

A New Species of the Genus *Pedetontinus* (Archaeognatha, Machilidae) from Korea

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A new species, *Pedetontinus lineatus* sp. nov., is described. The genus *Pedetontinus* is reported for the first time from South Korea in this study. The total number of species of Archaeognatha from Korea is eight in four genera, all of which belong to the family Machilidae. Description, remarks and biological notes of the species are given.

Five species of the genus *Pedetontinus* have been known from Japan (Silvestri, 1943) and a single species have been known to occur in North Korea (Mendes, 1990b) thus far. In Korean fauna, four genera, eight species of the family Machilidae are known: Petrobiinae - *Pedetontus coreanus* Silvestri, 1943; *Pedetontus unimaculatus* Machida, 1980; *Pedetontus silvestrii* Mendes, 1991; *Pedetontus longus* Lee and Choe, 1992; *Pedetontinus szeptyckii* Mendes, 1990b; *Pedetontinus lineatus* sp. nov. Machilinae - *Coreamachilis coreanus* Mendes, 1991; *Haslundichilis viridis* Lee and Choe, 1992.

The genus *Pedetontinus* however has not yet been reported in South Korea. We supposed that there would be additional species of Archaeognatha in South Korea considering that three genera, fourteen species have been described so far in Japan (Silvestri, 1943; Uchida, 1955, 1960; Machida, 1980, 1985). We found an additional species, *Pedetontinus lineatus* sp. nov., from South Korea as a result of the present study.

Holotype and paratypes are deposited in the Department of Life Science, Jeonju University, Korea.

Materials and Methods

The present specimens were collected with aspirators from fallen pine needles and broad-leaves, and under stones in Is. Hong-do and Dolsan-up, South Korea, between July, 1990 and December, 2000. After taken pictures under anesthesia with ethylether, they were preserved in alcohol. Afterward they were dissected and mounted on slides with Canada balsam for observation.

We followed the higher classification of Remington (1954), Paclt (1972) and Sturm & Bach de Roca (1993) for higher categories, and those of Wygodzinsky (1948), Paclt (1970), Mendes (1990a) and Sturm & Bach de

Roca (1993) for genera and species.

Results

Family Machilidae Verhoeff, 1910
Subfamily Petrobiinae Verhoeff, 1910
Genus *Pedetontinus* Silvestri, 1943

* *Pedetontinus lineatus* sp. nov.
(Fig. 1A, B; Fig. 2A-S)

Body length from head to tergum 8-9 mm. Ratio of antenna to body length 0.62-0.67. Median caudal filament approximately equal to body length. Ratio of cercus to median caudal filament 0.35-0.40. General body color ivory. Reddish brown hypodermal pigments more intense on head, appendages and legs; pigmentation pattern more or less variable among individuals. Scale pattern as shown in Fig. 1A, B. Terga with a pair of prominent median black scales. Terga mostly covered with golden scales, but laterally with blackish brown scales. Black spots present on both sides of terga II, VI and IX.

Shape and hypodermal pigmentation of head as shown in Fig. 2A. Frons scaled between bases of antenna, pigmented specially in a straight line on central portion of frons. Clypeolabrum with dense hairs, pigmented.

Oculus relatively small, slightly wider than long (length/width 0.90-0.95, usually 0.92-0.93); its line of contact/length 0.70-0.75. Ground color of oculus reddish brown; the median portion or also lower portion golden yellow (in living insects). Lateral ocellus reddish brown, dumb-bell-shaped, transverse, situated anteriorly to margin of oculus, slightly narrower than oculus (ocellus/oculus 0.85-0.95) (Fig. 2A).

Scapus and pedicellus of antenna densely scaled; no scales on flagellum. Scapus rather long (width/length about 0.6); pedicellus as long as wide (Fig. 2B). Flagel-

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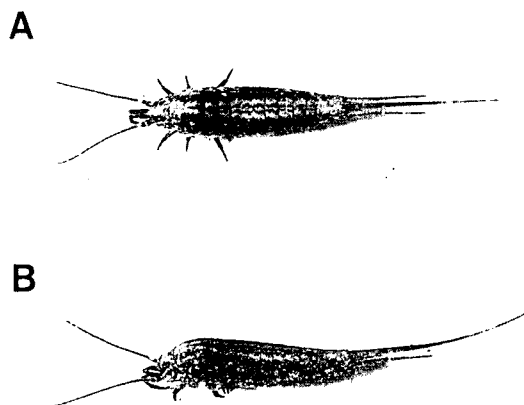


Fig. 1. *Pedetontinus lineatus* sp. nov. A, Dorsal view. B, Dorsolateral view.

lum divided up to 32 segments. Proximal segments (up to 7, 8th) of flagellum not subdivided; median segments divided into 2-7 subsegments; terminal ones into 8-9. Pigmentation pattern of antenna as shown in Fig. 2B, C. Segments of distal half of flagellum uniformly brownish; junction between segments pale.

Mandible 4-toothed, pigmented as shown in Fig. 2D, E.

Maxillary palpus stouter in males; ratio of article VII to VI 0.65-0.70 (about 2/3); apex more pointed in females. Maxilla and its palpus of male with chaetotaxy and hypodermal pigmentation as Fig. 2F. Maxillary palpus with numerous setae of moderate size; generally those in articles V-VII denser than in articles I-IV in number. Numerous short suberect setae on undersurface of articles II-VII in males, but sparse in females. Spines on uppersurface of articles VI-VII and anterior portion of article V of maxillary palpus in both sexes, those of apex of article VII of males smaller than in females. The number of spines variable (Table 1); denser in females. Maxilla and article I of its palpus dark pigmented, pigmentation on undersurface of anterior portion of articles II-III conspicuous in both sexes. Articles II-VI of maxillary palpus scaled densely, articles I and VII sparsely.

Shape and pigmentation of labium and its palpus of male (Fig. 2G); palpus of male larger than that of female. Apical portion of labial palpus with many sensory cones in both sexes. Numerous setae of moderate size on article III, less in number on article II, and rare on article I. Short suberect setae present in labial palpus, rare on article I. Labium dark pigmented except labial palpus. All articles of labial palpus sparsely scaled.

Hypodermal pigmentation and spines of leg (Fig. 2H), pigmentation almost the same in all legs. Ratio of width to length of tarsomere III 0.35-0.40 in male,

Table 1. Number of spines on uppersurface of maxillary palpus of *Pedetontinus lineatus* sp. nov.

Maxillary palpus	No. of spines	
	♂	♀
Article V	1-3 (1-2)*	2-5 (2-3)
Article VI	7-13 (9-11)	10-18 (11-14)
Article VII	7-11 (8-9)	7-14 (10-13)

*Usual number of spines.

0.40-0.45 in female; in the case of hindleg ratio small in both sexes. Ratio of coxal styli in length to coxa 0.5-0.6. Chaetotaxy fundamentally same in all legs and in both sexes. Numerous setae on tarsus and tibia, slightly less in number on femur and trochanter, and rare on coxae. Number of spines on undersurface of legs (Table 2). Legs, on the whole, dark. Pigmentation on coxae and proximal portion of trochanter conspicuous. All articles of legs and styli scaled.

Abdominal segments I-VII each with one pair of exsertile vesicles. Shape of urosterna V, VII, VIII and IX as shown in Fig. 2I-O. Posterior angle of 5th median plate approximately 85-90 degrees in male, 90-95 degrees in female. Inner posterior lobes of coxite VII of female projected. Inner distal half of coxite IX 4-9 (usually 5-7) spines. Ratio of stylus (without spine) to coxite: urosterna V and VII 0.4-0.5 in male, 0.35-0.45 in female; urosternum VIII 0.5-0.6 in male; urosternum IX 0.7-0.8 in male; urosterna VIII and IX 0.5-0.6 in female.

Ovipositor of primary type, slightly surpassing apex of stylus IX. Anterior and posterior gonapophyses with 38-53 (usually 45-48) annuli. Chaetotaxy of gonapophyses as illustrated in Fig. 2P-S. Basal half of posterior gonapophysis glabrous, while all annuli of anterior gonapophysis setose. Sensory cones on approximately 5 most apical annuli of both gonapophyses, if present, 1-2 cones/annulus.

Shape of penis and paramere as shown in Fig. 2L. Ratio in length of penis to coxite IX 0.55-0.65. Ratio of basal part of penis to apical part 2.2-2.8. Penis slightly surpassing paramere (ratio of penis to paramere 1.0-1.1). Apical part of penis with numerous short setae; less in number on basal part. Paramere with I + 5 or 6 annuli. Inner portion of annulated part of paramere provided with numerous spine-like short setae.

Type data: Holotype, ♂, Hong-do Island, Heugsanmyeon, Shinan-gun, Jeonranam-do Province, 29. VII. 1990 (G. H. Choe and Y. M. Cho). Paratypes, 10 ♂♂, 11 ♀♀, same data as the holotype; 1 ♂, 1 ♀, Ulim-ri, Dolsan-up, Yeosu-si, Jeonranam-do Province, 27. XII. 2000 (G. H. Choe and Y. M. Cho).

Remarks: Five species of the genus *Pedetontinus* Silvestri (*P. dicroceros*, *P. esakii*, *P. ishii*, *P. yosii*, *P. kuwanae*) have been described from Japan and compared each other by Mendes (1990b). However,

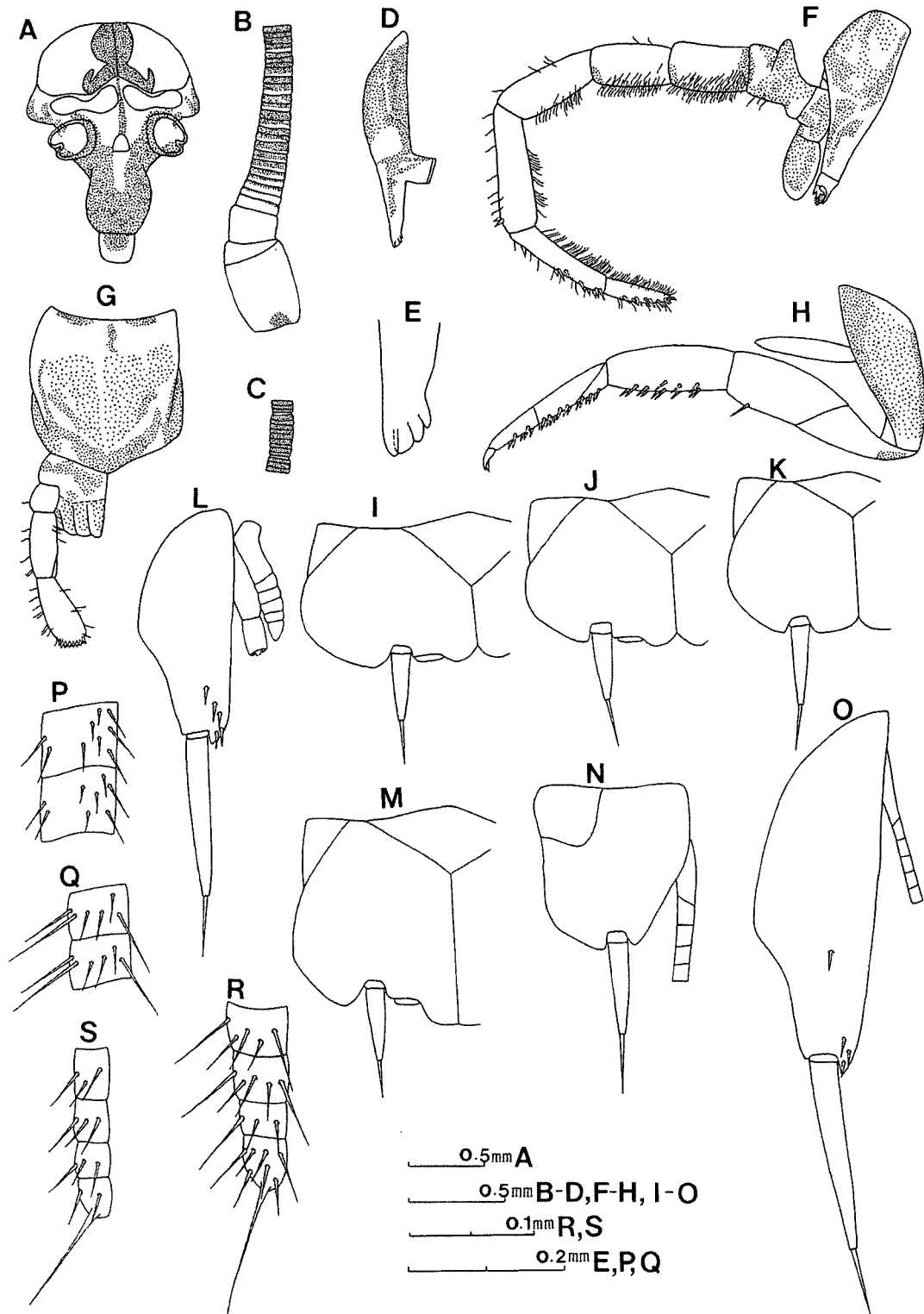


Fig. 2. *Pedetontinus lineatus* sp. nov. A, Head, frontal view with hypodermal pigmentation (oculi, golden yellow area dotted). B, Antenna with pigmentation on basal portion. C, Median segment (22th) of flagellum. D, Mandible with pigmentation, anterior view. E, Apical portion of mandible. F, Maxilla and its palpus of male with chaetotaxy and pigmentation. G, Labium and its palpus of male with shape and pigmentation. H, Hindleg of male, anterior view with pigmentation and spines. I, Urosternum V of male. J, Urosternum VII of male. K, Urosternum VIII of male. L, Urosternum IX of male with penis and paramere. M, Urosternum VII of female. N, Urosternum VIII of female. O, Urosternum IX of female. P, Basal annuli (6, 7th) of anterior gonapophysis of female. Q, Median annuli (23, 24th) of anterior gonapophysis. R, Apical annuli of anterior gonapophysis. S, Apical annuli of posterior gonapophysis.

Table 2. Number of spines on undersurface of legs of *Pedetontinus lineatus* sp. nov.

Leg	No. of spines					
	Foreleg		Midleg		Hindleg	
	♂	♀	♂	♀	♂	♀
Femur	0	0	0-1 (0)	0	0-1	0-1
Tibia	0-3 (1)*	0-3 (0)	4-9 (4-6)	3-6	5-12 (5-8)	5-13 (6-8)
Tarsomere I	2-5 (2-4)	2-5 (2-4)	3-7 (3-4)	3-6 (3)	2-7 (3-5)	3-6
Tarsomere II	4-9 (5-8)	4-7	4-7	4-6	4-9 (5-6)	4-7 (5-7)
Tarsomere III	2-5 (3)	2-3	1-4 (3)	2-4	2-5 (3-4)	2-4

() usual number of spines.

these species need careful redescription because the original description is insufficient. *Pedetontinus szeptyckii* was described from North Korea (Mendes, 1990b).

The specific name of this new species is derived from linear scale pattern. This species has a field of numerous short suberect setae on the undersurface of male maxillary palpus. The length and width of oculus are almost same (length/width 0.90-0.95). The tibia of foreleg and femur of midleg and hindleg have sometimes one spine (Table 2). Hypodermal pigments are widely distributed on head, appendages and legs (Fig. 2A-H).

This new species is similar to *Pedetontinus szeptyckii* of North Korea. However, the new species can be easily distinguished from the latter by the dark pigmentation of whole body, characteristic scale pattern (a pair of median black scales on terga), and color pattern and shape of the eyes (Table 3). In addition, the number of spines (Mendes, 1990b mentioned as hyalin spiniform setae) of maxillary palpus and legs is generally smaller than those of *P. szeptyckii*. Subdivision of terminal segments of flagellum (usually 7-9) is similar to those of *Pedetontinus okajimae* (Machida, 1985).

Biology: *Pedetontinus lineatus* sp. nov. was generally found in the forest leaf litters. They appear to occur in both dry and humid conditions. This species was mostly collected from the south coast such as Hong-do Island and Dolsan-up of South Korea. We collected many individuals even in December and January from Dolsan-up. It is not easy to collect this species because the color and line pattern of their scales is cryptic, blended with fallen pine needles and dead broad-leaves.

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Table 3. Comparison for characteristics between *Pedetontinus lineatus* sp. nov. and *P. szeptyckii*

Characteristics	<i>Pedetontinus lineatus</i> sp. nov.	<i>P. szeptyckii</i>
1. Whole body color	Hypodermal pigment dark	Pigment not specially dark
2. Scale pattern	A pair of median black scales on terga	Black longitudinal strips
3. Oculus color pattern	Yellow portion of oculus present	Three different pigmental patterns
4. Ocellus color and shape	Ocellus uniformly reddish brown	Shoe-shaped with bright area