CHAPTER 4

RESULTS

Proturan taxonomy and description

4.1 Summary and checklist of proturan in Doi Inthanon National Park, Chiang Mai province

Soil samples were collected on 30 January 2007 along an altitudinal gradient in Doi Inthanon National Park, Chiang Mai province, Thailand. Five different forests were chosen at 500 meters intervals: dry deciduous dipterocarp forest; mixed deciduous forest; lower evergreen forest; upper evergreen forest; and cloud forest, respectively. At each site, 10 soil samples were collected using a 15 × 15 centimeters quadrat with a depth of 5 centimeters.

After specimen preparation and identification, it was determined that eleven species and two subspecies of proturans were collected. These 11 species and 2 subspecies consist of 3 described species (*Condeellum regale* (Condé), *C. ishiianum ishiianum* Imadaté, *Silvestridia keijiana* (Imadaté)), one newly recorded subspecies for Thailand (*C. ishiianum setosum* Imadaté, 1991), and 8 undescribed species (*Australentulus* sp., *Baculentulus* sp., *Kenyentulus* sp. 1, *Kenyentulus* sp. 2, *Eosentomon* sp. 1, *Eosentomon* sp. 2, *Eosentomon* sp. 3, and *Eosentomon* sp. 4). The species collected belong to the genera *Condeellum* Tuxen (2 spp.), *Australentulus* Tuxen (1 sp.), *Silvestridia* Bonet (1 sp.), *Baculentulus* Tuxen, 1977 (1 sp.), *Kenyentulus* Tuxen (2 spp.), *Eosentomon* Berlese (4 spp.). The following analysis was based on morphological characteristics of proturan in the adult stage.

4.2 Checklist of proturans in Doi Inthanon National Park, Chiang Mai province

Suborder **Acerentomoidea** Condé, 1951

Family **Protentomidae**, Ewing, 1936

Genus ***Condeellum*** Tuxen, 1963

1. *Condeellum regale* (Condé, 1958)
2. *Condeellum ishiianum ishiianum* Imadaté, 1965
3. *Condeellum ishiianum setosum* Imadaté, 1991

Family **Acerentomidae** Silvestri, 1907

Genus ***Australentulus*** Tuxen, 1967

4. *Australentulus* sp.

Genus ***Silvestridia*** Bonet, 1942

5. *Silvestridia keijiana* (Imadaté, 1965)

Genus ***Baculentulus*** Tuxen, 1977

6. *Baculentulus* sp.

Genus ***Kenyentulus*** Tuxen, 1981

7. *Kenyentulus* sp. 1
8. *Kenyentulus* sp. 2

Suborder **Eosentomoidea** Condé, 1951

Family **Eosentomidae** Berlese, 1909

Genus ***Eosentomon*** Berlese, 1909

9. *Eosentomon* sp. 1
10. *Eosentomon* sp. 2
11. *Eosentomon* sp. 3
12. *Eosentomon* sp. 4

4.3 Key to genus of proturan in Doi Inthanon National Park, Chiang Mai Province

1. Thoracic tergites II-III without spiracle……..2

1′. Thoracic tergites II-III with a pair of spiracles (Fig. 11)……..……*Eosentomon*

2. Abdominal appendage II without terminal vesicle (Fig. 7E).....3

2′. Abdominal appendage II with a terminal vesicle (Fig. 7H) ……....…*Condeellum*

3. Striate band on abdomen VIII reduced, labrum not protruded (Fig. 27F)…….4

3′. Striate band on abdomen VIII well developed (Fig. 23F), labrum strikingly protruded……..……...…..…*Australentulus*

4. Abdominal appendage III without terminal vesicle and two setae (Fig. 27C), labial palpus with three setae…..……..……5

4′. Abdominal appendage III without terminal vesicle and one seta (Fig. 25C), labial palpus with two setae…..……..*Silvestridia*

5. Canal of maxillary gland with two additional dilatations (Fig. 29E)…*Kenyentulus*

5′. Canal of maxillary gland simple without additional dilatation (Fig. 27E)…..…….. ……*Baculentulus*

4.4 Key to species of proturan in Doi Inthanon National Park, Chiang Mai province

1. Thoracic tergites II-III without spiracle……..2

1′. Thoracic tergites II-III with a pair of spiracles (Fig. 11)……..…..……..9

2. Abdominal appendage II without terminal vesicle (Fig. 7E).....3

2′. Abdominal appendage II with a terminal vesicle (Fig. 7H)…….....5

3. Urotergites II-VI with 3 pairs of anterior setae (A1, 2, 5).....…….…….……..4

3′. Urotergites II-VI with 2 pairs of anterior setae (A1, 5)…..…….…….
……...….*Condeellum regale* (Condé, 1958)

4. Urotergite VII with 2 pairs of anterior setae (A4, 5)……..……..……..……..
……..*Condeellum ishiianum ishiianum* Imadaté, 1965

4′. Urotergite VII with 3 pairs of anterior setae (A1, 4, 5)……...…..……..…..
……..……*Condeellum ishiianum setosum* Imadaté, 1991

5. Striate band on abdomen VIII reduced (Fig. 27F), labrum not protruded…….6

5′. Striate band on abdomen VIII well developed or not reduced (Fig. 23F), labrum strikingly protruded.……...…..….*Australentulus* sp.

6′. Abdominal appendage III (Fig. 27C) without terminal vesicle and two setae, labial palpus with three setae…..……...…….……..…….7

6. Abdominal appendage III (Fig. 25C) without terminal vesicle and one seta, labial palpus with two setae…….…..…...…..*Silvestridia keijiana* (Imadaté, 1965)

7. Canal of maxillary gland with two additional dilatations (Fig. 29E)……..8

7′. Canal of maxillary gland simple without additional dilatation (Fig. 27E)……...…
……*Baculentulus* sp.

8. Urotergite IV with 3 pairs of anterior setae (A1, 2, 5).....……*Kenyentulus* sp. 1

8′. Urotergite IV with 2 pairs of anterior setae (A2, 5)……..*Kenyentulus* sp. 2

9. Urotergite V with 2 pairs of anterior setae (A4, 5)……..……..……10

9′. Urotergite V with 3 pairs of anterior setae (A1, 4, 5)……..……11

10. Urotergite VII with 2 pairs of anterior setae (A4, 5)……...……*Eosentomon* sp. 1

10′. Urotergite VII with a pairs of anterior setae (A5)…….……*Eosentomon* sp. 2

11. Urotergite VI with 3 pairs of anterior setae (A1, 4, 5)...…….....*Eosentomon* sp. 3

11′. Urotergite VI with 2 pairs of anterior setae (A4, 5)……...……..*Eosentomon* sp. 4

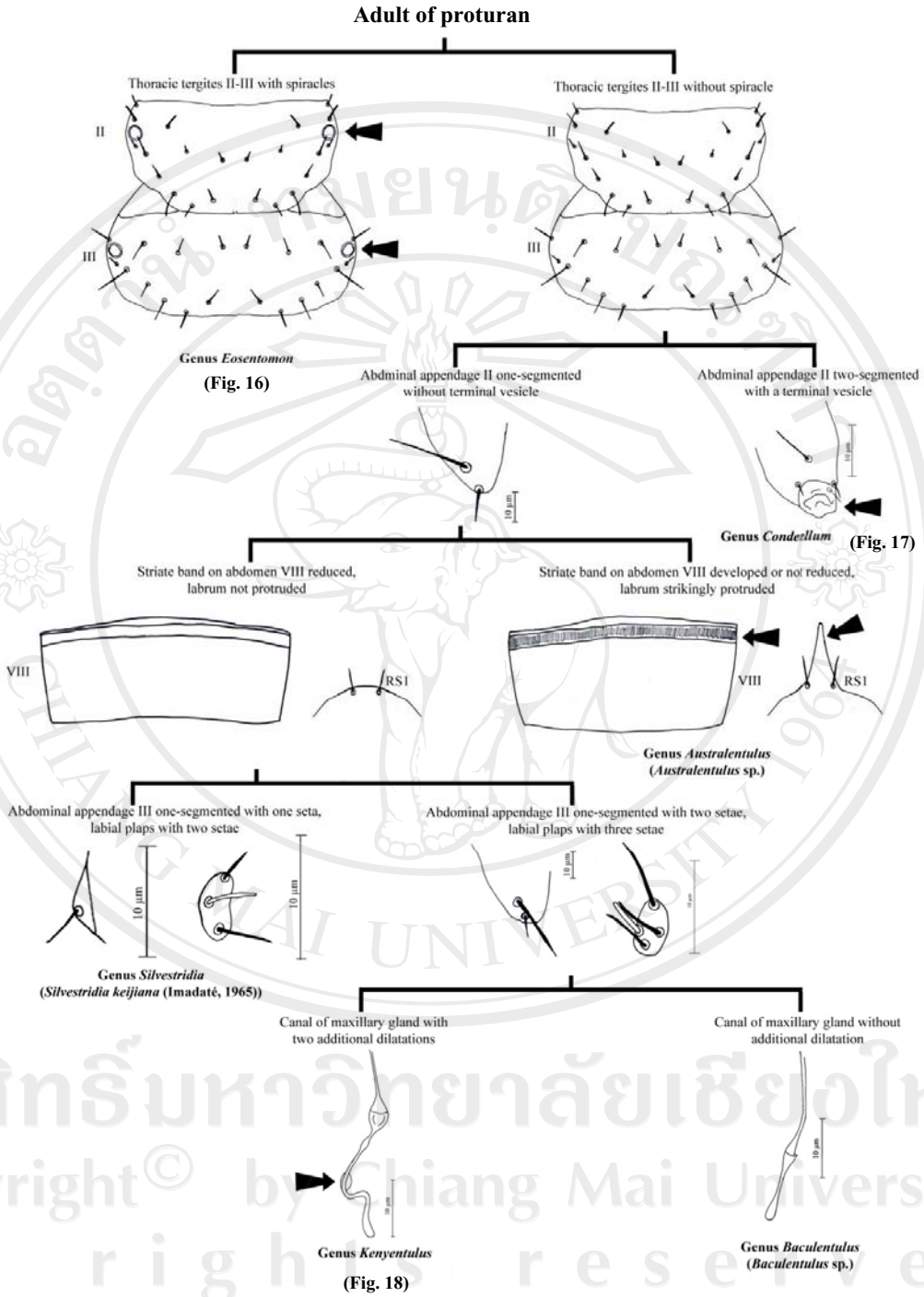

Figure 15 Pictorial key to genera for adult of proturan in Doi Inthanon National Park, Chiang Mai province, Thailand.

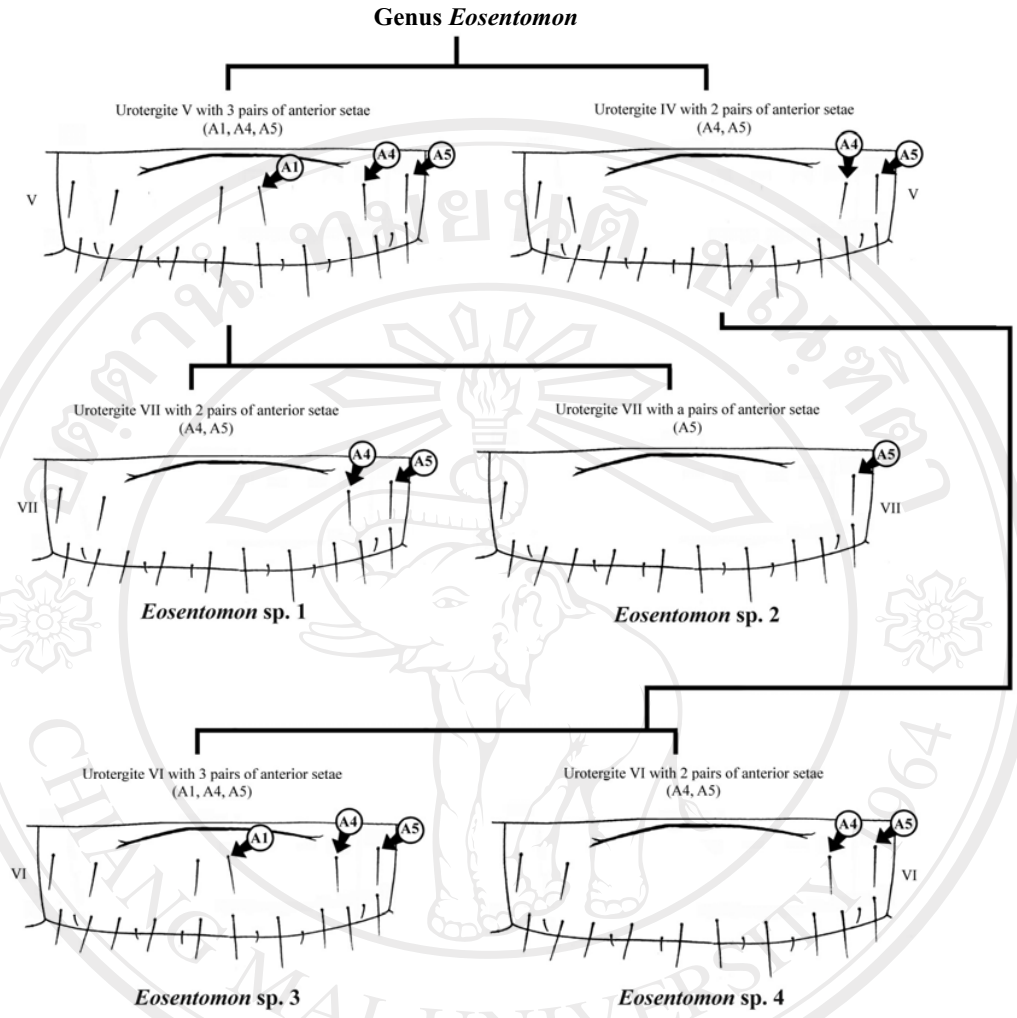

Figure 16 Pictorial key to species for adult of genus *Eosentomon* in Doi Inthanon National Park, Chiang Mai province, Thailand.

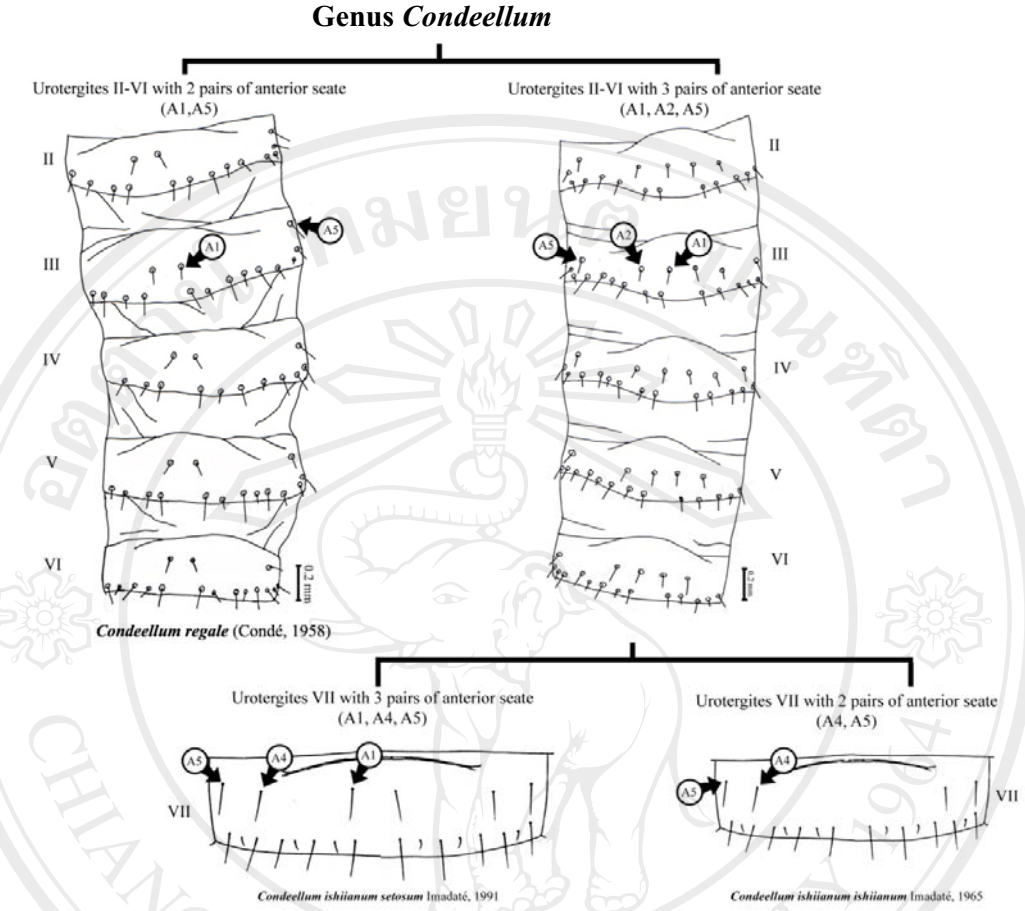

Figure 17 Pictorial key to species for adult of genus *Condeellum* in Doi Inthanon National Park, Chiang Mai province, Thailand.

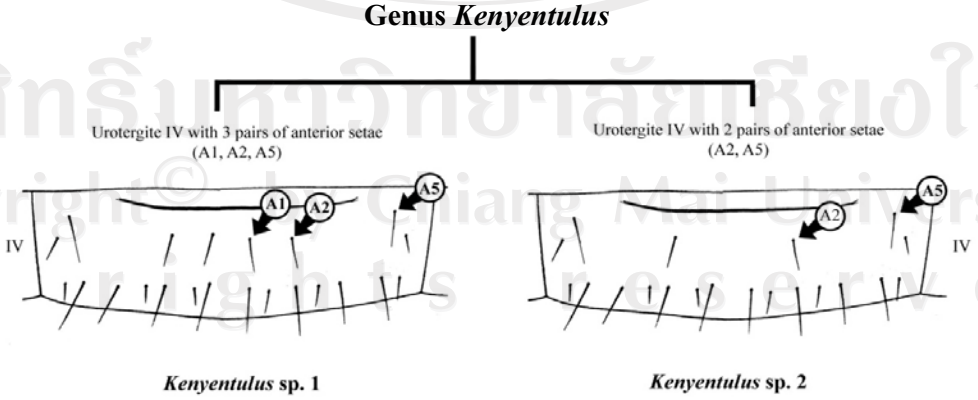

Figure 18 Pictorial key to species for adult of genus *Kenyentulus* in Doi Inthanon National Park, Chiang Mai province, Thailand.

4.5 Descriptions of species found in Doi Inthanon National Park, Chiang Mai province

In this study, identifications were based on adult characteristics including additional setae, labrum and LR ratio, psedoculi and PR ratio, maxillary palps, labial palps, canal of maxillary gland, foretarsi, BS ratio, TR ratio, empodium, EU ratio, chaetotaxy of thoracic and abdomen, abdominal appendages, spiracles, comb VIII, striate band, and genitalia. Drawings of morphological characters were based directly from specimens used for the construction of the pictorial keys and descriptions of each species.

Genus *Condeellum* Tuxen, 1963

Diagnosis: Protentomid with broad body, the abdominal appendages I-II (Fig. 19A and B) with 4 setae and terminal vesicle, the abdominal appendage III (Fig. 19C) with 3 setae, without terminal vesicle. Pseudoculus (Fig, 19D) circular-shape and without posterior prolongation. On the foretarsus *t*-1 and *t*-2 are long, thin and pointed and other sensilla filiform, strongly reduced or missing. Female squama genitalis (Fig. 19E) with pointed acrostyli.

Type-species: *Condeellum regale* (Condé, 1958).

Distribution: Madagascar, Nepal, China, Thailand, Borneo, and Taiwan.

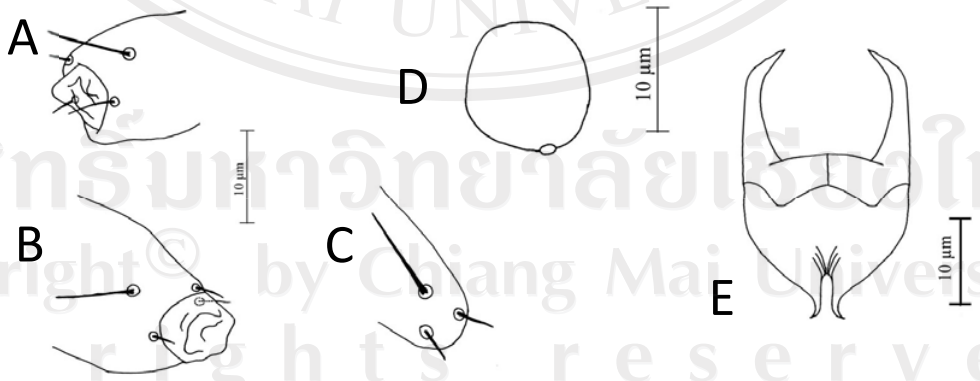

Figure 19 Structures of genus *Condeellum*.
A, abdominal appendage I; B, abdominal appendage II; C, abdominal appendage III; D, pseudoculus; E, female squama genitalis

***Condeellum regale* (Condé, 1958)**

(Fig. 20)

Diagnosis. Urotergites II–VII with two pairs of anterior setae (A4, 5).

Description. Body length 800 µm.

Head (Fig. 20A) Oval, length 90 µm, width 69 µm. Additional setae absent. Maxillary palps with two pointed sensilla. Labial palps with a tuft and 4 setae. Rostrum not protruded. Pseudoculus (Fig. 20B) almost circular, length 10 µm, width 9–11 µm, PR = 9. Canal of maxillary gland (Fig. 20C) with ball-shaped dilatation; proximal part forming sac-like dilation and terminal part globular dilatation.

Thorax (Table 2) Prosternum with two pairs of anterior setae (A1, M). Mesosternum and metasternum with four pairs of anterior part (A1, 2, 3, M).

Foretarsal (Fig. 20D and E) length 45 µm, claw length 16 µm, TR = 2.8; empodium length 2.9 µm, EU = 0.18, S-shaped setae length 18 µm. Dorsal sensilla *t*-1 and *t*-2 slim and long, BS = 0.88; *t*-3 spatulate, its apex surpassing tarsus. Exterior sensilla *a* spatulate, its apex reaching the base of α3; *b* normal, its apex reaching the base of γ2; *f* short, its apex surpassing the base of γ4. Interior sensilla *a′* spatulate, surpassing the base of *t*-1. Middle tarsal length 20–22 µm, claw length 13 µm. Hind tarsal length 23–25 µm, claw length 13 µm.

Abdomen (Table 2) Urotergite I with two pairs of anterior setae (A1, 2), with seven pairs of posterior setae. Urotergite II–VI with two pairs of anterior setae (A1, 5). Urotergite VII with two pairs of anterior setae (A4, 5).

Striate band on abdominal segment VIII absent; comb VIII (Fig. 20F) oblique rectangle, with about nine posterior teeth of equal size.

Genitals Male: unknown. Female: (Fig. 20H) robust and pointed acrostyli.

Specimens examined. 1 ♀, bamboo stands, 700 m altitude, Doi Inthanon National Park, Chiang Mai province, 30-I-2007.

Remark. Mesosternum has Mc, urosternite XII with six setae.

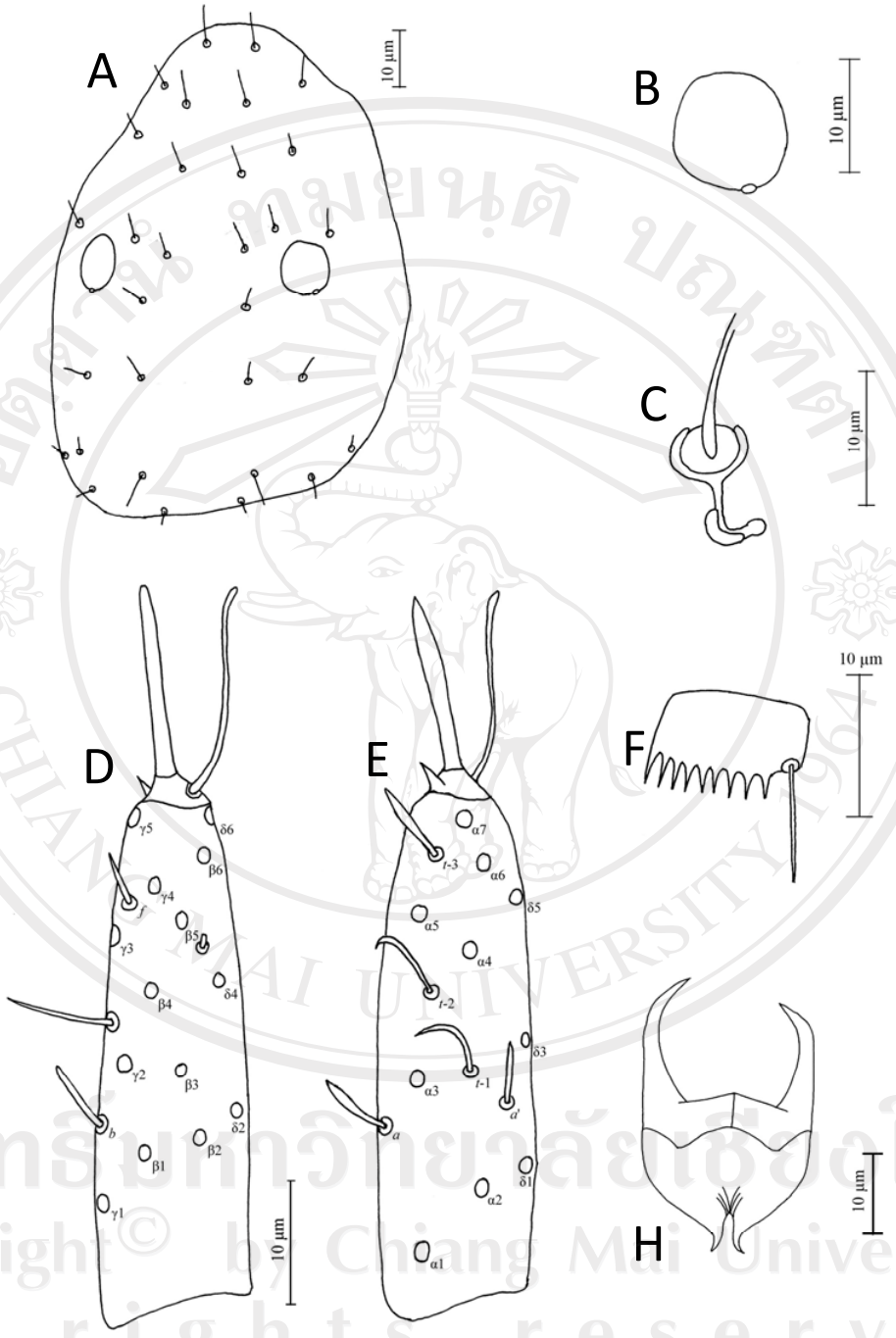

Figure 20 Structures of *Condeellum regale* (Condé).

A, head, dorsal view; B, pseudoculus; C, canal of maxillary gland; D, posterior view of foretarsus; E, anterior view of foretarsus; F, comb on abdominal VIII; H, female squama genitalis.

Table 2 Chaetotaxy of *Condeellum regale* (Condé)

	Dorsal		Ventral	
	Formula	Composition of setae	Formula	Composition of setae
Thorax I	6	1,1a,2	$\frac{2-2}{6}$	A1,M
				P1,2,3
Thorax II	$\frac{4-2}{14}$	A2,4,M	$\frac{6-2}{4}$	A1,2,3,M
		P1,1a,2,2a,3,4,5		P1,2
Thorax III	$\frac{4-2}{16}$	A2,4,M	$\frac{6-2}{6}$	A1,2,3,M
		P1,1a,2,2a,3,4,5,5a		P1,2,3
Abdomen I		A1,2		A1,2
		P1,1a,2,2a,3,4a,5		P1,2
Abdomen II-III		A1,5		A1,2
		P1,1a,2,2a,3,4,4a,5		P1,1a,2
Abdomen IV		A1,5		A1,2
		P1,1a,2,2a,3,4,4a,5		Pc,1,1a,2,2a
Abdomen V		A1,5		A1,2
		P1,1a,2,2a,3,4,4a,5		Pc,1,1a,2,2a
Abdomen VI		A1,5		A1,2
		P1,1a,2,2a,3,4,4a,5		Pc,1,1a,2,2a
Abdomen VII		A4,5		A1,2
		P1,1a,2,2a,3,3a,4,4a,5		Pc,1,1a,2,3
Abdomen VIII		A1,3,5		

		P1,1a,2,3a,4,4a,5		P1,1a,2
Abdomen IX	14	1,1a,2,2a,3,4,5	4	1,2
Abdomen X	12	1,2,2a,3,4,5	4	1,2
Abdomen XI	8	1,2,2a,3	6	1,2,3
Abdomen XII	9	Ac,1,2,3,4	8	1,2,3,4

***Condeellum ishiianum ishiianum* Imadaté, 1965**

(Fig. 21)

Diagnosis. Urotergite II–VI with three pairs of anterior setae (A1, 2, 5). Urotergite VII with two pairs of anterior setae (A4, 5).

Description. Body length 890, 960 µm.

Head (Fig. 21A) Oval, length 95, 115 µm, width 82, 90 µm. Additional setae absent. Maxillary palps with two pointed sensilla. Labial palps with a tuft and 4 setae. Rostrum not protruded. Pseudoculus (Fig. 21B) almost circular, length 10–11 µm, width 9–11 µm, PR = 9.5–10. Canal of maxillary gland (Fig. 21C) with ball-shaped dilatation; proximal part forming sac-like dilation and terminal part globular dilatation.

Thorax (Table 3) Prosternum with three pairs of anterior setae (A1, 2, M). Mesosternum with four pairs of anterior setae (A1, 2, 3, M). Metasternum with five pairs of anterior setae (A1, 2, 3, 4, M).

Foretarsal (Fig. 21D and E) length 51–59 µm, claw length 20–21 µm, TR = 2.4–2.81; empodium length 4 µm, EU = 0.19, S–shaped setae length 23 µm. Dorsal sensilla *t*-1 and *t*-2 slim and long, BS = 0.89–0.97; *t*-3 spatulate. Exterior sensilla *a* spatulate, its apex reaching the base of α3; *b* normal, its apex surpassing the base of γ2; *f* short, its apex surpassing the base of γ4. Interior sensilla *a′* spatulate, its apex surpassing the base of *t*-1. Middle tarsal length 24–29 µm, claw length 13–17 µm. Hind tarsal length 28–35 µm, claw length 14–18 µm.

Abdomen (Table 3) Urotergite I with two pairs of anterior setae (A1, 2), with seven pairs of posterior setae. Urotergite II–VI with three pairs of anterior setae (A1, 2, 5). Urotergite VII with two pairs of anterior setae (A4, 5).

Striate band on abdominal segment VIII absent; comb VIII (Fig. 21F) consisting of about eight posterior teeth of irregular size.

Genitals Male: unknown. Female: (Fig. 21H) robust and pointed acrostyli.

Specimens examined. 1 ♀, bamboo stands, 700 m altitude; 1 ♀, evergreen hill forest, 1650 m altitude, Doi Inthanon National Park, Chiang Mai province, 30-I-2007.

Remark. 1 ♀, bamboo stands, P3 on left–hand on prosternum is missing, A3 on right–hand on metasternum is missing.

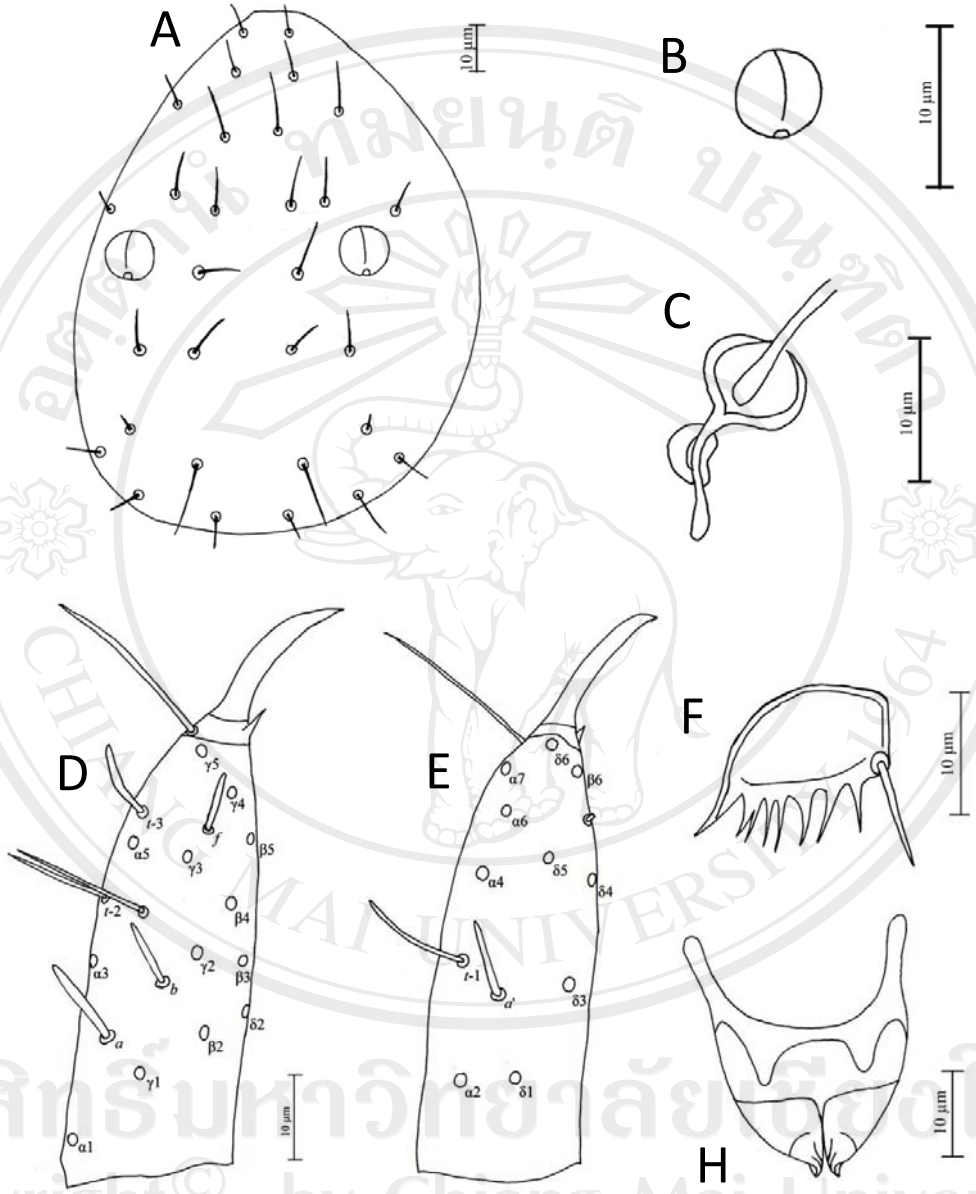

Figure 21 Structures of *Condeellum ishiianum ishiianum* Imadaté.
A, head, dorsal view; B, pseudoculus; C, canal of maxillary gland; D, exterior view of foretarsus; E, interior view of foretarsus; F, comb on abdominal VIII; H, female squama genitalis.

Table 3 Chaetotaxy of *Condeellum ishiianum ishiianum* Imadaté.

	Dorsal		Ventral	
	Formula	Composition of setae	Formula	Composition of setae
Thorax I	6	1,1a,2	$\frac{4-2}{6}$	A1,2,M
				P1,2,3
Thorax II	$\frac{4-2}{14}$	A2,4,M	$\frac{6-2}{4}$	A1,2,3,M
		P1,1a,2,2a,3,4,5		P1,2
Thorax III	$\frac{4-2}{14}$	A2,4,M	$\frac{8-2}{4}$	A1,2,3,4,M
		P1,1a,2,2a,3,4,5		P1,2
Abdomen I		A1,2		A1,2
		P1,1a,2,2a,3,4a,5		P1,2
Abdomen II-III		A1,2,5		A1,2
		P1,1a,2,2a,3,4,4a,5		P1,1a,2
Abdomen IV		A1,2,5		A1,2
		P1,1a,2,2a,3,4,4a,5		Pc,1,1a,2,2a
Abdomen V		A1,2,5		A1,2
		P1,1a,2,2a,3,4,4a,5		Pc,1,1a,2,2a
Abdomen VI		A1,2,5		A1,2
		P1,1a,2,2a,3,4,4a,5		Pc,1,1a,2,2a
Abdomen VII		A4,5		A1,2
		P1,1a,2,2a,3,3a,4,4a,5		Pc,1,1a,2,3
Abdomen VIII		A1,3,5		

		P1,1a,2,3a,4,4a,5		P1,1a,2
Abdomen IX	14	1,1a,2,2a,3,4,5	4	1,2
Abdomen X	12	1,2,2a,3,4,5	4	1,2
Abdomen XI	8	1,2,2a,3	6	1,2
Abdomen XII	9	Ac,1,2,3,4	8	1,2,3,4

***Condeellum ishiianum setosum* Imadaté, 1991**

(Fig. 22)

Diagnosis. Urotergite I–VII with three pairs of anterior setae (A1, 2, 5).

Description. Body length 780–850 µm.

Head (Fig. 22A) Oval, length 82–94 µm, width 70–75 µm. Additional setae absent. Maxillary palps with two pointed sensilla. Labial palps with a tuft and 4 setae. Rostrum not protruded. Pseudoculus (Fig. 22B) almost circular, length 9 µm, width 8.5 µm, PR = 10–10.4. Canal of maxillary gland (Fig. 22C) with ball-shaped dilatation; proximal part forming sac-like dilation and terminal part globular dilatation.

Thorax (Table 4) Prosternum with four pairs of anterior setae (A1, 2, M1, 2). Mesosternum with four pairs of anterior setae (A1, 2, 3, M) and metasternum with five pairs of anterior setae (A1, 2, 3, 4, M).

Foretarsal (Fig. 22D and E) length 41–51 µm, claw length 14–18 µm, TR = 2.89–2.9; empodium length 4–5 µm, EU = 0.22–0.29, S-shaped setae length 13–14 µm. Dorsal sensilla *t*-1 and *t*-2 slim and long, BS = 0.82–0.92; *t*-3 spatulate, its apex surpassing the base of α7. Exterior sensilla *a* spatulate, its apex reaching the base of α3; *b* normal, its apex surpassing the base of γ2; *f* short, its apex reaching the base of γ4. Interior sensilla *a′* spatulate, surpassing the base of *t*–1. Middle tarsal length 17–23 µm, claw length 10–12 µm. Hind tarsal length 20–27 µm, claw length 11–14 µm.

Abdomen (Table 4) Urotergite I with two pairs of anterior setae (A1, 2), with seven pairs of posterior setae. Urotergite II–VI with three pairs of anterior setae (A1, 2, 5). Urotergite VII with three pairs of anterior setae (A1, 4, 5). Urosternite IX with seven setae.

Striate band on abdominal segment VIII absent; comb VIII (Fig. 22F) consisting of about ten posterior teeth of irregular size.

Genitals Male: (Fig. 22G) robust, basistylus with short setae. Female: (Fig. 22H) pointed acrostyli.

Specimens examined. 2 ♂, bamboo stands, 700 m altitude; 1 ♂, evergreen hill forest, 2100 m altitude; 1 ♀, evergreen hill forest, 1650 m altitude, Doi Inthanon National Park, Chiang Mai province, 30-I-2007.

Remark. 1 ♂, evergreen hill forest, prosternum with two pairs of anterior setae (A1, M1) and urotergite IX with 16 setae.

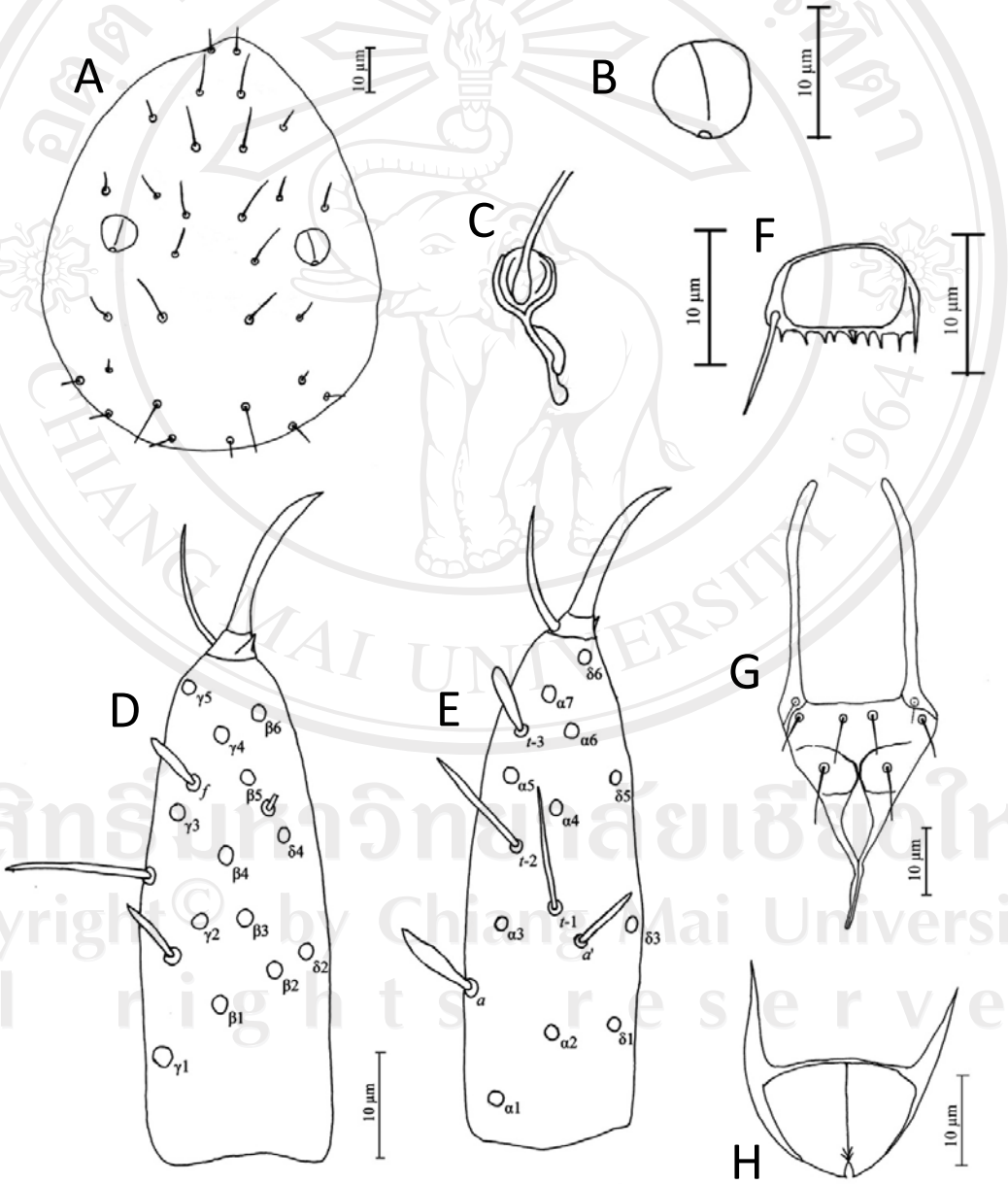

Figure 22 Structures of *Condeellum ishiianum setosum* Imadaté.

A, dorsal view of head; B, pseudoculus; C, canal of maxillary gland; D, posterior view of foretarsus; E, anterior view of foretarsus; F, comb on abdominal VIII; G, male genitalis; H, female squama genitalis.

Table 4 Chaetotaxy of *Condeellum ishiianum setosum* Imadaté.

	Dorsal		Ventral	
	Formula	Composition of setae	Formula	Composition of setae
Thorax I	6	1,1a,2		A1,2,M1,2
				P1,2,3
Thorax II		A2,4,M		A1,2,3,M
		P1,1a,2,2a,3,4,5		P1,2
Thorax III		A2,4,M		A1,2,3,4,M
		P1,1a,2,2a,3,4,5		P1,2
Abdomen I		A1,2		A1,2
		P1,1a,2,2a,3,4a,5		P1,2
Abdomen II-III		A1,2,5		A1,2
		P1,1a,2,2a,3,4,4a,5		P1,1a,2
Abdomen IV		A1,2,5		A1,2
		P1,1a,2,2a,3,4,4a,5		Pc,1,1a,2,2a
Abdomen V		A1,2,5		A1,2

		P1,1a,2,2a,3,4,4a,5		Pc,1,1a,2,2a
Abdomen VI		A1,2,5		A1,2
		P1,1a,2,2a,3,4,4a,5		Pc,1,1a,2,2a
Abdomen VII		A1,4,5		A1,2
		P1,1a,2,2a,3,3a,4,4a,5		Pc,1,1a,2,3
Abdomen VIII		A1,3,5		
		P1,1a,2,3a,4,4a,5		P1,1a,2
Abdomen IX	14	1,1a,2,2a,3,4,5	6	1,1a,2
Abdomen X	12	1,2,2a,3,4,5	4	1,2
Abdomen XI	8	1,2,2a,3	6	1,2,3
Abdomen XII	9	Ac,1,2,3,4	8	1,2,3,4

Genus *Australentulus* Tuxen, 1967

Diagnosis: The abdominal appendage I (Fig. 23A) with 4 setae and terminal vesicle, and with 3 setae on the abdominal appendages II–III (Fig. 23B and C). Labial palps (Fig. 23D) more or less reduced. Canal of maxillary gland (Fig 23E) simple. Sensilla *t*-3 in foretarsus not willow-leaf-like, but shaped as a longer or shorter bud, from 2–5 times as long as broad, rounded at apex, and mostly parallel-sided; *t*-1 claviform. Striate band on abdomen VIII (Fig. 23F) developed or not reduced. Urosternite VIII with 4 setae and no posterior setae near the hind border.

Type-species: *Australentulus australensis* (Condé, 1957).

Distribution: Thailand, Cambodia, Singapore, Vietnam, Java, and Australia.

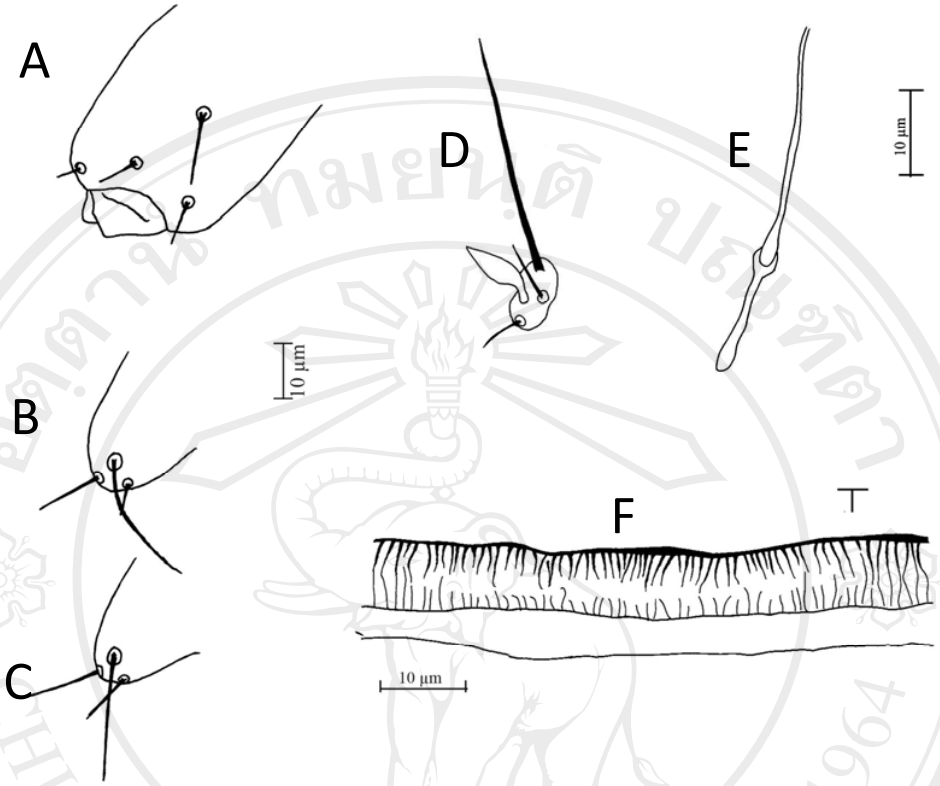

Figure 23 Structures of genus *Australentulus*.
A, abdominal appendage I; B, abdominal appendage II; C, abdominal appendage III; D, labial palpus; E, canal of maxillary gland; F, striate band.

***Australentulus* sp.**

(Fig. 24)

Diagnosis. Striate band on abdominal segment VIII well developed. Urotergite V with three pairs of anterior setae (A1, 2, 5).

Description. Body length 1575–1775 µm.

Head (Fig. 24A) Oval, length 145–147 µm, width 118–120 µm. Labrum distinctly protruded, 28–29 µm, LR = 4.83–4.92. Additional setae absent. Pseudoculus (Fig. 24B) almost circular, length 12.5 µm, width 12.5 µm, PR = 13.3–14.5. Canal of maxillary gland (Fig. 24C) simple.

Thorax (Table 5) Mesonotum and metanotum with three pairs of anterior setae (A2, 4, M).

Foretarsal (Fig. 24D and E) length 115–125 µm, claw length 30 µm, TR = 3.8–4.2; empodium length 5–6 µm, EU = 0.17–0.22, S-shaped setae length 35–40 µm. Dorsal sensilla *t*-1 club-shaped, BS = 0.36; *t*-2 normal; *t*-3 small and spatulate. Exterior sensilla *a* long, its apex reaching the base of γ3; *b* and *c* very close to each other; *b* long, surpassing the base of *f*; *c* relatively short, not reaching the base of *e*; *d* long, its apex reaching the base of *f*; *e* and *f* very close to each other, its apex reaching the base of γ5; *g* relatively short, its apex reaching the base to γ5. Interior sensilla *a′* broad, its apex reaching the base of δ3; *b′* long, its apex reaching the base of *c′*; *c′* long, its apex reaching tarsus. Middle tarsal length 54–57 µm, claw length 12–17 µm. Hind tarsal length 60–68 µm, claw length 18–23 µm.

Abdomen (Table 5) Urotergite II–V with three pairs of anterior setae (A1, 2, 5). Urotergite VI–VII with four pairs of anterior setae (A1, 2, 4, 5). Urotergite I–VII with eight pairs of posterior setae.

Striate band on abdominal segment VIII well developed, with distinct dense striae; comb VIII (Fig. 24F) consisting of about twelve posterior teeth of irregular size.

Genitals Male: unknown. Female: (Fig. 24H) with pointed acrostyli.

Specimens examined. 3 ♀, evergreen hill forest, 2100 m altitude; Doi Inthanon National Park, Chiang Mai province, 30-I-2007.

Remark. 1 ♀, Evergreen hill forest, pronotum with two pairs of anterior setae (A1, M) and A4 in the right on urotergite V is lacking.

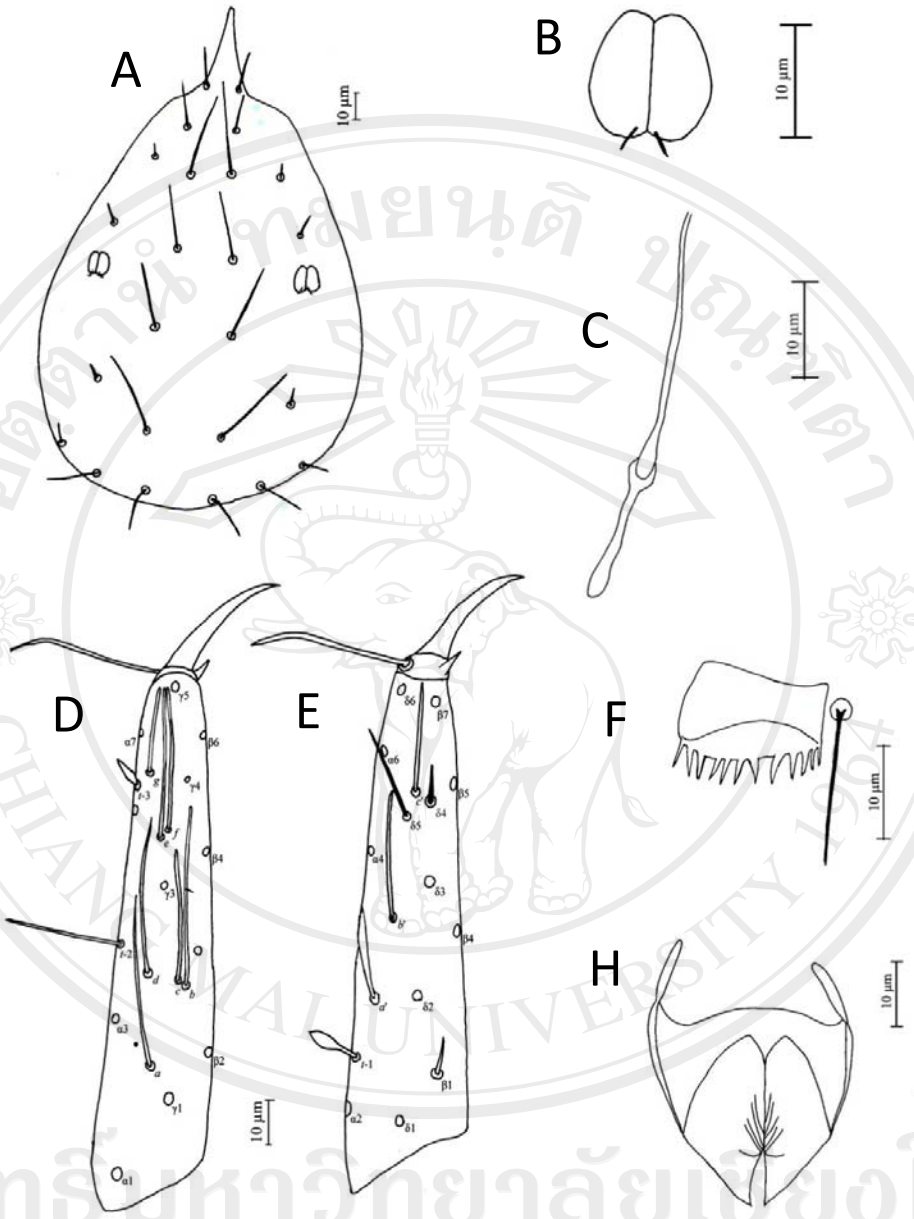

Figure 24 Structures of *Australentulus* sp.
A, dorsal view of head; B, pseudoculus; C, canal of maxillary gland; D, exterior view of foretarsus; E, interior view of foretarsus; F, comb on abdominal VIII; H, female squama genitalis.

Table 5 Chaetotaxy of *Australentulus* sp.

	Dorsal		Ventral	
	Formula	Composition of setae	Formula	Composition of setae
Thorax I	4	1,2		A1,2,M1,2
				P1,2,3
Thorax II		A2,4,M		Ac,2,3,4,M
		P1,1a,2,2a,3,4,5,5a		P1,2
Thorax III		A2,4,M		Ac,2,3,4,M
		P1,1a,2,2a,3,4,5,5a		P1,2
Abdomen I		A1,2		Ac,2
		P1,1a,2,2a,3,4a,5,5a		P1,2
Abdomen II-III		A1,2,5		Ac,2
		P1,1a,2,2a,3,4,4a,5		Pc,2,3
Abdomen IV		A1,2,5		Ac,2
		P1,1a,2,2a,3,4,4a,5		P1,P1a,2,3
Abdomen V		A1,2,5		Ac,2
		P1,1a,2,2a,3,4,4a,5		P1,P1a,2,3
Abdomen VI		A1,2,4,5		Ac,2
		P1,1a,2,2a,3,4,4a,5		P1,P1a,2,3
Abdomen VII		A1,2,4,5		Ac,2

		P1,1a,2,2a,3,4,4a,5		P1,P1a,2,3
Abdomen VIII		A1,3,5,M1,2,3,5		A1,2
		P2,3,4,5		P1
Abdomen IX	14	1,1a,2,2a,3,4,5	4	1,2
Abdomen X	12	1,2,2a,3,4,5	4	1,2
Abdomen XI	6	1,2,3	6	1,2,3
Abdomen XII	9	Ac,1,2,3,4	6	1,2,3

Genus *Silvestridia* Bonet, 1942

Diagnosis: Acerentomids with the abdominal appendage I (Fig. 25A) with 4 setae and terminal vesicle, and with usually one sub apical seta on the abdominal appendages II–III (Fig. 25B and C). Labial palps (Fig. 25D) reduced with only two setae and a sensillum. Mouthparts small. Canal of Maxillary gland (Fig. 25E) simple. Sensillum *b* in foretarsus much longer than *c* and broad, spindle-shaped. Striate band on abdominal segment VIII (Fig. 25F) reduced, dispersed striae in the band area proceeding from the proximal border. Comb VIII concave, with small teeth. Hind tarsus at most one and a half times the length of its claw.

Type-species: *Silvestridia artiochaeta* (Bonet, 1942).

Distribution: Mexico, Brazil, Madagascar, Seychelles, Reunion, Thailand, Java, Borneo, Taiwan, and Japan.

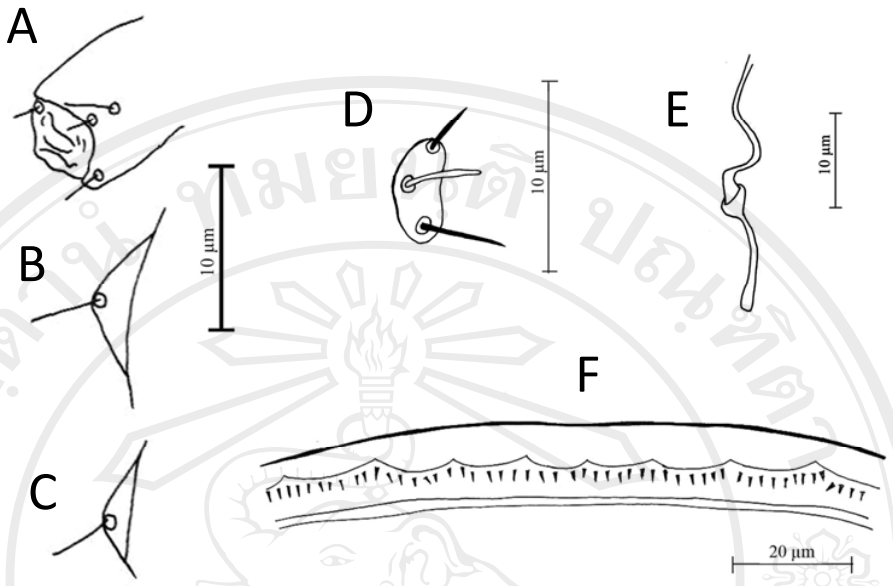

Figure 25 Structures of genus *Silvestridia*.
A, abdominal appendage I; B, abdominal appendage II; C, abdominal appendage III; D, labial palpus; E, canal of maxillary gland; F, striate band.

***Silvestridia keijiana* (Imadaté, 1965)**
(Fig. 26)

Diagnosis. Mesonotum and metanotum with three pairs of anterior setae (A2, 4, M). Urotergite I with three pairs of anterior setae (A1, 2, 5).

Description. Body length 600–780 µm.

Head (Fig. 26A) Oval, length 68–76 µm, width 63–68 µm. Maxillary palps with two slender sensilla on penultimate segment. Labium palps with two setae and a sausage-shaped sensillum. Additional setae absent. Rostrum not protruded. Pseudoculus (Fig. 26B) almost circular, length 6 µm, width 6 µm, PR = 12.0–12.7. Canal of maxillary gland (Fig. 26C) simple.

Thorax (Table 6) Mesonotum and metanotum with three pairs of anterior setae (A2, A4, M), with seven pairs of posterior setae (P1, 1a, 2, 2a, 3, 4, 5).

Foretarsal (Fig. 26D and E) length 43–45 μm, claw length 15–16 μm, TR = 2.7–3.0; empodium length 3–4 μm, EU = 0.19–0.25, S–shaped setae length 16–23 μm. Dorsal sensilla *t*-1 club–shaped, BS = 0.33–0.42; *t*-2 normal and long; *t*-3 small and spatulate. Exterior sensilla *a* relatively short, its apex reaching the base of *t*-2; *b* long, surpassing the base of *f*; *c* and *d* very close to each other; *c* relatively short, its apex reaching the base of α5; *d* long, its apex surpassing the base of α5; *e* and *f* very close to each other, its apex not reaching the base of γ5, *e* longer than *f*; *g* relatively short, its apex reaching the base to γ5. Interior sensilla *a′* broad and long, its apex surpassing the base of *b′*; *b′* long, its apex reaching the base of *c′*; *c′* long, its apex reaching tarsus. Middle tarsal length 18–21 μm, claw length 11–13 μm. Hind tarsal length 21–24 μm, claw length 12–14 μm.

Abdomen (Table 6) Urotergite I with three pairs of anterior setae (A1, 2, 5), with six pairs of posterior setae (P1, 1a, 2, 2a, 3, 5). Urotergite II–VI with two pairs of anterior setae (A2, 5), with eight pair of posterior setae (P1, 1a, 2, 2a, 3, 4, 4a, 5). Urosternite I has one posterior setae (P1).

Striate band on abdominal segment VIII reduced, with wedge-shaped dispersed at the anterior margin; comb VIII (Fig. 26F) consisting of about seven posterior teeth of small size.

Genitals Male: unknown. Female: (Fig. 26H) with pointed acrostyli.

Specimens examined. 9 ♀, evergreen hill forest, 1650 m altitude, Doi Inthanon National Park, Chiang Mai province, 30-I-2007.

Remark. 1 ♀, evergreen hill forest, Ac on urosternite I is lacking.

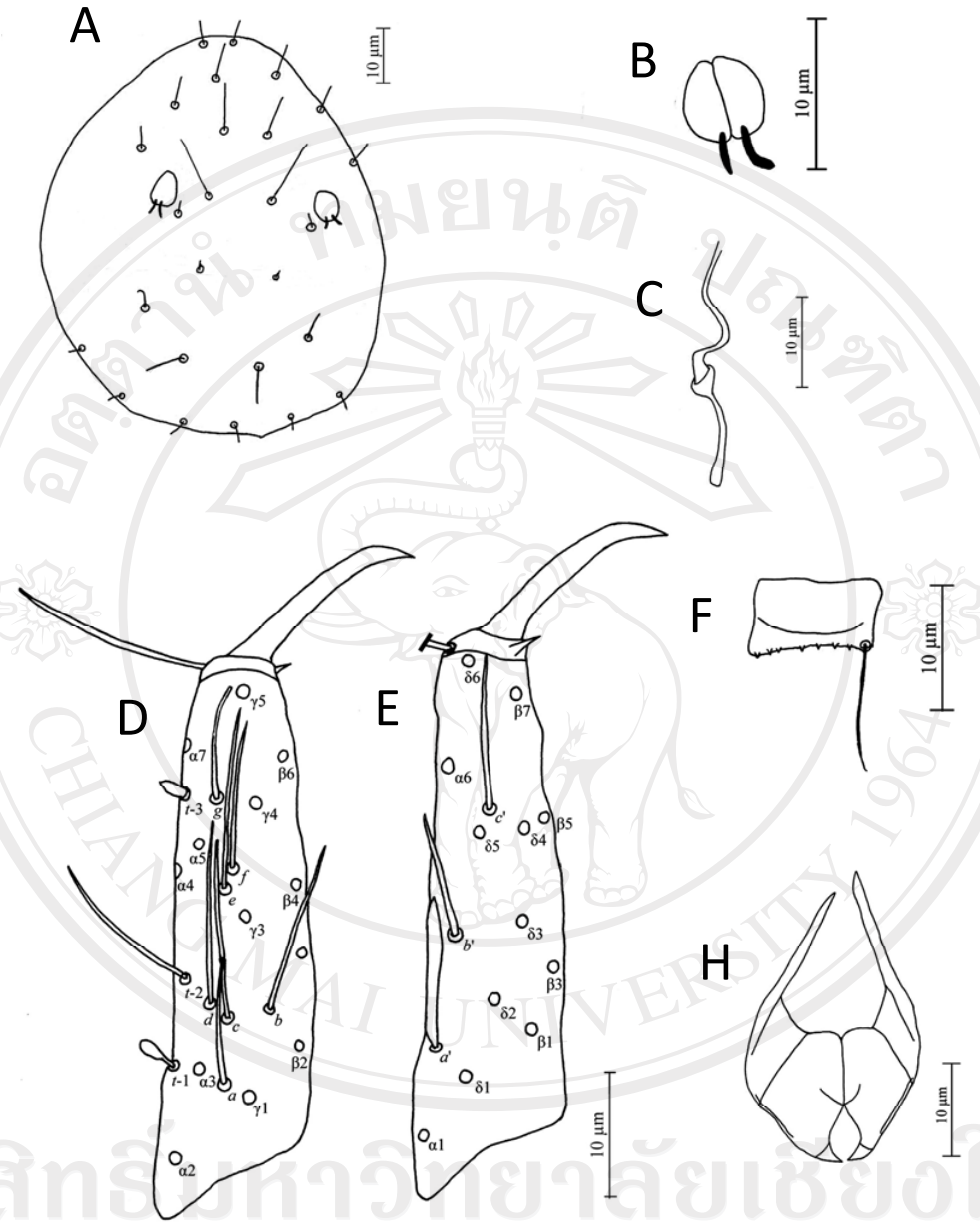

Figure 26 Structures of *Silvestridia keijiana* (Imadaté).
A, dorsal view of head; B, pseudoculus; C, canal of maxillary gland; D, exterior view of foretarsus; E, interior view of foretarsus; F, comb on abdominal VIII; H, female squama genitalis.

Table 6 Chaetotaxy of *Silvestridia keijiana* (Imadaté)

	Dorsal		Ventral	
	Formula	Composition of setae	Formula	Composition of setae
Thorax I	4	1,2	$\frac{4-4}{6}$	A1,2,M1,2
				P1,2,3
Thorax II	$\frac{4-2}{14}$	A2,4,M	$\frac{7-2}{4}$	Ac,2,3,4,M
		P1,1a,2,2a,3,4,5		P1,2
Thorax III	$\frac{4-2}{14}$	A2,4,M	$\frac{7-2}{4}$	Ac,2,3,4,M
		P1,1a,2,2a,3,4,5		P1,2
Abdomen I		A1,2,5		Ac,2
		P1,1a,2,2a,3,5		P1
Abdomen II-III		A2,5		Ac,2
		P1,1a,2,2a,3,4,4a,5		Pc,2,3
Abdomen IV		A2,5		Ac,2
		P1,1a,2,2a,3,4,4a,5		P1,1a,2,3
Abdomen V		A2,5		Ac,2
		P1,1a,2,2a,3,4,4a,5		P1,1a,2,3
Abdomen VI		A2,5		Ac,2
		P1,1a,2,2a,3,4,4a,5		P1,1a,2,3
Abdomen VII		A5		Ac,2
		P1,1a,2,2a,3,3a,4,4a,5		P1,1a,2,3
Abdomen VIII	$\frac{4-7}{8}$	A3,5,Mc,2,3,4		
		P2,3,4,5		P1,2

Abdomen IX	12	1,2,3,3a,4,5	4	1,2
Abdomen X	12	1,2,3,3a,4,5	4	1,2
Abdomen XI	6	1,2,3	4	1,2
Abdomen XII	9	Ac,1,2,3,4	6	1,2,3

Genus *Baculentulus* Tuxen, 1977

Diagnosis: Acerentomids with the abdominal appendage I (Fig. 27A) with 4 setae and terminal vesicle, and the abdominal appendages II–III (Fig. 27B and C) with one long and one very short setae. Labial palps (Fig. 27D) reduced with 2–3 setae. Canal of maxillary gland (Fig. 27E) simple. Foretarsus sensillum *t*-1 baculiform. The striate band (Fig. 27F) reduced. Comb VIII more or less oblique.

Type-species: *Baculentulus becki* (Tuxen, 1976)

Distribution: North and South America, East Africa, Southwest Asia, India, Thailand, Japan, and Australia.

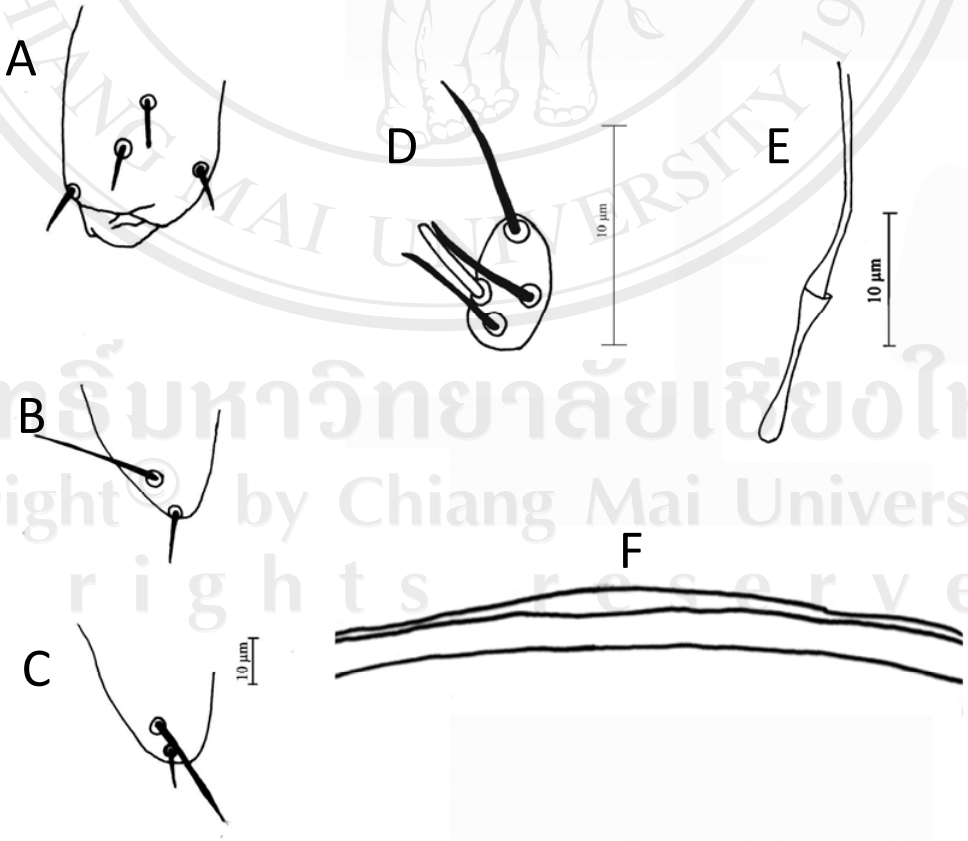

Figure 27 Structures of genus *Baculentulus*.
A, abdominal appendage I; B, abdominal appendage II; C, abdominal appendage III; D, labial palpus; E, canal of maxillary gland; F, striate band.

***Baculentulus* sp.**

(Fig. 28)

Diagnosis. Interior sensillum *b′* absent.

Description. Body length 790–893 µm.

Head (Fig. 28A) Oval, length 84–88 µm, width 71–77 µm. Additional setae absent. Rostrum not protruded. Pseudoculus (Fig. 28B) almost circular, length 6–6.5 µm, width 6.4–7 µm, PR = 13.3–14.7. Canal of maxillary gland (Fig. 28C) simple.

Thorax (Table 7) Mesonotum and metanotum with three pairs of anterior setae (A2, 4, M), with eight pairs of posterior setae (P1, 1a, 2, 2a, 3, 4, 5, 5a).

Foretarsal (Fig. 28D and E) length 64–71 µm, claw length 21–22 µm, TR = 3–3.2; Empodium length 3.9–5 µm, EU = 0.18–0.23, S-shaped setae length 24–27 µm. Dorsal sensilla *t*-1 baculiform, BS = 0.42–0.45; *t*-2 normal and long; *t*-3 small and spatulate. Exterior sensilla *a* long, its apex reaching the base of *γ3*; *b* long, reaching the base of *g*; *c* long, its apex reaching the base of *f*; *d* long, its apex reaching the base of δ5; *e* and *f* long, its apex reaching tarsus; *g* relatively short, its apex reaching the base to α7. Interior sensilla *a′* broad and long, distally contracted, its apex surpassing the base of *γ3*; *b′* absent; *c′* long, its apex surpassing tarsus. Middle tarsal length 29–32 µm, claw length 13–15 µm. Hind tarsal length 33–36 µm, claw length 13–16 µm.

Abdomen (Table 7) Urotergite I with two pairs of anterior setae (A1, 2), seven pairs of posterior setae. Urotergites II–VI with three pairs of anterior setae (A1, 2, 5). Urotergite VII with two pairs of anterior setae (A4, 5). Urotergites II–VII with eight pairs of posterior setae.

Striate band on abdominal segment VIII reduced; comb VIII (Fig. 28F) consisting of about nine posterior teeth of irregular size.

Genitals Male: (Fig. 28G) basistylus with short setae. Female: (Fig. 28H) with pointed acrostyli.

Specimens examined. 1 ♂, 3 ♀, evergreen hill forest, 1650 m altitude, Doi Inthanon National Park, Chiang Mai province, 30-I-2007.

Remark. –

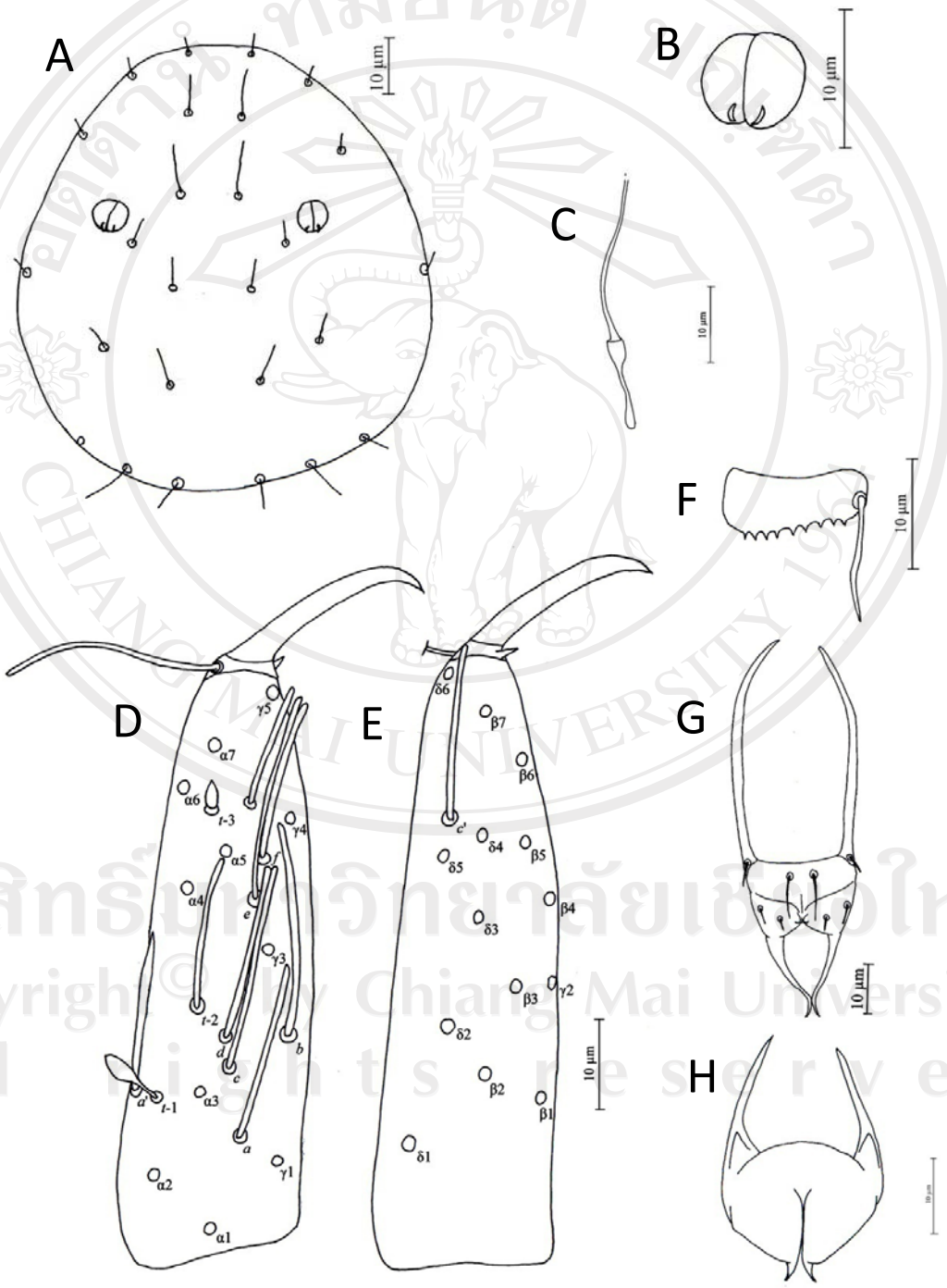

Figure 28 Structures of *Baculentulus* sp.

A, dorsal view of head; B, pseudoculus; C, canal of maxillary gland; D, anterior view of foretarsus; E, posterior view of foretarsus; F, comb on abdominal VIII; G, male squama genitalis; H, female squama genitalis.

Table 7 Chaetotaxy of *Baculentulus* sp.

	Dorsal		Ventral	
	Formula	Composition of setae	Formula	Composition of setae
Thorax I	4	1,2		A1,2,M1,2
				P1,2,3
Thorax II		A2,4,M		Ac,2,3,4,M
		P1,1a,2,2a,3,4,5,5a		P1,2
Thorax III		A2,4,M		Ac,2,3,4,M
		P1,1a,2,2a,3,4,5,5a		P1,2
Abdomen I		A1,2		Ac,2
		P1,1a,2,2a,3,4a,5		P1
Abdomen II-III		A1,2,5		Ac,2
		P1,1a,2,2a,3,4,4a,5		Pc,2,3
Abdomen IV		A1,2,5		Ac,2
		P1,1a,2,2a,3,4,4a,5		P1,P1a,2,3
Abdomen V		A1,2,5		Ac,2
		P1,1a,2,2a,3,4,4a,5		P1,P1a,2,3
Abdomen VI		A1,2,5		Ac,2

		P1,1a,2,2a,3,4,4a,5		P1,P1a,2,3
Abdomen VII		A4,5		Ac,2
		P1,1a,2,2a,3,4,4a,5		P1,P1a,2,3
Abdomen VIII		A1,3,5,Mc,2,3,5		A1,2
		P2,3,4,5		
Abdomen IX	14	1,1a,2,2a,3,4,5	4	1,2
Abdomen X	12	1,2,2a,3,4,5	4	1,2
Abdomen XI	6	1,2,3	6	1,2,3
Abdomen XII	9	Ac,1,2,3,4	6	1,2,3

Genus *Kenyentulus* Tuxen, 1981

Diagnosis: The abdominal appendage I (Fig. 29A) with 4 setae and terminal vesicle, and the abdominal appendages II and III (Fig. 29B and C) with 2 setae, without terminal vesicle, a long sub apical one. Labial palps (Fig. 29D) reduced with 3 setae. Canal of maxillary gland (Fig. 29E) with 2 or 3 dilatations proximal to calyx. Sensilla *t*-1 on foretarsus baculiform, *t*-3 knob–shaped, *b′* present. Striate band (Fig. 29F) reduced. Urosternite VIII without posterior setae.

Type–species: *Kenyentulus kenyanus* (Condé, 1948).

Distribution: Seychelles, India, Nepal, China, Thailand, Singapore, Malaya, Java, Borneo, Taiwan, Korea, and Japan

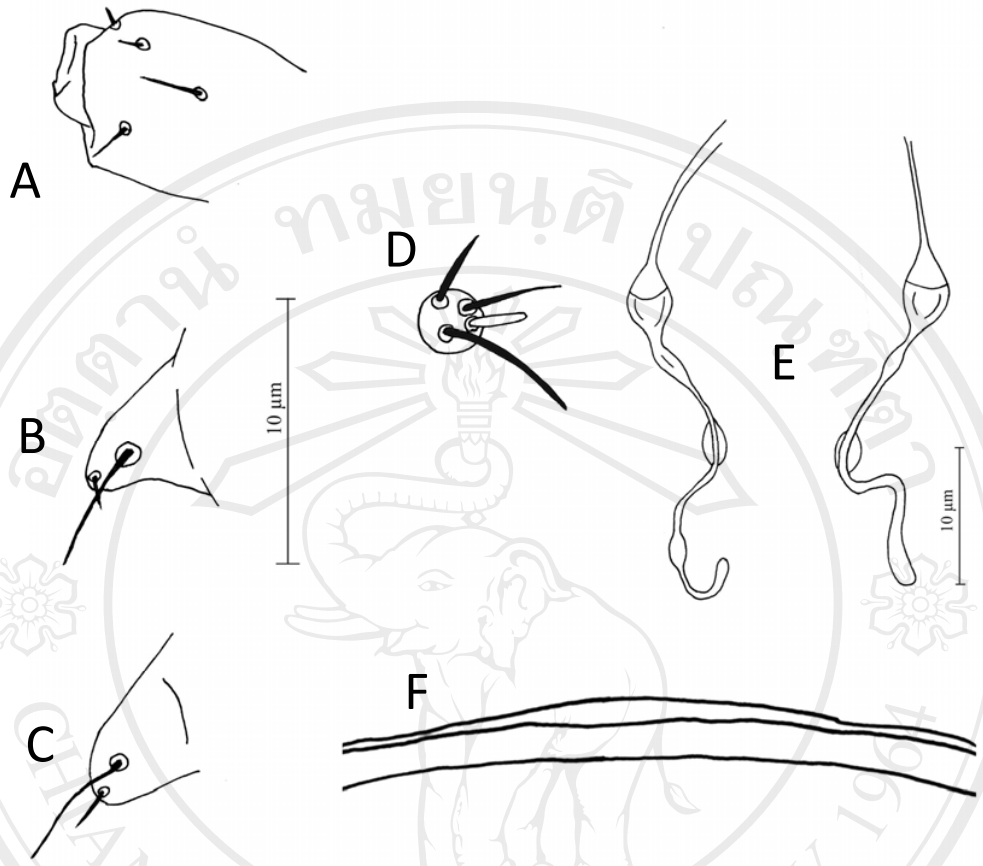

Figure 29 Structures of genus *Kenyentulus*.
A, abdominal appendage I; B, abdominal appendage II; C, abdominal appendage III; D, labial palpus; E, canal of maxillary gland; F, striate band.

***Kenyentulus* sp. 1**

(Fig. 30)

Diagnosis. Canal of maxillary gland with two additions on the proximal part. Urotergite I-IV with three pairs of anterior setae (A1, 2, 5).

Description. Body length 680–840 µm.

Head (Fig. 30A) Oval, length 79–86 µm, width 69–78 µm. Additional setae absent. Rostrum not protruded. Pseudoculus (Fig. 30B), length 6–6.7 µm, width 6.2–7 µm, PR = 11.8–13.3. Canal of maxillary gland (Fig. 30C) relatively long with two additions on the proximal part.

Thorax (Table 8) Mesonotum and metanotum with three pairs of anterior setae (A2, 4, M), with eight pairs of posterior setae (P1, 1a, 2, 2a, 3, 4, 5, 5a).

Foretarsal (Fig. 30D and E) length 50–54 µm, claw length 16–18 µm, TR= 2.9–3.2; empodium length 3.0–3.8 µm, EU = 0.18–0.25, S–shaped setae length 19–22 µm. Dorsal sensilla *t*-1 claviform, BS = 0.42–0.48; *t*-2 normal and long; *t*-3 small and spatulate. Exterior sensilla *a* long, its apex surpassing the base of *γ3*; *b* slim and short, surpassing the base of *γ2*; *c* and *d* long, its apex surpassing the base of *f*; *e* normal, its apex surpassing the base of *g*, *f* long, its apex reaching the base of γ5; *g* relatively short, its apex reaching the base to γ5. Interior sensilla *a′* long, its apex reaching the base of *b′*; *b′* long, its apex reaching the base of *c′*; *c′* long, its apex surpassing tarsus. Middle tarsal length 22–24 µm, claw length 11–13 µm. Hind tarsal length 24–27 µm, claw length 12–15 µm.

Abdomen (Table 8) Urotergite I-IV with three pairs of anterior setae (A1, 2, 5). Urotergite V–VI with two pairs of anterior setae (A2, 5). Urotergite VII with three pairs of anterior setae (A2, 4, 5).

Striate band on abdominal segment VIII reduced; comb VIII (Fig. 30F) consisting of about eight small size.

Genitals Male: unknown. Female: (Fig. 30H) with sharply pointed acrostyli.

Specimens examined. 11 ♀, bamboo stands, 700 m altitude, Doi Inthanon National Park, Chiang Mai province, 30-I-2007.

Remark. –

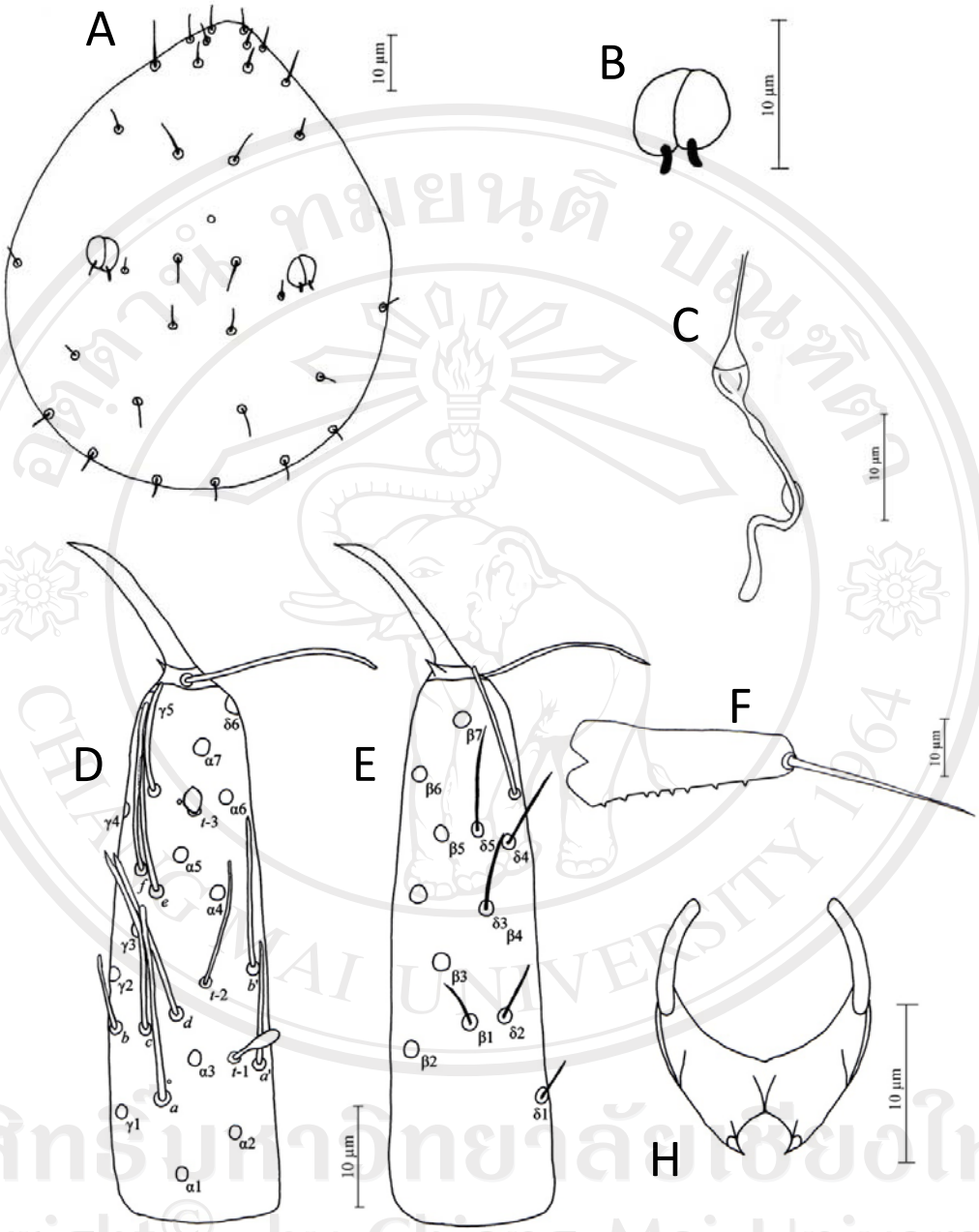

Figure 30 Structures of *Kenyentulus* sp. 1.

A, dorsal view of head; B, pseudoculus; C, canal of maxillary gland; D, anterior view of foretarsus; E, posterior view of foretarsus; F, comb on abdominal VIII; H, female squama genitalis.

Table 8 Chaetotaxy of *Kenyentulus* sp. 1

	Dorsal		Ventral	
	Formula	Composition of setae	Formula	Composition of setae
Thorax I	4	1,2		A1,2,M1,2
				P1,2,3
Thorax II		A2,4,M		Ac,2,3,4,M
		P1,1a,2,2a,3,4,5,5a		P1,2
Thorax III		A2,4,M		Ac,2,3,4,M
		P1,1a,2,2a,3,4,5,5a		P1,2
Abdomen I		A1,2,5		Ac,2
		P1,1a,2,2a,3,4a,5		P1,2
Abdomen II-III		A1,2,5		Ac,2
		P1,1a,2,2a,3,4,4a,5		Pc,2,3
Abdomen IV		A1,2,5		Ac,2
		P1,1a,2,2a,3,4,4a,5		P1,P1a,2,3
Abdomen V		A2,5		Ac,2
		P1,1a,2,2a,3,4,4a,5		P1,P1a,2,3
Abdomen VI		A2,5		Ac,2
		P1,1a,2,2a,3,4,4a,5		P1,P1a,2,3
Abdomen VII		A2,4,5		Ac,2

		P1,1a,2,2a,3,3a,4,4a,5		P1,P1a,2,3
Abdomen VIII		A1,3,4,Mc,2,3,4		A1,2
		P2,3,4,5		
Abdomen IX	14	1,1a,2,2a,3,4,5	4	1,2
Abdomen X	12	1,2,2a,3,4,5	4	1,2
Abdomen XI	6	1,2,3	6	1,2,3
Abdomen XII	9	Ac,1,2,3,4	6	1,2,3

***Kenyentulus* sp. 2**

(Fig. 31)

Diagnosis. Canal of maxillary gland with two additions on the proximal part. Urotergite IV-VI with two pairs of anterior setae (A2, 5).

Description. Body length 745–810 µm.

Head (Fig. 31A) Oval, length 64–80 µm, width 52–74 µm. Rostrum not protruded. Pseudoculus (Fig. 31B), length 4.5–6.5 µm, width 4.5–7 µm, PR = 12–14.2. Canal of maxillary gland (Fig. 31C) relatively long with two additions on the proximal part.

Thorax (Table 9) Mesonotum and metanotum with three pairs of anterior setae (A2, 4, M), with eight pairs of posterior setae (P1, 1a, 2, 2a, 3, 4, 5, 5a).

Foretarsal (Fig. 31D and E) length 51–54.5 µm, claw length 16.5–17 µm, TR = 3–3.2; empodium length 3 µm, EU = 0.18, S-shaped setae length 21–22 µm. Dorsal sensilla *t*-1 claviform, BS = 0.44–0.46; *t*-2 normal and long; *t*-3 small and spatulate. Exterior sensilla *a* long, its apex reaching the base of *e*; *b* slim and short, surpassing the base of *γ2*; *c* and *d* long, its apex reaching the base of *f, d* longer than *c*; *e* and *f* long, its apex reaching the base of *γ*5; *g* relatively short, its apex reaching the base to *γ*5. Interior sensilla *a′* long, its apex reaching the base of *b′*; *b′* long, its apex not reaching the base of *c′*; *c′* long, its apex surpassing tarsus. Middle tarsal length 19–23 µm, claw length 10–13 µm. Hind tarsal length 19–25 µm, claw length 11–15 µm.

Abdomen (Table 9) Urotergite I–III with three pairs of anterior setae (A1, 2, 5). Urotergite IV–VI with two pairs of anterior setae (A2, 5). Urotergite VII with three pairs of anterior setae (A2, 4, 5).

Striate band on abdominal segment VIII reduced; comb VIII (Fig. 31F) consisting of about ten small size.

Genitals Male: unknown. Female: (Fig. 31H) with sharply pointed acrostyli.

Specimens examined. 4 ♀, bamboo stands, 700 m altitude, Doi Inthanon National Park, Chiang Mai province, 30-I-2007.

Remark. –

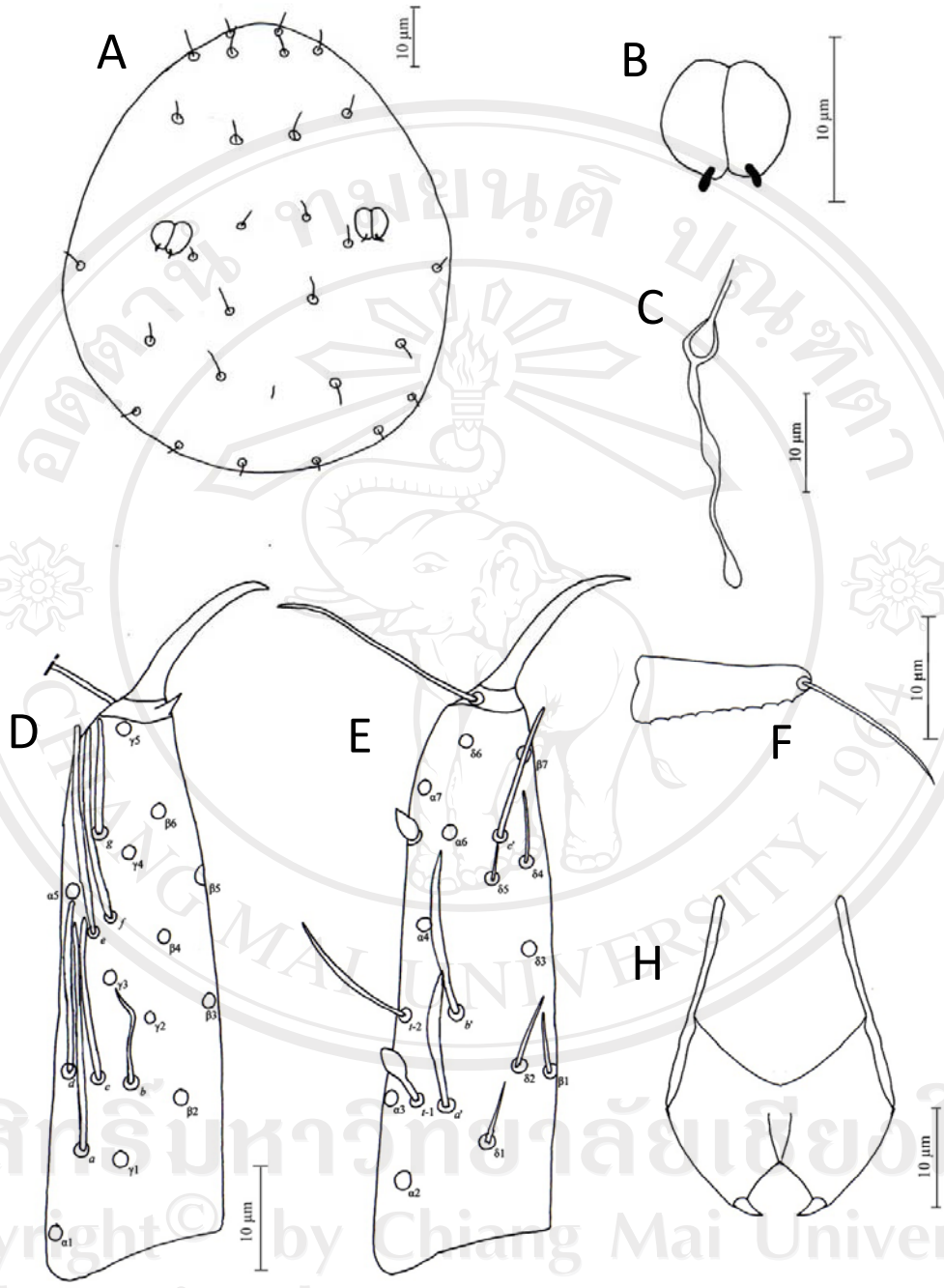

Figure 31 Structures of *Kenyentulus* sp. 2.

A, dorsal view of head; B, pseudoculus; C, canal of maxillary gland; D, exterior view of foretarsus; E, interior view of foretarsus; F, comb on abdominal VIII; H, female squama genitalis.

Table 9 Chaetotaxy of *Kenyentulus* sp. 2

	Dorsal		Ventral	
	Formula	Composition of setae	Formula	Composition of setae
Thorax I	4	1,2		A1,2,M1,2
				P1,2,3
Thorax II		A2,4,M		Ac,2,3,4,M
		P1,1a,2,2a,3,4,5,5a		P1,2
Thorax III		A2,4,M		Ac,2,3,4,M
		P1,1a,2,2a,3,4,5,5a		P1,2
Abdomen I		A1,2,5		Ac,2
		P1,1a,2,2a,3,4a,5		P1,2
Abdomen II-III		A1,2,5		Ac,2
		P1,1a,2,2a,3,4,4a,5		Pc,2,3
Abdomen IV		A2,5		Ac,2
		P1,1a,2,2a,3,4,4a,5		P1,P1a,2,3
Abdomen V		A2,5		Ac,2
		P1,1a,2,2a,3,4,4a,5		P1,P1a,2,3
Abdomen VI		A2,5		Ac,2
		P1,1a,2,2a,3,4,4a,5		P1,P1a,2,3
Abdomen VII		A2,4,5		Ac,2

		P1,1a,2,2a,3,3a,4,4a,5		P1,P1a,2,3
Abdomen VIII		A1,3,4,Mc,2,3,4		A1,2
		P2,3,4,5		
Abdomen IX	14	1,1a,2,2a,3,4,5	4	1,2
Abdomen X	12	1,2,2a,3,4,5	4	1,2
Abdomen XI	6	1,2,3	6	1,2,3
Abdomen XII	9	Ac,1,2,3,4	6	1,2,3

Genus *Eosentomon* Berlese, 1908

Diagnosis: Eosentomids with 5 setae and terminal vesicle on the abdominal appendages I–III (Fig. 32A-C). Mesonotum and metanotum (Fig. 32D) with spiracles. Mandibles rather broad and stout, ending usually in 3 teethes, and striate in its distal part. Sensilla *e* and *g* on foretarsus spatulate.

Type–species: *Eosentomon transitorium Berlese, 1908*

Distribution: World wide

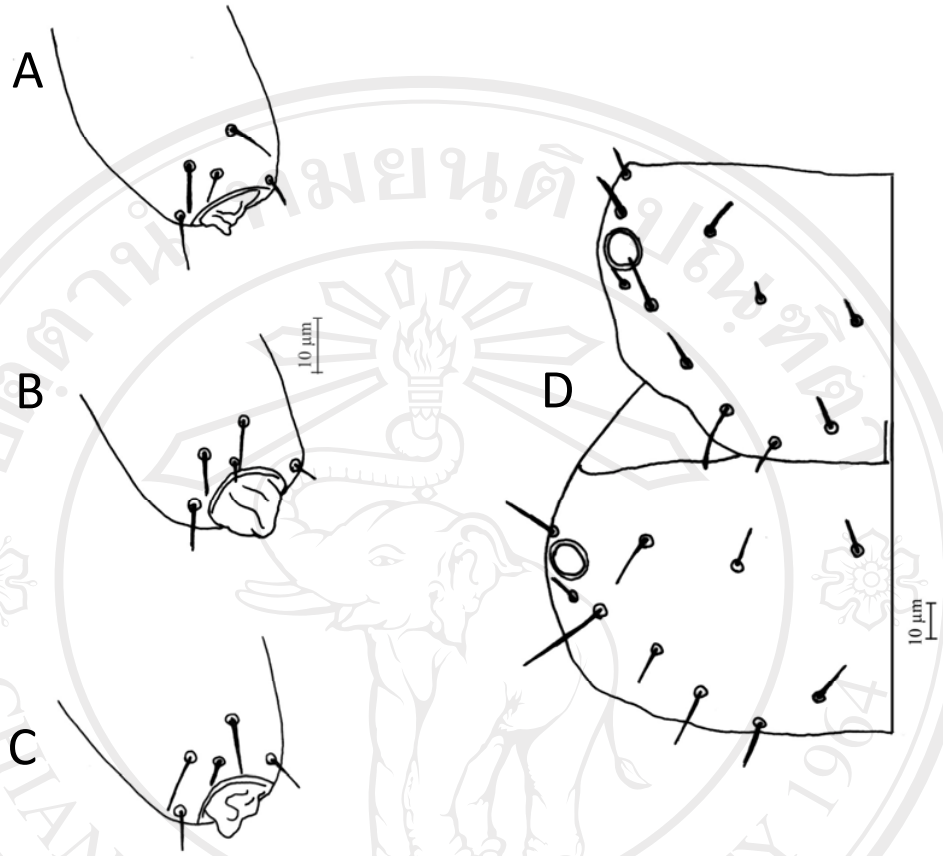

Figure 32 Structures of genus *Eosentomon*.
A, abdominal appendage I; B, abdominal appendage II; C, abdominal appendage III; D, spiracles on mesonotum and metanotum.

***Eosentomon* sp. 1**
(Fig. 33)

Diagnosis. Urotergites V–VII with two pairs of anterior setae (A4, 5).

Description. Body length 880–950 µm.

Head (Fig. 33A) Oval, length 128–135 µm, width 117–122 µm. Posterior sensilla, anterior additional setae, posterior additional setae, anterior sensilla, medium 4 setae present; subposterior setae 2.2 times longer than posterior setae; sensilla

posterior to pseudoculus rudimentary. Pseudoculus (Fig. 33B) ovoid with one central depression and line, length 14 µm, width 11 µm, PR = 0.96.

Thorax (Table 10) On mesonotum and metanotum, P1a situated posterior to the row of P1 and P2, seta-like; P2a on the same row as P2 and P3, seta-like. Metanotum with P5a, but P5a′ indistinct. Tracheal camerae (Fig. 33C) slender.

Foretarsal (Fig. 33D and E) length 94–96 µm, claw length 22–23 µm, TR = 4.1–4.2; Empodium length 21–22 µm, EU = 0.91–0.96, S-shaped seta length 23–25 µm. Dorsal sensilla *t*-1 about halfway between α3 and α3′, BS = 1.1–1.2; *t*-2 filiform, relatively long, its apex reaching base of α5; *t*-3 normal. Exterior sensilla *a* of medium size; *b* and *c* linear; *d* broad, distally contracted, and relatively long, its apex reaching base of α7; *e* and *g* spatulate; *f* 1 filiform, its apex surpassing base of γ5; *f* 2 short. Interior sensilla *a′* short, its apex slightly reaching the base α3′; *b′*1 broad; *b′*2 filiform, its apex reaching base of α6; *c′* normal, its apex reaching base of δ6. Middle tarsal length 48–50 µm, claw length 13–15 µm. Hind tarsal length 60–63 µm, claw length 16–18 µm.

Abdomen (Table 10) On Urotergites II–IV with five pairs of anterior setae. Urotergites V–VII with two pairs (A4, 5). Urotergites X–XI with eight setae. Urotergite I with five pairs of posterior setae (P1, 1a, 2, 3, 3a), P3a small leaf-shaped. Urotergite II–III, P1a situated posterior to the row of P1 and P2, hair-like; P2a situated posterior to the row of P3 and P4, hair–like. Urotergites I–VI with P1a and P2a and urotergite VII with P2a situated posterior to the row of P1 and 2, hair-like; on urotergite VII P1a situated on posterior row to row of P1 and P2, near to P2, sensillum-like and short; on urotergite VIII, P1a′ without basal dilatation; P2a′ linear. Urosternite VIII with seven setae.

Genitals Male: (Fig. 33F) acroperiphallus with short setae. Female: (Fig. 33G) semicircular caput processus combined with a rather developed caput processus, a small median sclerotization of stylus in the rounded part of caput.

Specimens examined. 2 ♂, 2 ♀, summit evergreen forest, 2450 m altitude, Doi Inthanon National Park, Chiang Mai province, 30-I-2007.

Remark. –

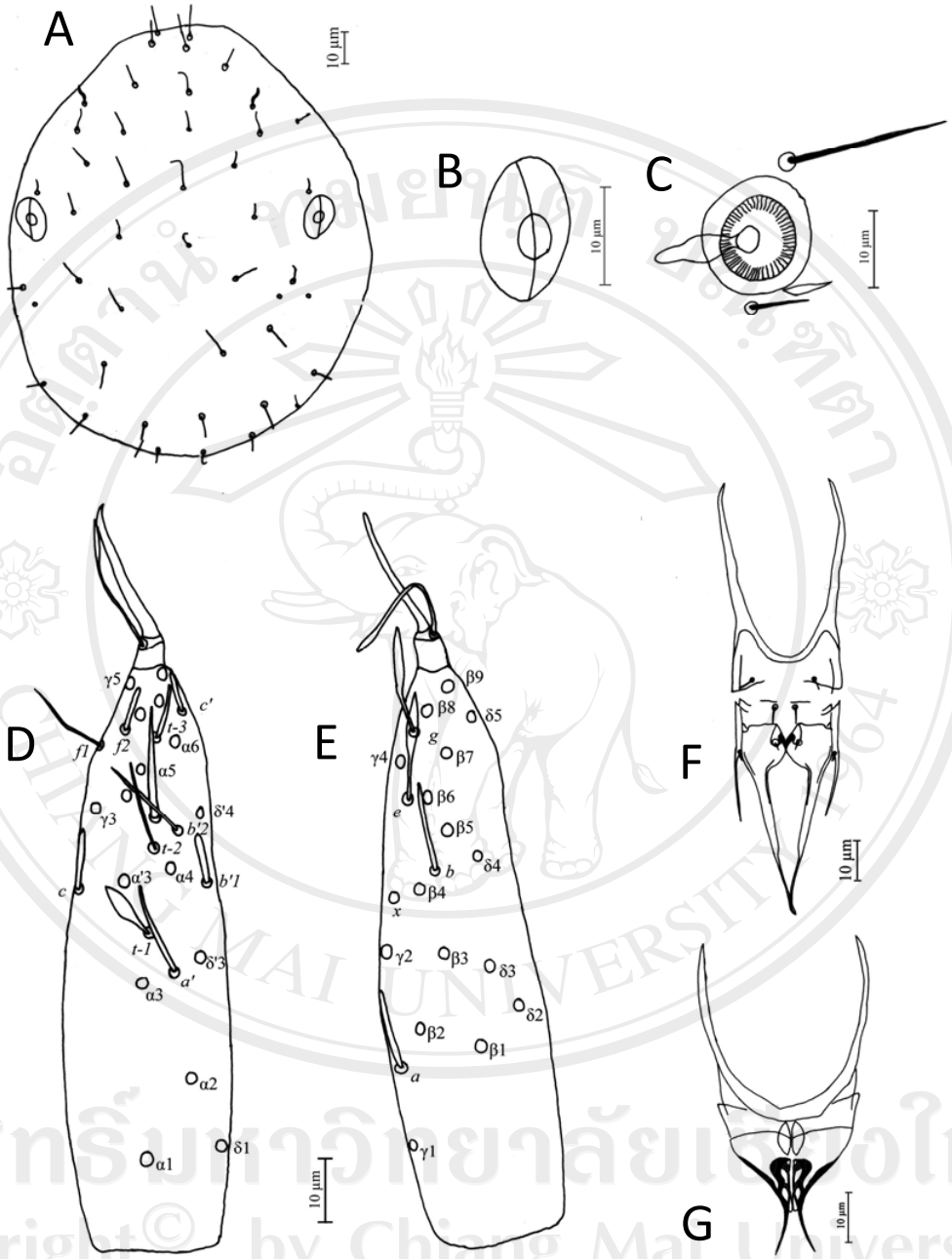

Figure 33 Structures of *Eosentomon* sp. 1.

A, dorsal view of head; B, pseudoculus; C, tracheal camerae; D, anterior view of foretarsus; E, posterior view of foretarsus; F, male squama genitalis; G, female squama genitalis.

Table 10 Chaetotaxy of *Eosentomon* sp. 1

	Dorsal		Ventral	
	Formula	Composition of setae	Formula	Composition of setae
Thorax I	4	1,2		A1,2,3,M
				P1,2,3
Thorax II		A2,4,M		A1,2,3,M
		P1,1a,2,2a,3,3a,4,5		P1,2,3
Thorax III		A1,2,M		A1,2,3,M
		P1,1a,2,2a,3,3a,4,5,5a		P1,2,3,4
Abdomen I		A1,2		A1,2
		P1,1a,2,3,3a		P1,2
Abdomen II-III	$\frac{10}{16}$	A1,2,3,4,5		A1,2,3
		P1,1a,2,2a,3,4,4a,5		P1,2
Abdomen IV	$\frac{10}{16}$	A1,2,3,4,5		A1,2,3
		P1,1a,2,2a,3,4,4a,5		P1,2,2a,2a′,3
Abdomen V		A4,5		A1,2,3
		P1,1a,2,2a,3,4,4a,5		P1,2,2a,2a′,3
Abdomen VI		A4,5		A1,2,3
		P1,1a,2,2a,3,4,4a,5		P1,2,2a,2a′,3
Abdomen VII		A4,5		A1,2,3

		P1,1a,2,2a,3,4,4a,5		P1,2,2a,2a′,3
Abdomen VIII		M2,4,5		
		Pc,1a,1a′,2,2a		Pc,1,1a,2
Abdomen IX	8	1,2,3,4	4	1,2
Abdomen X	8	1,2,3,4	4	1,2
Abdomen XI	8	1,2,3,4	8	1,2,3,4
Abdomen XII	9	Ac,1,2,3,4	12	1,2,3,4,5,6

***Eosentomon* sp. 2**

(Fig. 34)

Diagnosis. Urotergites V–VI with two pairs of anterior setae (A4, 5). Urotergite VII with a pairs of anterior setae (A5).

Description. Body length 1300–1375 µm.

Head (Fig. 34A) Oval, length 150–157 µm, width 120–125 µm. Anterior additional setae absent; posterior additional setae, posterior sensilla, anterior sensilla, medium 4 setae present; subposterior setae 2.6 times longer than posterior setae; sensilla posterior to pseudoculus rudimentary. Pseudoculus (Fig. 34B) ovoid with one central line, length 14 µm, width 9 µm, PR= 0.96.

Thorax (Table 11) On mesonotum and metanotum, P1a situated posterior to the row of P1 and P2, seta-like; P2a on the same row as P2 and P3, seta-like. Metanotum with P5a and P5a′ distinct. Tracheal camerae (Fig. 34C) slender.

Foretarsal (Fig. 34D and E) length 110–112 µm, claw length 23 µm, TR = 4.8–4.9; empodium length 24–25 µm, EU = 1.04–1.09, S-shaped setae length 25–26 µm. Dorsal sensilla *t*-1 about halfway between α3 and α3′, BS = 1.1–1.2; *t*-2 filiform, relatively long, its apex reaching base of γ3; *t*-3 broad, distally contracted, and relatively long, its apex surpassing tarsus. Exterior sensilla *a* of medium size; *b* and *c* linear; *d* broad, distally contracted, and relatively long, its apex surpassing base of *t*-3; *e* and *g* spatulate; *f* 1 filiform, its apex reaching base of γ5; *f* 2 short. Interior sensilla *a′* short, its apex slightly reaching the base *t*-2; *b′*1 absent; *b′*2 seta–form, its apex reaching base of α5; *c′* absent. Middle tarsal length 56–58 µm, claw length 15–17 µm. Hind tarsal length 70–74 µm, claw length 17–19 µm.

Abdomen (Table 11) On Urotergites II–IV with five pairs of anterior setae. Urotergites V–VI with two pairs (A4, 5). Urotergite VII with a pairs (A5). Urotergite I with five pairs of posterior setae (P1, 1a, 2, 3, 3a), P3a small leaf-shaped. Urotergite II–III, P1a situated posterior to the row of P1 and P2, hair–like; P2a situated posterior

to the row of P3 and P4, hair-like. Urotergites X–XI with four pairs of setae. P1a and P2a on urotergites I–V and P2a on urotergites VI–VII situated posterior to the row of P1 and 2, hair-like; on urotergites VI–VII P1a situated on posterior row to row of P1 and P2, near to P2, sensillum-like and short. On urosternite I P1 situated posterior to the row of P1 and 2, hair-like, slightly shorter than P1 in length; P3 and P4 minute, club-shaped, 3 μm in length.

Genitals Male: unknown. Female: (Fig. 34G) caput processus roundly bent against the middle line like crane head, with oblique appendices, filum processus relatively long, proximolateral sclerotization well developed.

Specimens examined. 3 ♀, summit evergreen cloud forest, 2450 m altitude, Doi Inthanon National Park, Chiang Mai province, 30-I-2007.

Remark. –

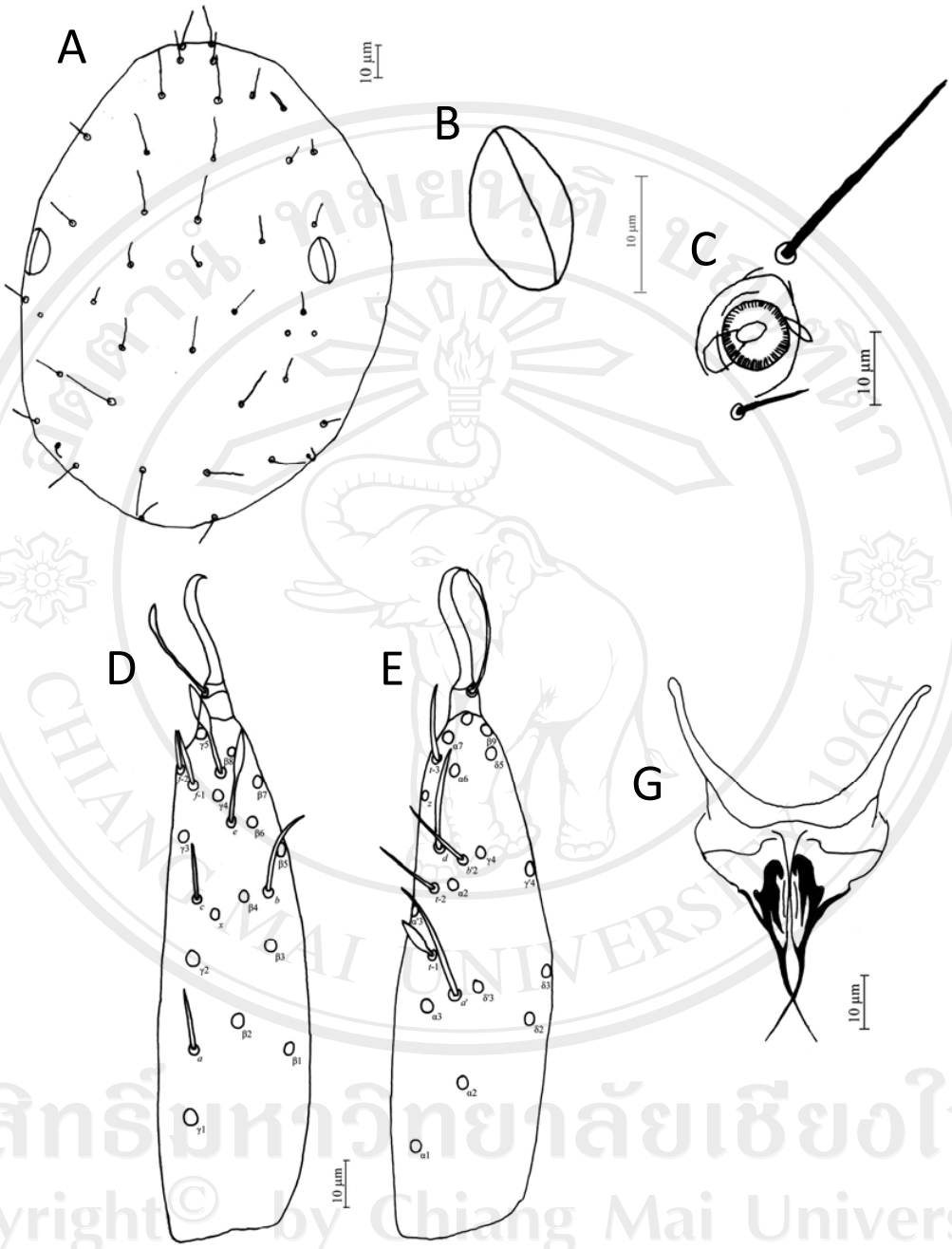

Figure 34 Structures of *Eosentomon* sp. 2.
A, dorsal view of head; B, pseudoculus; C, tracheal camerae; D, posterior view of foretarsus; E, anterior view of foretarsus; G, female squama genitalis.

Table 11 Chaetotaxy of *Eosentomon* sp. 2

	Dorsal		Ventral	
	Formula	Composition of setae	Formula	Composition of setae
Thorax I	4	1,2		A1,2,3,M
				P1,2,3
Thorax II		A2,4,M		A1,2,3,M
		P1,1a,2,2a,3,3a,4,5		P1,2,3
Thorax III		A1,2,M		A1,2,3,M
		P1,1a,2,2a,3,3a,4,5,5a		P1,2,3,4
Abdomen I		A1,2		A1,2
		P1,1a,2,3,3a		P1,2
Abdomen II-III	$\frac{10}{16}$	A1,2,3,4,5		A1,2,3
		P1,1a,2,2a,3,4,4a,5		P1,2
Abdomen IV	$\frac{10}{16}$	A1,2,3,4,5		A1,2,3
		P1,1a,2,2a,3,4,4a,5		P1,2,2a,2a′,3
Abdomen V		A4,5		A1,2,3
		P1,1a,2,2a,3,4,4a,5		P1,2,2a,2a′,3
Abdomen VI		A4,5		A1,2,3
		P1,1a,2,2a,3,4,4a,5		P1,2,2a,2a′,3
Abdomen VII		A5		A1,2,3

		P1,1a,2,2a,3,4,4a,5		P1,2,2a,2a′,3
Abdomen VIII		M2,4,5		
		Pc,1a,1a′,2,2a		Pc,1,1a,2
Abdomen IX	8	1,2,3,4	4	1,2
Abdomen X	8	1,2,3,4	4	1,2
Abdomen XI	8	1,2,3,4	8	1,2,3,4
Abdomen XII	9	Ac,1,2,3,4	12	1,2,3,4,5,6

***Eosentomon* sp. 3**

(Fig. 35)

Diagnosis. Urotergites V–VI with three pairs of anterior setae (A1, 4, 5). Urotergite VII with two pairs of anterior setae (A4, 5).

Description. Body length 930–980 µm.

Head (Fig. 35A) Oval, length 128–135 µm, width 117–122 µm. Posterior sensilla, anterior additional setae, posterior additional setae, anterior sensilla, medium 4 setae present; subposterior setae 2.8 times longer than posterior setae; sensilla posterior to pseudoculus rudimentary. Pseudoculus (Fig. 35B) ovoid with one central depression and line, length 12 µm, width 10 µm, PR= 11.25.

Thorax (Table 12) On mesonotum and metanotum, P1a situated posterior to the row of P1 and P2, seta-like; P2a on the same row as P2 and P3, seta-like. Metanotum with P5a, but P5a′ indistinct. Tracheal camerae (Fig. 35C) slender.

Foretarsal (Fig. 35D and E) length 91–93 µm, claw length 19 µm, TR = 4.8–4.9; empodium length 20–21 µm, EU = 1.05–1.10, S-shaped seta length 19–25 µm. Dorsal sensilla *t*-1 about halfway between α3 and α3′, BS = 1.1–1.2; *t*-2 thin, relatively long, its apex surpass the base of γ3; *t*-3 normal. Exterior sensilla *a* of medium size; *b* and *c* linear; *d* broad, distally contracted, and relatively long, its apex surpassing the base of α7; *e* and *g* spatulate; *f* 1 filiform, its apex reaching the base of γ5; *f* 2 short. Interior sensilla *a′* short, its apex reaching the base α3′; *b′*1 broad; *b′*2 filiform, its apex reaching base of *c′*; *c′* normal, its apex reaching base of δ6. Middle tarsal length 40–43 µm, claw length 11–12 µm. Hind tarsal length 51–53 µm, claw length 13–15 µm.

Abdomen (Table 12) Urotergites II–IV with five pairs of anterior setae. Urotergites V–VI with three pairs (A1, 4, 5). Urotergite VII with two pairs (A4, 5). Urotergite I with five pairs of posterior setae (P1, 1a, 2, 3, 3a), P3a small leaf–shaped. Urotergite II–III, P1a situated posterior to the row of P1 and P2, hair-like; P2a

situated posterior to the row of P3 and P4, hair-like. Urotergites IX–XI with eight setae. P1a and P2a on urotergites I–VI and P2a on urotergite VII situated posterior to the row of P1 and 2, hair-like; on urotergite VII P1a situated on posterior row to row of P1 and P2, about halfway between P1 and 2, sensillum-like and short; on urotergite VIII, P1a′ without basal dilatation; P2a′ linear.

Genitals Male: (Fig. 35F) basiperiphallus with short seta, acroperiphallus with short seta. Female: (Fig. 35G) caput processus swan's head–shaped; median sclerotization present; filum processus relatively long.

Specimens examined. 1 ♀, bamboo stands, 700 m altitude; 2 ♂, summit evergreen forest, 2450 m altitude, Doi Inthanon National Park, Chiang Mai province, 30-I-2007.

Remark. –

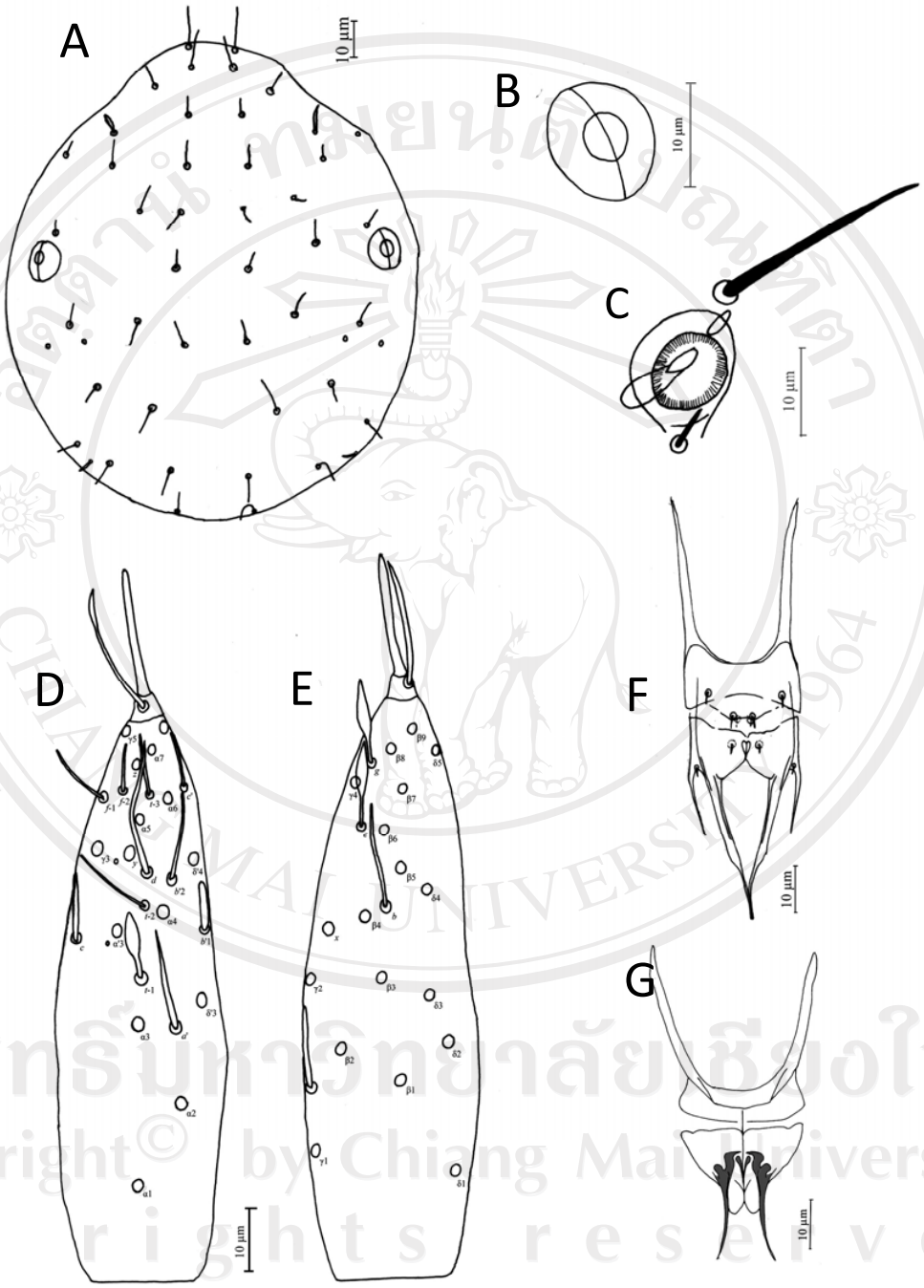

Figure 35 Structures of *Eosentomon* sp. 3.

A, dorsal view of head; B, pseudoculus; C, tracheal camerae; D, anterior view of foretarsus; E, posterior view of foretarsus; F, male squama genitalis; G, female squama genitalis.

Table 12 Chaetotaxy of *Eosentomon* sp. 3

	Dorsal		Ventral	
	Formula	Composition of setae	Formula	Composition of setae
Thorax I	4	1,2		A1,2,3,M
				P1,2,3
Thorax II		A2,4,M		A1,2,3,M
		P1,1a,2,2a,3,3a,4,5		P1,2,3
Thorax III		A1,2,M		A1,2,3,M
		P1,1a,2,2a,3,3a,4,5,5a		P1,2,3,4
Abdomen I		A1,2		A1,2
		P1,1a,2,3,3a		P1,2
Abdomen II-III	$\frac{10}{16}$	A1,2,3,4,5		A1,2,3
		P1,1a,2,2a,3,4,4a,5		P1,2
Abdomen IV	$\frac{10}{16}$	A1,2,3,4,5		A1,2,3
		P1,1a,2,2a,3,4,4a,5		P1,2,2a,2a′,3
Abdomen V		A1,4,5		A1,2,3
		P1,1a,2,2a,3,4,4a,5		P1,2,2a,2a′,3
Abdomen VI		A1,4,5		A1,2,3
		P1,1a,2,2a,3,4,4a,5		P1,2,2a,2a′,3
Abdomen VII		A4,5		A1,2,3

		P1,1a,2,2a,3,4,4a,5		P1,2,2a,2a′,3
Abdomen VIII		M2,4,5		
		Pc,1a,1a′,2,2a		Pc,1,1a,2
Abdomen IX	8	1,2,3,4	4	1,2
Abdomen X	8	1,2,3,4	4	1,2
Abdomen XI	8	1,2,3,4	8	1,2,3,4
Abdomen XII	9	Ac,1,2,3,4	12	1,2,3,4,5,6

***Eosentomon* sp. 4**

(Fig. 36)

Diagnosis. Urotergites V with three pairs of anterior setae (A1, 4, 5). Urotergite VI–VII with two pairs of anterior setae (A4, 5).

Description. Body length 920–1200 µm.

Head (Fig. 36A) Oval, length 116–132 µm, width 87–113 µm. Posterior sensilla, anterior additional setae, posterior additional setae, anterior sensilla, medium 4 setae present; subposterior setae 1.9 times longer than posterior setae; sensilla posterior to pseudoculus rudimentary. Pseudoculus (Fig. 36B) ovoid, length 12 µm, width 11 µm, PR= 10.42.

Thorax (Table 13) On mesonotum and metanotum, P1a situated posterior to the row of P1 and P2, seta-like; P2a on the same row as P2 and P3, seta-like. Metanotum with P5a, but P5a′ indistinct. Tracheal camerae (Fig. 36C) slender.

Foretarsal (Fig. 36D and E) length 87–91 µm, claw length 18–21 µm, TR = 4.2–4.8; empodium length 19–23 µm, EU = 1.0–1.1, S–shaped setae length 19–22 µm. Dorsal sensilla *t*-1 about halfway between α3 and α3′, BS = 1.1–1.2; *t*-2 filiform, relatively long, its apex surpass the base of α5; *t*-3 normal. Exterior sensilla *a* of medium size; *b* and *c* linear; *d* broad, distally contracted, and relatively long, its apex reaching the base of *z*; *e* and *g* spatulate; *f* 1 filiform, its apex surpassing the base of γ5; *f* 2 short. Interior sensilla *a′* short, its apex reaching the base α3′; *b′*1 broad; *b′*2 filiform, its apex reaching base of α6; *c′* normal. Middle tarsal length 43–45 µm, claw length 10–13 µm. Hind tarsal length 53–56 µm, claw length 13–16 µm.

Abdomen (Table 13) On urotergites II–IV with five pairs of anterior setae. Urotergite V with three pairs of anterior setae (A1, 4, 5). Urotergites VI–VII with two pairs of anterior setae (A4, 5). Urotergite I with five pairs of posterior setae (P1, 1a, 2, 3, 3a), P3a small sensilla-like. Urotergite II–III, P1a situated posterior to the row of P1 and P2, hair-like; P2a situated posterior to the row of P3 and P4, hair-like. Urotergites X–XI with four pairs of setae. P1a and P2a on urotergites I–VI and P2a on urotergite VII situated posterior to the row of P1 and 2, hair-like. On urotergite VII

P1a situated on posterior row to row of P1 and P2, near to P2, sensillum-like and short. On urosternite I P1situated posterior to the row of P1 and 2, hair-like, slightly shorter than P1 in length; P3 minute, club-shaped, 3 μm in length.

Genitals Male: (Fig. 36F) with short basiperiphallus setae. Female: (Fig. 36G) S-shaped sclerotization distinct on the processus sternalis; median sclerotization present; filum processus relatively short.

Specimens examined. 1 ♂, bamboo stands, 700 m altitude; 5 ♂, 5 ♀, summit evergreen forest, 2450 m altitude, Doi Inthanon National Park, Chiang Mai province, 30-I-2007.

Remark. –

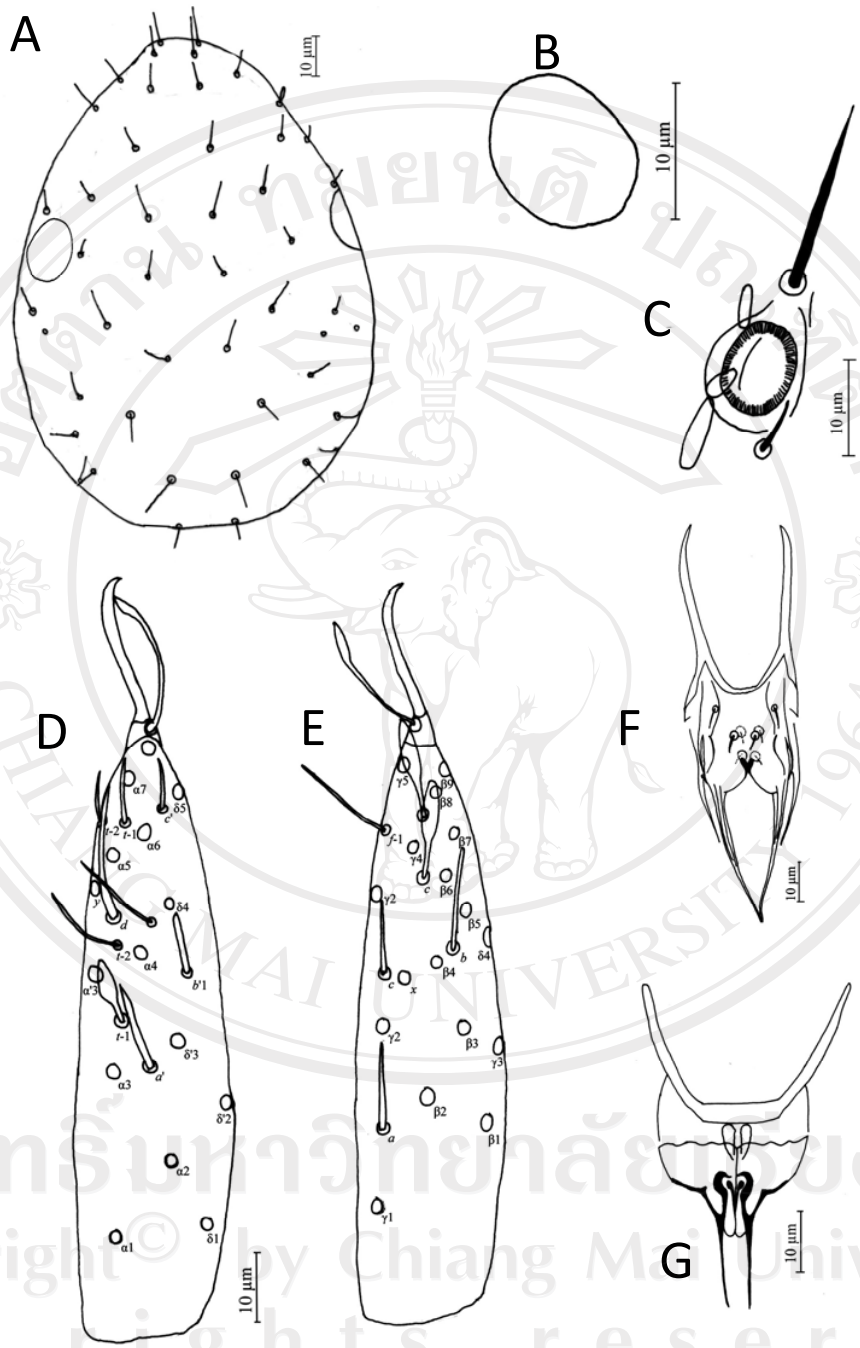

Figure 36 Structures of *Eosentomon* sp. 4.

A, dorsal view of head; B, pseudoculus; C, tracheal camerae; D, anterior view of foretarsus; E, posterior view of foretarsus; F, male squama genitalis; G, female squama genitalis.

Table 13 Chaetotaxy of *Eosentomon* sp. 4

	Dorsal		Ventral	
	Formula	Composition of Setae	Formula	Composition of Setae
Thorax I	4	1,2		A1,2,3,M
				P1,2,3
Thorax II		A2,4,M		A1,2,3,M
		P1,1a,2,2a,3,3a,4,5		P1,2,3
Thorax III		A1,2,M		A1,2,3,M
		P1,1a,2,2a,3,3a,4,5,5a		P1,2,3,4
Abdomen I		A1,2		A1,2
		P1,1a,2,3,3a		P1,2
Abdomen II-III	$\frac{10}{16}$	A1,2,3,4,5		A1,2,3
		P1,1a,2,2a,3,4,4a,5		P1,2
Abdomen IV	$\frac{10}{16}$	A1,2,3,4,5		A1,2,3
		P1,1a,2,2a,3,4,4a,5		P1,2,2a,2a′,3
Abdomen V		A1,4,5		A1,2,3
		P1,1a,2,2a,3,4,4a,5		P1,2,2a,2a′,3
Abdomen VI		A4,5		A1,2,3
		P1,1a,2,2a,3,4,4a,5		P1,2,2a,2a′,3
Abdomen VII		A4,5		A1,2,3

		P1,1a,2,2a,3,4,4a,5		P1,2,2a,2a′,3
Abdomen VIII		M2,4,5		
		Pc,1a,1a′,2,2a		Pc,1,1a,2
Abdomen IX	8	1,2,3,4	4	1,2
Abdomen X	8	1,2,3,4	4	1,2
Abdomen XI	8	1,2,3,4	8	1,2,3,4
Abdomen XII	9	Ac,1,2,3,4	12	1,2,3,4,5,6