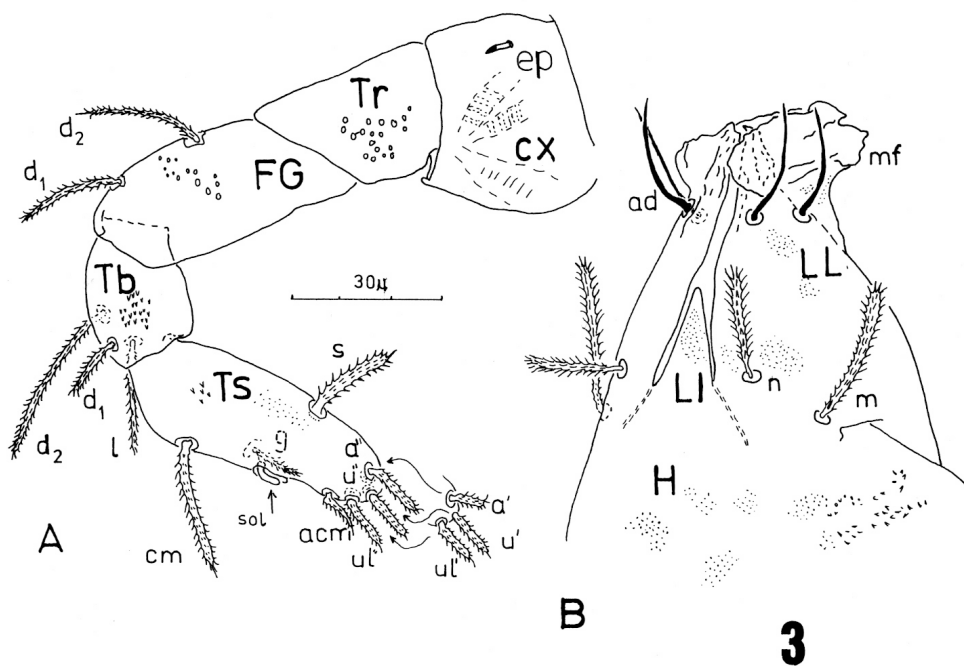
Description. One adult female examined. Body longitudinally oval, whitish, weakly sclerotized. Length of idiosoma 550 µm. Ratio of leg I length to idiosomal length 0,79.

Gnathosoma (Figs 3, 4). Subcapitulum (Fig. 3B) broadly oval (length about 93 µm); distal free parts of lateral lips (LL) with internal and external malar processes forming a membraneous funnel



Figs 1 & 2. Fig. 1. *Janes rafalskii* gen. n., sp. n., female, idiosoma dorsum. Fig. 2. *Janes rafalskii* gen. n., sp. n., female, idiosoma venter.

(mf); two pairs of nude adoral setae (*ad*), approximately of the same length (about 22 µm); proximal subcapitular setae (*m*, *n*) pilose, thick, external pair (*m*, 32 µm) slightly longer than internal pair (*n*, 21 µm). Hypostome (H) short, separated by internal sclerotized lines from lateral lips and continuing anteriorly into labium. Labium (LI) triangular, small (about 20 µm), its length almost one third of free ventral part of lateral lip length. Chelicerae (Fig. 4) strong, dorsal surfaces with long and deep saddle-shaped depression above articulation of the movable digit; ventral part of chelicera between the base of movable digit and cheliceral shaft, just under articulation of the movable digit, distinctly elongated. Cheliceral digits well developed, strong; movable digit strongly sclerotized, flattened laterally, broad, axe-shaped in lateral aspect and dentate along masticatory surface. Movable digit characteristically oriented upwards. Chelicera with 2 setae, proximal cheliceral seta dorsally, proximad of articulation of the movable digit, distal cheliceral seta laterally; apex of proximal seta reaching an insertion pit of distal seta; apex of distal seta overlaps the tip of the fixed digit. Fixed digit 2-cusped distally, elongated, weakly sclerotized, gradually narrowed in lateral aspect. Length of chelicera 110 µm, dorsoventral width 50 µm, length of movable digit 35 µm; length of fixed digit free part 31 µm; lengths of proximal and distal cheliceral setae 22 and 25 µm, respectively; distance between insertion pits of cheliceral setae 21 µm. Ratio of cheliceral length to



Figs 3 & 4. Fig. 3. *Janes rafalskii* gen. n., sp. n., female, A – pedipalp, lateral view; B – subcapitulum, ventrolateral view.
 Fig. 4. *Janes rafalskii* gen. n., sp. n., A – chelicera of female, lateral view; B – chelicera of tritonymph, lateral view; saddle-shaped depression arrowed.

dorsoventral width 2,2; ratio of the length of movable digit to the length of chelicera 0,3; ratio of the length of movable digit to dorsoventral width of chelicera 0,7. Pedipalps (143 μm), slightly longer than chelicerae, with elipsoidal, somewhat conical tarsus and short, quadrangular in profile tibia (Fig. 3A). Ratio of the length of terminal palpal segment (50 μm) to the width (20 μm) 2,5. Lengths of pedipalpal trochanter, femorogenu, tibia and tarsus, 28-40-25-50 μm , respectively. Number of setae and solenidia (indicated parenthetically) on pedipalpal trochanter, femorogenu, tibia and tarsus: 0-2-3-10(1); banana-shaped tarsal solenidion recumbent in depression. 1 supracoxal seta (*ep*, 5 μm) on the dorsal part of pedipalpal coxal region. Lengths of two femorogenu setae: proximal 26 μm , distal 20 μm . Lengths of three tibial setae: proximal 33 μm , distal 13 and lateral 21 μm . Setae of pedipalpal tarsus thick, delicately pilose, eupathidial, short, with the exception of the longest *cm* seta (24 μm) and setiform, plumose seta *g* (12 μm). Seta *s* (20 μm) in deep pore; setae: *acm*, *ul'*, *ul''*, *u'*, *u''*, *a'*, *a''* about similar length (12 μm).

Aspidosoma. Aspidosoma distinctly separated from opisthosoma by „*das*” furrow dorsally. Two pigmental eyes laterad of *xa* setae (= *sc*₂).

Prodorsum (dorsal part of aspidosoma; Fig. 5). Naso triangular, well developed, with a pair of strikingly long, rostral setae, *ro* (56 μm), in bothridia, one third of its distal length finely filiform.

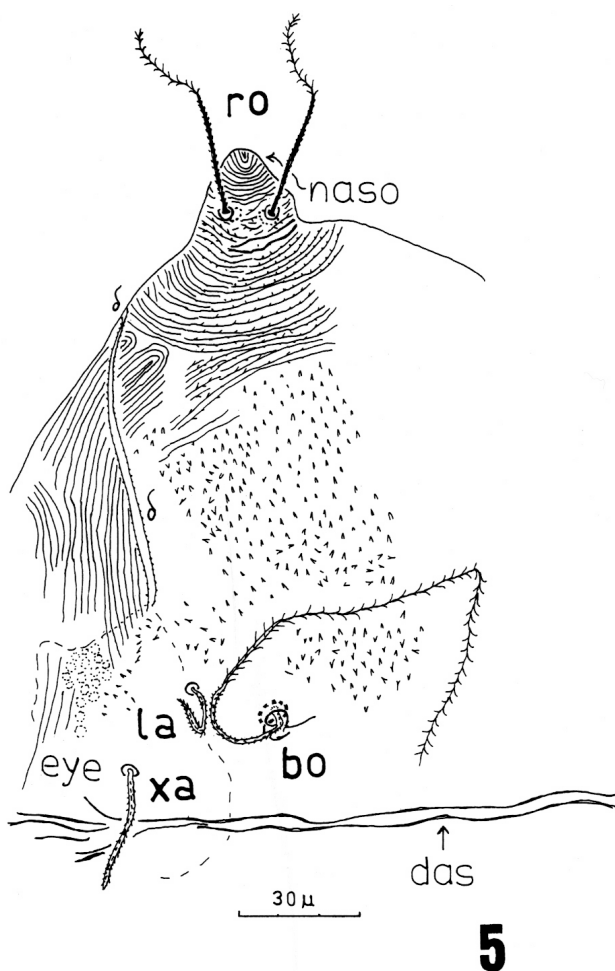


Fig. 5. *Janes rafalskii* gen. n., sp. n., female, prodorsum.

Naso with transverse linear ornamentation. Part of prodorsum behind the base of naso created by the patch of transverse ornamentation lines with tiny, spiniform costulae. Similar ornamentation on lateral parts of aspidosoma, while central part of prodorsum with strongly sclerotized prodorsal plate covered by small, spiniform costulae. On prodorsal plate three pairs of setae: *bo*, *la* and *xa*. Bothridial setae, *bo* (164 μ m), very long, tapered gradually to a very thin and finely filiform distal part. Setae *la* and *xa* elongated (22 μ m, 45 μ m, respectively) and shortly pilose. Two dehiscence lines (δ) extended laterally from the base of naso to posterior limit of prodorsum.

Opisthosoma (Figs 1, 2, 6, 7). Arrangement of dorsal setae typical for the Rhagidiidae. Opisthosoma consisted of the following segments: C, D, E, F, H, PS, AD, AN, PE. Ornamentation lines composed in such a way that the differentiating of the segments is possible. Segmentation indicated also by pairs of setae and pairs of lyrifissures. Transverse ornamentation lines created strips with setae indicating the segments arrangement. Segments C, D, E, well developed with axial (transverse lines of ornamentation), lateral (longitudinal lines of ornamentation) and ventral parts. Segment F, H, PS, AD, AN and PE very reduced (transverse ornamentation lines) so that the setae rows inserted closer to one another on the opisthosoma end. At the level of segment F opisthosoma narrowed gradually towards the end. Segments D, E, F, H, AN with only one pair of setae, while segments C, PS and AD with two pairs of setae. Segment PE without setae creates paraproctal lips. Number of opisthosomal setae (excluding genital region) 11 pairs. Number of lyrifissures 4 pairs, dorsal: *ia*, *im*, *ip* and ventral *ih?* (probably *ips* due to reduced segment H; Fig. 6). All opisthosomal setae (excluding genital region) elongated and shortly pilose (Fig. 6). Setae *c*₁ (29 μ m) shorter than *c*₂ (36 μ m), setae *f* (56 μ m) and *ps*₁ (62 μ m) distinctly longer than others. Setae *h* (43 μ m) positioned lateropos-

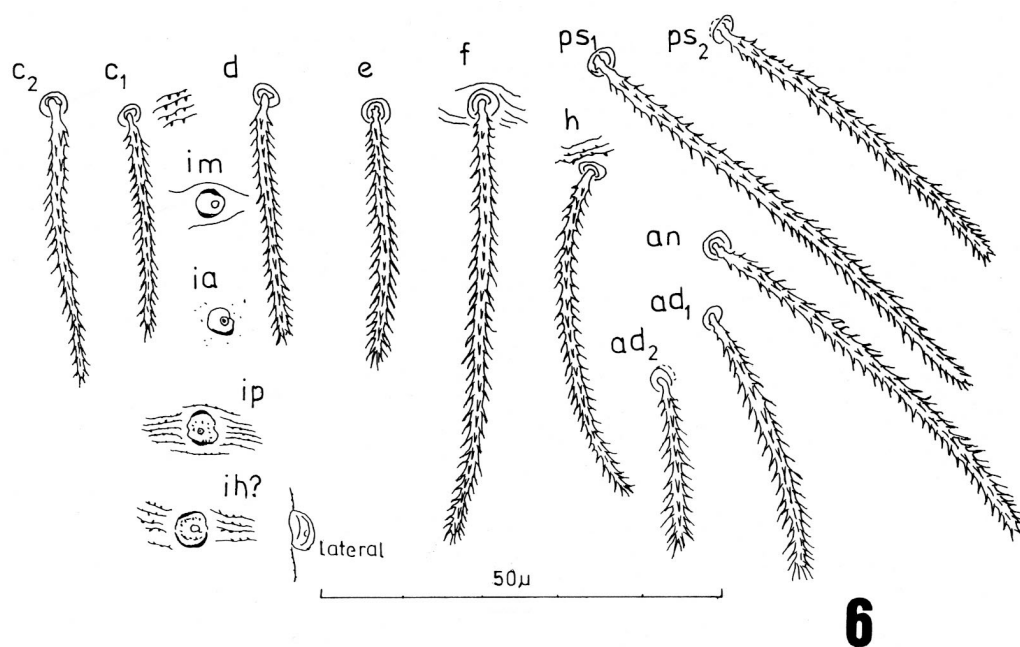


Fig. 6. *Janes rafalskii* gen. n., sp. n., female, opisthosomal setae (excluding genital region) and lyrifissures.

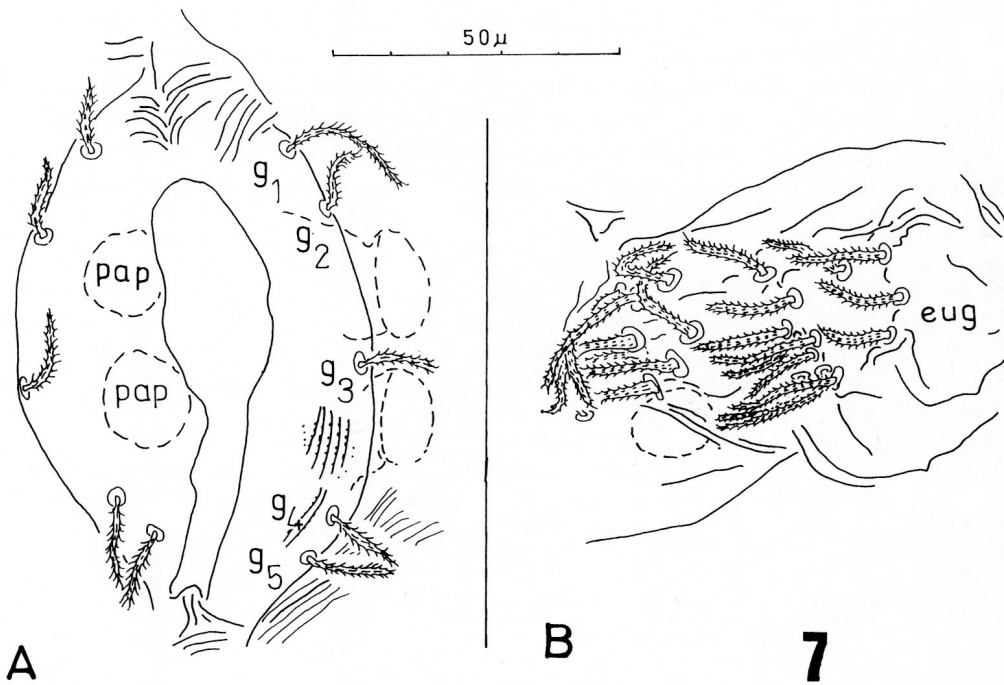


Fig. 7. *Janes rafalskii* gen. n., sp. n., female, A – genital lips with genital setae (g) and genital papillae (pap); B – eugenital setae on short ovipositor.

teriorly to transverse row of *f* setae. Setae *h*, *ps*₂ (46 μm), *an* (53 μm) distinctly longer than setae *c*₁, *d* (32 μm), *e* (33 μm), *ad*₁ (36 μm), *ad*₂ (23 μm). Distances between setae *c*₁ (45 μm), *d* (55 μm) and *e* (51 μm) similar, and exceeded the length of particular setae. Distances between rows of setae *c*₁ and *d* (82 μm), *d* and *e* (50 μm), *e* and *f* (85 μm) similar and exceeded distinctly the length of these setae. Distance between setae *h* (90 μm) similar to that of setae *ps*₂ (85 μm). Distance between setae *ps*₁ (23 μm) about twice as short as that between setae *f* (40 μm). Pair of setae *ps*₂ located slightly lateroposteriad of setae *ps*₁; similarly, setae *h* positioned well posterolaterad of setae *f*, and the distance between row of setae *f* and row of setae *h* larger (20 μm). Distance between row of setae *f* and row of setae *ps*₁ (64 μm) almost the same as the length of seta *ps*₁ (62 μm). Distance between rows of *h* and *ps*₁ setae (45 μm) nearly equal to the length of seta *h* (43 μm). The shortest setae *ad*₂ (23 μm) morphologically similar to ventral body setae, i.e. short, distal part slightly thicker than proximal, shortly pilose. Anal cleft located subterminally. Pair of *ia* lyrifissures located laterally and between the alignments of *c*₁ and *d* setae. Pair of *im* lyrifissures inserted laterally between rows of *d* and *e* setae. Pair of *ip* lyrifissures positioned laterally, slightly before the row of setae *f*. Genital region (Figs 2, 7). Genital region composed by small ventral parts of segments C, D, E, F, H (Fig. 2). Five pairs of aggenital setae (*agg*) of similar length (*agg*₁₋₂ 20, *agg*₃₋₅ 15 μm), shortly pilose and slightly thicker in distal part. First pair of aggenital setae situated on the reduced Xth (=VII) segment (Fig. 2). Fifth pair of aggenital setae well removed posterioirely from progenital lips. Progenital lips slightly more sclerotized with 5 pairs of pilose genital setae (*g*) of similar length (about 15 μm), separated serially by similar longitudinal intervals. 25 shortly pilose eugenital setae (*eug*, about

10-25 μm) with broad bases arranged in 3 whorls on ovipositor. Two pairs of genital papillae (*pap*) in progenital chamber.

Podosoma (Figs 2, 8-11). Two contiguous coxal regions I and II slightly separated from contiguous coxal regions III and IV by sejugal furrow. Setae of coxal regions elongate, shortly pilose, with slightly thicker distal part (coxal region I: 15 μm and 32 μm ; cx. reg. II: 25 μm ; cx. reg. III: 28 μm , 38 μm , 40 μm ; cx. reg. IV: 25 μm , 35 μm). Coxal regions IV well removed from each other. „Coxal” formula: 2-1-3-2. Pairs of sternal setae (about 21 μm) pilose, shorter and thicker than „coxal” ones. Sternal formula: 1-0-2-2. Legs (Figs 8-11). Legs I (about 435 μm) distinctly longer

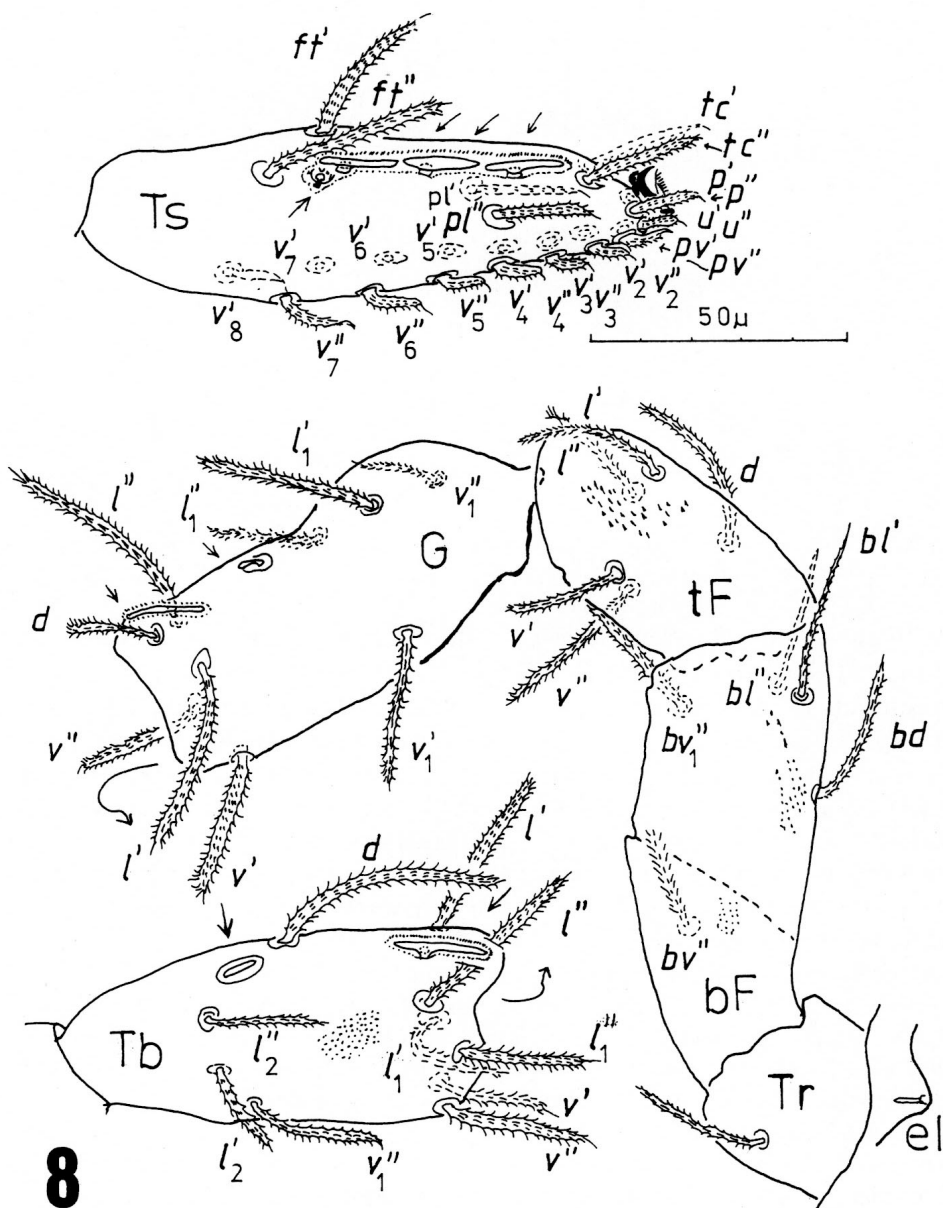


Fig. 8. *Janes rafalskii* gen. n., sp. n., female, leg I – laterodorsal view; solenidia arrowed.

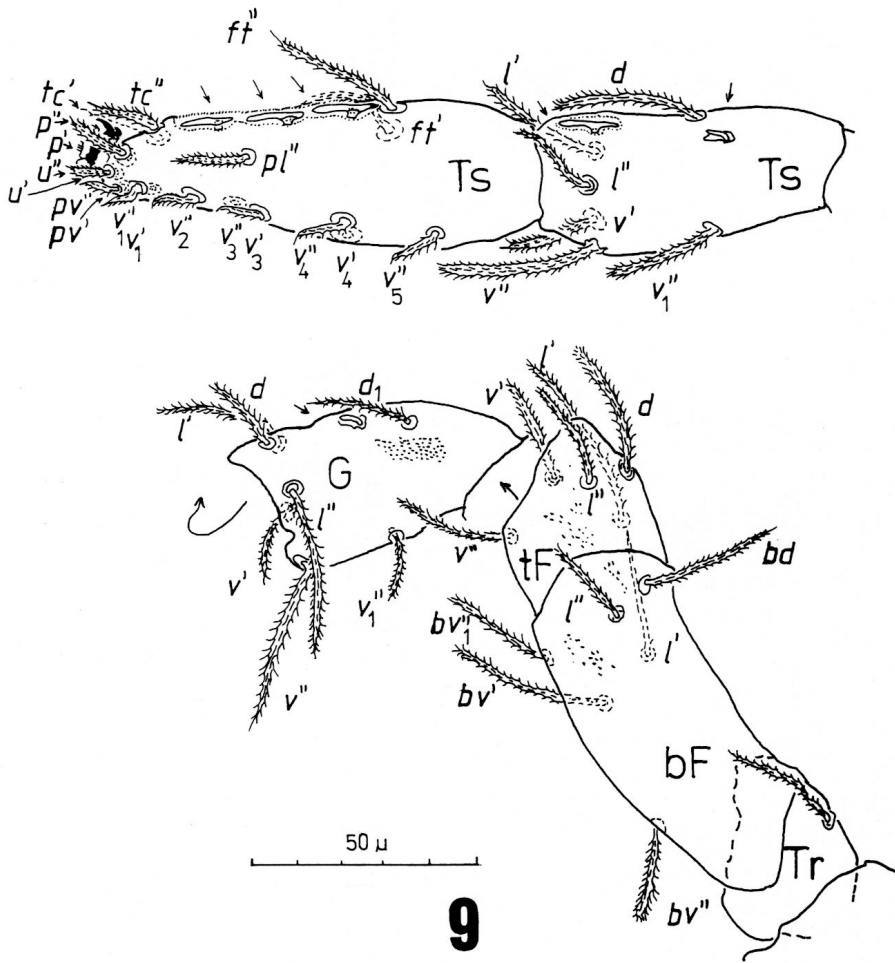


Fig. 9. *Janes rafalskii* gen. n., sp. n., female, leg II – lateral view; solenidia arrowed.

than legs II (about 353 μm), slightly longer than legs III (413 μm) and distinctly shorter than legs IV (about 523 μm). Legs IV almost the same length of idiosoma (about 550 μm). The supracoxal seta (*e* I) on dorsal side of coxal region I, short (8 μm), thorn-shaped with thicker, collar-shaped base. Ambulacra almost the same on legs I, II, III (16, 15, 17 μm , respectively) and slightly longer on legs IV (20 μm) consisted of two claws (claws IV with setulae) and setulose, ligulate empodium. On all legs empodium shorter than claws. All femora subdivided. Number of setae and solenidia (indicated parenthetically), respectively, on legs I-II-III-IV: trochanters 1-1-2-2; basifemora+telfemora 5+5-6+5-4+4-3+3; genua 9(2)-7(1)-5(1)-5; tibiae 10(2)-6(2)-6(2)-5; tarsi 27(3)-20(3)-15-15. Lengths of leg segments (I-IV) as follows: Tr 20-20-40-48; F 70+55-80+30-75+43-97+50; G 90-58-60-85; Tb 88-65-80-100; Ts 112-100-115-143. Rhagidial organ on tarsi I and II each consisted of 3 T-shaped solenidia of similar length (I: proximal 17, medial 15, distal 16 μm ; II: proximal 14, medial 12, distal 12 μm) forming tandem in common shallow depression (Figs 8, 9). Proximal solenidium of rhagidial organ I accompanied laterally and antiaxially by stellate famulus. Two solenidia on tibia I: 1 proximal, dorsomedial, small, recumbent, banana-shaped (6 μm), and 1 dorsodistal, large, T-shaped in rhagidial depression (18 μm). On tibia II two solenidia: 1 small, re-

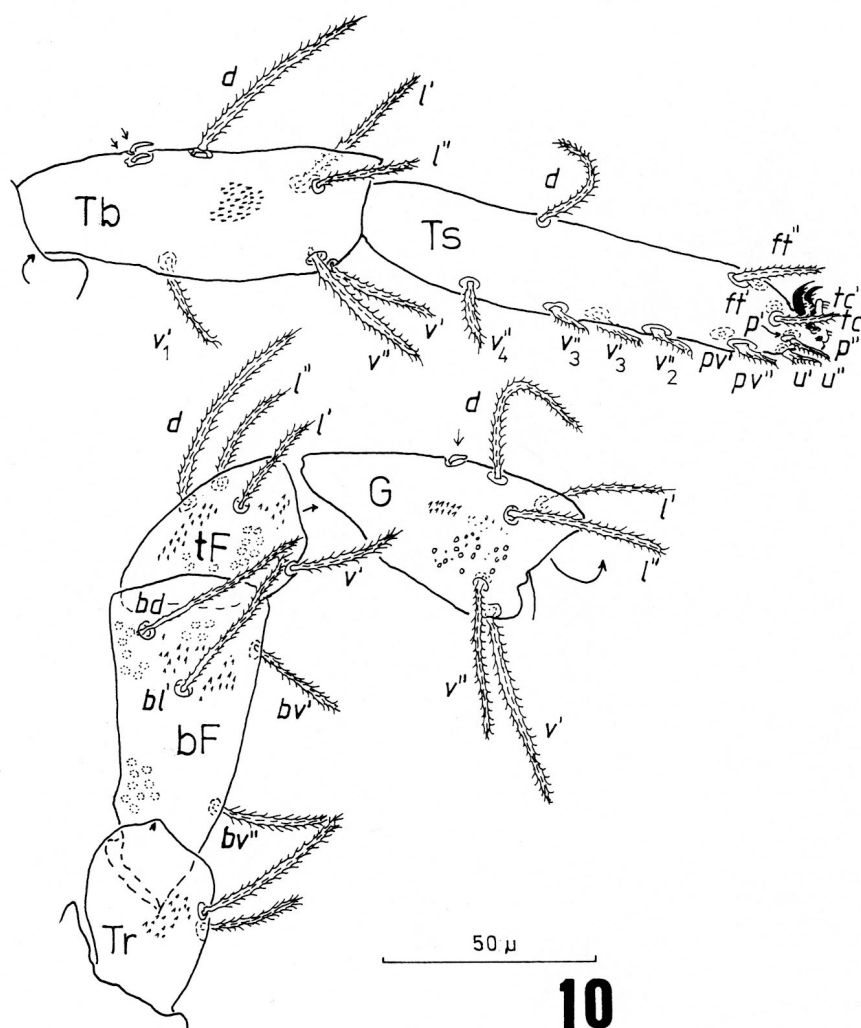


Fig. 10. *Janes rafalskii* gen. n., sp. n., female, leg III – lateral view; solenidia arrowed.

cumbent, banana-shaped, laterodorsal, medioproximal (6 μ m) and one dorsodistal, large (13 μ m), T-shaped in rhagidial depression (no lanceolate solenidion, typical for the Rhagidiidae). Tibia III with 2 small, recumbent, banana-shaped, dorsoproximal, closely parallel solenidia (about 7 μ m). Tibia IV lacking solenidia. Genu I with 2 solenidia: 1 small, banana-shaped, recumbent, dorsomedial (6 μ m), and 1 large, dorsodistal, T-shaped in rhagidial depression (15 μ m). Genu II with small recumbent, banana-shaped, dorsomedial solenidion (6 μ m). Genu III with 1 small, recumbent, banana-shaped dorsomedial solenidion (5 μ m). Genu IV lacking solenidia. Almost all setae on legs are cylindrical, shortly pilose and some of them (e.g. tarsi and tibiae I, II) with short terminal needle. All ventral pairs of setae on all tarsi foot-shaped. Some setae on telofemora, genua, tibiae and tarsi modified as eupathidia (e.g. on Ts I). Length of setae on trochanters: 16–39 μ m, on basifemora: 19–61 μ m, on telofemora: 20–60 μ m, on genua: 16–55 μ m, on tibiae: 19–72 μ m, on tarsi: 7–52 μ m (Table I).

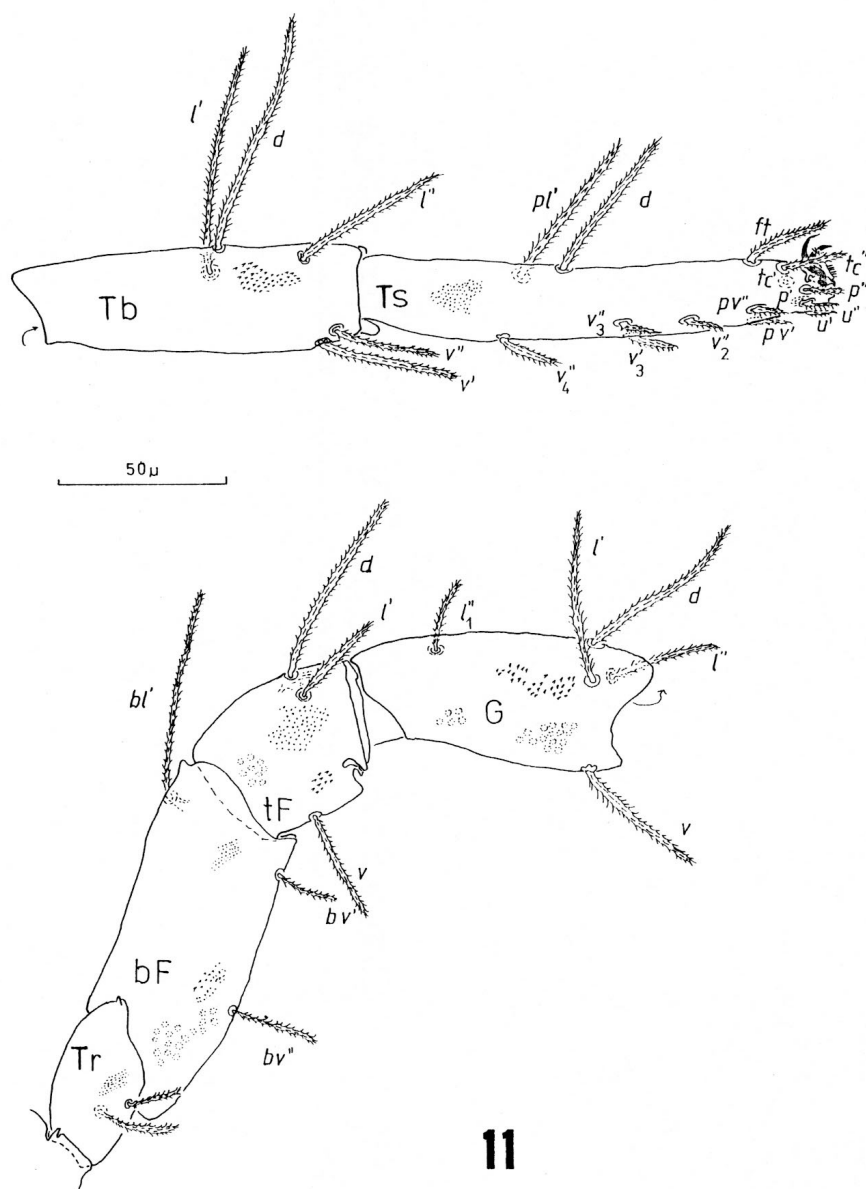


Fig. 11. *Janes rafalskii* gen. n., sp. n., female, leg IV – lateral view.

R e m a r k s. Adults of this species are readily recognised by the characters diagnostic for the monotypic genus (see above). In adult specimen described above the dehiscence line (δ) is distinctly retained. This suggests that adults, not only nymphs, most probably grow and undergo ecdysis.

E t y m o l o g y. The new taxa are named in the memory of Prof. dr Jan RAFALSKI, a great Polish zoologist, teacher and friend, and the long standing head of the Department of Animal Morphology, Adam Mickiewicz University, Poznań.

Male unknown

Table I

Lengths of setae (in μm) on leg segments in *Janes rafalskii* sp. n., holotype, female

	trochanter	basifemur	telfemur	genu	tibia	tarsus
Leg I	25	Bd-25, bl'-36, bl''-22, bv''-20, bv ₁ '-27	d-33, l'-32, l''-20, v'- 23, v''-33	d-16, l'-40, l''-41, l ₁ '- 35, l ₁ ''-20, v'-37, v''- 32, v ₁ '-32, v ₁ ''-17	d-47, l'-38, l''-38, l ₁ '- 32, l ₁ ''-23, l ₂ '-19, l ₂ ''- 25, v'-23, v''-29, v ₁ ''- 27	ft'-33, ft''-40, tc-25, pl''-22, pl'-23, p-15, u-10, pv'-7, v ₂ -9, v ₃ -9, v ₄ -10, v ₅ -12, v ₆ -13, v ₇ - 14, v ₈ -14
Leg II	27	Bd-32, l'-30, l''-21, bv'-36, bv''-21, bv ₁ '-25	d-31, l'-41, l''-23, v'- 24, v''-27	d-18, d ₁ -22, l'-30, l''-41, v'-19, v''-45, v ₁ '-16	d-34, l'-30, l''-19, v'-23, v''-36, v ₁ ''-27	ft'-24, ft''-32, pl''-17, tc''-16 tc'-17, p-14, u-10, pv-8, v ₁ -10, v ₂ -12, v ₃ -12, v ₄ -14, v ₅ -14
Leg III	26, 28	bd-45, bl'-42, bv'-25, bv''-26	d-50, l'-26, l''-30, v'-27	d-46, l'-32, l''-37, v'-48, v''-38	d-58, l'-38, l''-25, v'-29, v''-38, v ₁ '-23	d-30, ft-21, tc-15, p-11, u-10, pv-13, v ₂ -12, v ₃ '-15, v ₃ ''-12, v ₄ -16
Leg IV	16, 24	bl'-61, bv'-19 bv''-27	d-60, l'-30, v-35	d-55, l'-55, l''-33, l ₁ ''-23, v-44	d-72, l'-69, l''-46, v'-45, v''-28	d-49, ft-28, tc-20, p-13, u-11, pl'-52, pv'-12, v ₂ -12, v ₃ '-16, v ₃ ''-12 v ₄ -21

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