Tropical Natural History, Supplement 8 (2025): 359–367
https://doi.org/10.58837/tnh.25.8.266718

A New Species of *Megachile* (*Callomegachile*) Michener, 1962 (Hymenoptera: Megachilidae) Described from Thailand

NONTAWAT CHATTHANABUN[1], ITSARAPONG VORAPHAB[2], CHAWATAT THANOOSING[1], PRAPUN TRAIYASUT[3*] AND NATAPOT WARRIT[1*]

[1]*Bee and Spider Research Unit, Department of Biology, Faculty of Science, Chulalongkorn University, Bangkok 10330, THAILAND*
[2]*Forest Entomology and Microbiology Research Group, Forest and Plant Conservation Research Office, Department of National Parks, Wildlife and Plant Conservation, Bangkok 10900, THAILAND*
[3]*Program in Biology, Faculty of Science, Ubon Ratchathani Rajabhat University, Ubon Ratchathani 34000, THAILAND*
*Corresponding authors. Natapot Warrit (Natapot.w@chula.ac.th); Prapun Traiyasut (Prapun.t@ubru.ac.th)
Received: 14 March 2025; Accepted: 17 September 2025; Date of Publication: 20 October 2025
https://zoobank.org/urn:lsid:zoobank.org:pub:61324F2B-5E97-49CA-AF95-5C178314E9D3

ABSTRACT.– During the revision of the resin bees subgenus *Callomegachile* Michener, 1962 in Thailand, we have identified and illustrated a novel species, *Megachile* (*Callomegachile*) *sirindhornae* Chatthanabun & Warrit, sp. nov. This discovery is based on three female specimens collected from northeastern and western regions of Thailand. The species exhibits an association with *Akschindlium godefroyanum* (Kuntze) H. Ohashi (Fabaceae), which serves as a floral resource. Additionally, the barcode sequence derived from the COI region of this new species has been submitted to GenBank, with the accession number PX354073.

KEYWORDS: wild bee, taxonomy, resin bee, DNA barcode

INTRODUCTION

Megachile Latreille, 1802, is a diverse genus of bees comprising over 1,400 species distributed globally, with the exception of Antarctica (Ascher and Pickering, 2025). The genus exhibits remarkable diversity in nesting behaviors and floral associations, notably characterized by wide variety of nesting materials for nest construction (Michener, 2007; Sheffield et al., 2011). Some subgenera employ leaf fragments or masticated leaf for nest building, while the others utilize such as petal, resin, or mud mixed with salivary secretion (Kronenberg and Hefetz, 1984; Michener, 2007; Sheffield et al., 2011). Furthermore, species within *Megachile* display flexibility in nesting preferences, utilizing a broad range of cavities from natural plant stems to human-made structures (Michener, 2007; Marinho et al., 2018; Patal et al., 2018; Akram et al., 2022).

In Thailand, a total of 38 species belonging to 10 subgenera of *Megachile* have been reported (Ascher and Pickering, 2025). Notably, the subgenera *Callomegachile* Michener, 1962, and *Carinula* Michener, McGinley & Danforth, 1994 were revised (Chatthanabun et al., 2020). This revision identified and documented 13 species of *Callomegachile* and 1 species of *Carinula*, collected throughout Thailand between 1956 and 2019, while also incorporating an analysis of diagnostic characters, including type specimens for each species.

Despite significant contributions to bee research in Thailand through the USA-Thai project "Thailand Inventory Group for Entomological Research (TIGER)" (Michael, 2006) and the Global Biodiversity Information Facility-Biodiversity Information Fund for Asia (GBIF-BIFA: Nalinrachatakan et al., 2024; Nalinrachatakan et al., 2025), comprehensive taxonomic studies of Thai megachilid bees remain necessary. Many species are inadequately represented in museum collections relative to their known diversity, and certain regions have not yet been thoroughly explored (Warrit et al., 2023). Additionally, occurrence data are lacking in seasonal and temporal coverage (Engel and Baker, 2006; Engel and Gonzalez, 2011; Ascher et al., 2016; Chatthanabun et al., 2020). In this context, we describe a new species of *Callomegachile* bee after a recent revision to enhance taxonomic knowledge regarding bees in Southeast Asia.

MATERIALS AND METHODS

Morphology and Taxonomy

Three specimens (3♀) deposited at the Chulalongkorn University Museum of Natural History (CUNHM) were examined for this study, the specimens from Chatthanabun et al. (2020) were also included in the examination. The additional *Callomegachile* Michener, 1962 collected from Phu Chong Na Yoi Natural Park and deposited at CUNHM were examined including *Megachile atratiformis* Meade-Waldo, 1914 (24♀, 5♂) (Thailand. Ubon Ratchathani province: 1♀, 1♂ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan Pa Chad, 14.435502°N, 105.25965°E, Alt. 247.17 m, 13-X-2019, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-2110; BSRU-AB-2111) (leg. NC and NW)), (Thailand. Ubon Ratchathani province: 5♀ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan

Pa Chad, 14.435502°N, 105.25965°E, Alt. 247.17 m, 30-XI-2019, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-2158; BSRU-AB-2162; BSRU-AB-2164; BSRU-AB-2165; BSRU-AB-2167) (leg. NC and NW)), (Thailand. Ubon Ratchathani province: 1♀ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan Pa Chad, 14.435502°N, 105.2 5965°E, Alt. 247.17 m, 1-XII-2019, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-2189) (leg. NC and NW)), (Thailand. Ubon Ratchathani province: 16♀ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan Pa Chad, 14.435502°N, 105.259 65°E, Alt. 247.17 m, 5-I-2020, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-2115; BSRU-AB-2116; BSRU-AB-2117; BSRU-AB-2118; BSRU-AB-2119; BSRU-AB-2120; BSRU-AB-2121; BSRU-AB-2122; BSRU-AB-2123; BSRU-AB-2124; BSRU-AB-2125; BSRU-AB-2126; BSRU-AB-2127; BSRU-AB-2128; BSRU-AB-2129; BSRU-AB-2130) (leg. NC and NW)), (Thailand. Ubon Ratchathani province: 3♂ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan Pa Chad, 14.434511°N, 105.26 0508°E, Alt. 286 m, 28-IX-2020, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-2314; BSRU-AB-2316; BSRU-AB-2317) (leg. NC and NW)) (Thailand. Ubon Ratchathani province: 1♀, 1♂ Buntharik district, Huai Kha subdistrict, Phu Chong Na Yoi National Park, Mod Ngam station, 14.551208°N, 105.426889°E, Alt. 216 m, 28-IX-2020, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-2335; BSRU-AB-2336) (leg. NC and NW)), *Megachile disjuncta* (Fabricius, 1781) (74♀, 1♂) (Thailand. Ubon Ratchathani province: 1♀, 1♂ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan Pa Chad, 14.435502°N, 105.25965°E, Alt. 247.17 m, 28-IX-2019, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-2155; BSRU-AB-2156) (leg. NC and NW)), (Thailand. Ubon Ratchathani province: 4♀ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan Pa Chad, 14.435502°N, 105.25965°E, Alt. 247.17 m, 13-X-2019, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-2105; BSRU-AB-2106; BSRU-AB-2107; BSRU-AB-2109) (leg. NC and NW)), (Thailand. Ubon Ratchathani province: 7♀ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan Pa Chad, 14.435502°N, 105.25965°E, Alt. 247.17 m, 6-XI-2019, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-2034; BSRU-AB-2035; BSRU-AB-2036; BSRU-AB-2037; BSRU-AB-2038; BSRU-AB-2039; BSRU-AB-2040) (leg. NC and NW)), (Thailand. Ubon Ratchathani province: 2♀ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan Pa Chad, 14.435502°N, 105.25965°E, Alt. 247.17 m, 7-XI-2019, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-2056; BSRU-AB-2057) (leg. NC and NW)), (Thailand. Ubon Ratchathani province: 4♀ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, 14.435 50183°N, 105.2596498°E, Alt. 247.17 m, 30-XI-2019, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-1149; BSRU-AB-1150; BSRU-AB-1151; BSRU-AB-1152) (leg. NC and NW)), (Thailand. Ubon Ratchathani province: 9♀ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan Pa Chad, 14.435502°N, 105.25965°E, Alt. 247.17 m, 30-XI-2019, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-2170; BSRU-AB-2171; BSRU-AB-2172; BSRU-AB-2173; BSRU-AB-2174; BSRU-AB-2175; BSRU-AB-2176; BSRU-AB-2177; BSRU-AB-2178) (leg. NC and NW)), (Thailand. Ubon Ratchathani province: 38♀ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan Pa Chad, 14.435502°N, 105.25965°E, Alt. 247.17 m, 1-XII-2019, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-2190; BSRU-AB-2191; BSRU-AB-2192; BSRU-AB-2193; BSRU-AB-2194; BSRU-AB-2195; BSRU-AB-2196; BSRU-AB-2197; BSRU-AB-2198; BSRU-AB-2199; BSRU-AB-2200; BSRU-AB-2201; BSRU-AB-2202; BSRU-AB-2203; BSRU-AB-2204; BSRU-AB-2205; BSRU-AB-2206; BSRU-AB-2207; BSRU-AB-2208; BSRU-AB-2209; BSRU-AB-2210; BSRU-AB-2211; BSRU-AB-2212; BSRU-AB-2213; BSRU-AB-2214; BSRU-AB-2215; BSRU-AB-2216; BSRU-AB-2217; BSRU-AB-2220; BSRU-AB-2221; BSRU-AB-2222; BSRU-AB-2223; BSRU-AB-2224; BSRU-AB-2225; BSRU-AB-2226; BSRU-AB-2229; BSRU-AB-2230; BSRU-AB-2231) (leg. NC and NW)), (Thailand. Ubon Ratchathani province: 8♀ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan Pa Chad, 14.435502°N, 105.25965°E, Alt. 247.17 m, 5-I-2020, coll. N. Chatthanabun, (CUNHM: BSRU-AB-2131; BSRU-AB-2132; BSRU-AB-2133; BSRU-AB-2134; BSRU-AB-2135; BSRU-AB-2136; BSRU-AB-2137; BSRU-AB-2138) (leg. NC and NW)), (Thailand. Ubon Ratchathani province: 1♀ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan Pa Chad, 14.434822°N, 105.26 1089°E, Alt. 280 m, 27-IX-2020, coll. N. Chatthanabun, (CUNHM: BSRU-AB-1696) (leg. NC and NW)), *Megachile odontophora* (Engel, 2011) (18♀, 5♂) (Thailand. Ubon Ratchathani province: 1♂ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan Pa Chad, 14.435502°N, 105.25965°E, Alt. 247.17 m, 28-IX-2019, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-2157) (leg. NC and NW)), (Thailand. Ubon Ratchathani province: 1♀, 1♂ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan Pa Chad, 14.435502°N,

105.25965°E, Alt. 247.17 m, 29-IX-2019, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-2002; BSRU-AB-2004) (leg. NC and NW)), (Thailand. Ubon Ratchathani province: 1♂ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan Pa Chad, 14.435502°N, 105.25965°E, Alt. 247.17 m, 13-X-2019, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-2112) (leg. NC and NW)), (Thailand. Ubon Ratchathani province: 6♀, 2♂ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan Pa Chad, 14.435502°N, 105.25965°E, Alt. 247.17 m, 6-XI-2019, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-2041; BSRU-AB-2042; BSRU-AB-2043; BSRU-AB-2044; BSRU-AB-2045; BSRU-AB-2046; BSRU-AB-2047; BSRU-AB-2048) (leg. NC and NW)), (Thailand. Ubon Ratchathani province: 6♀ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan Pa Chad, 14.435502°N, 105.25965°E, Alt. 247.17 m, 30-XI-2019, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-2159; BSRU-AB-2160; BSRU-AB-2161; BSRU-AB-2163; BSRU-AB-2166; BSRU-AB-2168) (leg. NC and NW)), (Thailand. Ubon Ratchathani province: 4♀ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan Pa Chad, 14.435502°N, 105.25 965°E, Alt. 247.17 m, 1-XII-2019, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-2185; BSRU-AB-2186; BSRU-AB-2187; BSRU-AB-2188) (leg. NC and NW)), (Thailand. Ubon Ratchathani province: 1♀ Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan Pa Chad, 14.435502°N, 105.25965°E, Alt. 247.17 m, 5-I-2020, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-2114) (leg. NC and NW)). The specimens were assessed and measured, with body length recorded from the edge of the clypeus (in dorsal view) to the apex of 6th tergum (T6). The mandibles and clypeus were prepared by soaking in a relaxing jar for 3–4 days, after which mandibular teeth were counted sequentially from the apex toward the base of the mandible. Forewing length was measured from the tegula to the lateral wing margin. Interocellar distance (ID) and ocelloccipital distance (OD) were measured, and the ID/OD ratio was calculated. Photomicrographs were obtained using a Canon 7D Mark II digital camera attached to a ZEISS Stemi 508 stereo microscope with a T2-T2 1.6x SLR lens, and images were stacked using Adobe Photoshop 2020. Measurements are expressed in millimeters using Axiovision LE 4.8.2.0. Morphological terminology follows the works of Stephen et al. (1969) and Michener (2007). A distribution map was created using QGIS 3.16.4.

In this study, we adopt the classification proposed by Trunz et al. (2016), which aligns closely with Michener's generic classification. This framework delineates the large genus *Megachile*, encompassing both leafcutter and dauber lineages, while excluding four relatively small tropical groups that are recognized as distinct genera: *Gronoceras* Cockerell, 1907; *Heriadopsis* Cockerell, 1931; *Noteriades* Cockerell, 1931; and *Matangapis* Baker & Engel, 2006.

Molecular analysis and DNA Barcoding

The specimens collected from Pha Taem National Park, Ubon Ratchathani province, Thailand and preserved in 95% ethanol, were selected for DNA extraction to ensure high-quality DNA, as other specimens had been pinned and stored at the CUNHM for several years. The right mid- and hind legs of the specimens were removed and allowed to dry for 30 minutes before returning the whole specimen to 95% ethanol. The excised legs were then placed in 1.5 mL microtubes and ground using a plastic pestle. DNA extraction was performed using a commercial kit (TIANamp Genomic DNA Kit, TIANGEN BioTech (Beijing) Co., Ltd., Changping, Beijing, China), following the manufacturer's instructions. DNA sequences were amplified using primers LEP-F1 (5'-ATTCAACCAATCATAAA GATAT-3') and LEP-R1 (5'-TAAACTTCTGGATGT CAAAAA-3') (Hebert et al., 2004). The PCR reaction was prepared in a total volume of 25 µL, comprising 12.5 µL of Instant PCR Master Mix (OnePCRTM, GeneDireX, Miaoly County, Taiwan), 1 µL of LEP-F1 primer, 1 µL of LEP-R1 primer, 2 µL of DNA template, and 8.5 µL of deionized water. The thermoscycling conditions included one cycle at 95°C for 2 minutes, followed by 40 cycles of 40 seconds at 94°C, 40 seconds at 51°C, and 1 minute and 10 seconds at 72°C, concluding with a final extension step of 5 minutes at 72°C. The PCR products were subjected to electrophoresis on a 1.5% TBE agarose gel and visualized under UV light. Purification of the PCR products was conducted using a commercial kit (TIANquick Midi Purification Kit, TIANGEN BioTech (Beijing) Co., Ltd., Changping, Beijing, China), in accordance with the manufacturer's guidelines. The purified products were then sent to ATGC Co., Ltd. (Khlong Luang, Pathum Thani, Thailand) for Sanger sequencing. The sequence data was analysed through MEGA XI (Tamura, Stecher, and Kumar, 2021), also identified with BLAST (Altschul et al., 1990) and BOLDSYSTEMS (Ratnasingham et al., 2024). The resulting sequence was deposited in GenBank.

RESULTS

Taxonomy

Family Megachilidae

Genus *Megachile* Latreille, 1802
Subgenus *Callomegachile* Michener, 1962

Chalicodoma (*Callomegachile*) Michener, 1962: 21. Type species: *Chalicodoma mystaceana* Michener, 1962, by original designation.

Chalicodoma (*Eumegachilana*) Michener, 1965: 191. Type species: *Megachile clotho* Smith,1861, by original designation

Chalicodoma (*Morphella*) Pasteels, 1965: 537. Type species: *Megachile biseta* Vachal, 1903, by original designation

Chalicodoma (*Orientocressoniella*) Gupta, 1993: 165. Type species: *Megachile relata* Smith, 1879, by original designation [but Gupta's description refers to a bee quite different from the nominal type species, see Baker and Engel 2006].

Chalicodoma (*Alocanthedon*) Engel & Gonzalez, 2011: 53. Type species: *Chalicodoma odontophorum* Engel, 2011, by original designation.

Callomegachile (*Oxymegachile*) Engel, 2023: 17. Type species: *Megachile duponti* Vachal, 1903, by original designation [but Engel's description refers to *Megachile devexa* Vachal, 1903, misidentified by Pasteels (1965) and Michener (2007)]

Comments.– Engel (2023) established the subgenus *Oxymegachile* Engel, 2023, based on *Megachile duponti* Vachal, 1903; however, discrepancies are noted in its establishment. Engel described *M. duponti* as possessing a complete omaular carina, contrasting with Vachal's (1903) original description, which did not mention the omaular, suggesting its incompleteness or absence. Vachal (1903) described the complete omaular and an impressed angle in *M. devexa* Vachal, 1903, a closely related species. This suggests that the taxonomic treatments by Michener (2007) and Pasteels (1965) of *M. devexa* are correct. The variability in the presence of the omaular carina, from complete to absent, is acknowledged within *Callomegachile* (Michener, 2007). Furthermore, the male holotype of *M. duponti* has been synonymized with *M. adeloptera* Schletterer, 1891, and certain syntypes of *M. duponti* were synonymized with *M. devexa* (Ascher and Pickering, 2025). Consequently, *M. duponti* should be considered an invalid name, leading to the conclusion that *Callomegachile* (*Oxymegachile*) Engel, 2023, cannot be regarded as a distinct subgenus and should be listed as a junior synonym of *Megachile* (*Callomegachile*) Michener, 1962.

Megachile (*Callomegachile*) *sirindhornae* Chatthanabun & Warrit, sp. nov.

http://zoobank.org/urn:lsid:zoobank.org:act:2616FA95-B8AC-4258-9785-ECB99461F465

(Fig. 1)

Diagnosis.– Female resembles *M.* (*Callomegachile*) *albobasalis* Smith, 1879, in overall appearance: black body; metasoma covered with brick-red hairs on apex (Fig. 1B, E); scopa brick-red hairs (Fig. 1E) except fore- and hindwing light yellow hyaline with brown vein (Fig. 1B, E); T1 without white hairs; inner side of tarsi covered black hairs.

Description.– ***Female*.** Length. Total body length 15.06–16.21; wingspan 23.54–23.61; fore wing 9.52–9.54 Structure and color. Head black; paraocular area rough with dense black hairs; clypeus with rough punctures, distal margin of clypeus with two small tubercles; area of subtriangular supraclypeal with rough punctures; mandible with five teeth, without cutting edge; outer surface of mandible minutely roughened with long dark brown hairs; labrum length twice as long as wide with minutely roughened surface, apex of labrum medially round apex with rectangle edge and erect brown hairs (Fig. 1A); gena with coarsely striate puncture pattern; bare vertex with sparse punctures, ID/OD = 0.6–0.63; antenna with ten flagella, first flagellomere slightly wider than long, shorter than the second; body parallel-sided; scutum, scutellum and lower part of mesepisternum with coarsely striate puncture pattern (Fig. 1C, F); surface of propodeal triangle rough with black hairs on lateral side; procoxa with short black hairs; pro-, meso- and metacoxal spine absent; meso- and metacoxa with fulvous hairs; pro- and mesotibiae with two apical spines, protibiae without spur, mesotibiae with one spur; apex of metatibiae round without spine, two spurs present; pro-, meso-, and metatarsus covered with black hairs on outer and inner sides, inner side with brown hairs; fore- and hindwing light yellow hyaline with brown vein; pro-, meso-, and metatarsal claw simple without arolia; T1 black, surface rough with dense puncture at median (Fig. 1B); T2–3 black, surface of pregradular area smooth with sparse punctures, surface of disc area rough with dense punctures, marginal zone smooth with fringe brick-red hairs posteriorly (Fig. 1B); T4 black, surface of pregradular area smooth with sparse punctures, surface of disc area rough with dense punctures, covered with sparse brick-red hairs, marginal zone smooth with fringe brick-red hairs posteriorly (Fig. 1B); T5 black, surface of pregra-

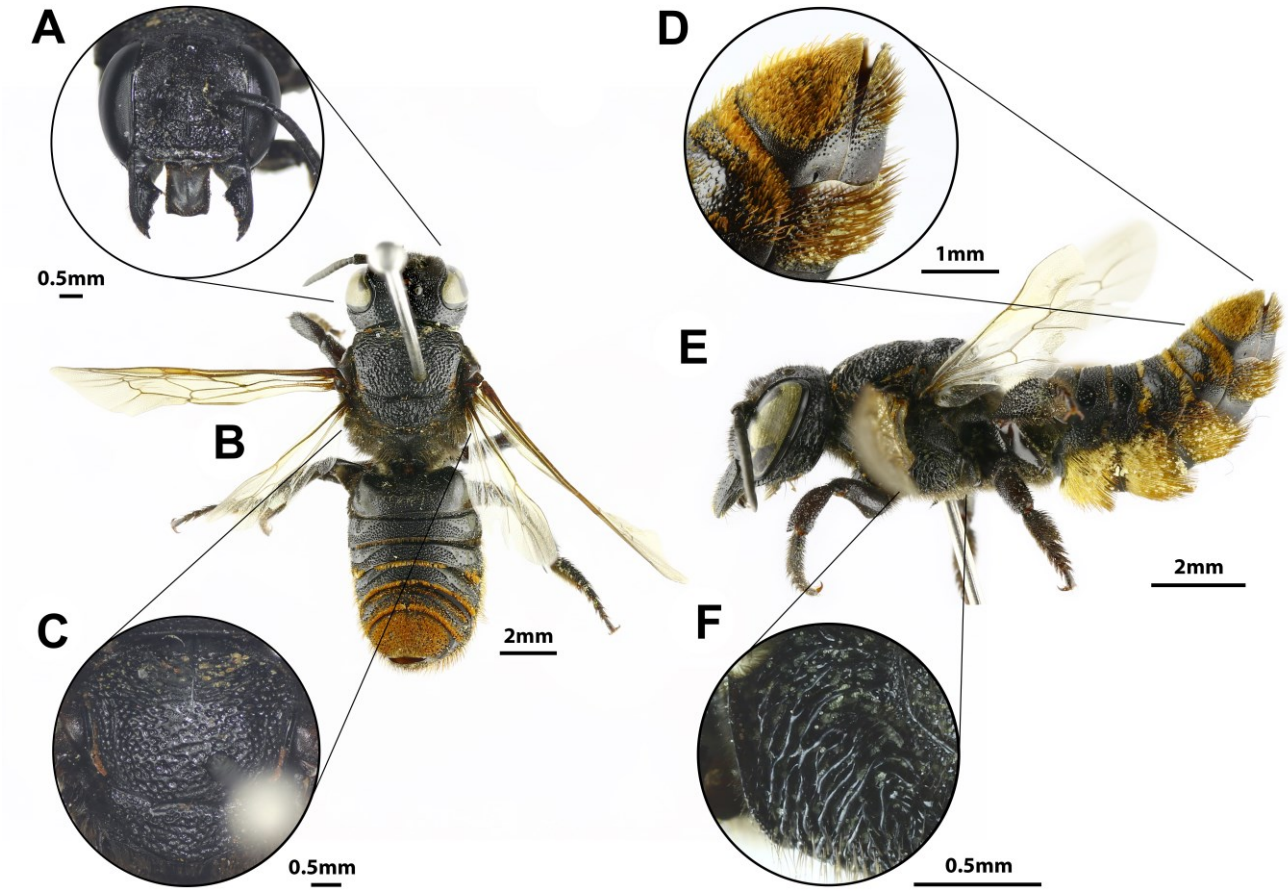

FIGURE 1. *Megachile* (*Callomegachile*) *sirindhornae* sp. nov., Holotype, female, **A.** frontal view of prosoma showing labrum, **B.** dorsal view, **C.** dorsal view of scutum showing striated punctures, **D.** T6 covered with brick-red hairs, **E.** lateral view, **F.** striated punctures on the lower part of mesepisterna.

dular area smooth without puncture, disc area smooth with sparse punctures and covered with brick-red hairs, marginal zone rough with dense punctures, covered with sparse brick-red hairs, and fringe brick-red hairs posteriorly (Fig. 1B); T6 black, surface rough and covered with dense brick-red hairs entire plate (Fig. 1B, D, E); S1–4 black, pregradular area and marginal zone smooth, disc area rough with dense punctures; S5 black and rough with dense punctures entire plate; scopa brick-red (Fig. 1E).

Male. Unknown.

Material examined.– Female holotype. Thailand. Ubon Ratchathani province: 1♀, Na Chaluai district, Na Chaluai subdistrict, Phu Chong Na Yoi National Park, Pha Lan Pa Chad, 14.4355018°N, 105.2599276° E, Alt. 247.17 m, 29-IX-2019, coll. P. Traiyasut et al., (CUNHM: BSRU-AB-2007) (leg. NC and NW); Female paratypes. Thailand. Kamphaeng Phet province: 1♀, Khlong Lan district, coll. C. Wimolsuthikul and S. Wongvilas, (CUNHM: BSRU-AA-5598) (leg. NC and NW); Ubon Ratchathani: 1♀, Khong Chiam district, Na Pho Klangsubdistrict, Pha Taem National Park, 15.6207036°N, 105.6139889°E, 20-IX-2022, coll. I. Voraphab (CUNHM: NC144) (leg. NC and NW).

Etymology.– The species is named in honor of the auspicious occasion of Her Royal Highness Princess Maha Chakri Sirindhorn's 70th birthday anniversary, celebrated on April 2nd, 2025.

Common name.– Sirindhorn's resin bee (Thai: ผึ้งยางไม้เจ้าฟ้าหญิงสิรินธร)

Floral association.– *Megachile* (*Callomegachile*) *sirindhornae* sp. nov. was collected from *Akschindlium godefroyanum* (Kuntze) H. Ohashi (Fabaceae), a native plant of Southeast Asia, in Phu Chong Na Yoi and Pha Taem National Parks.

Remark.– *Megachile* (*Callomegachile*) *sirindhornae* sp. nov. is considered as a native species of Southeast Asia based on its distribution and associated floral resources. The coloration of the hairs on the metasoma

is also reminiscent of those found in other species from Thailand, such as *M*. (*Callomegachile*) *ornata* Smith, 1853, *M*. (*Callomegachile*) *parornata* Chatthanabun, Warrit & Ascher, 2020, and *M*. (*Carinula*) *stulta* Bingham, 1897. Additionally, the appearance of brick-red hairs on the apex of abdomen also similar to those of foreign species such as *M.* (*Callomegachile*) *albobasalis* Smith, 1879 from Australia or *M.* (*Callomegachile*) *chrysorrhoea* Gerstäcker, 1857 from Sub-Saharan Africa.

Molecular analysis and DNA Barcode

The sequence exhibited no matches with any other *Megachile* Latreille, 1802 species sequences deposited in GenBank, the nearest taxon is *M. disjuncta* (Fabricius, 1781) accounting for 88.82 percentage of identity (accession number OK287393). However, we found the sequence of same species on BOLDSYSTEMS accounting for 98.69 percentage of identity (ProcessID: BOWGH507-12 [BOLD: ABW1760]) with no specific epithet name. The sequence has been submitted to GenBank under the accession number (PX354073).

DISCUSSION

The presences of striated punctures on mesoscutum and lower part of mesepisternum, lacking of cutting edge on mandibles, mandible five teeth with minutely roughened ridge, and parallel-sided "chalicodomiform" body representing on *Megachile* (*Callomegachile*) *sirindhornae* sp. nov. (Fig. 1C, F) are used for the subgeneric replacement. These features are distinct among *Megachile* (Michener, 1962; Michener, 2007; Chatthanabun et al., 2020), nevertheless, some species such as *M. atratiformis* Meade-Waldo, 1914, *M. memecylonae* Engel & Gonzalez, 2011, and *M. odontophora* Engel & Gonzalez, 2011 lack the striated punctures and these bees are treated in the narrow sense as subgenus *Alocanthedon* Engel and Gonzalez, 2011 (Engel and Gonzalez, 2011). The brick-red hairs on apex of T2–5 (Fig. 1B, E), T4–5 covered with sparse brick-red hairs on disc (Fig. 1B, E), and T6 covered with brick-red hairs entire plate (Fig. 1B, E) resembles *M.* (*Callomegachile*) *albobasalis* Smith, 1879 from Australia or *M.* (*Callomegachile*) *chrysorrhoea* Gerstäcker, 1857 from Sub-Saharan Africa, but these features are completely different from those of *Callomegachille* Michener, 1962 reported across Cambodia, Laos, Myanmar, Thailand, and Vietnam namely *M. ardens* Smith, 1879, *M. atratiformis* Meade-Waldo, 1914, *M. badia* Bingham, 1890, *M. binghami* Meade-Waldo, 1912, *M. chiangmaiensis* Chatthanabun & Warrit, 2020, *M. disjuncta* (Fabricius, 1781), *M. faceta* Bingham, 1897, *M. fulvipennis* Smith, 1879, *M. impressa* Friese, 1903, *M. memecylonae* (Engel, 2011), *M. monticola* Smith, 1853, *M. odontophorum* (Engel, 2011), *M. ornata* Smith, 1853, *M. parornata* Chatthanabun, Warrit & Ascher, 2020, *M. tuberculata* Smith, 1858 and *M. umbripennis* Smith, 1853 (Ascher and Pickering, 2025). We also incorporate an analysis of diagnostic characters, including type specimens for each species except for *M. binghami* Meade-Waldo, 1912 and *M. impressa* Friese, 1903. We found the sequence of same species in BOLDSYSTEMS, also the specimen was only identified to subgenus level with no specific epithet name by Christophe Praz. Additionally, the results from COI phylogeny that we are working within all Thai megachilid bees also confirm the validity of *M. sirindhornae* sp. nov. by the separating linage from others *Callomegachile* (unpublished data). With the above reasons, we decide to propose *M. sirindhornae* sp. nov. as a new species.

The holotype of *Megachile* (*Callomegachile*) *sirindhornae* sp. nov. was collected from Pha Lan Pa Chad in Phu Chong Na Yoi National Park, while a paratype was obtained from Pha Taem National Park. Both specimens were found in the same habitat type, specifically a dry dipterocarp forest where *Dipterocarpus obtusifolius* Teijsm. ex Miq. (Dipterocarpaceae) is prevalent. The abundance of *D. obtusifolius* and the absence of chewed leaves in these habitats suggest that *M. sirindhornae* is more likely a resin bee rather than a leaf-cutting bee, consistent with the behavior observed in other *Callomegachile* species such as *M. disjuncta* (Fabricius, 1781), *M. fulvipennis* Smith, 1879, and *M. pluto* Smith, 1860 (Messer, 1984; Soh, 2014). The label on the paratype from Kamphaeng Phet province did not specify the exact locality; thus, the location was inferred from the district name, and the coordinates were obtained via Google Maps for the purpose of mapping distribution (Fig. 2). Furthermore, it is anticipated that the distribution of *M.* (*Callomegachile*) *sirindhornae* sp. nov. may extend to neighboring countries such as Vietnam and Laos due to two factors: 1) the presence of similar forest types near the type localities and 2) the widespread occurrence of *Akschindlium godefroyanum* (Kuntze) H. Ohashi (Fabaceae), which is found throughout Southeast Asia (Ohashi, 2003).

Key to species of subgenera *Callomegachile* and *Carinula* in Thailand (females) (modified from Chatthanabun et al., 2020)

1. Pronotum, mesoscutum, and scutellum covered with white and/or black hairs ……..…..……. 2
   - At least pronotum or mesoscutum and scutellum covered and/or fringed with fulvous hairs ….. 13

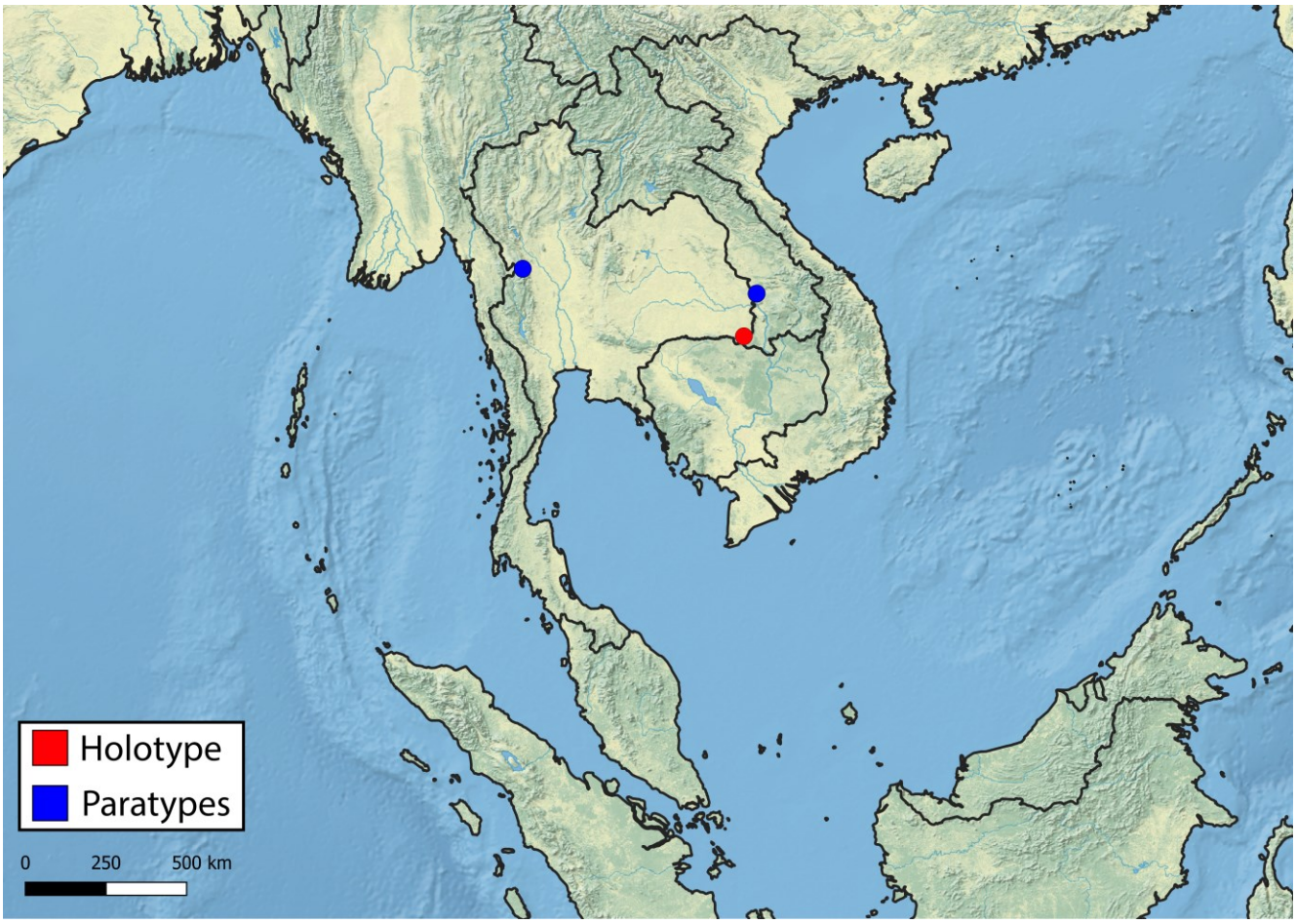

FIGURE 2. Distribution of *Megachile* (*Callomegachile*) *sirindhornae* sp. nov.

2(1) Most metasomal terga covered with brick-red hairs or covered with black hairs with black hairs with fringe of brick-red hairs on lateral areas of T2–T5; scopa brick-red 3
- Most metasomal terga covered with black hairs (sometimes T1 with band of white hairs); scopa black …….. 7

3(2) Second spine of pro- and mesotibiae bifurcate ... 4
- Second spine of pro- and mesotibiae not bifurcate ……..…….…. 5

4(3) T1–T4 covered with black hairs, T2 with small patch of brick-red hairs laterally; T5–T6 covered with pale light yellow hairs ……..... *M. ornata*
- T1 covered with black hairs; T2–T5 cover with brick-red hairs; T6 covered with light yellow hairs ……..... *M. parornata*

5(3) Clypeal margin crenulate with median carina; mandible four teeth ……..……. *M. stulta*
- Clypeal margin with two small tubercles; mandible five teeth with two stout apical teeth and three small teeth basally ……..……...…… 6

6(5) Pronotum, mesoscutum, and scutellum covered with white hairs; metasomal terga covered with brick-red hairs entirely …..……..... *M. impressa*
- Pronotum, mesoscutum, and scutellum covered with black hairs (Fig. 1B, E); T1 bare; T2–T3 with brick-red hair strip posteriorly; T4–5 covered with sparse brick-red hairs with fringe brick- red hairs posteriorly; T6 covered with brick-red hairs entirely (Fig. 1B, E) ….. *M. sirindhornae* sp. nov.

7(2) T1 and propodeum covered with white hairs ... 8
- T1 and propodeum covered with black hairs …. 9

8(7) Clypeus with prominent apical impression and strong median carina; mandible with three stout teeth at apex; labrum oblong, apical margin medially strongly pointed with two lateral teeth ……..……..…… *M. chiangmaiensis*

- Clypeus without apical impression, apical margin smooth with two tubercles; mandible five teeth with two stout apical teeth at apex and three small teeth basally; labrum rectangle, apical margin truncate with two lateral teeth ….. ……...…. *M. disjuncta*

9(7) Base of clypeus with large protruding tubercle; mandible three teeth with small tubercle at base ……..……..…..…… *M. tuberculata*
- Base of clypeus without large protruding tubercle; mandible four to five teeth without small tubercle at base …….……..…... 10

10(9) Mandible with five teeth with two stout apical teeth at apex and three small teeth basally; medium size (15–16 mm) ….....… *M. fulvipennis*
- Mandible with four teeth; large size (20–23 mm) ……..……11

11(10) Apical margin of clypeus with small median tubercle; labrum oblong, apical pointed with two lateral teeth ….……..…… *M. ordontophorum*
- Apical margin of clypeus without median tubercle; labrum rectangle, apical margin truncate without teeth …….……....…. 12

12(11) Mesoscutum with strong transverse wrinkle pattern on disc, posteriorly with irregular punctures …….……..…….. *M. memecylonae*
- Mesoscutum with weak transverse wrinkle pattern on disc, posteriorly with weakly transverse wrinkle pattern-like disc ….....… *M. atratiformis*

13(1) Fulvous or black tergal hair bands; base of clypeus with large protruding tubercle; mandible three teeth with small tubercles at base; scopa black; large size (20–26 mm) ….. *M. monticola*
- White tergal hair bands, sometimes interrupted at median, base of clypeus without large protruding tubercle; mandible five teeth with two stout apical teeth at apex and three small teeth basally without tubercle at base; scopa white with black at apex; median size (10–13 mm) ……..… 14

14(13) Vertex with median carina; only pronotum covered with fulvous hairs; propodeal triangle with tuft white hairs …….…… *M. faceta*
- Vertex without median carina; pronotum, mesoscutum, and scutellum covered with dense fulvous hairs throughout; propodeal triangle with dense fulvous hairs …….…..... *M. umbripennis*

ACKNOWLEDGEMENTS

The authors would like to express their gratitude towards the following institutions and persons as follow: Assoc. Prof. Thammarak Laongnual, President of Ubon Ratchathani Rajabhat University; Rungsima Tanthalekha, Senior director of Research Administration Department for supporting National Strategy (RNS); Jinna Samsri, Director of Phu Chong Na Yoi National Park and Pramuan Rattanawan, Director of Pha Taem National Park, Department of National Parks, Wildlife and Plant Conservation. This research is supported by the 90th Anniversary of Chulalongkorn University Fund (Ratchadaphiseksomphot Endowment Fund) (GCUGR1125662038D) and the scholarship from the Graduate School, the 100th Anniversary Chulalongkorn University Fund, is acknowledged to Nontawat Chatthanabun and Natapot Warrit. Science and Technology Development Agency (NSTDA) MOU-CO-2563-11312-TH provided funding, acknowledged by Prapun Traiyasut. Thailand Science Research and Innovation through the Hub for the Department of National Parks, Wildlife and Plant Conservation, Thailand to Itsarapong Voraphab, (grant number, FF: 194449) also provided partial funding. The authors would also like to thank, Siwhat Sudadech, lab's alumni and a subcommittee of Sirindhorn Foundation, for providing partial funding for DNA sequencing.

LITERATURE CITED

Akram, W., Sajjad, A., Ghramh, H.A., Mudssar, A. and Khan, K.A. 2022. Nesting Biology and Ecology of a Resin Bee, *Megachile cephalotes* (Megachilidae: Hymenoptera). Insect, 13: 1058. https://doi.org/10.3390/insects13111058

Altschul, S.F., Gish, W., Miller, W., Myers, E.W. and Lipman, D.J. 1990. Basic local alignment search tool. Journal of Molecular Biology, 215: 403–410. https://doi.org/10.1016/S0022-2836(05)80360-2

Ascher, J.S., Risch, S., Soh, Z.W.W., Lee, J.X.Q. and Soh, E.J.Y. 2016. *Megachile* leaf-cutter and resin bees of Singapore (Hymenoptera: Apoidea: Megachilidae). The Raffles Bulletin of Zoology Supplement, 32: 33–55.

Ascher, J.S. and Pickering, J. 2025. Bee species Guide (Hymenoptera: Apoidea: Anthophila). Available from: http:// www.discoverlife.org/mp/20q?guide=Apoidea_species, (accessed via discoverlife.org on 20 February 2025).

Chatthanabun, N., Ascher, J.S., Pinkaew, N., Thanoosing, C., Traiyasut, P. and Warrit, N. 2020. Resin bees of genus *Megachile*, subgenera *Callomegachile* and *Carinula* (Hymenoptera, Megachilidae) from Thailand with description of a new species. ZooKeys, 997: 95–144. https://doi.org/10.3897/zookeys.997.34935

Engel, M.S. and Baker, D.B. 2006. A remarkable new leaf-cutter bee from Thailand (Hymenoptera: Megachilidae). Contributions to Entomology, 56: 69–74. https://doi.org/10.21248/contrib. entomol.56.1.69-74

Engel, M.S. and Gonzalez, V.H. 2011. *Alocanthedon*, a new subgenus of *Chalicodoma* from Southeast Asia (Hymenoptera,

Megachilidae). ZooKeys, 101: 51–80. https://doi.org/10.3897/zookeys.101.1182

Hebert, P.D.N., Penton, E.H., Burns, J.M., Janzen, D.H. and Hallwachs, W. 2004. Ten species in one: DNA barcoding reveals cryptic species in the neotropical skipper butterfly *Astraptes fulgerator*. PNAS, 101: 14812–14817. https://doi.org/10.1073/pnas.0406166101

Kronenberg, S. and Hefetz, A. 1984. Role of labial glands in nesting behavior of *Chalicodoma sicula*. Physiological Entomology, 9: 175–179. https://doi.org/10.3752/cjai.2011.18

Marinho, D., Muniz, D.B. and Azevedo, G.G. 2018. Nesting biology of three *Megachile* (Hymenoptera: Megachilidae) species from Eastern Amazonia, Brazil. Revista Brasileira de Entomologia, 62: 97–106. https://doi.org/10.1016/j.rbe.2018. 03.002

Messer, A.C. 1984. *Chalicodoma pluto*: the world's largest bee rediscovered living communally in termite nests (Hymenoptera: Megachilidae). Journal of the Kansas Entomological Society, 57: 165–168.

Michael, S. 2006. TIGER: Thailand Inventory Group for Entomological Research.Available from: https://scholars.uky.edu/en/projects/tiger-thailand-inventory-group-for-entomological-research-2, (accessed via scholars.uky.edu on 7 March 2025).

Michener, C.D. 1962. Observations on the classification of the bees commonly placed in the genus Megachile (Hymenoptera: Apoidea). Journal of the New York Entomological Society, 70: 17–29.

Michener, C.D. 2007. The Bees of the World (2nd edn.). Johns Hopkins University Press, Baltimore, 953 pp.

Nalinrachatakan, P., Chatthanabun, N., Thanoosing, C., Kamram, T., Liangchuea, A., Sanunsilp, N., Yendee, S., Phaengphongsai, S. and Warrit, N. 2024. Database and digitization of bees from TIGER project (Thailand). Version 1.7. Chulalongkorn University, Department of Biology. Occurrence dataset, https://doi.org/10.15468/p6zfzc, (accessed via GBIF.org on 2025-03-05).

Nalinrachatakan, P., Chatthanabun, N., Thanoosing, C. and Warrit, N. 2025. Database and digitization of bees in Thailand. Version 1.26. Chulalongkorn University, Department of Biology, Occurrence dataset, Available from: https://doi.org/10.15468/tf4ejd (accessed via GBIF.org on 2025-03-05).

Ohashi, H. 2003. A new circumscription of *Tadehagi* and a new genus *Akschindlium* (Leguminosae). Journal of Japanese Botany, 78: 269–294.

Patal, D., Rajpurohit, A., Pathan, H., Imran, Parmar, H. and Gupta, R.K. 2018. Nesting biology of the solitary bee, *Megachile* (*Eutricharaea*) *gathela* Cameron (Insecta, Hymenoptera, Apoidea, Megachilidae). Annals of entomology, 36: 61–65.

Ratnasingham, S., Wei, C., Chan, D., Agda, Ji., Agda, Jo., Ballesteros-Mejia, L., Boutou, H.A., Mohammad El Bastami, Z., Ma, E., Manjunath, R., Rea, D., Ho, C., Telfer, A., McKeowan, J., Rahulan, M., Steinke, C., Dorsheimer, J., Milton, M. and Hebert, P.D.N. 2024. BOLD v4: A Centralized Bioinformatics Platform for DNA-Based Biodiversity Data. In DNA Barcoding: Methods and Protocols, New York, NY: Springer US, 403–441 pp, Chapter 26.

Sheffield, C.S., Ratti, C., Packer, L. and Griswold, T. 2011. Leafcutter and mason bees of the genus *Megachile* Latreille (Hymenoptera: Megachilidae) in Canada and Alaska. Canadian Journal of Arthropod Identification, 18: 1–107. https://doi.org/10.3752/cjai.2011.18

Soh, E.J.Y. 2014. Nesting of two species of resin bees (genus *Megachile*) in a wooden bench. Singapore Biodiversity Records, 2014: 280–280. https://doi.org/10.13140/RG.2.2.34958.05444

Stephen, W.P., Bohart, G.E. and Torchio, P.F. 1969. The Biology and External Morphology of Bees with a Synopsis of the Genera of North-western America. Agricultural Experiment Station, Oregon State University, Corvallis. 140 pp.

Tamura, K., Stecher, G. and Kumar, S. 2021. MEGA11: Molecular evolutionary genetics analysis version 11. Molecular Biology and Evolution, 38: 3022–3027. https://doi.org/10.1093/molbev/msab120

Trunz, V., Packer, L., Vieu, J., Arrigo, N. and Praz, C.J. 2016. Comprehensive phylogeny, biogeography and new classification of the diverse bee tribe Megachilini: Can we use DNA barcodes in phylogenies of large genera? Molecular Phylogenetics and Evolution, 103: 245–259. https://doi.org/10.1016/j.ympev.2016.07.004

Vachal, J. 1903. Hyménoptères du Congo Français rapportés par l'ingénieur J. Bouyssou. Annales de la Société Entomologique de France, 72: 358–400.

Warrit, N. et al. 2023. Opportunities and challenges in Asian bee research and conservation. Biological Conservation, 285: 1–11. https://doi.org/10.1016/j.biocon.2023.110173