

Two Parasitic Wasps from Aptian (Lower Cretaceous) Choshi Amber, Chiba, Japan

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Abstract Two Parasitic wasps from the Choshi amber are described as new genera and new species. The Inubouzaki and the Toriakeura Formations in which two wasps were occurred, are assigned to the Aptian age, the late Early Cretaceous. The insect remains from the Early Cretaceous except the earliest Cretaceous (Neocomian age), are rather scarce in the world. *Chosia* is possibly situated between Jurassic Ephialtitidae and Cenozoic Stephanidae. *Cretapria* may belong to the family Diapriidae.

Key words: Choshi amber, Parasitic wasps, Aptian, Stephanidae, Diapriidae.

At the small peninsula of Choshi, situated at the eastern tip of Central Japan (Fig. 1), the lower Cretaceous Choshi Group is exposed along sea-shore. It has been known that the Choshi Group includes amber pieces in mudstone and sandstone. The Choshi amber is geologically the oldest one in the world next to the Lebanese amber, as it was assigned to the Aptian (lower Cretaceous) in age. Fossil remains from the Choshi amber are very scarce. Recently, two small parasitic wasps were found for the first time, which are specifically described in this paper. The occurrence of one specimen of the two was recorded in brief by the discoverer (Tsukada, 1992).

Geologic age of Choshi amber

The Choshi Group has been well-known to yield Lower Cretaceous fossils of ammonites (Shimizu, 1931, and others), molluscs (Hayami and Oji, 1980; Kase and Maeda, 1980) and plants. A number of authors briefly have written on the geology and paleontology of the Choshi Group. The litho- and bio-stratigraphic studies were done by Obata, Hagiwara and Kamiko (1975). Obata, Maiya, Inoue and Matsu-kawa (1982) revised the stratigraphical sequence of the group and determined the geologic ages based on not only ammonite study but foraminiferal analysis. According to Obata *et al.* (1982), the Choshi Group is divided into five formations, the Ashikajima, the Kimiga-

hama, the Inubouzaki, the Toriakeura and the Nagasakihana Formations in ascending order, and ranges Lower Barremian to Upper Aptian ages.

Amber pieces appear in mudstone and sandstone beds of every formation in the Choshi Group. Among them, mudstone of the Toriakeura and the Kimigahama Formations most includes amber pieces, sandstone of the Inubouzaki and the Ashikajima Formations is next to them and scarcely in the Nagasakihana Formation (according to Mr. Katsuhiko Yamada). The biggest amber pieces of diameters 29×13 cm was found from the Toriakeura Formation in 1989. The two pieces including insect remains are from the Inubouzaki and the Toriakeura Formations (according to the discoverers). These formations are assigned to the Early Aptian to the early Late Aptian by associated ammonite and foraminiferal fossils (Obata *et al.*, 1982).

Description of fossils

Family Stephanidae Leach, 1815

Genus *Chosia*, gen. nov.

Type species: *Chosia yamadai* sp. nov., Choshi, Japan. Aptian (Lower Cretaceous) amber.

Diagnosis: ♂. Body rather small (3.5 mm long in the holotype of type species) and slender. Head spherical (a part of posterior area of holotype broken off). Frons with a flat projec-

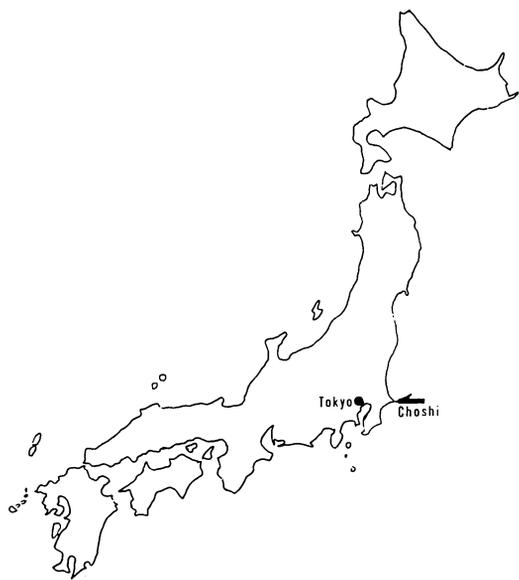


Fig. 1. Map showing the Choshi Peninsula, the amber locality.

tion protruded forward between compound eyes. Antenna rising under projection; long; 20-segmented. Mesoscutum with longitudinal carinae; without nothaulus. Each leg with large coxa and 5-segmented long tarsus. Each femur swollen, fore one largest; hind femur not dentate on lower margin. Tarsus thin; basitarsus thinnest. Hind tibia and tarsus not modified in male. Forewing with thin but distinct costal cell, and thin and long pterostigma. Cross vein 2rs-m, 3rs-m and 2m-cu lost, so cell SMC1 large, cell SMC2 and cell DC2 open. Hind wing not observed. Gaster attached near bottom of propodeum not at top. Petiole thin, gaster not beyond tip of folded forewings.

Remarks. So far as comparing the wing venation of forewing the new genus *Chosia* is related to the "primitive genus e.g. *Schlettererius*" (Townes, 1949) of Stephanidae in the lacking of 2 and 3 rs-m and 2 m-cu (Rasnitsyn, 1988) and in the consequent elongation of the cell SMC1. However, *Chosia* has a projection protruded forward from frons instead of crown of teeth which is characteristic of living species of Stephanidae. Segments of antenna in *Chosia* are less number than those of most living species. Hind femur not dentated on the lower margin differs from living stephanids. The

gaster of *Chosia* is not remarkably elongate. These features in *Chosia* may not allow to drop *Chosia* in the family Stephanidae unconditionally. Therefore, the writer tentatively classes *Chosia* in Stephanidae in broad sense.

Many genera of the family Ephialtitidae are known from the Jurassic of Kara-tau (Kazakhstan) (Rasnitsyn, 1975) and Spain, they bear the veins 2rs-m and 3rs-m which are lost in *Chosia*. Tertiary species of Stephanidae is closely related to the living ones. The new genus *Chosia* may act a link of Jurassic Ephialtitidae with the Paleogene and living species of Stephanidae.

***Chosia yamadai* sp. nov.**

(Figs. 2, 3 and 4)

Holotype: CBM-PI 000001. In Choshi amber, Inubouzaki, Choshi, Chiba, Japan. Inubouzaki Formation, Choshi Group, Aptian (Lower Cretaceous). Found by Katsuhiko Yamada. Stored at the Natural History Museum and Institute of Chiba.

Description. Probably ♂, as ovipositor invisible at abdominal tip of holotype. 3.5 mm long till tip of abdomen. Head spherical but a part of posterior margin broken off in holotype, about 0.78 times as long as wide. Compound eye large. Frons with frontal projection protruded forward, its apical part thin, upper surface with two longitudinal carinae on both margins and sulcate at middle. Antenna 20-segmented, rising under frontal projection. The first segment extremely thin. Each segment cylindrical; distally shortened from three times to twice as long as wide; last one long but not forming club. Pronotum triangular, its frontal tip very thin, angular at both sides. Five longitudinal carinae on mesoscutum. Coxae of middle and hind legs large; fore femur largest and most swollen, hind femur not dentate on lower margin. Middle tibia swollen but smaller than femur, Tarsus 5-segmented; long, especially in basitarsus; the 2nd-4th tarsi of foreleg bearing planter lobes. Each segment of leg without distinct spurs or spines. Forewing 2.6 mm long. Wing venation distinct; with thin but distinct costal cel, about a half long of fore margin of wing. Cross veins 2rs-m and 3rs-m lost, consequently cell SMC1 large, and cell



Fig. 2. *Chosia yamadai* sp. nov. Holotype, CBM-PI 000001. a: nearly upper view, b: nearly side view. x ca. 16.

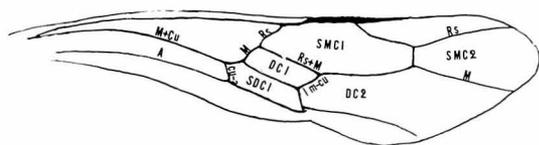


Fig. 4. *Chosia yamadai* sp. nov. Holotype, CBM-PI 000001. Forewing. x ca. 25.

SMC2 open. Cell DC1 small, and nearly symmetric with cell SDC1. M+Cu diverging more distally than cross vein cu-a. No transverse infuscation on wing. Venation of hind wing cannot be observed. Gaster thin, but not long.

Family Diapriidae Haliday, 1833

Genus *Cretapria*, gen. nov.

Type species: *Cretapria tsukadai* sp. nov. Choshi, Japan. Aptian (Lower Cretaceous) amber.

Diagnosis: ♀. Body small and slender, 1.15 mm long in the holotype of the type species. Head broad, without shelf-like process on which antenna is inserted. Antenna long, 14-segmented; scape elongate, more than three times as long as wide; club large, not abrupt. Notaulus inobserved in the holotype. Leg slender and long. Tibiae of hind leg with one spur respectively. Basitarsus of hind leg very long and



Fig. 3. *Chosia yamadai* sp. nov. Holotype, CBM-PI 000001.

thin. Forewing broad, without pterostigma; with very thin and short costal cell and marginal vein ending at one third of fore margin of wing. Thin and short Y-shaped vein near bases. Hind wing inobserved. Ovipositor a little exposed at abdominal tip.

Remarks. The present fossil parasitic wasp is characterized by the slender body, especially slender and long legs. Nevertheless, the forewing is very broad. It is curious that both hind wings of the type specimen are disappeared though both forewings and all legs are sufficiently preserved. The hind wing of the type specimen is never covered with forewing nor attached to forewing by hooks, even stalk is not remained. Thin Y-shaped vein seen at the basal part of forewing occasionally appears in the living species of Diapriidae and related families (e.g. Kieffer, 1911, pl.2, nos. 11 and 12; Kieffer, 1916, fig. 15), possibly a remnant of the vein M and Cu. The present new genus has no frontal shelf, characteristic in most of species of Diapriidae. From only this point of view,

Cretapria should be dropped into the subfamily Ismarinae, but other features of *Cretapria* do not always correspond with those of Ismarinae.

***Cretapria tsukadai* sp. nov.**

(Figs. 5 and 6)

Holotype: NSM-PA12923. In Choshi amber. Toriakeura, Choshi, Chiba, Japan. Toriakeura Formation, Choshi Group. Aptian (Lower Cretaceous), collected by Jun Tsukada. Stored at the Department of Paleontology, National Science Museum, Tokyo.

Description. Body slender, 1.15 mm in length till tip of ovipositor. Head broad; detailed structure inobserved; compound eye seemingly large; without shelf-like process on face. Antenna long, nearly as long as body; 14-segmented. Scape elongate, more than three times as long as wide; the second segment short and stout, the third to sixth segments thin and tubular; from the seventh to thirteenth ones rather short and gradually broadened; apical one elongate next to scape in length, formed a club but not abrupt. Leg slender, with long coxa and trochanter. Femur and tibia swollen in distal half. Fore tibia with one spur; middle tibia without long spur, hind tibia with one spur.



Fig. 5 *Cretapria tsudai* sp. nov. Holotype, NSM-PA12923. x ca. 40.

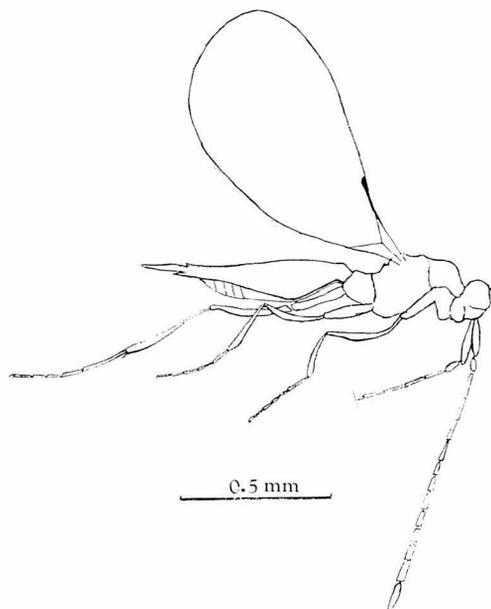


Fig. 6. *Cretapria tsudai* sp. nov. Holotype, NSM-PA12923.

Tarsus with five segments. Basitarsus of each leg very long, especially of hind leg. No long trichia on each segment of leg. Forewing broad, without pterostigma. Submarginal vein lying close by fore margin and forming thin and short costal cell near base of wing; ending distally at a wedge-shaped thickening at a third of fore margin of wing. Without stigmal vein. Y-shaped vein arising at base of wing and bifurcate, ending at proximal part of thickening and on hind margin respectively. Forewing with fringe, longest at postero-lateral part; with fine trichia, but not densely. Hind wing invisible in the type specimen, even its basal part. Abdomen slender, rather depressed-formed, not recognized abdominal segments on dorsal sternite. Ovipositor extruded at apical part.

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千葉県のアプチアン（白亜紀前期）銚子琥珀から発見された寄生蜂の2新属新種

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千葉県のアプチアン（白亜紀前期）銚子琥珀から新属新種の寄生蜂2種が発見されたので、本論文において記載した。1種目は、*Chosia yamadai* Fujiyama sp. nov. で、Stephanidae（ツノヤセバチ）科と完全には一致しないが、一応この科に所属させておく。2種目は、*Cretapria tsukadai* Fujiyama sp. nov. であり、Diapriidae（ハエヤドリクロバチ）科に属すると思われる。