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## A remarkable new leaf-cutter bee from Thailand

### (Hymenoptera: Megachilidae)

With 11 figures

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#### Summary

A remarkable new species of leaf-cutter bee, *Megachile trichorhytisma* ENGEL sp. n., is described and figured from two males collected in northern Thailand. The species is placed in a new subgenus, *Aethomegachile* ENGEL & BAKER subgen. n., and is differentiated from previously known lineages of *Megachile*.

#### Zusammenfassung

Die bemerkenswerte und als neu erkannte Blattschneiderbienen-Art, *Megachile trichorhytisma* ENGEL sp. n. wird beschrieben. Die Beschreibung wird ergänzt durch Abbildungen verschiedener Ansichten des Habitus und der Genitalien zweier Männchen, die im nördlichen Thailand gesammelt wurden. Die Art wird in die neue Untergattung *Aethomegachile* ENGEL & BAKER subgen. n. gestellt, die von bisher bekannten Abstammungslinien von *Megachile* unterschieden wird.

#### Keywords

Apoidea, Anthophila, Megachilinae, Megachilini, Southeast Asia, taxonomy

## Introduction

Among the startlingly diverse array of species in the cosmopolitan bee genus *Megachile* (sensu MICHENER, 2000) are included a series of subgenera commonly known as the leaf-cutter bees (i.e., *Megachile* in the sense of older systems such as MICHENER, 1962; MITCHELL, 1980). These bees typically use pieces of leaves in the construction of brood cells within the nest, itself generally in pre-existing cavities such hollow stems, between stones, in insect wood-borings, or other such suitable orifices (e.g., TROSTLE & TORCHIO, 1994), although some species do excavate nests in soil or sand (e.g., EICKWORT et al., 1981; WILLIAMS et al., 1986; NEFF & SIMPSON, 1991; KATAYAMA, 1997).

While the *Megachile* fauna worldwide is relatively well studied, that of Southeast Asia is perhaps the most poorly known. Some small contributions toward a revised understanding of the *Megachile* in the region have been produced (e.g., BAKER & ENGEL, 2006) and additional material is under preparation, particularly with regard to previously unexamined type material (ENGEL & BAKER, unpubl. data). As part of this consideration of Oriental *Megachile*, herein is described an aberrant new subgenus and species from

Thailand in which the distalmost flagellomere, metasomal terga, and concealed sterna and genitalia are remarkably modified. Format for the description follows that of BAKER & ENGEL (2006) while morphological terminology follows that of ENGEL (2001).

## Systematics

### Genus *Megachile* LATREILLE

#### *Aethomegachile* ENGEL & BAKER subgen. n.<sup>1</sup>

**Etymology:** The new genus-group name is a combination of *aethos* (Greek meaning, “strange”) and *Megachile*, type genus of the tribe.

**Type species:** *Megachile (Aethomegachile) trichorhytisma* ENGEL sp. n.

**Description:** ♂. Moderate-sized bees of the *Megachile* group of subgenera (ca. 10 mm in total length) (Figs. 1, 3). Head broad; clypeal margin straight and without modifications characteristic of some other groups (Fig. 2); mandible quadridentate, slanting, with strong acetabular sulcus and broadly concave anterior surface; juxtagenal process absent; F11 slightly compressed, expanded ventrally in basal half, gently tapering to acutely rounded apex from widest point near mid-length (Figs. 3, 5). Procoxa without apical spine or tubercle; protarsus not expanded. Dorsal surface of T1 strongly narrowed mesially, mesially about as long as marginal area of T2, its whole surface with long erect pubescence, without distinct marginal fascia; whole discal postgradular areas of T2–3 strongly depressed, marginal areas of these terga consequently defined anteriorly by prominent ridges; discal depressions densely filled with short, fine, uniform pubescence (Figs. 1, 4) which is nearly inconspicuous in certain lights (e.g., Fig. 3); marginal areas with entire, narrow, terminal fasciae of plumose setae; T4–5 with weak postgradular depressions, ill-defined posteriorly; no postgradular or marginal fasciae present; T6 with shallow discal depression and weak transverse carina confined to median third, the carina not distinctly emarginate; lateral teeth absent; apical margin shallowly, arcuately emarginate in medial third; T7 with apical margin deeply, broadly emarginate, forming two prominent teeth (Fig. 6); T8 weakly sclerotized, its lateral portions thinly setose apically (Fig. 7); metasomal venter with four normally exposed sterna (i.e., S5–6 concealed); S1–4 without remarkable structural characters; S4 with strong marginal fringe, especially developed laterally; S5 posteriorly with transverse discal plicae and a narrow median tract of introrse hairs; posterolaterally weakly lobate, apical margin truncate in median half (Fig. 8); S6 with strongly sclerotized posterolateral lobes, its apical margin strongly produced in median third, process so formed produced apicolaterally on either side as a slender, slightly recurved, digitiform process, apical margin between these processes bi-emarginate, medially acutely dentate (Fig. 8); S8 elongate, apically broadly rounded with weak median excision, laterally with small, reflex, hamate processes duplicating those of S6 (Fig. 9); without marginal setae. Gonocoxa dorsal surface basally with strong, free lobe (Figs. 10, 11); apically near junction with gonotylus gonocoxa produced medially and dorsally as

<sup>1</sup> Dr. Baker sadly passed away while the work on Oriental Megachilini was still underway. As such, Dr. Baker did not have the opportunity to participate in the final construction of the manuscript. Authorship of taxa reflects the degree to which the material had been completed at the time of his death.

a slender, coarsely setose, digitiform process, inwardly bearing an extensive, dense, even brush of fine setae (Fig. 10); penis valve elongate, slender, parallel, not widely separated basally, weakly enlarged apically (Fig. 10).

♀. Latet.

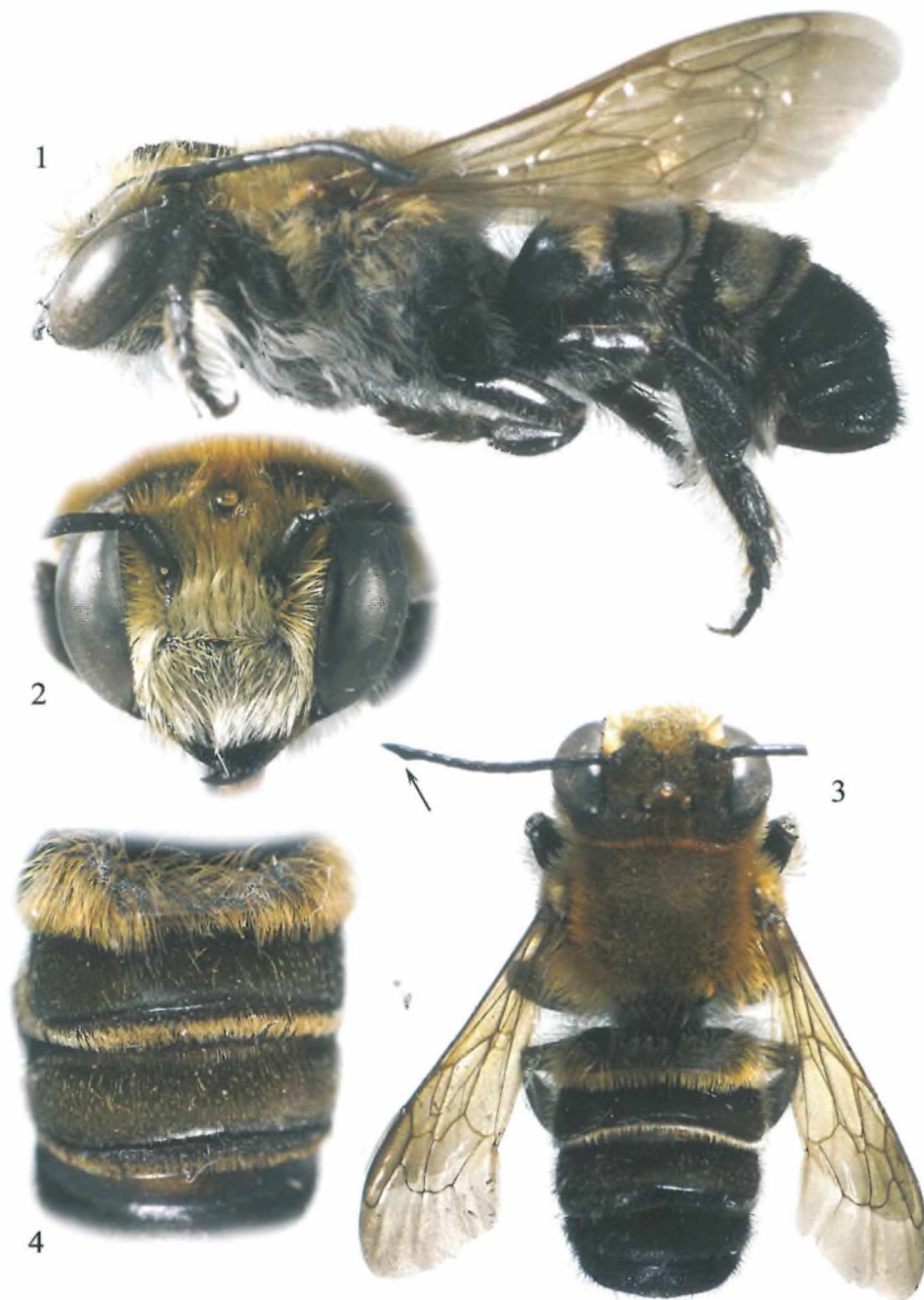
**Comments:** The general habitus of the species suggests a species of *Megachile* s. str. but in many unusual ways it may be excluded from this subgenus, exceeding range of variation of characters in that subgenus. However, recognition of the female may necessitate a re-evaluation. Unfortunately, most megachilines from Southeast Asia are represented in museums by unique or by very few specimens. As a result, despite scouring material from the region for many years no females approximating the species described herein have been revealed. More intensified collecting in Southeast Asia is necessary to resolve issues surrounding this interesting fauna. The megachiline fauna of the region is species-rich but population densities appear generally to be very low. With a few exceptions, individual species, even those having a wide distribution, appear nowhere to occur, or at least to have been collected, in quantity.

*Megachile (Aethomegachile) trichorhytisma* ENGEL sp. n. (Figs. 1-11)

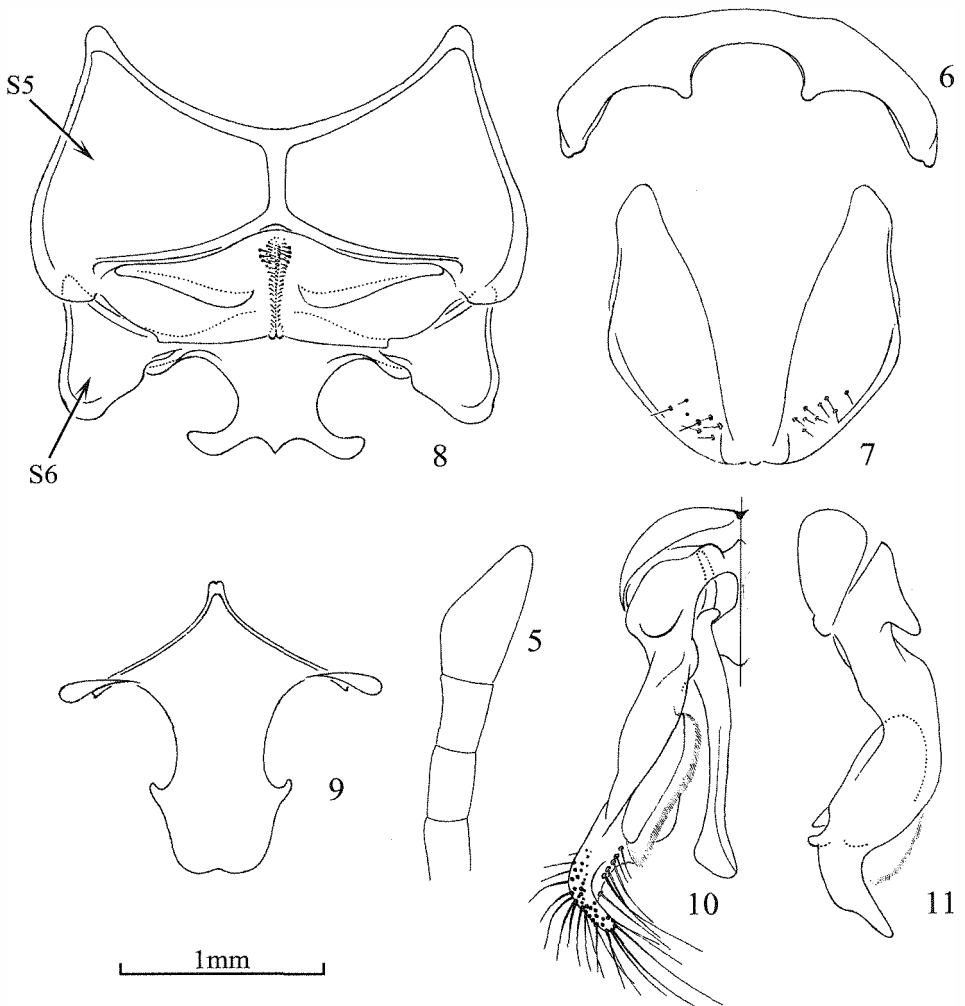
**Etymology:** The specific epithet is a combination of the Greek words *trichos* (meaning, "hair") and *rhytisma* (meaning, "patch") and is a reference to the characteristic modified fields of setae on the second and third metasomal terga (Figs. 1, 3, 4).

**Description:** The description of the subgenus (*vide supra*) serves to characterize the species as well, to which we append the following, minor additions:

♂. Total body length approximately 10 mm; forewing length approximately 6,75 mm. Head in frontal aspect transverse, with: length (to clypeal apical margin) ratio 1:0,7. Vertex of moderate length, lateral ocelli separated from occipital ridge by about twice their diameter. Lower part of gena not structurally modified but with long pubescence in hypostomal area. Antenna of normal length, extending posteriorly to near posterior border of mesosoma; F1 short, shorter than pedicel; F2 elongate; F3–9 progressively shorter and ventrally more strongly thickened apically (the flagellum consequently appearing subserrate); F10–11 slightly compressed, F11 distinctly expanded (*vide* subgeneric description, *supra*). Procoxa unmodified, mutic, anterior surface without cluster of rufescent setae, simply, uniformly pubescent; profemur unmodified, ventrally uniformly convex in profile, widest near mid-length; protibia unmodified; protarsus unmodified, speculi absent; probasitarsus little more than twice as long as broad, not canaliculate; probasitarsus and medioprotarsus slightly compressed, not expanded, with long but not dense posterior fringes; prodistitarsus slender, not elongate. Mid-legs without special characters; mesofemur moderately swollen, mesotibial spur present, mesotarsus with posterior fringe similar to that of anterior leg. Hind legs without special characters; metafemur moderately swollen, less so in proportion to length than mesofemur; metatibia moderately swollen, its greatest breadth, at about two-thirds of its length, not greater than that of metafemur; two metatibial spurs present; metatarsus relatively slightly more elongate than protarsi and mesotarsi, with long but weak anterior and posterior fringes. Pretarsal ungues (claws) cleft. Integument black without markings; wing veins brown, membrane hyaline, with some faint infuscation (Figs. 1, 3). Integument of head, me-



Figs 1-4: *Megachile (Aethomegachile) trichorhytisma* subgen. et sp. nov., male. – 1 lateral habitus of male holotype (note the setal fields on the second and third metasomal terga). – 2 facial view of male paratype. – 3 dorsal habitus of male paratype (arrow indicates modification of distalmost flagellomere). – 4 dorsal view of holotype male metasomal terga 1-3 detailing large, modified setal fields of second and third metasomal terga.



Figs 5-11: *Megachile (Aethomegachile) trichorhytisma* subgen. et sp. nov., male antenna and terminalia. – 5 distal flagellomeres depicting ventral swelling in basal half of distalmost flagellomere. – 6 terminal aspect of seventh metasomal tergum. – 7 eighth metasomal tergum. – 8 fifth and sixth metasomal sterna. – 9 eighth metasomal sternum. – 10 dorsal aspect of genitalic capsule. – 11 lateral aspect of genitalic capsule.

sosoma, and metasomal terga punctate, punctures strong and contiguous; declivitous basal area of propodeum imbricate, posterior surface of propodeum imbricate with weak punctures separated by 1–3 times a puncture width, lateral surface of propodeum with contiguous punctures, punctures strongly defined anteriorly becoming less well defined posteriorly, blending to strongly imbricate integument by border with posterior surface; metasomal sterna with shallow, contiguous punctures blending to strongly imbricate by apical margins.

♀. Latet.

**Type material:** Holotype ♂ (Fig. 1) labeled “SIAM / Xieng Khong. / 10–22 avril 1920. / R.V. de Salvaza” and “N. Boubée & Cie / 9 Jan. 1948” [the type locality, “Xieng Khong”, is tentatively, in the lack of knowledge of the transliteration system used, identified with Chiang Kong, on the Mekong, at 20°17'N, 100°24'E”; there are “Xien Khouang” and “Xingkhoang” in Laos at 19°12'N, 102°43'E and 19°20'N, 103°22'E, respectively, all three localities in the same general area]. A single paratype ♂ (Fig. 3) labeled “THAILAND: Loei Province, Phu Luang Wildlife Sanctuary, 700–900 m, 8–14 x 1984, Karsholt, Lomholdt & Nielsen”. The holotype is in the Donald & Madge Baker Collection, Division of Entomology, University of Kansas Natural History Museum, while the paratype is in the Zoölogical Museum, University of Copenhagen.

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