

First Record of the Genus *Kleidotoma* (Insecta: Hymenoptera: Figitidae: Eucoilinae) from Korea

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ABSTRACT

The genus *Kleidotoma* (Figitidae: Eucoilinae) is reported for the first time in Korea. We here describe *K. striaticollis* Cameron (new to Korea) and *K. pulchrinis* Choi n. sp. A key, descriptions, illustrations of diagnostic characters and distributional data are provided.

Key words: *Kleidotoma*, Eucoilinae, Figitidae, new record, Korea

INTRODUCTION

The subfamily Eucoilinae belonging to the family Figitidae is an important group of parasitoids of Diptera (Weld, 1952). The members of Eucoilinae are characterized by the possession of a scutellar plate with a glandular release pit situated in the center (Ronquist, 1995; Fontal-Cazalla et al., 2002). The subfamily was erected by Dalla Torre and Kieffer (1910), and then Weld (1952) upgraded it to family level as Eucoilidae. However, Ronquist (1999) downgraded it to the subfamily again as a part of the family Figitidae based on the inferred phylogeny of the Superfamily Cynipoidea. In Korea, a total of 10 species in 5 genera of the subfamily Eucoilinae are known (Cho et al., 1992; Lee and Choi, 1993).

The genus *Kleidotoma* Westwood contains about 65 species in the world. The phylogenetic relationship of *Kleidotoma* with its related genera in the subfamily were reported by Fontal-Cazalla et al. (2002) and they postulated the genus *Kleidotoma* as a monophyletic group. Members of the genus are characterized by the combinations of concaved outer margin of fore wing, fully opened radial cell and very short R₁ vein.

In this paper we report the genus *Kleidotoma* with two species, *K. striaticollis* Cameron (new to Korea) and *K. pulchrinis* n. sp., for the first time in Korea. We provide descriptions, a habitus photo, illustrations of diagnostic characters and distributional data of the species.

MATERIALS AND METHODS

Morphological terminology used in this study follows Weld (1952). The measurements and relative proportions of body structures employed generally have been explained in Nordlander (1981, 1982) and the terminology of the wing venation is after Lee and Choi (1993). Abbreviations used for the measurements are as follows; BTd: Distance between tentorial pits, Eh: Maximum diameter of compound eye, FAI: Length of face, FAW: Width of face, FRI: Length of frons. Hh: Height of head excluding mandibles, Hw: Width of head, IOD: Interocellar distance, PGw: Postgena width, LOI: Lateral ocellus length, LOW: Lateral ocellus width, MSI: length of malar space, MI: Length of mesoscutum, OOD: outerocellar distance, PPI: Length of pronotal plate, PPw: Width of pronotal plate, SI: Length of scutellum, Tw: Temple width.

Specimens are examined by the stereo microscope (Zeiss Stemi SV 11 Apo) and photographs produced with Zeiss AxioCam MRc5 digital camera system and optimized with an i-delta imaging system (Image & Microscope Technology). Examined specimens are deposited in the Department of Biology, Yeungnam University and the National Institute of Biological Resources in Korea.

SYSTEMATIC ACCOUNTS

Order Hymenoptera
Family Figitidae
Subfamily Eucoilinae
Genus ^{1*}*Kleidotoma* Westwood, 1833

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Fig. 1. Habitus of *Kleidotoma pulchrinis*, n. sp. Scale bar=0.5 mm.

Kleidotoma Westwood, 1833: 494, Type species: *K. psiloides*, by original designation and monotype.
Pentacrita Forster, 1869: 342, 349, Type species: *Cothonaspis retusa* Hartig.
Nedinoptera Forster, 1869: 343, 350, Type species: *Kleidotoma halophila* Thomson.
Aphiloptera Forster, 1869: 343, 351, Type species: *Aphiloptera anisomera* Forster.
Agroscopa Forster, 1869: 343, 352, Type species: *Agroscopa helgolandica* Forster.
Rhynchacis Forster, 1869: 344, Type species: *Cothonaspis nigra* Hartig.
Schizosema Kieffer, 1901: 161, Type species: *Cothonaspis emarginatus* Hartig.
Trirhoptrasema Kieffer, 1901: 344, Type species: *Kleidotoma Americana* Ashmead.

Materials examined. Total 2 specimens. 1 ♀ KOREA: Gangwon-do, Yanggu-gun, Dutayun, 30.v.1992 (J.-W. Lee); 1 ♀, Korea: Gangwon-do, Gansung-gun, Temp. Konbong-sa, 22.V.1992 (J.-W. Lee).

Diagnosis. Body smooth and polished. Compound eyes rather small. Cheek with malar groove. Antennae 13 segmented but has variable club segment in female, and 15 segmented in male. Scutellar disc of thorax rounded along the margin and has longitudinally striped punctures. Dorsal cup long ovate and 0.8X as long as scutellum. Propodeum with long hairs not covered entirely and distinct propodeal carinae. Fore wing with short hairs covered entirely and the outer margin concaved. Radial cell fully opened at the anterior margin and R1 very short. Abdomen smooth and polish-

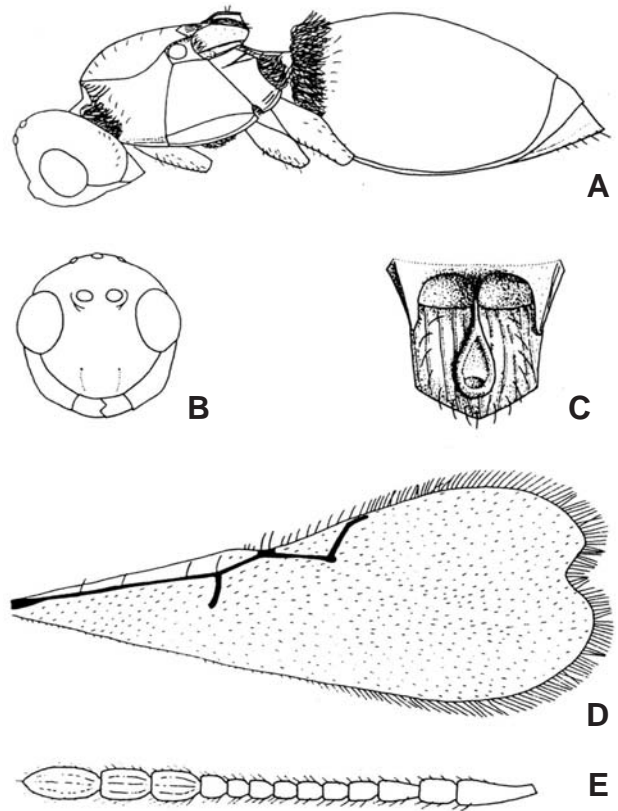


Fig. 2. Female of *Kleidotoma striaticollis*: A, whole body in lateral view; B, head in frontal view; C, scutellum in dorsal view; D, forewing; E, antennae.

ed, and the size is variable. Anterior part of the 2nd abdominal segment has a hairy ring.

Key to the Korean species of *Kleidotoma*

1. The center of vertex smooth and polished. Posterior area of pronotal plate with irregular punctures. Lateral bar of scutellum smooth. Scutellar fovea deep and distinct. Pronotum with distinct striae at the antero-lateral sides *Kleidotoma striaticollis* Cameron
- Vertex with weak transverse striae at the center but strong striae in the posterior part. Posterior area of pronotal plate smooth. Lateral bar of scutellum with longitudinal long striae. Scutellar fovea not deep and the boundary between scutellar disc indistinct. Pronotum with weak striae in the antero-lateral sides *Kleidotoma pulchrinis* Choi n. sp.

¹**Kleidotoma striaticollis* Cameron, 1888 (Fig. 2A-E)

Kleidotoma striaticollis Cameron, 1888: 167, Holotype: female, BMNH, by original designation.

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Cleidotoma striaticollis Kieffer, 1902: 117.

Redescription of female. Body length 1.70 mm, antennae length 1.1 mm, fore wing length 1.75 mm.

Head rounded, smooth and polished. Ocelli small. Anterior part of vertex and frons smooth and polished, but posterior part of vertex with transverse striae. Face smooth and polished with short sparse hairs. Antennal socket weakly projected (Fig. 2B). Striae of vertex reach to upper part of temple but the lower part of temple smooth and polished with short and linear strong striae (Fig. 2A). Cheek broad with long sparse hairs around malar groove. Mandible with long and dense hairs. Compound eyes rather small, 0.73X as wide as long. Antennae 13 segmented with 3 segmented club and each club segments with longitudinal weak rhinaria. Ratio of antennal segments 1.00 : 0.50 : 0.56 : 0.39 : 0.33 : 0.33 : 0.30 : 0.30 : 0.30 : 0.30 : 0.33 : 0.33 : 1.00 (Fig. 2E). Thorax smooth and polished. Pronotal plate projected on pronotum and margin of posterior plate rounded. Lateral cavity distinct. Anterior plate with rough and irregular striae. Posterior plate with irregular punctures. Mesoscutum smooth and flattened with linear fine hairs. Scutellar disc with long longitudinal striae, apex of disc weakly projected with long and linear strong hairs. Lateral bar 0.50X as long as scutellum. Scutellar fovea deep. Dorsal cup long ovate, 0.87X as long as scutellum (Fig. 2C). Sides of pronotum anteriorly with dense, tuft hairs. Mesopleural suture distinct. Metapleuron rather projected. Propodeum with dense, long and fine hairs, but the hairs not covered entirely. Propodeal carinae distinct (Fig. 2A). Legs with sparse and long hairs entirely. Fully winged, the surface pubescence. Fore wing with long cilia from the middle of anterior margin to the middle of posterior margin. Radial cell fully opened, 2.60X as wide as long. Rs+M and M absent (Fig. 2D). Abdomen smooth and polished, 0.55X as wide as long. The 2nd abdominal segment with strong hairy ring (Fig. 2A).

Color. Head black. Thorax dark blackish brown. Abdomen blackish brown dorsally and reddish brown ventrally. Legs pale reddish brown. Wing veins yellowish brown.

Measurements. Hh/Hw: 1.10, LOI/LOW: 1.29, IOD/OOD: 0.62, FRI/FAI: 0.40, FAI/FAw: 0.63, dHI/dHw: 0.75, Tw/PGw: 0.73, BTD/FAw: 0.22, MSI/Eh: 0.80, PPI/PPw: 0.88, MI/Sl: 1.54, Sc+R/Sc+R₁: 4.00, r/Rs: 0.90

Male. Unknown.

Distribution. Palearctic (Europe, Korea).

Host. Unknown.

¹**Kleidotoma pulchris* Choi n. sp. (Figs. 1, 3A-E)

Materials examined. Holotype: ♀, Korea: Gyeongsangbuk-

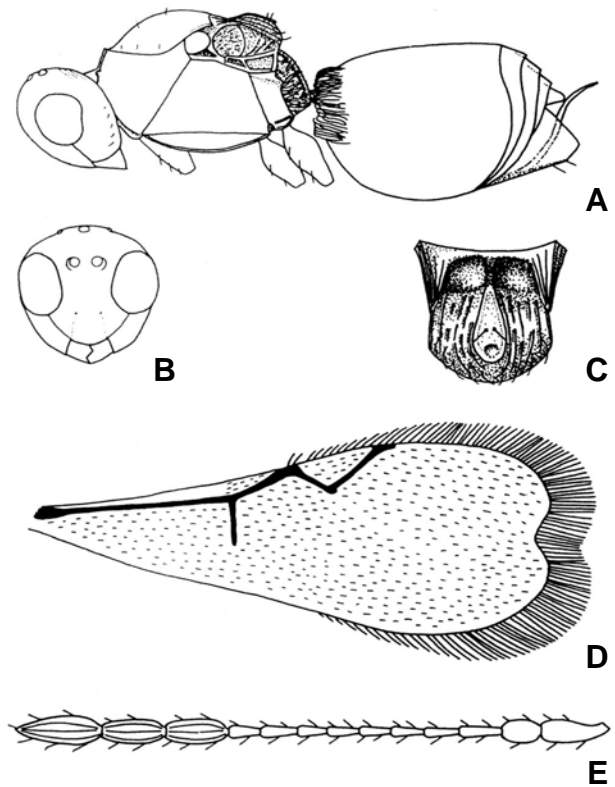


Fig. 3. Holotype (female) of *Kleidotoma pulchris*: A, whole body in lateral view; B, head in frontal view; C, scutellum in dorsal view; D, radial cell of forewing; E, antennae.

do, Gyeongsan-si, 13.ix.1988 (W.Y. Choi), deposited at YNU. Paratype: 1 ♀, same locality as holotype, 13.viii.1988 (W.-Y. Choi); 1 ♀, same locality as holotype, 16.viii.1988 (W.-Y. Choi).

Description of female. Body length 0.96 mm, antennae length 0.73 mm, fore wing length 1.00 mm.

Head rounded, smooth and polished. Ocelli small. Vertex with weak transverse striae in the middle and strong transverse striae at the posterior. Frons and face smooth and polished with short sparse hairs. Below of antennal socket with linear long and fine hairs (Fig. 3B). Temple wide, smooth and polished. Cheek broad with distinct malar groove (Fig. 3A). Mandible with long and dense hairs. Compound eyes rather small, 0.69X as wide as long. Antennae 13 segmented with 3 segmented club and each club segments with longitudinal strong rhinaria and long, fine hairs. Ratio of antennal segments 1.00 : 0.63 : 0.70 : 0.55 : 0.55 : 0.50 : 0.50 : 0.50 : 0.58 : 0.50 : 1.00 : 1.08 : 1.38 (Fig. 3E). Thorax smooth and polished. Pronotal plate projected on pronotum and margin of posterior plate rounded. Lateral cavity distinct. Anterior

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plate with irregular transverse striae but posterior plate smooth. Mesoscutum smooth and polished with linear fine hairs in the middle. Apex of scutellar disc rounded with weak longitudinal striae, and long and strong hairs along the margin. Lateral bar with weak and long striae, and 0.53X as long as scutellum. Scutellar fovea not deep, so the boundary between scutellar disc indistinct. Dorsal cup long ovate with two setae at the center and 0.94X as long as scutellum (Fig. 3C). Sides of pronotum smooth and polished with dense, tuft hairs in the anterior part and with weak striae at the posterior of pronotal plate. Mesopleural suture distinct. Metapleuron rather projected, but mostly smooth and polished. Propodeum with dense and long hairs in the posterior part of metapleuron, but the hairs short and weak in the remaining part. Propodeal carinae distinct and oval (Fig. 3A). Legs with sparse and long hairs entirely. Fully winged, the surface pubescence. Fore wing with long cilia from the middle of anterior margin to the middle of posterior margin and the outer margin concaved. Radial cell fully opened, 2.43X as wide as long (Fig. 3D). Abdomen large, smooth and polished, 0.62X as wide as long. Hairry ring of the 2nd abdominal segment strong in the anterior part but incomplete at the apex (Fig. 3A).

Color. Head and thorax blackish brown. Antennae brown but the basal parts yellow. Abdomen reddish brown. Legs yellow except reddish brown coxa. Wing veins brown.

Measurements. Hh/Hw: 0.96, LOI/LOw: 1.36, IOd/OOd: 0.60, FRI/FAI: 0.30, FAI/FAw: 1.82, Tw/PGw: 0.63, BTd/FAw: 0.55, MSI/Eh: 0.38, PPI/PPw: 0.64, MI/SI: 1.18, Sc+R/Sc+R₁: 2.90, r/Rs: 0.67

Male. Unknown.

Distribution. Korea.

Host. Unknown.

Etymology. The specific epithet is derived from the Latin word 'pulchris' (means beauty) because of its cute shape.

Remarks. This species is easily distinguished from other species by the projected pronotal plate. Also it has not deep scutellar fovea, so the boundary between scutellar disc is indistinct.

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REFERENCES

- Cameron, P., 1888. *Biologia Centrali-Americana*. Hymenoptera, 1: 1-466.
- Cho, H.C., T.H. Kim and J.C. Paik, 1992. Hymenopteran parasitoids of the onion maggot *Delia antiqua* (Meigen) (anthomyiidae: Diptera) in Korea. *Kor. J. of Ent.*, 22(3): 209-214.
- Dalla Torre, K.W. and J.J. Kieffer, 1910. Hymenoptera Cynipidae. *Das Tierreich*, 24: 1-891.
- Fontal-Cazalla, F.M., M.L. Buffington, G. Nordlander, J. Liljeblad, P. Ros-Farre, J.L. nieves-Aldrey, J. Pujade-Villar and F. Ronquist, 2002. Phylogeny of the Eucoilinae (Hymenoptera: Cynipoidea: Figitidae). *Cladistics*, 18: 154-199.
- Forster, A., 1869. Veber die Gallwespen. *Verhandlungen der kaiserlich-koniglichen. Zool.-botani. Gesell schaft in Wien.*, 19: 327-370.
- Kieffer, J.J., 1901. Revision des Eucoelines. *La Feuille Nat.*, 31: 158-162.
- Kieffer, J.J., 1902. Les Cynipides. *In* Andre, E., ed., *Species des Hymenopteres d'Europe and d'Algerie*, Vol. VII bis. Froment-Dubosclard, Paris, p. 117.
- Lee, J.-W. and W.-Y. Choi, 1993. A systematic study of superfamily Cynipoidea (Hymenoptera) from Korea I. Family Eucoilidae. *Ent. Res. Bull. (KEI)*, 19: 45-54.
- Nordlander, G., 1981. A review of the genus *Trybliographa* Forster 1869 (Hymenoptera: Cynipoidea: Eucoilidae). *Entomol. Scand.*, 12: 381-402.
- Nordlander, G., 1982. Identities and relationships of the previously confused genera *Odontoeucoila*, *Coneucoela* and *Trichoplata* (Hymenoptera: Cynipoidea: Eucoilidae). *Entomol. Scand.*, 13: 269-292.
- Ronquist, F., 1995. Phylogeny and early evolution of Cynipoidea (Hymenoptera). *Syst. Entomol.*, 20: 309-335.
- Ronquist, F., 1999. Phylogeny, classification and evolution of the Cynipoidea. *Zool. Scripta*, 28: 139-164.
- Weld, L.H., 1952. Cynipoidea (Hymenoptera). *Ann Arbor, Michigan*, pp. 1-351.
- Westwood, J.O., 1833. Notice of the habits of a Cynipideous insect, parasitic upon the rose louse (*Aphis rosae*), with descriptions of several other parasitic Hymenoptera. *Magazine of Natural History*, 6: 494.

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