

Three New Species of *Strumigenys* Fr. Smith (Hymenoptera: Formicidae) with a Key to Taiwanese Species

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ABSTRACT

Three new species, *Strumigenys chuchihensis* sp. nov., *S. konteiensis* sp. nov. and *S. orchidensis* sp. nov., are described and illustrated from Taiwan. A key to the species of Taiwanese *Strumigenys* is presented.

Key words: Hymenoptera, Formicidae, Dacetoniini, *Strumigenys*, new species, Taiwan.

Introduction

The ant genus *Strumigenys* Fr. Smith, 1860, belongs to the tribe Dacetoniini in the subfamily Myrmicinae. The first description of Taiwanese *Strumigenys* was that of Forel (1912), who recognized *Strumigenys feae* var. *formosensis*. A full taxonomic study of the Dacetoniini (including *Strumigenys*) of East Asia (the region including Japan, China, and Taiwan) was made by Brown (1949). Later, Terayama and Kubota (1989) revised the tribe of Taiwan, providing a key for genera, and described four species of *Strumigenys*. Recently, Lin and Wu (1996) revised the genus *Strumigenys* of Taiwan, and included a key to Taiwanese species.

The genera of Dacetoniini were revised and redefined by Bolton (1999), and a new classification was proposed with a phylogenetic analysis. *Pyramica* was revived from the synonymy of *Strumigenys*, and *Strumigenys* was one of the oldest

names in the tribe. Two species formerly placed in *Quadristruma*, *emmae* and *eurycera*, were included in *Strumigenys* in that paper. The former species is known to occur in Taiwan (Terayama and Kubota, 1989).

To the present, 13 species of the genus *Strumigenys* are known in Taiwan, including *S. emmae* and three new species, *S. chuchihensis* sp. nov., *S. konteiensis* sp. nov., and *S. orchidensis* sp. nov. An illustrated key to the species of Taiwanese *Strumigenys* is also presented in this paper. *Strumigenys chuchihensis* sp. nov. and *S. konteiensis* sp. nov. occur on the main island of Taiwan. *Strumigenys orchidensis* sp. nov. has only been collected from Orchid Island, a small island southeast of Taiwan.

The measurements and indices used in this paper follow those in Lin and Wu (1996): TL (total length), HL (head length), HW (head width), SL (scape length), ML (mandibular length), FCD (frontal carinal

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distance), PW (pronotum width), WL (Weber's length of mesosoma), CI (cephalic index), MI (mandibular index), SI (scape index), FCI (frontal carinal index), and MSI (mesosoma index).

Strumigenys chuchihensis sp. nov.
屈尺瘤顎家蟻 (Figs. 1-6)

Holotype. Worker. TL, 2.53 mm; HL, 0.72 mm; HW, 0.53 mm; SL, 0.41 mm; ML, 0.34 mm; FCD, 0.20 mm; PW, 0.34 mm; WL, 0.69 mm; CI, 74; MI, 47; SI, 77; FCI, 37; MSI, 49.

Head as in Fig. 1, microreticulate sculpturing, with short, narrowly spatulate hairs on cranium; in full face view, posterolateral corners of head with 1 pair of long flagellate hairs. Mandibles hook-like, slender in full face view; external margin very shallowly and evenly convex; internal margin almost straight; preapical teeth of mandibles prominently spiniform; apical fork with 2 spiniform teeth and 2 intercalary denticles (Fig. 2). Anterior clypeal margin transverse. Antennae 6-segmented, in a ratio of 10.5:2.2:1:1:2.2:8.3 in length from base; scape microreticulate, with a row of narrowly spatulate hairs; 2nd segment 1.5X as long as wide; 3rd and 4th segments each shorter than wide; 5th segment 1.5X as long as wide; apical segment 4X as long as wide. Eyes relatively large, 0.07 mm in maximum diameter, with about 10 ommatidia.

Dorsum of promesonotum with microreticulate sculpturing; pairs of long flagellate hairs and short erect hairs present (Fig. 3). Mesopleuron and metapleuron smooth and shiny on most parts. Metanotum with microreticulate sculpturing. Propodeal lamellae well developed; propodeal teeth acute absent.

Petiole with microreticulate sculpturing, with long flagellate hairs; peduncle long; dorsal margin of node convex in profile. Spongiform appendages of pedicelled segments well developed.

First gastral tergite smooth and shiny, with numerous, long flagellate hairs.

Body brownish yellow.

Paratype workers. Seven paratype workers had the following measurements and indices: TL, 2.53-2.65 mm; HL, 0.67-0.73 mm; HW, 0.51-0.54 mm; SL, 0.40-0.42 mm; ML, 0.32-0.45 mm; FCD, 0.19-0.21 mm; PW, 0.33-0.36 mm; WL, 0.67-0.72 mm; CI, 70-75; MI, 45-49; SI, 75-82; FCI, 35-39; MSI, 48-53.

Paratype females. Three paratype females had the following measurements and indices: TL, 2.70-2.72 mm; HL, 0.67-0.71 mm; HW, 0.56-0.58 mm; SL, 0.50-0.52 mm; ML, 0.34-0.36 mm; FCD, 0.20-0.22 mm; PW, 0.37-0.38 mm; WL, 0.78-0.80 mm; CI, 79-85; MI, 48-54; SI, 86-93; FCI, 34-39; MSI, 46-49.

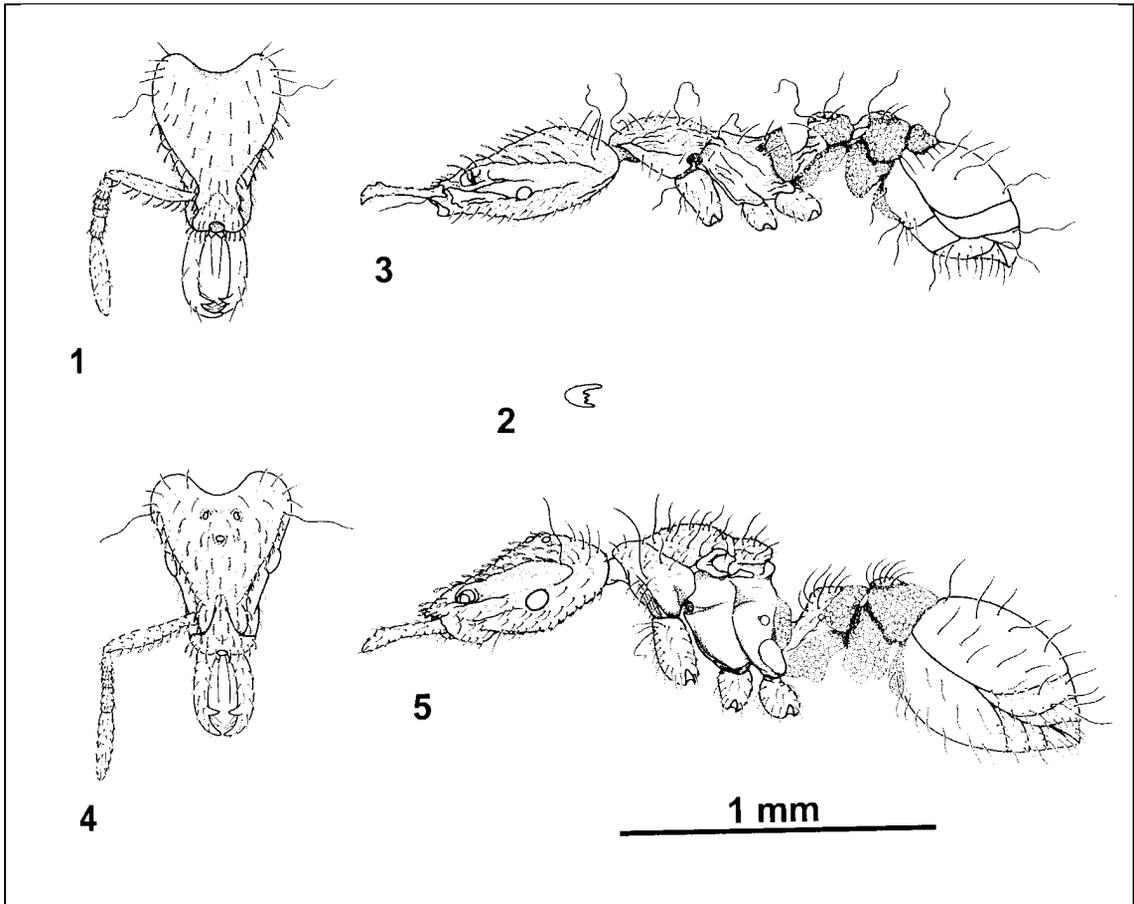
General shape of head and alitrunk as shown in Figs. 4-5. Head and antennal scape with microreticulate sculpturing. Head with narrowly spatulate hairs in cranium; in full face view, posterolateral corners of head with 1 pair of long flagellate hairs. Compound eyes large. Ocelli relatively small, without blackened callus.

Alitrunk in profile more even dorsally, arching from anteriormost of mesonotum to posteriormost of metanotum (Fig. 5). Propodeal lamellae well developed; propodeal teeth acute absent. Dorsum of alitrunk with numerous short erect hairs. Long flagellate hairs present on dorsal of alitrunk, petiole, postpetiole and 1st gastral tergite.

Body brownish yellow.

Holotype, worker, TAIWAN: Chuchih, Taipei County, 10-ix-1997 (C. C. Lin) (Type depository: National Taiwan University).

Paratypes. One , 6 workers, TAIWAN: Chuchih, Taipei County, 10-ix-1997 (C. C. Lin) from the same nest as holotype; 12 workers, Chuchih, Taipei County, 10-ix-1997 (C. C. Lin); Yinhotung, Taipei County, 24-vii-1992 (C. C. Lin); 3 , 67 workers, Fushan, Ilan County, 10-x-1992 (C. C. Lin) (Type depository: National Taiwan



Figs. 1-5. *Strumigenys chuchihensis* sp. nov. 1, head, full face view, worker; 2, apical fork of mandible, end-on view, worker; 3, profile, worker; 4, head, full face view, female; 5, profile, female.

University; National Museum of Natural Science, Taiwan; Taiwan Agricultural Research Institute).

Distribution. Taiwan.

Etymology. Named after Chuchih, the type locality of this new species.

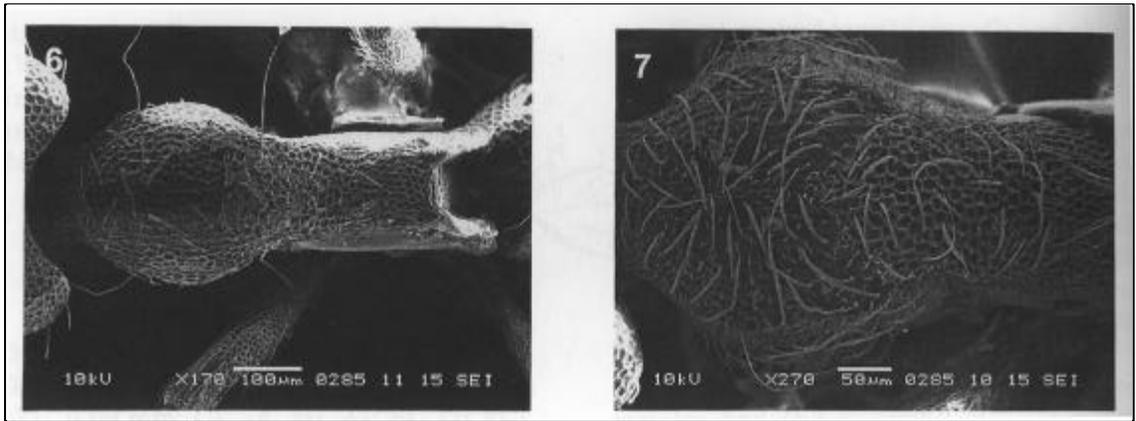
Remarks. This new species is closely related to *S. godeffroyi* Mayr and *S. nanzanensis* Lin & Wu (1996). However it is easily distinguished from *S. godeffroyi* and *S. nanzanensis* by the different pilosity on the mesosoma, without the abundant, short narrowly spatulate hairs (Figs. 6, 7).

Strumigenys kontelensis sp. nov.

墾丁瘤顎家蟻 (Figs. 8-10)

Holotype. Worker. TL, 2.6 mm; HL, 0.67 mm; HW, 0.52 mm; SL, 0.40 mm; ML, 0.32 mm; FCD, 0.22 mm; PW, 0.37 mm; WL, 0.76 mm; CI, 78; MI, 49; SI, 77; FCI, 43; MSI, 49.

Head as in Fig. 8, with microreticulate sculpturing, with numerous long spoon-shaped hairs on cranium; in full face view, dorsolateral corners of head posteriorly with a pair of long flagellate hairs. Mandibles hook-like, slender in full face view; external margin very shallowly and evenly convex; internal margin almost straight; preapical teeth prominently spiniform; apical fork with 2 spiniform



Figs. 6-7. Mesosoma in dorsal view. 6. *Strumigenys chuchihensis* sp. nov.; 7. *S. godeffroyi* Mayr.

teeth, and 4 intercalary denticles (Fig. 10). Anterior clypeal margin transverse and broad. Antennae 6-segmented, in a ratio of 8.6: 2: 1: 1: 3.5: 6.9 in length from base; scape microreticulate, with a row of long spoon-shaped hairs. Eyes relatively small, 0.06 mm in maximum diameter, with 8 ommatidia.

Dorsum of promesonotum with microreticulate sculpturing, with numerous long spoon-shaped hairs and a pair of long flagellate hairs present on the dorsum of mesosoma (Fig. 9). Mesopleuron and metapleuron smooth and shiny on most parts. Propodeum with long spoon-shaped hairs and microreticulate sculpturing. Propodeal lamellae well developed; posterodorsal corner rounded, not forming an angle in profile.

Petiole with microreticulate sculpturing, with numerous long spoon-shaped hairs and long flagellate hairs; peduncle long; node with convex dorsal margin in profile. Spongiform appendages of waist segments well developed.

First gastral tergite smooth and shiny, with numerous, long spoon-shaped hairs and sparsely, long flagellate hairs.

Body brownish yellow.

Holotype, worker, TAIWAN: Kenting, Pintung County, 16-ix-1996, (C. C. Lin.)

(Type depository: National Taiwan University, Taipei).

Distribution. Taiwan.

Etymology. The specific epithet refers to the type locality. Kontei is an old name for Kenting.

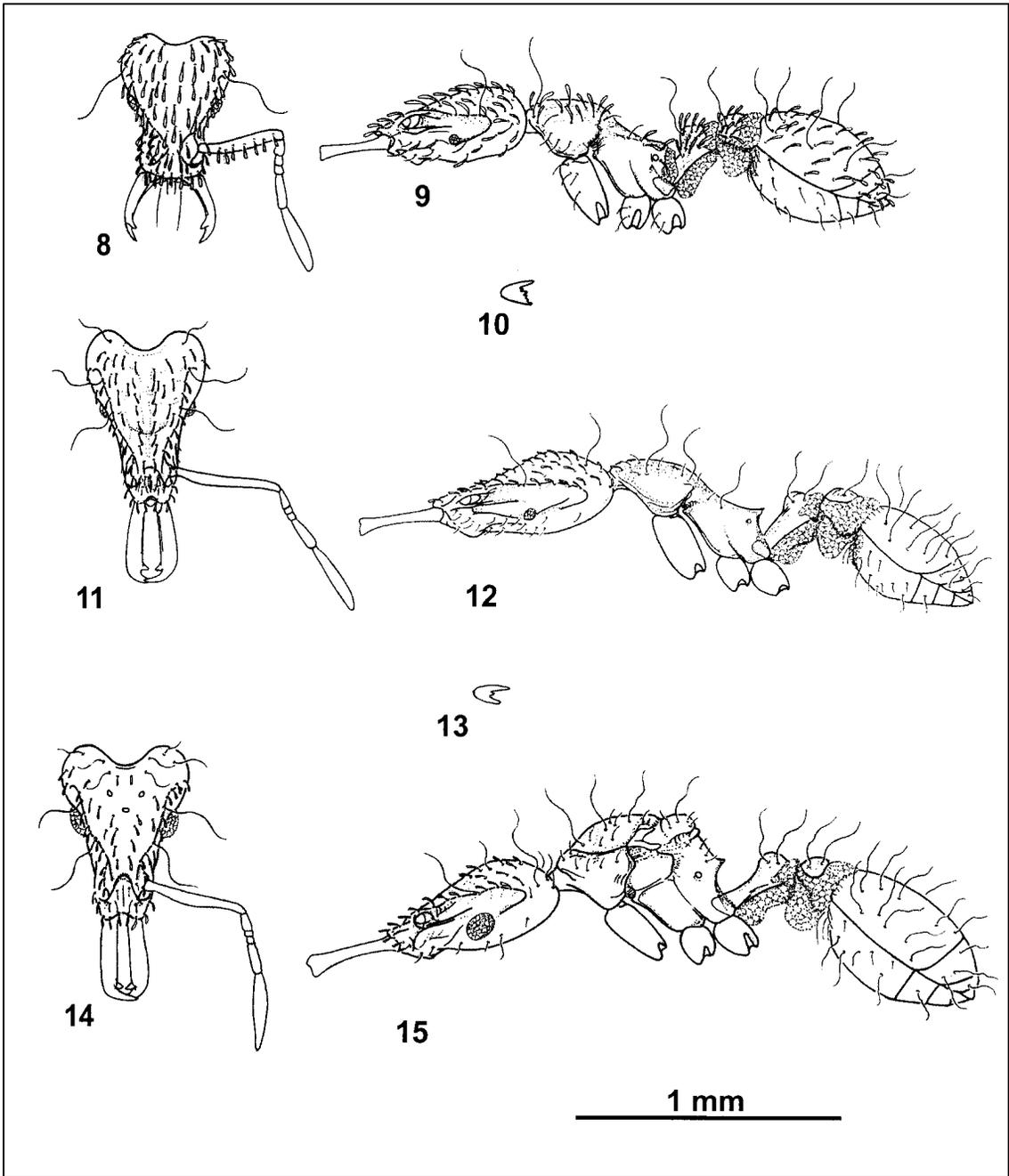
Remarks. This species is easily distinguished from the other known species of the genus from Taiwan and East Asia by the long spoon-shaped hairs on the head, mesosoma, petiole, postpetiole, and gaster. Only one specimen was collected from Kenting in southern Taiwan.

Strumigenys orchidensis sp. nov.

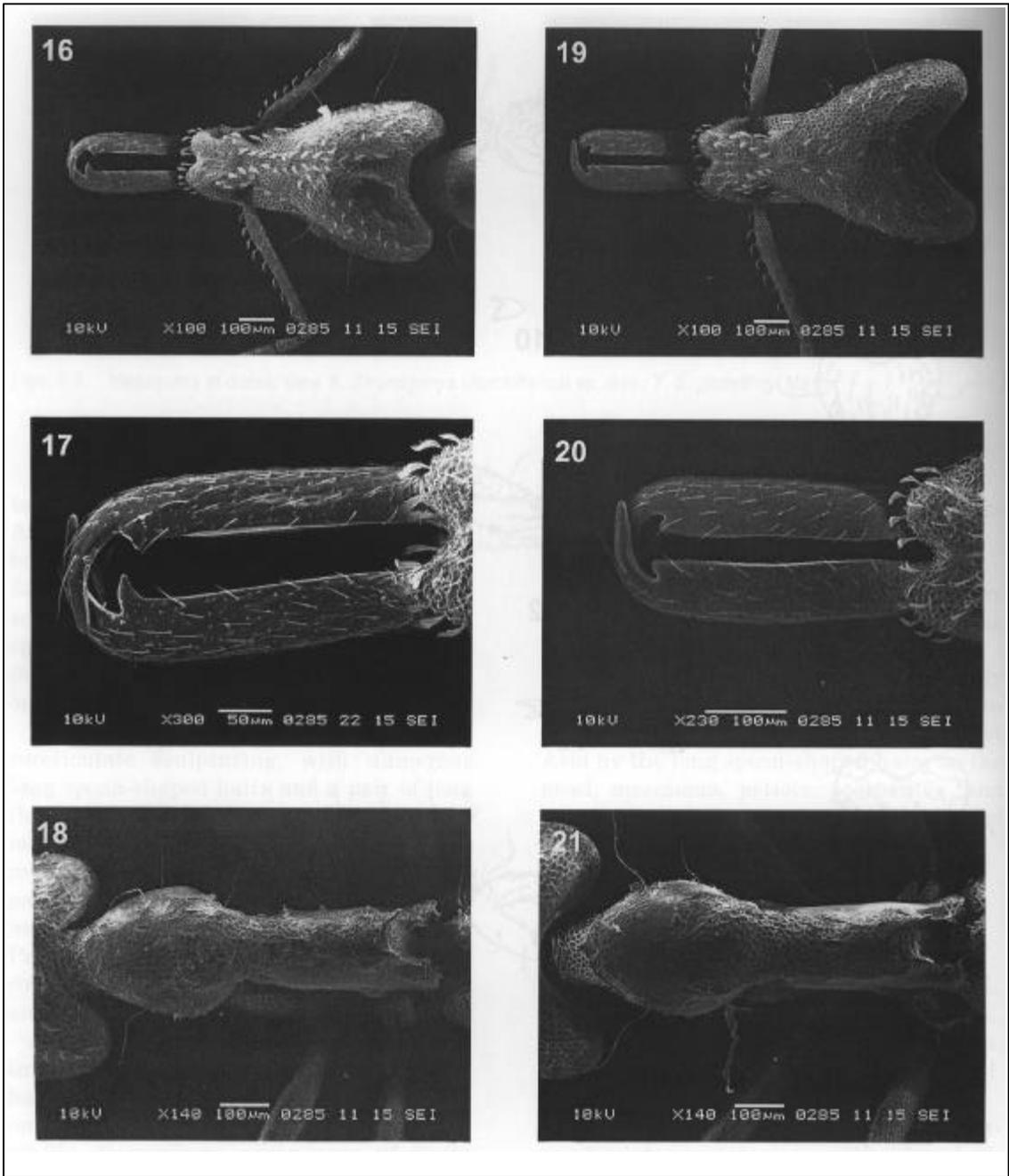
蘭嶼瘤顎家蟻 (Figs. 11-18)

Holotype. Worker. TL, 2.89 mm; HL, 0.83 mm; HW, 0.59 mm; SL, 0.54 mm; ML, 0.39 mm; FCD, 0.20 mm; PW, 0.37 mm; WL, 0.84 mm; CI, 71; MI, 47; SI, 91; FCI, 34; MSI, 44.

Head as in Fig. 11, with microreticulate sculpturing, with abundant, short, narrowly spatulate hairs on cranium; in full face view, posterolateral corners of head with 3 pairs of long flagellate hairs. Mandibles sickle-like, slender in full face view; external and internal margins almost straight; preapical teeth of mandibles prominently spiniform; apical



Figs. 8-15. 8-10, *Strumigenys konteiensis* sp. nov. 8, head, full face view, worker; 9, profile, worker; 10, apical fork of mandible, end-on view, worker. 11-15, *S. orchidensis* sp. nov.; 11, head, full face view, worker; 12, profile, worker; 13, apical fork of mandible, end-on view, worker; 14, head, full face view, female; 15, profile, female.



Figs. 16-21. 16-18, *Strumigenys orchidensis* sp. nov.; 16, head, full face view, worker; 17, mandible, full face view, worker; 18, mesosoma, dorsal view, worker. 19-21, *S. formosensis* Forel; 19, head, full face view, worker; 20, mandible, full face view, worker; 21, mesosoma, dorsal view, worker.

fork with 2 spiniform teeth and an intercalary denticle (Fig. 13). Anterior clypeal margin deeply concave medially. Antennae 6-segmented, in a ratio of 14.5: 2.5: 1: 1: 4.5: 9.5 in length from base; scape microreticulate, with a row of narrowly spatulate hairs; 2nd segment 2X as long as wide; 3rd and 4th segments each shorter than wide; 5th segment 3X as long as wide; apical segment 6X as long as wide. Eyes relatively large, 0.07 mm in maximum diameter, with about 15 ommatidia.

Dorsum of promesonotum with microreticulate sculpturing; pairs of long flagellate hairs and erect hairs present (Fig. 12). Mesopleuron and metapleuron smooth and shiny on most parts. Metanotum with microreticulate sculpturing. Propodeal teeth acute and well developed; propodeal lamellae weakly developed.

Petiole with microreticulate sculpturing, with long flagellate hairs; peduncle long; dorsal margin of node convex in profile. Spongiform appendages of pedicelled segments well developed.

First gastral tergite smooth and shiny, with numerous, long flagellate hairs.

Body brownish yellow.

Paratype workers. Seven paratype workers had the following measurements and indices: TL, 2.78-2.93 mm; HL, 0.80-0.85 mm; HW, 0.58-0.60 mm; SL, 0.53-0.55 mm; ML, 0.39-0.42 mm; FCD, 0.20-0.21 mm; PW, 0.35-0.38 mm; WL, 0.82-0.86 mm; CI, 71-73; MI, 46-49; SI, 88-91; FCI, 33-34; MSI, 43-47.

Paratype female. One paratype female had the following measurements and indices: TL, 2.80 mm; HL, 0.72 mm; HW, 0.56 mm; SL, 0.44 mm; ML, 0.34 mm; FCD, 0.19 mm; PW, 0.36 mm; WL, 0.74 mm; CI, 78; MI, 47; SI, 79; FCI, 34; MSI, 47.

General shape of head and alitrunk as shown in Figs. 14-15. Head and antennal scape with microreticulate sculpturing. Head with narrowly spatulate hairs on cranium; in full face view, posterolateral corners of head with 3 pairs of long

flagellate hairs. Compound eyes large. Ocelli relatively large, each with blackened callus.

Alitrunk in profile more even dorsally, arching from anteriormost of mesonotum to posteriormost of metanotum (Fig. 15). Propodeal teeth acute and well developed; propodeal lamellae weakly developed. Dorsum of alitrunk with numerous short erect hairs. Long flagellate hairs present on dorsal of alitrunk, petiole, postpetiole, and 1st gastral tergite.

Body brownish yellow.

Holotype, worker, TAIWAN: Orchid Island, Taitung County, 10-ix-1997 (*C. C. Lin*) (Type depository: National Taiwan University).

Paratypes. One , 16 workers, TAIWAN: Orchid Island, Taitung County, 10-ix-1997 (*C. C. Lin*), from the same nest as the holotype; 49 workers, Orchid island, Taitung County, 10-ix-1997 (*C. C. Lin*) (Type depository: National Taiwan University; National Museum of Natural Science, Taiwan; Taiwan Agricultural Research Institute).

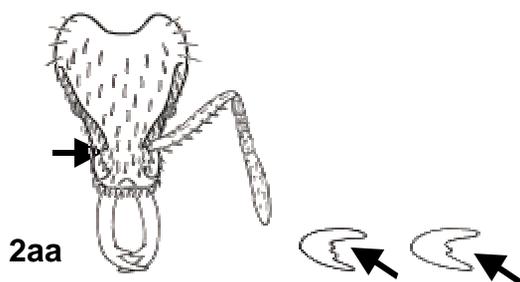
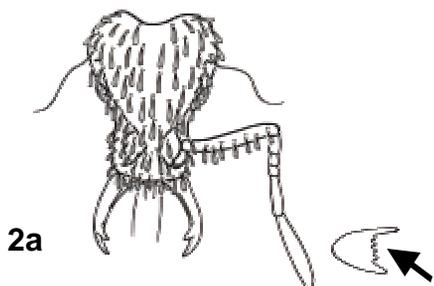
Distribution. Taiwan (Orchid Island).

Etymology. Named after Orchid Island, the type locality of this new species.

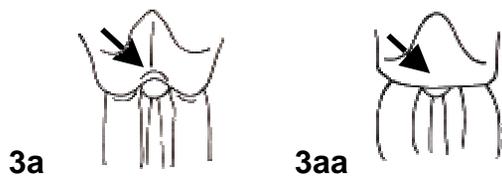
Remarks. This new species is closely related to *S. formosensis* Forel by the (1) sickle-like mandibles with an extreme apex; and (2) anterior median margin border of the clypeus being deeply concave. However it is easily distinguished from the latter by the following characters: (1) smaller body size (TL < 2.6 mm in *orchidensis*, TL > 2.8 mm in *formosensis*); (2) different pilosity on the cranium (with numerous short, narrowly spatulate hairs in *orchidensis* (Fig. 16), with sparse hairs in *formosensis* (Fig. 19)); (3) the preapical teeth of mandible spiniform in *orchidensis* (Fig. 17) and reduced in *formosensis* (Fig. 20); and (4) the different sculpturing on the pronotum (Figs. 18, 21). This new species was only collected from Orchid Island of Taiwan.

Key to the species of *Strumigenys* in Taiwan

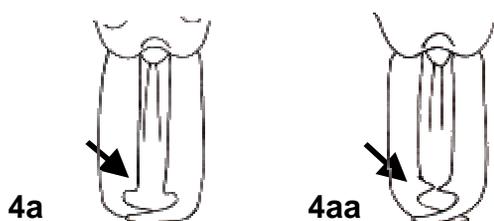
- 1a. Antennae with 4 segments -----
----- *S. emmae* (Emery)
- 1aa. Antennae with 6 segments----- 2
- 2a. Head and mesosoma with numerous long spoon-shaped hairs; apical fork of mandible with 2 spiniform teeth, and 4 intercalary denticles -----
----- *S. konteiansis* sp. nov.
- 2aa. Head and mesosoma without spoon-shaped hair; apical fork of mandible with 2 spiniform teeth, and 1 or 2 intercalary denticles ----- 3



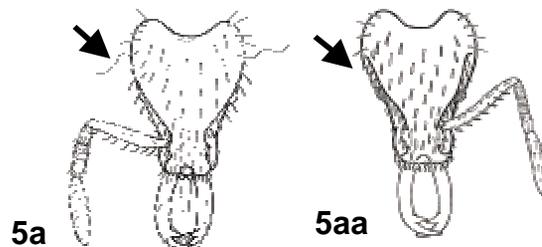
- 3a. Anterior clypeal margin deeply concave medially ----- 4
- 3aa. Anterior clypeal margin transverse ----- 5



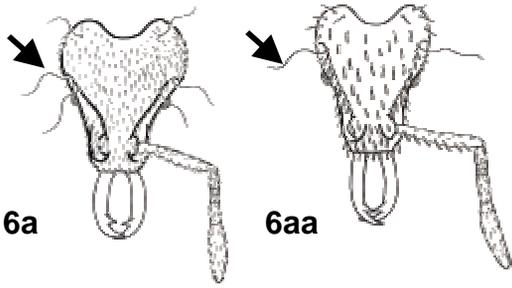
- 4a. Preapical teeth of mandible reduced; larger body size, TL > 2.8 mm -----
----- *S. formosensis* Forel
- 4aa. Preapical teeth of mandible spiniform; small body size, TL < 2.6 mm -----
----- *S. orchidensis* sp. nov.



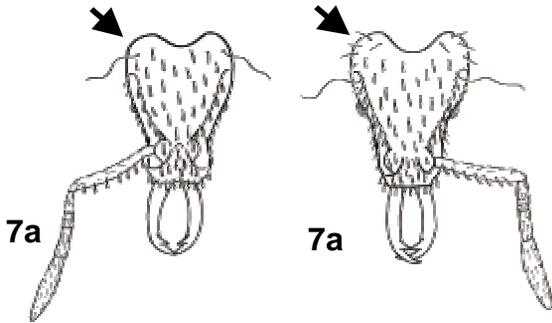
- 5a. Dorsolateral margin of head behind level of eye with 1 or more laterally projecting flagellate hairs ----- 6
- 5aa. Dorsolateral margin of head behind level of eye without laterally projecting flagellate hairs ----- 10



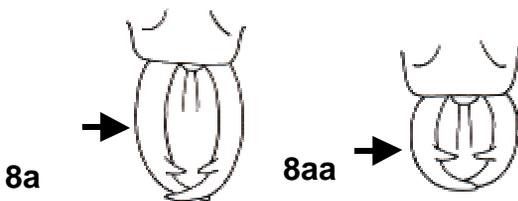
- 6a. Head and mesosoma with flocculent hairs and lacunose sculpturing; head dorsolaterally with 3 pairs of long flagellate hairs; mandible with a pair of spiniform preapical teeth or reduced; apical fork with an intercalary denticle between spiniform teeth; propodeal teeth acute and well developed -----
----- *S. lacunosa* Lin & Wu
- 6aa. Head with spatulate hairs; head dorsolaterally with 2 pairs of long flagellate hairs at most; mandible with a pair of acute spiniform preapical teeth; apical fork with 1 or 2 intercalary denticles between spiniform teeth; propodeal teeth spongiform ----- 7



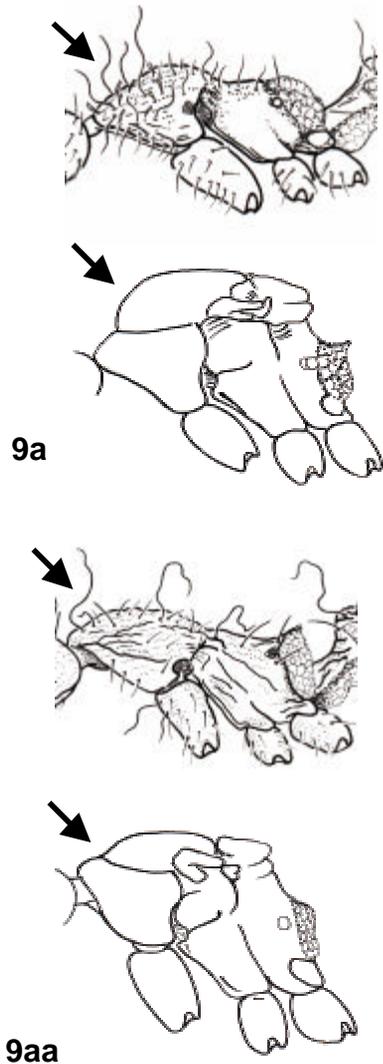
- 7a. First gastral tergite with 5 pairs of long flagellate hairs at most; dorsolateral border of head posteriorly without erect hairs ----- 8
- 7aa. First gastral tergite with numerous, long flagellate hairs; dorsolateral border of head posteriorly with at least 3 pairs of erect hairs ----- 9



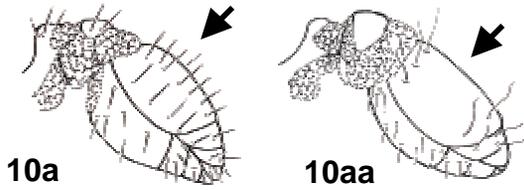
- 8a. Medium species, TL 2.20-2.44 mm; mandible relatively long, MI > 45, straight in full face view; propodeum smooth and shiny on most parts; eye with 6 ommatidia -----
----- *S. trada* Lin & Wu
- 8aa. Smaller species, TL 1.70-1.96 mm; mandible relatively short, MI < 37, arcuate in full face view; propodeum microreticulate; eye consisting of 9-11 ommatidia -----
----- *S. minutula* Terayama & Kubota



- 9a. Dorsum of promesonotum with numerous, short curved hairs; size relatively small, TL 2.20-2.22 mm; eye relatively large, consisting of 28-29 ommatidia; in female, mesosoma in profile with scutum convex ----- *S. nanzanensis* Lin & Wu
- 9aa. Dorsum of promesonotum with few short curved hairs; size relatively medium, TL 2.36-2.44 mm; eye relatively small, consisting of 10-13 ommatidia; in female, mesosoma in profile with scutum even -----
----- *S. chuchihensis* sp. nov.

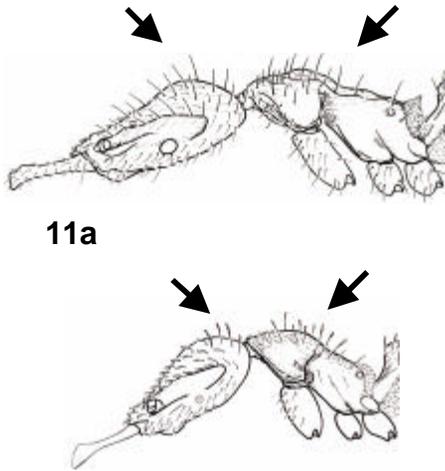


- 10a. First gastral tergite with numerous simple erect hairs ----- 11
 10aa. First gastral tergite with long flagellate hairs, without simple erect hairs ----- 12



- 11a. Cephalic dorsum with numerous long erect hairs; dorsal margin of antennal scrobe with long erect hairs; dorsum of mesosoma with pairs of long erect hairs; larger species, TL 2.5-2.7 mm -----
S. liukueiensis Terayama & Kubota

- 11aa. Cephalic dorsum with long spatulate hairs only on posterolateral area; dorsal margin of antennal scrobe with short, narrowly spatulate hairs; dorsum of mesosoma with pairs of long spatulate hairs; smaller species, TL 2.10-2.14 mm -----
S. lichiaensis Lin & Wu



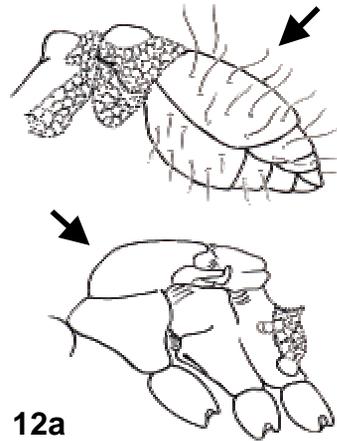
11a

11aa

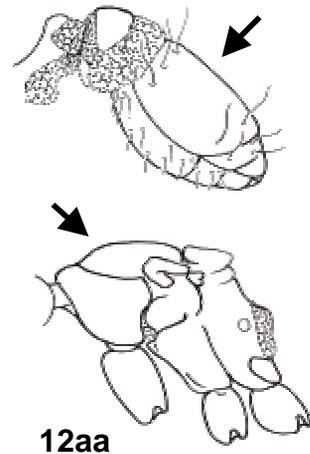
- 12a. Numerous, long flagellate hairs on 1st gastral tergite; with propodeal

teeth acute; propodeal lamellae well developed; in female, mesosoma in profile with scutum convex -----
S. solifontis Brown

- 12aa. Sparse, long flagellate hairs on 1st gastral tergite; propodeal teeth spongiform; in female, mesosoma in profile with scutum even -----
S. hispida Lin & Wu



12a



12aa

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Tokyo, Japan) for his confirming these new species, and S. F. Shiao (National Taiwan University, Taiwan) for reviewing the manuscript. This work was funded by the National Science Council, Republic of China (NSC-86-2313-B-002-078 & NSC-87-2313-B-002-057).

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瘤顎家蟻屬三新種及台灣種類檢索表 (膜翅目：蟻科)

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摘 要

本文描述並繪圖瘤顎家蟻屬三新種 (屈尺瘤顎家蟻、墾丁瘤顎家蟻及蘭嶼瘤顎家蟻)。文中並附台灣產瘤顎家蟻屬種之檢索表。

關鍵詞：膜翅目、蟻科、針刺家蟻族、瘤顎家蟻屬、新種、台灣。