

## **Review of Korean Dacetini (Hymenoptera: Formicidae: Myrmicinae)**

**Dong-Pyeo LYU, Byeong-MOON CHOI<sup>1)</sup> and Soowon CHO**

Department of Agricultural Biology, Chungbuk National University, Cheongju,  
CB 361-763, Korea

<sup>1)</sup>Dept. of Science Education, Cheongju National University of Education,  
Cheongju, CB 361-150, Korea

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**Abstract** Most current systematic changes in the tribe Dacetini are applied to the Korean dacetine ants. The tribe Dacetini of Korea include *Strumigenys lewisi*, *Pyramica incerta*, *P. japonica*, *P. mutica*, and *P. hexamerus*. Taxonomic positions are revised, new informations are added, and a full reference list is provided.

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**Key words** *Strumigenys lewisi*, *Pyramica incerta*, *P. japonica*, *P. mutica*, *P. hexamerus*, Dacetini, Formicidae, Korea

### **INTRODUCTION**

The Dacetini is a tribe of ants that are all predators, most of them small, cryptic elements of tropical forest leaf litter and rotten wood (Bolton, 1998). Most of them have highly modified mandibles, being different from the standard triangular mandible common to most other ants. Many have mandibles that are elongate, linear, and with opposing tines at the tip. Others have elongate mandibles like serrated scissors, or have serrated mandibles that are curved ventrally.

For some time, the name Dacetini had been confused with Dacetonini. The tribe name was originated from the genus *Daceton*, but the genitive of daketon (“biter”) would be daketou, so the tribe name must be Dacetini, not Dacetonini. Bolton (2000) also recently found this problem and he resurrected the name Dacetini.

The generic classification of the tribe up to now is the product of a series of revisionary papers mainly by Brown (1948, 1949a, b, c, 1950a, b, 1952b, 1953a, 1954a), Brown and Wilson (1959) and Brown and Carpenter (1979). Recently some major changes on the classification were suggested by Baroni Urbani and de Andrade (1994) based mainly on fossil records, e.g., synonymizing *Pyramica* into *Strumigenys*. However, because of the presence of two different sets of morphological characters in the mandibular-labral complex, and two different modes of operation of the mandibles that correspond to these morphologies (see below for further explanation), Bolton (1998) revived *Pyramica* and recognized

both genera. A synopsis of the taxonomic history of Dacetini and its component genera outlined by Bolton (1998) is as follows.

### **Tribe Dacetini**

#### Subtribe Dacetiti

Genera: *Acanthognathus*, *Daceton* (= *Dacetum*).

#### Subtribe Epopostrumiti

Genera: *Colobostruma* (= *Alistruma*, = *Clarkistruma*), *Epopostruma* (= *Hexadaceton*), *Mesostruma*, *Microdaceton*.

#### Subtribe Orectognathiti

Genus: *Orectognathus* (= *Arnoldidris*).

#### Subtribe Strumigenyiti

Genera: *Asketogenys*, *Chelystruma*, *Cladarogenys*, *Codiomyrmex*, *Codioxenus*, *Dorisidris*, *Dysedrognathus*, *Epitritus*, *Glamyromyrmex* (= *Borgmeierita*), *Gymnomyrmex*, *Kyidris* (= *Polyhomoa*), *Neostruma*, *Pentastruma*, *Quadrstruma*, *Serrastruma*, *Smithistruma* (= *Cephaloxys*, = *Miccostruma*, = *Platystruma*, = *Weberistruma*, = *Wessonistruma*), *Strumigenys* (= *Eneria*, = *Labidogenys*, = *Proscopomyrmex*, = *Pyramica*), *Tingimyrmex*, *Trichoscapa*.

Bolton (1999) discussed a major dichotomy in dacetine mouthpart morphology, related to distinct methods of capturing prey. In one group, the mandibles do not open very widely. They are more widely separated where they articulate with the head. They tend to have a series of teeth or denticles along the length of the mandible. They generally do not have enlarged teeth at the apex, and the labrum has a pair of distinct lobes projecting from the anterior border. This suite of characters is associated with a mode of prey attack, termed static pressure mode, in which after a strike the mandibles remained clamped on the prey, and the sting should be applied to subdue the prey. In the other group, the mandibles open very widely. The articulation point on the head differ each other. They tend to have long, cylindrical shafts with enlarged apical teeth that engaged when the mandibles closed. The shaft lacks a series of teeth or denticles, instead of having 0–2 teeth or denticles near the apical teeth, and the labrum is T-shaped, with no anterior lobes. This is associated with a so called kinetic mode, in which a strike alone is sufficiently brutal to incapacitate a prey, so that no subsequent actions are needed. The immobilized prey could be lifted and carried back to the nest. Based on his finding, Bolton (1999) re-defined some genera.

The Korean Dacetini contain two of Bolton's (1999) newly defined genera: *Pyramica* and *Strumigenys*. *Pyramica* retains the primitive static pressure mode of predation. It is a morphologically diverse genus. All of the members of this genus share the suite of mandibular characters described above. *Strumigenys* is another lineage that has evolved kinetic mandibles.

Some reshuffling of genera nomenclature in the Korean Dacetini is required according to the recent changes. Based on the studies of evolutionary character changes by Baroni Urbani and de Andrade (1994) followed by Bolton (1999), the genera *Smithistruma*, *Kyidris*, and *Epitritus* are now junior synonyms of either *Strumigenys* or *Pyramica*. We follow Bolton's classification here as the mouthpart

character, a key character of his classification, has been long recognized and discussed its evolution since Brown and Wilson (1959). Therefore, the genera *Smithistruma*, *Kyidris* and *Epitrius*, reported in Korea, are now junior synonyms of *Pyramica*, and all of their constituent species are moved to *Pyramica*. There are now two genera and five species belonging to the tribe Dacetini in Korea. *Pyramica* retains the primitive static pressure mode of predation. It is a morphologically diverse genus. All of the members of this genus share the suite of mandibular characters described above. *Strumigenys* is another lineage that has evolved kinetic mandibles. Five species recorded in the Dacetini are as follows: *Strumigenys lewisi* Cameron by Kim and Kim (1982), *Pyramica japonica* (Ito) by Kim *et al.* (1991), *P. mutica* Brown and *P. hexamerus* Brown by Kim *et al.* (1992), and *P. incerta* Brown by Choi and Lee (1995).

Abbreviations used in this paper are as follows: GG, Gyeonggi-do; GW, Gangwon-do; CB, Chungcheongbuk-do; CN, Chungcheongnam-do; JB, Jeonlabuk-do; JN, Jeonlanam-do; GB, Gyeongsangbuk-do; GN, Gyeongsangnam-do; JJ, Jeju-do. Romanization of Korean geographic names follows the rule set by the National Academy of the Korean Language in 2000.

## MATERIALS AND METHODS

The specimens examined in this study have been collected by the first author for the last six years, or loaned from the private collection of the second author. In general, it is difficult to find dacetine ants by usual field search. However, after shifting litter and surface soil and applying extraction methods using Winkler bags or Berlese funnels, abundant samples are sometimes found. The specimens collected were saved as either dry-mounted or alcohol-preserved.

To observe morphological characters, specimens were dehydrated through ethanol and fixed by 100% amyl acetate. They were then dried by a critical point drier (Hitachi Hcp-2, Japan), gold-coated, and observed using a scanning electron microscope (Hitachi S-2460N).

## SYSTEMATICS

### Tribe Dacetini Forel, 1892 비늘개미족

Dacetonini Forel, 1892, Mitt. Schweiz. Entomol. Ges. 8: 344 [as genus group]. Type genus: *Daceton* Perty, 1833: 136.

Dacetonii: Forel, 1893, Ann. Soc. Entomol. Belg. 37: 164 [as tribe of Myrmicinae].

Dacetii: Emery, 1895: 770 [emended spelling].

Dacetini: Emery, 1914: 13; Forel, 1917: 246 [emended spelling].

Key to the genera of the tribe Dacetini in Korea

1. Mandibles short, triangular or nearly so, and with teeth along their entire inner margin ..... *Pyramica*
- Mandibles thin, elongate and with only 2–3 teeth at their extreme tips ..... *Strumigenys*

### Genus *Strumigenys* Smith, 1860

*Strumigenys* Smith, F. 1860, J. Entomol. 1: 72. Type species: *Strumigenys mandibularis* Smith, 1860: 72, by monotypy.

*Labidogenys* Roger, 1862, Berl. Entomol. Z. 6: 249. Type species: *Labidogenys lyroessa* Roger, 1862: 249, by monotypy.

*Proscopomyrmex* Patrizi, 1946, Boll. Ist. Entomol. Univ. Bologna 15: 294. Type species: *Proscopomyrmex londianensis* Patrizi, 1946: 295, by monotypy.

*Eneria* Donisthorpe, 1948, Ann. Mag. Nat. Hist. (11) 12: 598. Type species: *Eneria excisa* Donisthorpe, 1948: 598, by original designation.

*Quadristruma* Brown, 1949a, Trans. Am. Entomol. Soc. 75: 47. Type species: *Epitritus emmae* Emery, 1890, Bull. Soc. Entomol. Ital. 22: 70.

### *Strumigenys lewisi* Cameron, 1886 비늘개미

(Figs 1–4)

*Strumigenys lewisi* Cameron, 1886, Proc. Manch. Lit. Philos. Soc. 25: 229; Bingham, 1903: 149; Brown, 1949b: 16; Collingwood, 1976: 303; Choi, 1985: 411; Choi *et al.*, 1985: 446; Choi, 1986: 297; Choi, 1987: 361; Choi, 1988: 223; Kim *et al.*, 1989: 218; Choi and Park, 1991a: 69; Choi and Park, 1991b: 83; Kim *et al.*, 1991: 287; Terayama *et al.*, 1992: 31; Choi and Bang, 1992a: 106; Choi and Bang, 1992c: 38; Kim *et al.*, 1992: 350; Kim *et al.*, 1993: 126; Choi and Bang, 1993: 322; Choi *et al.*, 1993: 360; Kim *et al.*, 1994: 300; Choi, 1995: 190; Choi and Lee, 1995: 193; Kim *et al.*, 1995: 105; Choi, 1996a: 209; Choi, 1996b: 10; Choi, 1996c: 47; Kim, 1996: 180; Choi, 1997a: 57; Choi, 1997b: 126; Choi, 1998: 217; Choi and Park, 1998: 60; Choi, 1999: 511; Choi and Lee, 1999: 2; Choi and Park, 1999: 25.

*Strumigenys godeffroyi* var. *lewisi* Mayr, 1887: 569; Wheeler, W. M. 1906: 318; Teranish, 1940: 5.

*Strumigenys* sp.: Terayama *et al.*, 1992: 32; Choi, 1995: 190; Choi, 1997a: 57.

*Workers.* Body length about 2 mm. Body color yellow to brown. Mandibles thin and elongate, with only 2 or 3 teeth near the extreme tips. Outer margin of mandibles feebly convex in full-face view; apical fork with 2 or 3 small intercalary denticles. A subapical tooth present on each mandibular shaft, each as long as the space between the mandibular shafts. Antennae 6-segmented, with the second and third funicular segments reduced. Antennal scrobes present. Standing hairs on mesosoma not abundant, numbering only 4 to 8. Dorsal outline of mesosoma only weakly interrupted by shallow metanotal groove. Scariose lamella developed below propodeal spine. Sides of the petiole, postpetiole and lower part of the gaster with masses of spongiform curtain. Most parts of mesothorax and propodeum unsculptured, smooth and shining.

*Specimens examined.* [GG] 17 workers (= w), Mt. Suri-san, 23. VII. 1999 (D.P. Lyu); 6w, Mt. Yumeong-san, 27. X. 2000 (D.P. Lyu). [CB] 12w, Mt. Weolag-san, 21. VI. 2001 (D.P. Lyu). [JJ] 42w, Sangumburi, 8. VI. 2001 (D.P. Lyu); 17w, Geopyeong, 8. VI. 2001 (D.P. Lyu).

*Locality.* [GG] Is. Baegryeong-do, Is. Daecheong-do, Is. Ganghwa-do, Mt. Nam-san, Suwon, Mt. Chiljang-san. [GW] Mt. Seolag-san. [CB] Mt. Weolag-san, Mt. Sokni-san. [CN] Mt. Gyeryong-san. [JB]

Mt. Deogyu-san, Is. Eocheong-do, Kunsan, Mt. Mai-san, Is. Seonyu-do, Is. Wi-do, Kimjae. [JN] Is. Jaeun-do, Mt. Weolchul-san, Mt. Yudal-san, Is. Bikeum-do, Is. Odong-do, Is. Hong-do, Is. Daeheugsan-do, Is. Soheugsando, Is. Keokeum-do, Is. Jindo, Is. Wan-do, Is. Soan-do, Is. Bokil-do. [GB] Is. Uleung-do. [GN] Is. Juk-do, Mt. Baegam-san, Masan, Jinhae, Keojae, Namhae, Is. Hansan-do, Is. Wonsan-do. [JJ] Mt. Hanla-san.

*Distribution.* Korea, Japan.

*Remarks.* Over all, this species is similar to the species of *Pyramica* in body size and shape, but differ in having thin, elongate mandibles rather than short and triangular ones.

### **Genus *Pyramica* Roger, 1862**

*Pyramica* Roger, 1862, Berl. Entomol. Z. 6: 251. Type species: *Pyramica gundlachi* Roger, 1862: 253, by monotypy.

*Cephaloxys* Smith, F. 1865, J. Proc. Linn. Soc. Lond. Zool. 8: 76. Type species: *Cephaloxys capitata* Smith, F. 1865: 77, by monotypy.

*Glamyromyrmex* Wheeler 1915, Bull. Mus. Comp. Zool. 59: 487. Type species: *Glamyromyrmex beebei* Wheeler, 1915: 488, by monotypy.

*Smithistruma* Brown 1948, Trans. Am. Entomol. Soc. 74: 104. Type species: *Strumigenys pulchella* Emery, 1895: 327.

*Epitritus* Emery, 1869, Bull. Soc. Entomol. Ital. 1: 136. Type species: *Epitritus argiolus* Emery, 1869: 136, by monotypy.

*Kyidris* Brown, 1949b, Mushi 20: 3. Type species: *Kyidris mutica* Brown, 1949b: 3.

*Miccostruma* Brown, 1948, Trans. Am. Entomol. Soc. 74: 123. Type-species: *Epitritus mandibularis* Szab, 1909: 27.

*Platystruma* Brown, 1953, Am. Midl. Nat. 50: 112. Type-species: *Strumigenys (Cephaloxys) depressiceps* Weber, 1934: 47.

*Polyhomoa* Azuma, 1950, Hyogo Biology 4: 36. Type-species: *Polyhomoa itoi* Azuma, 1950: 36, by monotypy.

### ***Pyramica incerta* (Brown, 1949) 긴털 톱비늘개미**

(Figs 9–10)

*Smithistruma incerta* Brown, 1949b, Mushi 20: 10; Choi, 1995: 191; Choi and Lee, 1995: 193; Choi, 1996a: 209; Choi, 1996c: 47; Kim, 1996: 181; Choi, 1997a: 57.

*Smithistruma habei* Onoyama, 1980: 194.

*Pyramica incerta*: Bolton, 1999, J. Nat. Hist. 33: 1673.

*Workers.* Body length around 1.5 mm. Body color yellowish to reddish brown. Lateral margins of head roundly convex. Clypeus fringed with spatulate hairs, and with a slightly concave anterior margin. Antennae 6 segmented. Leading edges of antennal scapes angulate at the basal third. Promesonotum more or less convex. Dorsal surface of mesosoma with numerous standing hairs. Pronotal humeri with elongate paired flagellate hairs. Sides of petiole and postpetiole and lower part of the gaster with masses

of spongiform curtain.

*Specimens examined.* [JN] 1 worker, Is. Soheugsan-do, 27. IV. 1994 (B.M. Choi).

*Locality.* [JN] Is. Soheugsan-do. [KB] Is. Uleung-do.

*Distribution.* Korea, Japan.

***Pyramica japonica* (Ito, 1914) 톱니비늘개미**

(Figs 5-8)

*Strumigenys japonica* Ito, 1914, Ann. Soc. Entomol. Belg. 58: 40.

*Smithistruma (Cephaloxys) japonica*: Emery, 1922: 325.

*Smithistruma (Smithistruma) japonica*: Brown, 1948: 105.

*Weberistruma japonica*: Brown, 1949b: 10.

*Smithistruma japonica*: Bolton, 1983; Kim *et al.*, 1991: 285; Terayama, Choi and Kim, 1992: 32;

Kim *et al.*, 1992: 350; Choi and Bang, 1993: 322; Choi *et al.*, 1993: 360; Choi, 1995: 191; Choi, 1996c: 47; Kim, 1996: 181; Choi, 1997a: 57.

*Pyramica japonica*: Bolton, 1999, J. Nat. Hist. 33: 1673.

*Workers.* Body length about 2 mm. Body color yellowish to reddish brown. Head somewhat slender in general shape, its posterior corners rather angulate. Clypeus almost as long as broad, not fringed with spatulate hairs; anterior margin projecting in the middle. Antennae are 6 segmented. Ventral margin of antennal scrobes reaching as far as eyes. Eyes large, maximum diameter longer than apical segment of antenna. Antennal scapes flattened, without angulate leading edges. Promesonotal area not raised. Propodeal spines distinct. Dorsal surfaces of head and pronotum without standing hairs, but with dense depressed, scale-like hairs. Sides of petiole and postpetiole and lower part of the gaster with masses of spongiform curtain.

*Specimens examined.* [JJ] 1 worker, Mt. Hanka-san, 8 VI 2001 (D.P. Lyu).

*Locality.* [JN] Is. Keokeum-do.

*Distribution.* Korea, Japan.

***Pyramica mutica* (Brown, 1949) 쌍털비늘개미**

(Figs 11-12)

*Kyidris mutica* Brown, 1949b, Mushi 20: 3; Terayama, Choi and Kim, 1992: 32; Kim *et al.*, 1992:

347; Choi *et al.*, 1993: 361; Choi, 1995: 191; Choi, 1996c: 47; Kim, 1996: 181; Choi, 1997a: 57; Choi, 1997b: 131.

*Kyidris itoi* Brown and Yasumatsu, 1951: 94.

*Kyidris nuda* Brown, 1952a: 124.

*Pyramica mutica*: Bolton, 1999, J. Nat. Hist. 33: 1672.

*Workers.* Body length around 1.5 mm. Body color reddish brown. Antennae are 6 segmented. Body surfaces from head to postpetiole finely reticulate. Paired scale-like hairs present on head and mesonotum. Posterior portion of propodeum simple, without teeth or lamellate structures. Spongiform

material on petiole and postpetiole relatively weakly developed. Sides of petiole and postpetiole and lower part of the gaster with masses of spongiform curtain.

*Specimens examined.* [JN] 6workers, Is. Daeheugsan-do, 4. IX. 1991 (B.M. Choi).

*Locality.* [KK] Is. Daecheong-do. [JN] Is. Daeheugsan-do.

*Distribution.* Korea, Japan.

### ***Pyramica hexamerus* (Brown, 1958) 조개무늬비늘개미**

(Figs 13–16)

*Epitritus hexamerus* Brown, 1958, *Mushi* 31: 70; Terayama, Choi and Kim, 1992: 32; Kim *et al.*, 1992: 347; Choi *et al.*, 1993: 361; Choi, 1995: 192; Choi, 1996c: 48; Kim, 1996: 181; Choi, 1997a: 57.

*Pyramica hexamerus*: Bolton, 1999, *J. Nat. Hist.* 33: 1672.

*Workers.* Body length around 2 mm. Body color yellowish brown. Mandibles with 2 pairs of preapical teeth; apical dentition including a distinct dorsal spiniform tooth. Anterior margin of clypeus without peculiar hairs. Dorsal outline of mesosoma horizontal from pronotum to mesonotum; the latter overhanging the propodeum. Propodeal spine distinct. Spongiform appendages on posterolateral portion of propodeum relatively weakly developed. Sides of petiole and postpetiole and lower part of the gaster with masses of spongiform curtain.

*Specimens examined.* [JN] 1worker, Is. Wan-do, 24. VI. 1994 (D.P. Lyu).

*Locality.* [JN] Is. Soan-do.

*Distribution.* Korea, Japan.

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### **Legends of figures**

- Figs 1-4.** *Strumigenys lewisi* Cameron. –1: Lateral view of worker; 2: Thorax and petiole, lateral view; 3: Head, lateral view; 4: Head, frontal view.
- Figs 5-8.** *Pyramica japonica* (Ito). –5: Lateral view of worker; 6: Thorax and petiole, lateral view; 7: Head, lateral view; 8: Head, frontal view.
- Figs 9-10.** *Pyramica incerta* Brown. –9: Lateral view of worker; 10: Head, frontal view.
- Figs 11-12.** *Pyramica mutica* Brown. –11: Lateral view of worker; 12: Head, frontal view.
- Figs 13-16.** *Pyramica hexamerus* Brown. –13: Lateral view of worker; 14: Thorax and Propodeum, lateral view; 15: Head, frontal view; 16: Mandible.



