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Subscriptions: Year 2021 (Volume 61): 450 €

<http://www1.montpellier.inra.fr/CBGP/acarologia/subscribe.php>

Previous volumes (2010-2020): 250 € / year (4 issues)

Acarologia, CBGP, CS 30016, 34988 MONTFERRIER-sur-LEZ Cedex, France

ISSN 0044-586X (print), ISSN 2107-7207 (electronic)

The digitalization of Acarologia papers prior to 2000 was supported by Agropolis Fondation under the reference ID 1500-024 through the « Investissements d'avenir » programme (Labex Agro: ANR-10-LABX-0001-01)



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Two new species of Eremellidae and Scheloribatidae (Acari, Oribatida) from the Kuma district of southern Japan

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(Received 17 November 2014; accepted 03 March 2015; published online 30 June 2015)

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ABSTRACT — A new oribatid species of Eremellidae was described from litter at the bottom of a hollow *Ilex oldhami* Miq. tree in Kumamoto Prefecture, in southern Japan in a subtropical area. The new species has long lamellar ridges subpararely connected by two translamellar ridges, rostral setae longer than lamellar setae, two pairs of adanal setae, and long solenidion $\varphi 1$ about four times as long as the length of the tibia. A key to all species of the genus *Eremella* is provided. Another new species, *Scheloribates yamaeensis* n. sp. was described from a chestnut plantation in Kumamoto Prefecture. The new species has a plicate integument, diverged sacculi, immovable pteromorphae with inward curve, a dorsosejugal suture, four pairs of genital setae, minute notogastral setae, adanal setae *ad3* inserted in a preanal position, Trägårdh's organ, three claws of legs, and smooth fastigial setae of tarsus I.

KEYWORDS — Chestnut plantation; *Eremella*; New species; Oribatida; Scheloribates; Southern Japan

INTRODUCTION

Two new oribatid species were collected from the towns of Asagiri-cho and Yamae-mura in Kuma District, Kumamoto prefecture, which is located in a subtropical zone. Some additional specimens belonging to the genus *Eremella* Berlese, 1913 were collected in Asagiri-cho from litter at the bottom of a hollow in a withered *Ilex oldhami* Miq. tree. In addition, Scheloribatid mites belonging to *Scheloribates* were collected from soil materials of a chestnut plantation in Yamae-mura.

Berlese (1913) described the genus *Eremella*, des-

ignating *E. vestita* Berlese, 1913 as the type species. Simultaneously, he described another new species, *E. induta* Berlese, 1913 as a member of the new genus. Balogh (1961) established the family Eremellidae of a new superfamily Oppioidea for *Eremella*, and added a known genus *Proteremella* Balogh, 1959, which Balogh and Balogh (1992) treated as a synonym of *Eremella* Berlese, 1913. Subías (2004) referred Eremellidae to the superfamily Eremelloidea. Balogh, 1961 recognized four genera as representatives of the family Eremellidae: *Archeremella* Balogh and Mahunka, 1974, *Eremella* Berlese, 1913, *Licno-*

cepheus Woolly, 1969 and *Triteremella* Kunst, 1971. Woas (2002) and Norton and Behan-Pelletier (2009) pointed out the possibility that the genus *Eremella* belongs to the superfamily Licneremaeoidea. According to Subías (2004), the genus *Eremella* is a small genus consisting of six species, namely: *E. vestita* Berlese, 1913, *E. induta* Berlese, 1913, *E. pulchella* (Balogh, 1959), *E. africana* (Balogh, 1966), *E. ensifera* Balogh and Mahunka, 1968 and *E. matildebellae* Mahunka and Palacios-Vargas, 1995, with these species being known from Africa, Argentina, Hungary, Java and Mexico.

The Eremellid group has several diagnostic characters such as having two linear, H-shaped costulae, lamellar setae originating near to rostral setae, large, plumose sensillus, rough reticulate notogaster, seven pairs of submarginal and three pairs of postero-marginal notogastral setae, genital and anal apertures separated by a great distance, genito-anal setal formula of 6-1-2-3, palpal eupathidium *acm* free from the solenidion, legs tri-heterodactyl or monodactyl, without a rostral incision, having a humeral enantiophysis, large dorsodistal tubercle of tibia I, neotrichy of ventral setae, taenidium and minitectorium of border of epimere IV (Balogh 1972; Balogh and Balogh 1990; 1992; Norton and Behan-Pelletier 2009). The present specimens of *Eremella* have some unique features and therefore, described as a new species in the present work.

According to Balogh (1962), Enami *et al.* (1996), Fujikawa (2003[2004]; 2011), Nakamura *et al.*, 2013 and Subías (2004), 329 species and 18 subspecies belonging to 20 genera and 4 subgenera have been identified as members of the family Scheloribatidae Grandjean (1933). This family is characterized as having, four pairs of sacculi, immovable pteromorphae, ten pairs of notogastral setae, clavate or fusiform sensilli, arched dorsosejugal suture, four pairs of genital setae, one pair of aggenital setae and three claws (Balogh & Balogh, 1992). The present specimens that were collected from a chestnut plantation in southern Japan have plicate integument near the posterior margin of the notogaster and diverged sacculi, but have numerous character states which are characteristic for Scheloribatidae.

MATERIALS AND METHODS

Study site — Yamae Mura and Asagiri-cho are located in Kuma District, Kumamoto Prefecture, south Japan, in the subtropical zone. Some additional specimens of Scheloribatid species were collected from a chestnut, *Castanea crenata* Sieb. and Zucc. plantation (area of about 10a) belonging to S. Hashimoto (one of the authors) of Yamae Mura (32°14'57" N; 130 °45'30" E; about 252 m a.s.l.) in 2007. In 2009, some specimens of Eremellid group were obtained from a big tree, *Ilex oldhami* Miq. being forty years old, withered in 2003 belonging to Y. Nishi (one of the authors) at Ueminami 1299-2 (32°12'5 N.; 130°54'5 E.; about 195 m a.s.l.) of Asagiri-cho.

Sampling — Sample of about 4,000 cm³ was collected by hand-picking from litter, humus and soil materials at the chestnut, *Castanea crenata* Sieb. And Zucc. plantation on 25th Oct. 2007 by S. Hashimoto. Sample of about 1,000 cm³ was collected by hand-picking from deposit at the bottom of a hollow of an *Ilex oldhami* Miq. tree on 19th Dec. 2009 by T. Fujikawa. After extraction with a modified Tullgren apparatus during seven days using 40 W electric bulbs, mites were kept in lactic acid for clearing during about 100 days, and then mounted on glass slides.

Terminology and classification — The notations and morphological terminology are mainly based on Balogh and Mahunka (1983), Grandjean (1952), van der Hammen (1989), Mahunka and Zombori (1985) and Norton and Behan-Pelletier (2009). Genito-anal setal formula refers to genital, aggenital, anal and adanal setae. The given number of tarsal claws is common to all legs of a species. Setal formula of legs is including famulus but excluding solenidia. [Right-left] means right and left sides of body from dorsal view. Measurements (µm) in the description are, for the most part, according to holotype.

RESULTS

More than 200 specimens of 34 oribatid species were collected from soil materials of a chestnut plantation of Yamae-mura, and about 50 specimens of

eight species were collected from litter at the bottom of a hollow withered *Ilex oldhami* Miq. tree. Of them, Scheloribatid and Eremellid specimens are described in detail in the present study.

Description of new species

Cohort Brachypylini Hull, 1918 Eremellidae Balogh, 1961

Eremella funnagasatoensis n. sp.

[Japanese name: Funnagasato-fuchikazaridani]
(Figs. 1 - 5)

Diagnosis — 236 (253) 264 μm ; width: 121 (139) 150. The whole integument except for anal plates, hypostoma and legs, reticulate. Relative lengths: $in > ro > le$. Sensilli consisting of conspicuously verrucose, club-shaped head and smooth, thin, long stem. All ten pairs of notogastral setae phylliform. Genito-anal setal formula: 6-1-2-2. Epimeral setal formula: 3-1-3-3; setae thin, smooth setiform. All tarsi monodactyl; claws without dilated portion.

Material examined — Holotype (Female) (NSMT-Ac 13579) from deposit at the bottom of a hollow of an *Ilex oldhami* Miq. tree, on 19th Dec. 2009, by T. Fujikawa; 11 paratypes (Female) (NSMT-Ac 13580 and 13581): the same data as holotype. The type series (NSMT-Ac 13579-13581) are deposited in the National Museum of Nature and Science, Tokyo. The remainder of paratypes is in the National Agricultural Research Center for Kyushu Okinawa Region, Kumamoto Prefecture.

Etymology — After the classic local name of sampling area.

Measurements and body appearance — Body length 236 (253) 264 μm ; width 121 (139) 150 μm . Body color light brown. The whole integument except for anal plates, hypostoma and legs, reticulate: reticulation variable in form and size (Fig. 4A). Anal plates costate; hypostoma and legs laterally-costate (Fig. 4B).

Prodorsum — Rostral tip round. Rostral ro (ca. 17 μm) and lamellar le (ca. 14 μm) setae spiniform, roughened throughout length; setae ro longer than setae le (Figs. 2B and 5A). Lamellar costulae (ca. 62 μm : insertion of le to bothridia) extending forwards

from bothridia to rostrum (Fig. 1). Translamellar costulae present in front of lamellar setae (ca. 16 μm), near middle portion (ca. 18 μm) and in front of interlamellar setae in (ca. 26 μm). Setae in (ca. 19 μm) and exobothridial setae ex (ca. 11 μm) ensiform roughened throughout length. Bothridia opened dorsally. Sensilli ss (ca. 57 μm) consisting of conspicuously verrucose, club-shaped head and smooth, thin, long stem (Fig. 4A). Relative lengths of prodorsal setae: $ss > in > ro > le > ex$.

Notogaster — Ten pairs of notogastral setae narrow phylliform, spinose throughout length, inserted submarginally. Setae p -series (13–16 μm) smaller than the others (16–27 μm); h_3 the longest, p_3 the shortest (Fig. 5B). Lyrifissures ia (ca. 6 μm) aligned obliquely in front of setae c ; im (ca. 8 μm) obliquely between setae lm and lp ; ih (ca. 6 μm) perpendicular to, ips (ca. 6 μm) and ip (ca. 9 μm) along notogastral outline (Fig. 2A).

Ventral region — Genital aperture (ca. 42 μm in length) almost square in form; anal aperture (ca. 38 μm in length) rectangular; distance (ca. 34 μm) between them slightly shorter than length of anal aperture (Fig. 2A). Genito-anal setal formula: 6-1-2-2; all setae thin, smooth setiform. Genital setae (ca. 13 μm) g_3 inserted nearer lateral margin of plates than the remainder; setae g_3 to g_6 inserted at the mid-ventral line. Setae ag (ca. 16 μm) inserted lateroposteriorly to genital aperture. Anal setae (ca. 13 μm) an_1 and an_2 inserted near anterior and posterior margins of plate, respectively. Adanal setae (ca. 13 μm) ad_1 aligned in postanal position, ad_2 in adanal, and ad_3 lost (Fig. 5C). Lyrifissures iad located postero-laterally to anterior margin of anal aperture. Sternal ridge indistinct. Epimeral borders II and sejugal distinct. Pedotecta I well developed. Epimeral setal formula: 3-1-3-3; setae (14–16 μm) thin, smooth setiform. Pedipalpal setal formula: 0-2-1-3-9[1]; palpal eupathidium acm (ca. 7 μm) free from solenidion ω (ca. 7 μm); ω bacilliform (Fig. 3F). Diarthric subcapitulum bearing 3 pairs of setae, a (ca. 9 μm), m (ca. 17 μm), and h (ca. 13 μm); setae thin, smooth setiform. Cheliceral setae cha (ca. 16 μm) and chb (ca. 7 μm) barbed throughout length; cha longer than chb (Fig. 3E).

Legs — All tarsi monodactyl; claws without

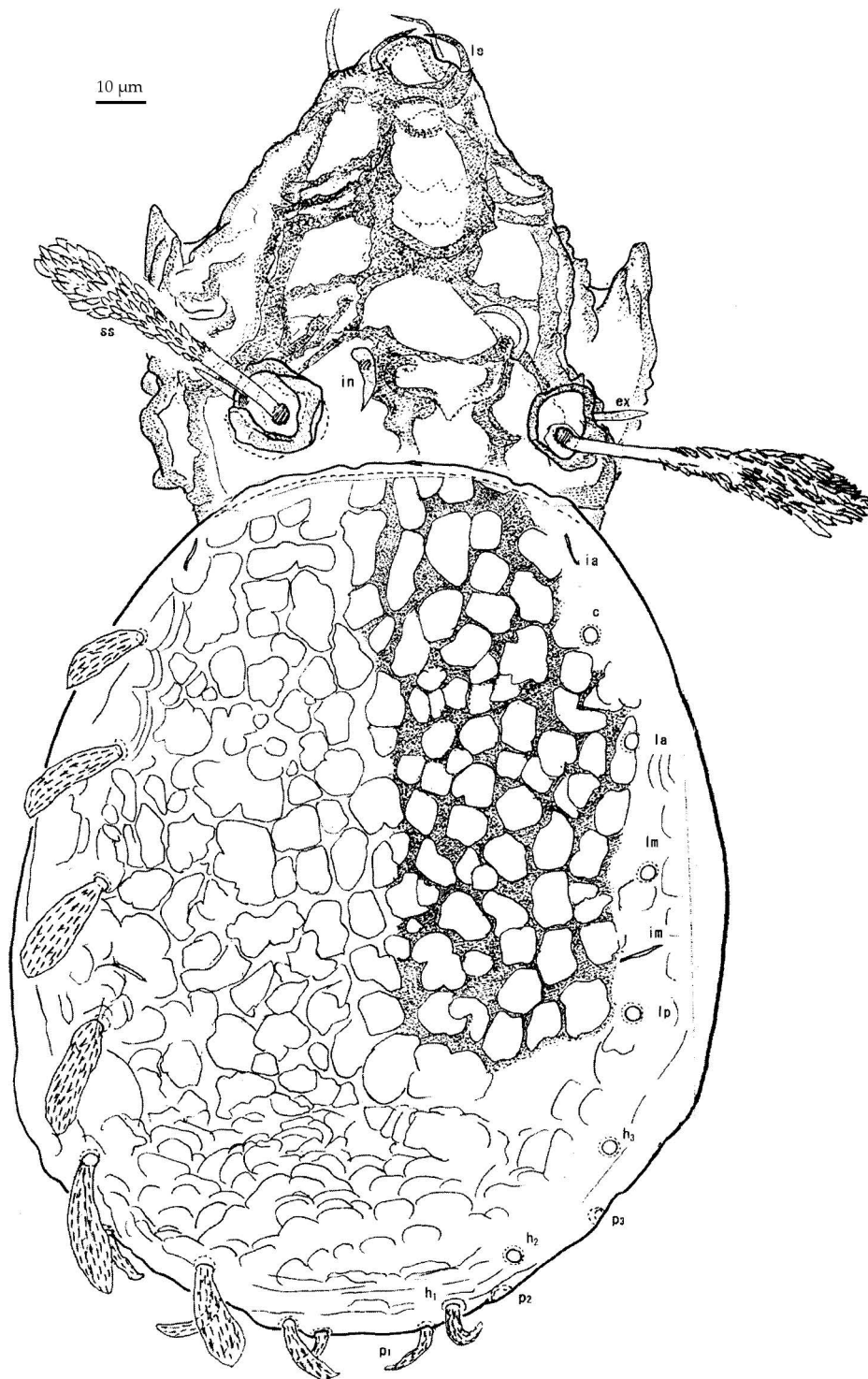


FIGURE 1: *Eremella funnagatoensis* n. sp. (NSMT-Ac 13580): Dorsal view.

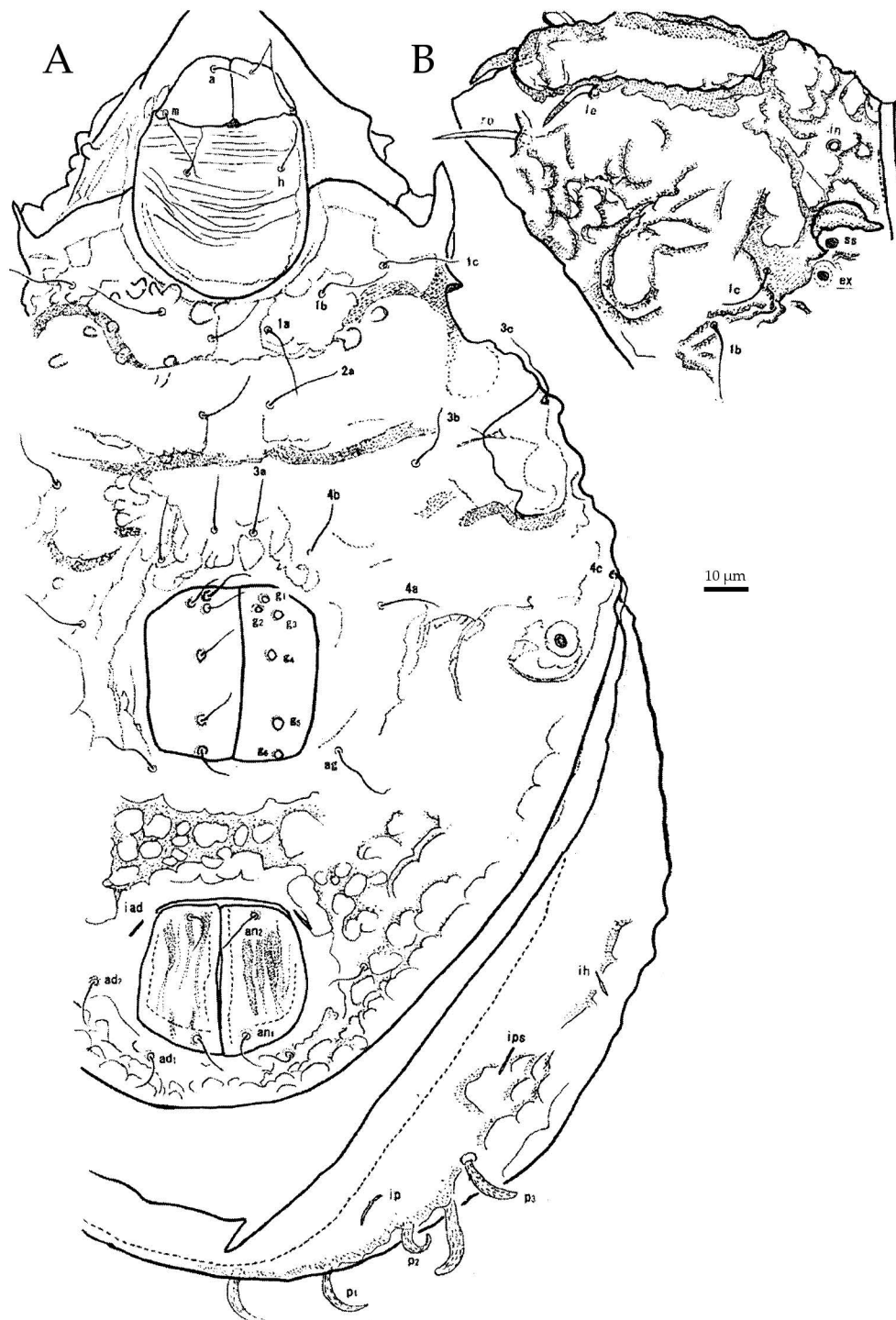


FIGURE 2: *Eremella funnagasatoensis* n. sp.: A – Ventral view (NSMT-Ac 13580); B – Lateral view of propodosoma (a depressed specimen) (NSMT-Ac 13581).

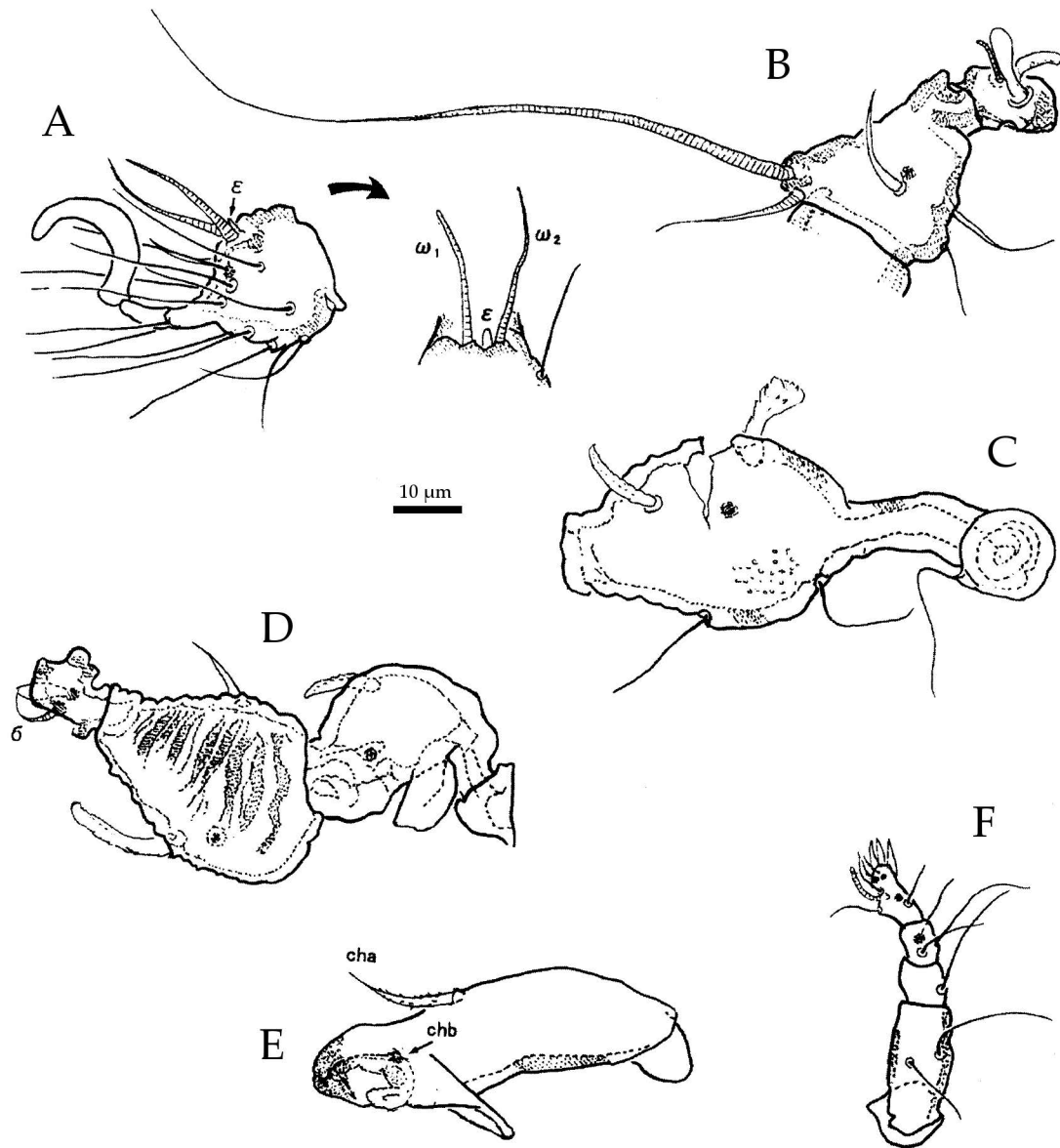


FIGURE 3: *Eremella funnagasatoensis* n. sp. (NSMT-Ac 13581): A – Tarsus I; B – Tibia and genu of leg I; C – Femur I; D – Genu to trochanter of leg III; E – Chelicera; F – Pedipalp.

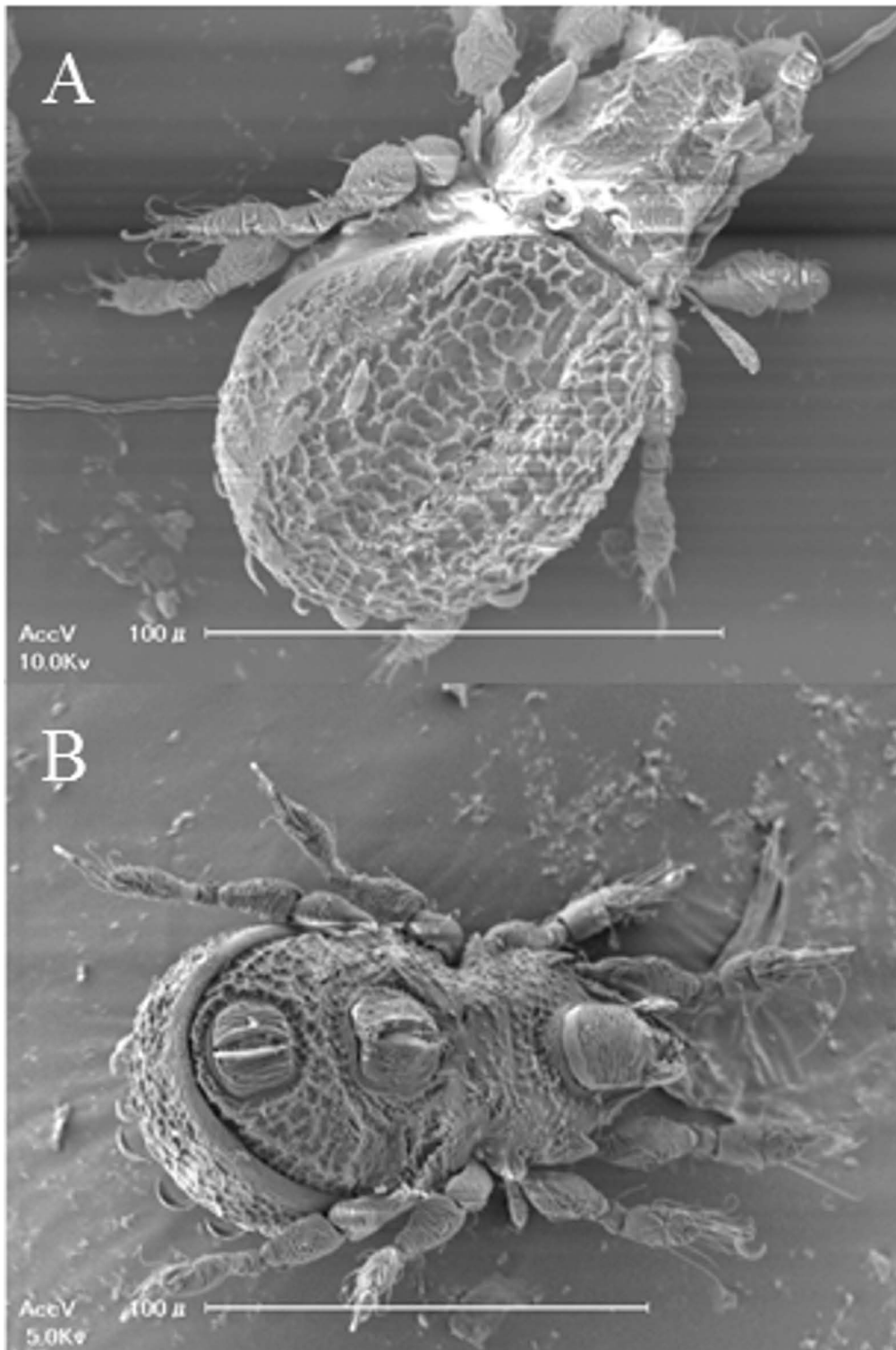


FIGURE 4: *Eremella funnagasatoensis* n. sp. scanning electron micrographs (photos by Nakamura Y.-N., Nishi Y. and Nakamura, Y.). Adult female: A – Dorsal view; B – Ventral view.

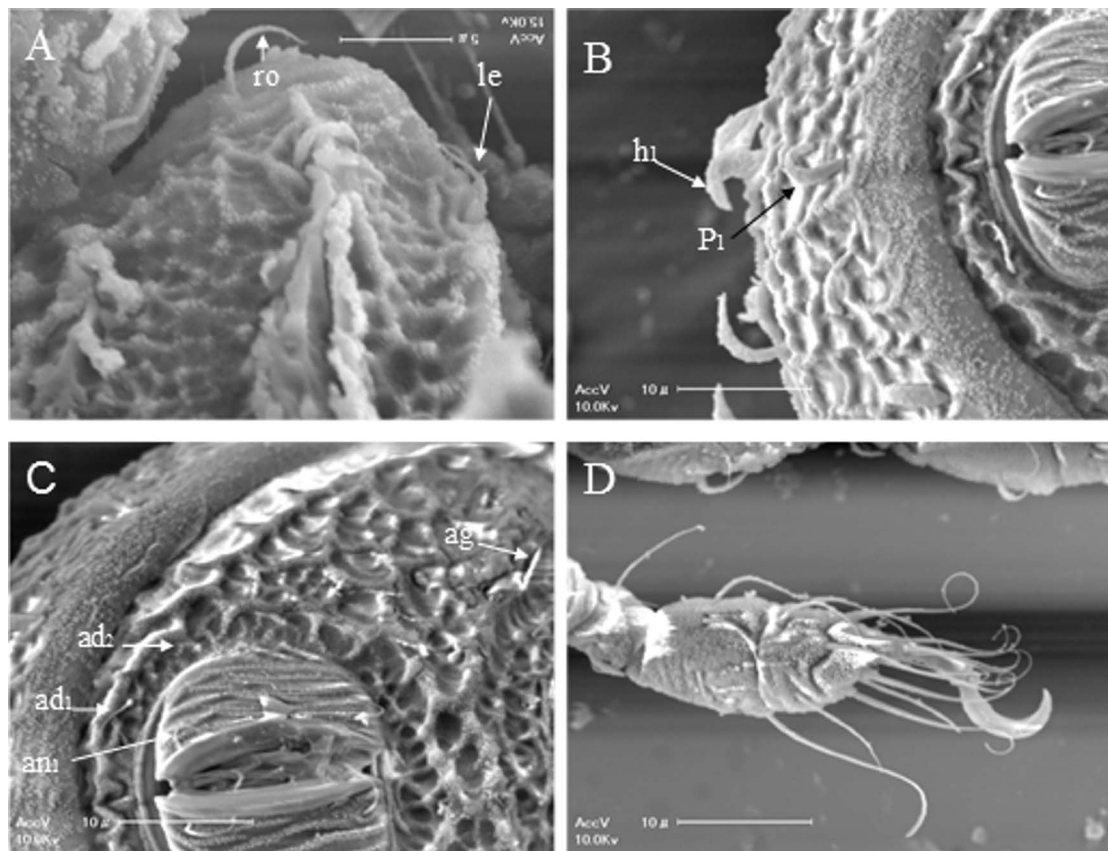


FIGURE 5: *Eremella funnagasatoensis* n. sp. scanning electron micrographs (photos by Nakamura Y.-N., Nishi Y. and Nakamura, Y.): A – Rostral region; B – Postro-marginal region of notogaster; C – Anal region; D – Tarsus and tibia of right leg III.

distinct dent or dilated portion (Figs. 3A, 5D); length (μm): [Right-left]: I [24-24], II [22-26], III [23-29] and IV [29-29]. Setal formula of legs including famulus but excluding solenidia: I (1-5-3-4-15), II (1-5-3-4-14), III (2-3-1-3-14), IV (1-2-2-3-12). Measurements (μm) of segments (trochanter to tarsus): [Right-left]: I [8-7]-[66-71]-[14-12]-[25-23]-[36-36], II [10-13]-[60-61]-[11-12]-[29-24]-[39-36], III [?-51]-[43-34]-[16-15]-[29-34]-[36-36], IV [38-31]-[39-45]-[16-14]-[36-41]-[41-43]. Femora I bearing three kinds of formed setae: thin, smooth setiform (*v*), thick barbed bacilliform (*l*) and spiculate phylliform *d* (Fig. 3C). Genu III and trochanter III bearing carina (Fig. 3D). Solenidiotaxy I (1-2-2), II (1-1-2), III (1-1-0), IV (0-1-0). On tarsus I, famulus ϵ (ca. 3 μm) bacilliform, situated between solenidia ω_1 and ω_2 (Fig. 3A). Solenidion ω_1 (ca. 19 μm) setiform with rounded tip; ω_2 (ca. 37 μm) setiform. Solenidion φ_1 (ca. 99 μm) setiform, originating from apophysis at the anterior margin of segment, about four times longer than the length of tibia (ca. 24 μm); φ_2 setiform (ca. 21 μm) (Figs. 3B). On genu I, solenidion σ (ca. 7 μm) short, bacilliform as long as seta *d*.

Remarks — Hitherto a single species, *Eremella induta* Berlese, 1913 has been found from Japan in Niigata Prefecture, Kanagawa Prefecture and Ehime Prefecture (Maruyama 1984; Ichisawa and Harada 2001; Yamamoto and Yamamoto 2000). However, the new species differs from *E. induta* according to the original description and redescription by Mahunka and Mahunka-Papp (1995) in having setae *ro* longer than setae *le*, phylliform *p*-series notogastral setae and long solenidion of tibia I. The new species is distinguished from *E. vestita* Berlese, 1913 by smaller body size, basely simple claws of legs, phylliform *p*-series setae, two transverse ridges between costulae and long solenidion of tibia I, from *E. pulchella* (Balogh, 1959) by phylliform notogastral setae and long costulae, from *E. africana* (Balogh, 1966) by smaller body size, phylliform notogastral setae, subparallele costulae and notogaster without protuberance, from *E. ensifera* Balogh et Mahunka, 1968 by smaller body size, two pairs of adanal setae, setae *ro* longer than *le*, phylliform notogastral setae and long costulae with two transverse ridges, and from *E. matildebellae* Mahunka et Palacios-Vargas,

1995 by monodactylous legs, two pairs of adanal setae, subparallele costulae and notogaster without crests.

Key to the species of *Eremella* Berlese, 1913. Body length and width (in μm) are shown with type locality according to the original description

1. Costulae not parallel.....2
— Costulae subparallel.....4
2. Interlamellar setae simple.....
.....*E. africana* (Balogh, 1966) (Tshad); 280 × 150
— Interlamellar setae phylliform, spinose or speculate3
3. Notogaster with longitudinal and transversal crests.....*E. matildebellae* Mahunka and Palacios-Vargas, 1995 (Mexico); 213-258 × 110-132
— Notogaster without longitudinal and transversal crests *E. induta* Berlese, 1913 (Jaba); 240 × 130
4. Lamellar setae originate far from the tip of lamellar costulae5
— Lamellar setae originate at the end of the tip of, or on the lamellar costulae6
5. Rostral setae longer than lamellar setae.....
E. pulchella (Balogh, 1959) (Hungary); 240-275 × 125-146
— Rostral setae shorter than lamellar setae.....
.....*E. ensifera* Balogh and Mahunka, 1968 (Argentina); 279-311 × 136-168
6. Costulae with one transversal ridge; claws of legs dilated basally (According to Mahunka and Mahunka-Papp 1995).....
.....*E. vestita* Berlese, 1913 (Giava); 300 × 180
— Costulae with two transversal ridges; claws not dilated basally.....
.....*Eremella funnagasatoensis* n. sp. (Japan); 236-264 × 121-150

Scheloribatidae Grandjean, 1933

Scheloribates yamaeensis n. sp.

[Japanese name: Yamae-shiwadani]

(Figs. 6 - 10)

Diagnosis — Prodorsum triangular. Rostrum rounded. Lamellae narrower situated laterally, with prolamellae, without cusps and translamella. Sensillus barbed fusiform. Anterior margin of immovable pteromorphae not extending anteriorly beyond level of dorsosejugal scissure; pteromorphae with inward curve. Notogaster elongate with ten pairs of minute setae and four pairs of sacculi; each sacculi diverged. Notogastral integument plicate near posterior margin. Genito-anal setae 4(3, 5)-1(2)-2-3; genital and aggenital setae variable in number. Adanal setae *ad*₃ situated in preanal position. Lyrifissures *iad* aligned along outline of anal aperture in adanal position. Posterial anal locking-pieces remarkable. Diarthric subcapitulum bearing 3 pairs of setae *a*, *m*, *h*. Epimeral setae 3-1-3-3, pedipalpal setae 0-2-1-3-9[1]. All legs heterotridactyl. Solenidiotaxy: I (1-2-2); II (1-1-2); III (1-1-0); IV (0-1-0). Femora II, III and IV with small leg-fin. Solenidia ω_1 and ω_2 , famulus, and fastigial seta *ft*" aligned in a line; setae *ft*" smooth.

Material examined — Holotype (Male) (NSMT-Ac 13034) from litter, humus and soil materials at the chestnut *Castanea crenata* Sieb. et Zucc. plantation of Yamae Mura in Kumamoto Prefecture on 25th Oct. 2007, by S. Hashimoto; 24 paratypes (NSMT-Ac, 13035: female): the same data as holotype. The type series with number of NSMT-Ac 13034 & 13035 is deposited in the National Museum of Nature and Science, Tokyo. The remainder of paratypes are deposited in the National Agricultural Research Center for Kyushu Okinawa Region, Kumamoto Prefecture.

Etymology — After the name of sampling locality.

Measurements and body appearance — Female (n = 13): Body length: 471 (508) 564 μ m; width: 300 (345) 400 μ m, male (n = 12): Body length: 457 (486) 514 μ m; width: 293 (320) 379 μ m. Body color light brown. The whole integument without granulation

except for exobothridial region. Description of features in common of male and female:

Prodorsum — Triangular (Fig. 6A). Rostrum rounded. Rostral setae *ro* sparsely barbed, inserted at lateral sides, extending in front of the rostrum for a distance equal to about two-third of their length. Lamellar ridges narrower, situated at the lateral sides, with prolamellae but without cusps nor translamella, extending forward from underneath of anterior notogastral margin for a distance equal to almost two-third length of the propodosoma (ca. 125 μ m) (Fig. 9A). Lamellar setae *le* sparsely barbed throughout length, inserted at the end of lamellae (Fig. 8B), extending anterior to rostral setae. Interlamellar setae *in* sparsely spiculate throughout length (Fig. 6C), inserted anterior to the level of bothridia. Bothridial basal part covered by anterior margin of notogaster, opening anteriorly (Fig. 9D). Sensilli *ss* fusiform, ciliate (Fig. 7A). Exobothridial setae *ex* smooth, minute. Relative lengths and distances of prodorsal setae: *ro* : *le* : *in* : *ss* : *ex* = 1 : 1.68 : 1.68 : 1.13 : 0.05; (*ro-ro*) : (*le-le*) : (*in-in*) : (*ro-le*) : (*le-in*) = 1 : 1 : 1 : 0.3 : 0.8.

Notogaster — Elongate, with broadly rounded anterior margin (Fig. 9C). Anterior margin of immovable pteromorphae not extending anteriorly beyond level of anterior notogastral margin; pteromorphae curved inward (Figs. 6D, 10D). Notogaster bearing 7 to 14 transverse plications near posterior margin (Fig. 9F). A number of light spots arranged peripherally. Dorsophragmatic apophyses *hy* small. Ten pairs of notogastral setae minute, smooth; *c*₂ and *la* on pteromorphae. Sacculi *Sa*, *S1*, *S2* and *S3* diverged (Figs. 8A, 9E, 10C): *Sa* situated antero-laterally to *lm*, *S1* lateral to *lp*, *S2* posterior to *h*₃, *S3* postero-laterally to *h*₂, respectively. Lyrifissures *ia* located parallel to suture between pteromorpha and body posterior to *c*₂; *im* aligned obliquely at the antero-laterally to setae *lp*; *ip* longitudinally to outline of body between *p*₁ and *p*₂. Opisthosomal gland-opening situated postero-laterally to *im*. Relative distances between notogastral setae in central part of notogaster: (*c*₂-*c*₂) : (*la-la*) : (*lm-lm*) : (*lp-lp*) : (*h*₃-*h*₃) : (*h*₂-*h*₂) : (*h*₁-*h*₁) : (*p*₁-*p*₁) = 9 : 11 : 7 : 7 : 6 : 5 : 1 : 2.

Ventral region — Genital and anal apertures

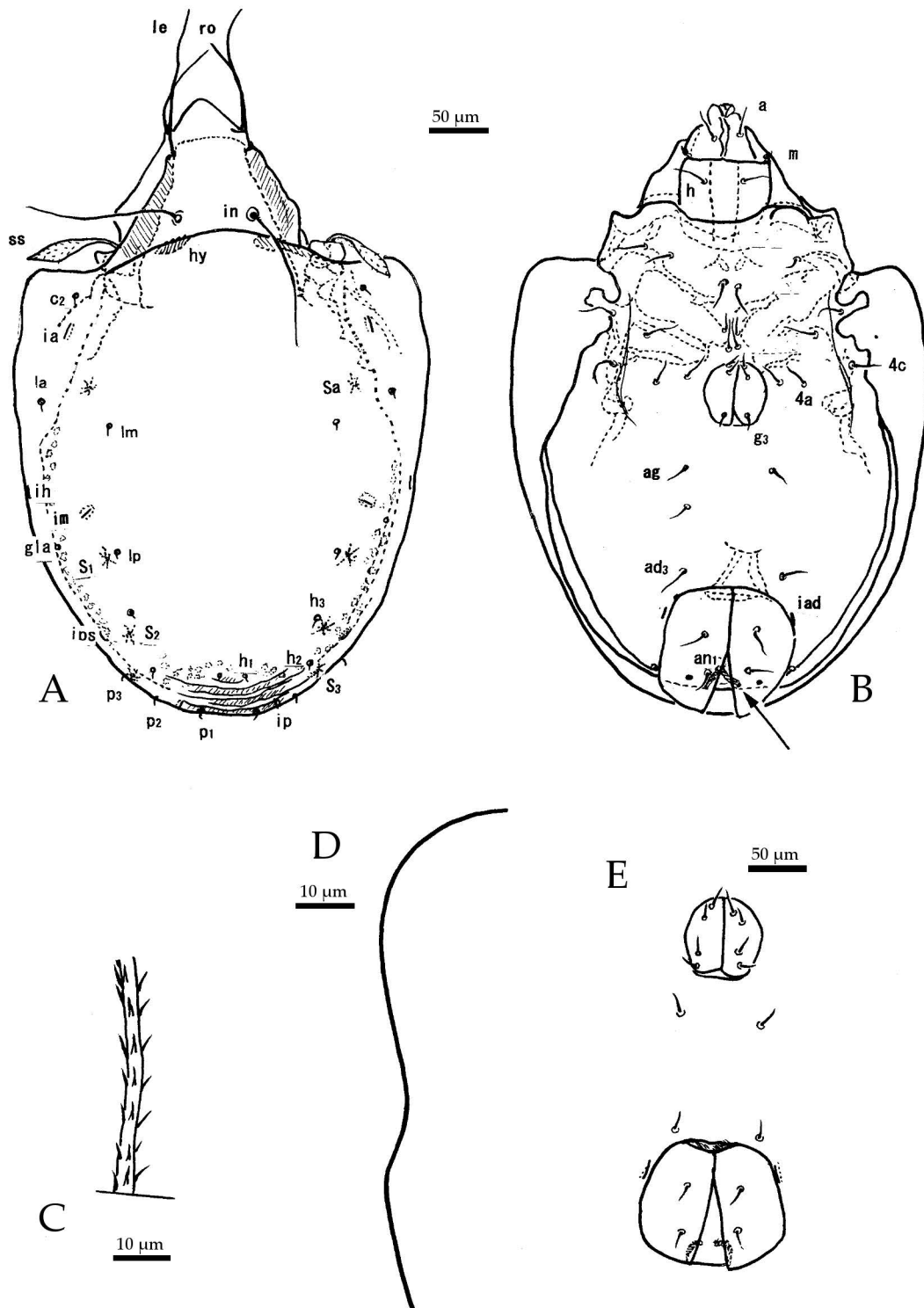


FIGURE 6: *Schelorbates yamaeensis* n. sp.: A – Dorsal view; B – Ventral view; C – A part of interlamellar seta; D – Left pteromorph of a depressed specimen; E – Genito-anal region of female. Posterial anal locking-pieces (black arrow). A, B: (NSMT-Ac 13034; male); C – E: (NSMT-Ac 13035; female).

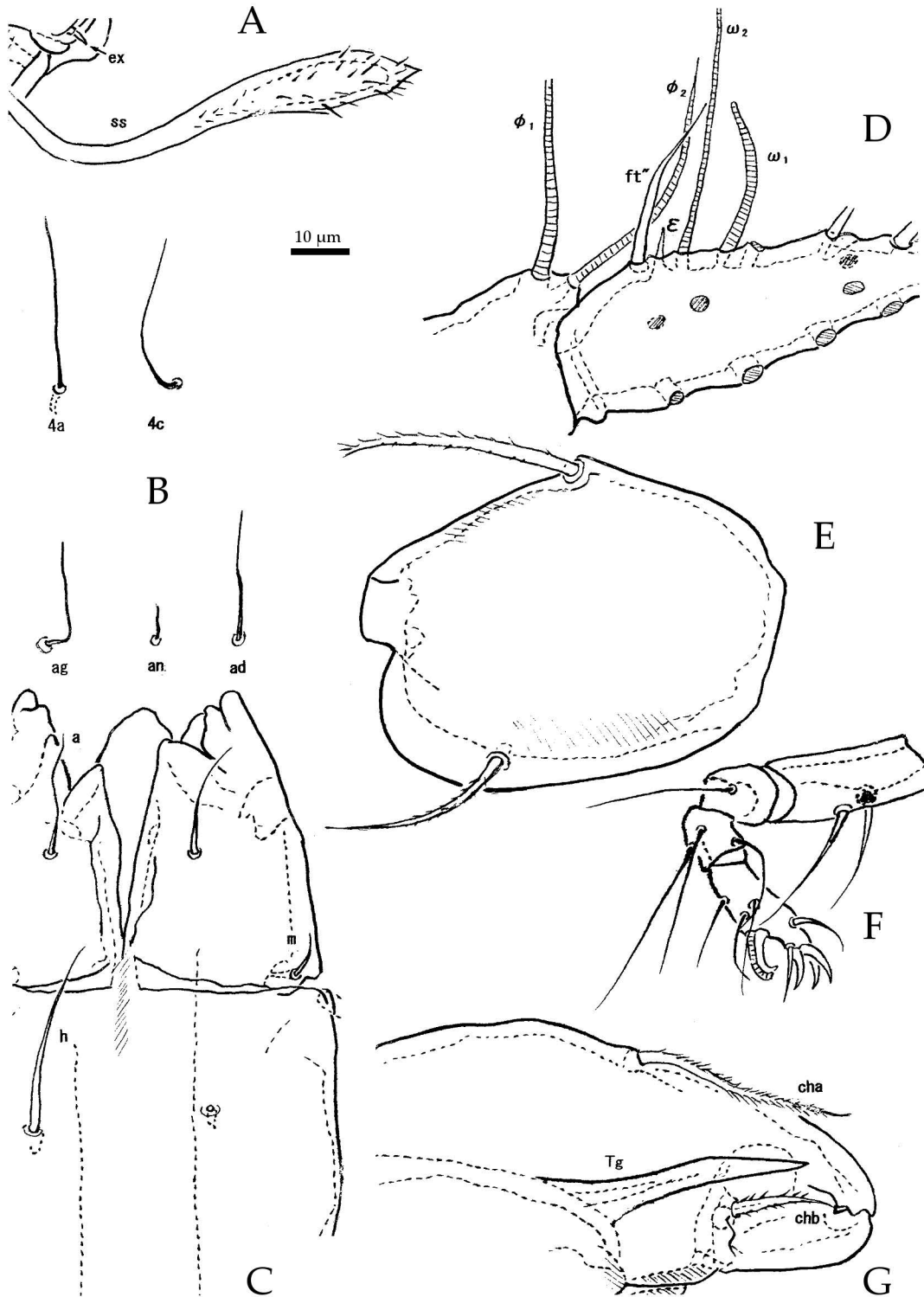


FIGURE 7: *Schelorbates yamaeensis* n. sp. (NSMT-Ac 13035; female). A – Sensillus (*ss*) and exobothridial seta (*ex*); B – Setae: *ag*, *an*, *ad*: aggenital, anal and adanal setae, respectively; *4a*, *4c*: Epimeral setae; C – Gnathosoma. *a*, *m*, *h*: Anterior, medial and posterior subcapitular setae, respectively; D – Solenidial region of tarsus-tibia of leg I. *ε*: Famulus; $\omega_{1,2}$, $\phi_{1,2}$: Solenidia; *ft''*: fastigial seta; E – Femur IV; F – Pedipalp; G – Chelicera. *cha*, *chb*: cheliceral setae, *Tg*: Trägårdh's organ.

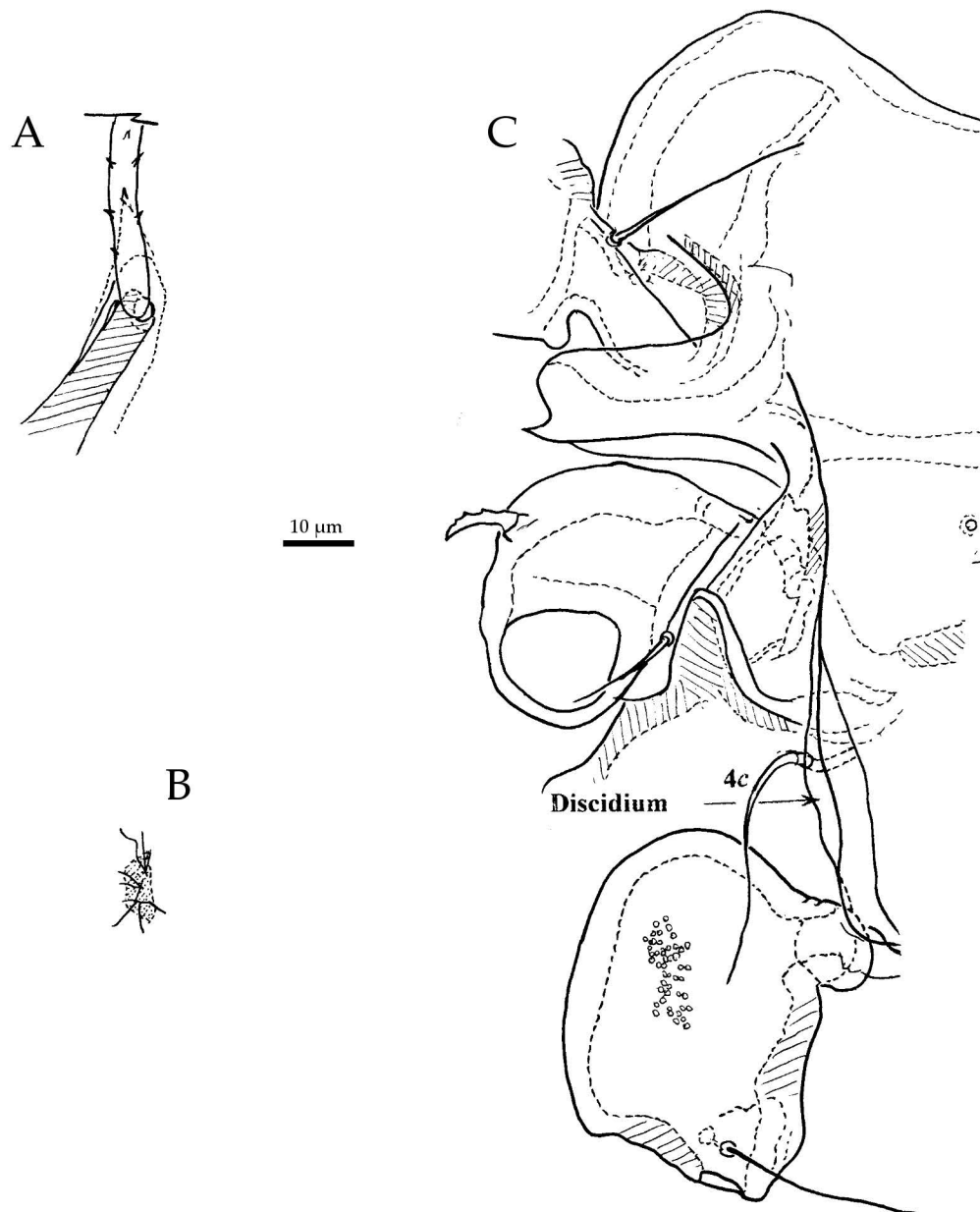


FIGURE 8: *Schelorbates yamaeensis* n. sp.: A – Tip of left lamella (NSMT-Ac 13034); B – Left sacculi *Sa* (NSMT-Ac 13035); C – Right trochantera II – IV region (NSMT-Ac 13034).

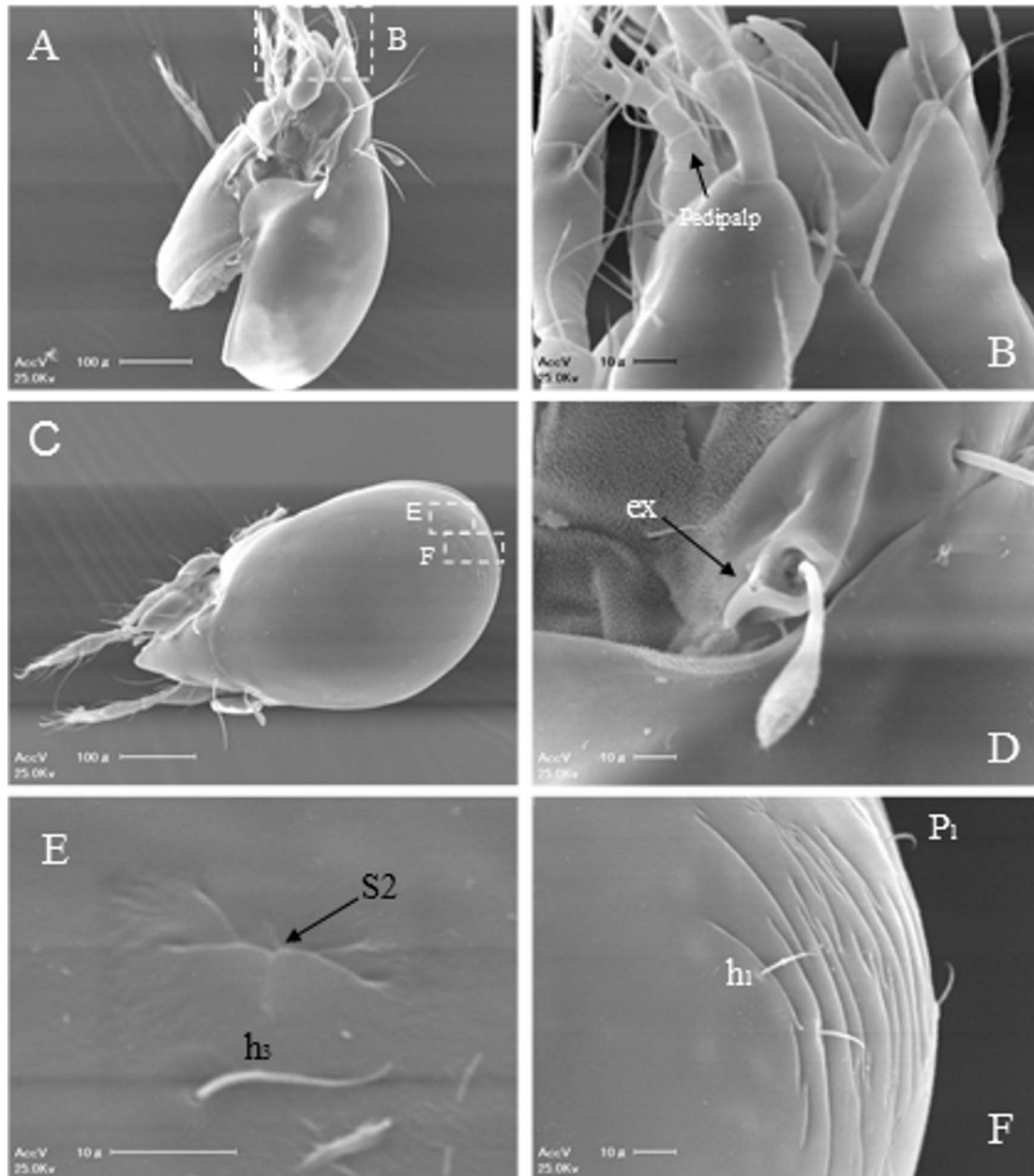


FIGURE 9: *Schelroribates yamaeensis* n. sp. scanning electron micrographs (photos by Nakamura Y.-N., Hashimoto S.): A – Lateral view; B – Camerostomal region; C – Dorsal view; D – Left bothridial region; E – Sacculus S2 and notogastral seta *h*₃; F – Plications near posterior margin of notogaster.

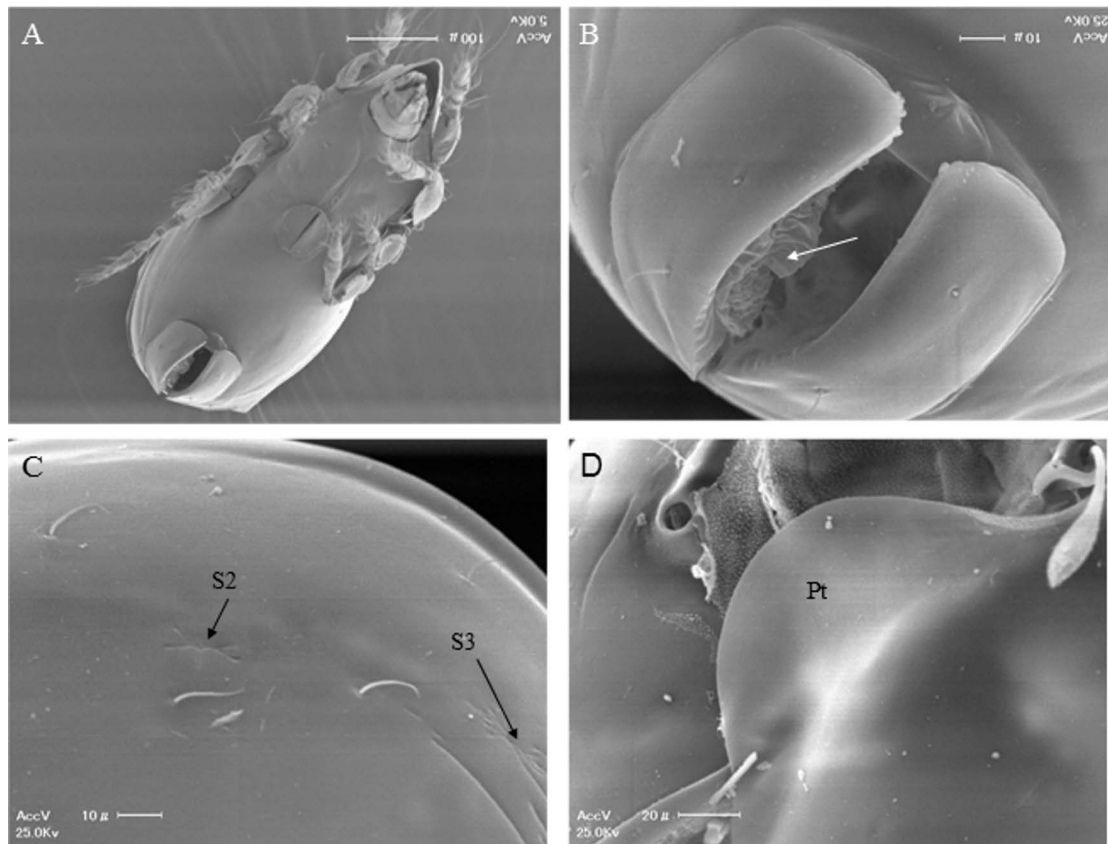


FIGURE 10: *Schelorigibates yamaeensis* n. sp. scanning electron micrographs (photos by Nakamura Y.-N., Hashimoto S.): A – Ventral view; B – Anal aperture; C – Sacculi S2, S3; D – Left pteromorph region.

roughly circular in outline (Figs. 6B, 6E, 10A); the latter about $1.5 \times$ as long as the former; distance between them appreciably $1.5 \times$ as long as anal aperture. Genito-anal setae: 4(3, 5)-1(2)-2-3; setae thin, smooth setiform (Fig. 7B); genital *g* and aggenital *ag* setae variable in number, but generally (4-4) and (1-1), respectively. Genital setae *g*₁ and *g*₂ remote from *g*₃ and *g*₄. Setae *ag* inserted postero-laterally remote from genital aperture. Adanal setae *ad*₁ inserted in postanal position; *ad*₂ postero-laterally; *ad*₃ preanal. Lyrifissures *iad* aligned in the paraanal position, between the level of anterior margin of anal aperture and insertion of setae *an*₂. Posterial anal locking-pieces remarkable (Fig. 10B). Sternal ridge and epimeral border IV indistinct. Custodium extending at the level of trochanter II; discidium small (Fig. 8C). Epimeral setal formula: 3-1-3-3; setae thin, smooth setiform (Fig. 7B), variable in length. Diarthric subcapitulum bearing 3 pairs of setae; setae thin, smooth setiform (Fig. 7C). Mentum without remarkable transverse slit connected with inner pharynx. Chelicera bearing short Trägårdh's organ (Fig. 7G). Two setae, *cha* and *chb* pilose; *cha* long, *chb* short. Pedipalpal chaetotaxy: 0-2-1-3-9[1]; tarsus with a short solenidion (ca. 9 µm) not extending forwards from tip of tarsus (Figs. 7F, 9B). Relative lengths of some of the ventral setae: $4c > 4a > g > ad > ag > an$.

Legs — All tarsi heterotridactylous; claws dorsally serrate. Setal formula of legs including famulus but excluding solenidia: I (1-5-3-4-18), II (1-5-2-4-16), III (2-3-1-3-14), IV (1-2-2-3-12). Femora of leg II, III and IV bearing small carina (Fig. 7E). Solenidiotaxy I (1-2-2), II (1-1-2), III (1-1-0), IV (0-1-0). Famulus on tarsus I short, spiniform, situated between ω_2 and fastigial seta *ft*"; solenidion ω_1 and ω_2 short bacilliform; ω_2 longer than ω_1 , inserted posteriorly to ω_1 ; ω_1, ω_2 , famulus and *ft*" aligned almost in a line (Fig. 7D).

Description of different characters between male and female: Female with genital aperture and distance between genital and anal apertures longer than those of male.

Remarks — The new species has dorsal aspect similar to those of *Scheloribates maoriensis* Hammer (1968) and *S. gunini* Bayartogtokh (2000). However,

the plications of posterial margin of notogaster and diverged sacculi are particular characters of the new species.

DISCUSSION

Chestnut, *Castanea crenata* Sieb. and Zucc. is native to Japan, and is widely cultivated all across the country. It would be interesting to know whether *Scheloribates yamaeensis* n. sp. depends on chestnut plantations or the subtropical region. Of six known species of *Eremella*, four species, *E. africana*, *E. induta*, *E. matildebellae* and *E. vestita* occur in the tropics, and two species, *E. ensifera* and *E. pulchella* in the temperate zone. However, in Japan *E. induta* has been recorded from both the temperate (Maruyama 1984, Ichisawa and Harada 2001) and the subtropical zones (Yamamoto and Yamamoto 2000). The new species, *Eremella funnagasatoensis* n. sp. was found in litter at the bottom of a hollow of an *Ilex oldhami* Miq. tree in the subtropical zone. The specimens of *E. induta* were collected from litter at the bottom of a hollow in a *Quercus* tree at 1.5 m above the ground (Yamamoto and Yamamoto 2000), from the canopy of *Castanopsis cuspidate* var. *sieboldii* (Maki.) Nakai at 1.5 - 10 m above the ground (Ichisawa and Harada 2001), and from soil materials on the ground surface of *Fagus* forests (Maruyama 1984). *Eremella matildebellae* has also been found from the canopy level and other species have been collected from litter, humus, mosses and soil materials.

ACKNOWLEDGEMENTS


The authors wish to express their sincere thanks to Mr. Ichiro Maruyama of Kashiwazaki city, Niigata Prefecture and Prof. Dr. Hiroshi Harada of Yokohama National University for the valuable advices and inspection of references.

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