

## Key to the genus *Megachile*, *Chalicodoma* group (Hymenoptera: Megachilidae) in Cuba

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**Abstract:** The megachilid bees of the *Chalicodoma* group includes four species in Cuba: *Megachile armaticeps*, *M. lanata*, *M. rufipennis* and *M. torrida*. The last three species are adventives while *M. atriceps* is endemic. An illustrated key to species is included.

**Key words:** Megachilid bees, *Megachile*, *Chalicodoma* group, key, distribution, nesting behavior.

The bees of the *Chalicodoma* group use resins and clay to build, in natural cavities, the cells of their nests. Those bees are generally characterized by having no cutting edges between the mandibular teeth of the female (Figs. 1a-d), and a dorsally strongly convex metasoma, which is more or less parallel-sided. In Cuba, the group is composed of four subgenera, with one species each; one, *Chelostomoides* is native and the other three, *Callomegachile*, *Carinula* and *Pseudomegachile* were introduced from the Old World (Mitchell 1980). Snelling (1990) revised the subgenus *Chelostomoides*.

Redescription of the introduced bee species that had already been described in their area of origin has added confusion to the systematics of the genus (Cresson 1865, Fox 1891). In this paper Michener *et al.* (1994) classification are followed. They recognize the genus *Megachile*

with seven groups, including several subgenera each. The purpose of this study is to offer a list of known Cuban species belonging to the genus *Megachile*, in the group *Chalicodoma*, giving their current systematic status, distribution, seasonal occurrence and some data on their biology.

Studied specimens are from the private collections of P. Alayo and the author, as well as the entomological collections of the Instituto de Ecología y Sistemática, Cuba (IES), Museo Nacional de Historia Natural de Cuba; Academy of Natural Sciences of Philadelphia (ANSP); American Museum Natural History (AMNH); United States National Museum (USNM) and Museum of Comparative Zoology at Harvard (MCZ).

The following key is a modification of that presented by Mitchell (1980) and Snelling (1990).

### Key to Cuban *Chalicodoma* group

- 1 Male. 13 segmented antenna, scopa absent  
2 Female. 12 segmented antenna, scopa present on metasomal sterna .....5
- 2 Metasoma with three exposed sterna (sternum IV covered beneath by sternum III); wings hyaline with dark veins; mandible with a small triangular process at midlength of the ventral margin (Fig.2a). Antenna with apical flagellomere flat, and wide at the central part (Fig.2b). .....*armaticeps*  
Metasoma with four exposed sterna (sternum IV exposed, not covered by sternum III, wings not hyaline .....3
- 3 Protarsus slender and unmodified, probasitarsus pilose on inner surface; metasomal terga V and VI without fulvous pilosity ..4  
Protarsus dilated, probasitarsus with glabrous excavation along anterior, inner margin; metasomal terga V and VI with fulvous pilosity .....*rufipennis*
- 4 Metasomal terga III-V with complete, white apical pubescent fasciae; lower margin of mandible with small process before middle; gena, without posterior marginal carina ...  
.....*lanata*
- Metasomal terga without fasciae of white pubescence; lower margin of mandible simple; gena with posterior marginal carina ....  
.....*torrida*
- 5 Entire metasoma quite densely rufous tomentose above; wings yellow, veins not contrasting with the general wing surface; robust form .....*rufipennis*  
Only terga I and II rufous pubescent, or none of this color .....6
- 6 Metasomal terga I and II not rufous tomentose; wings hyaline; mandible with five apical teeth (Fig.1d), with a large, flattened lobe from each side of the clypeus that projects at right angles to the face; an erect T-shaped protuberance between these lobes; an erect and thin process abruptly curved toward the median clypeal process on the supraclypeal area (Fig.3) .....*armaticeps*  
Metasomal terga I and II densely rufous pubescent or tomentose; head without facial projections. ....7
- 7 Metasomal terga III-V with entire, white apical fasciae; median line of clypeus smooth and impunctate, not cariniform ....  
.....*lanata*  
Terga III-V not fasciate apically; median line of clypeus cariniform. ....*torrida*

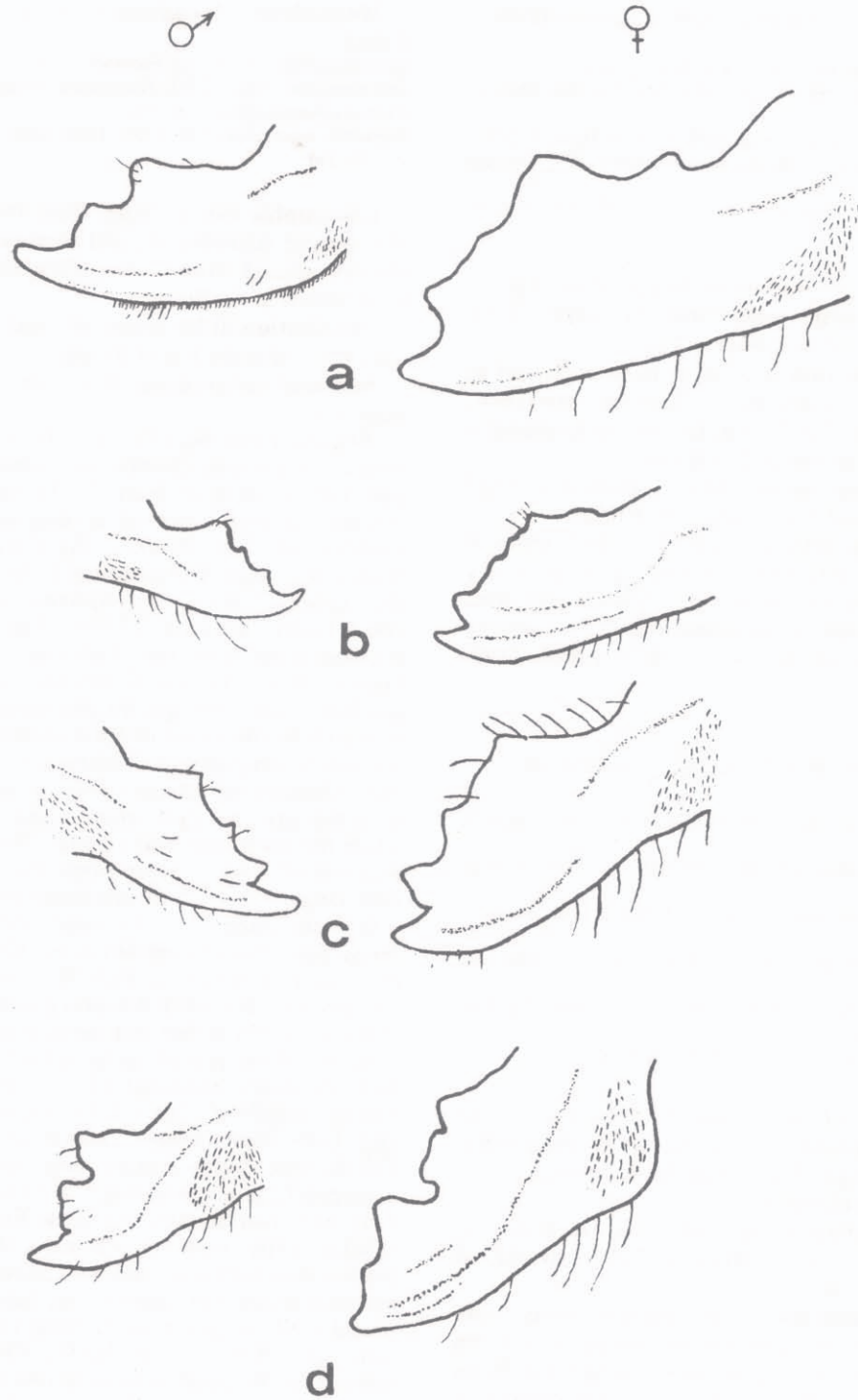


Fig. 1. Mandibles of males and females of Cuban megachilid bees of the *Chalicodoma* group. a. *Megachile rufipennis*, b. *M. torrida*, c. *M. lanata*, d. *M. armaticeps*.



*Megachile (Callomegachile) rufipennis* (Fabr.)

- Apis rufipennis* Fabr., 1793. Ent. Syst., 2: 335.  
*Megachile atriceps* Cresson, 1865. Proc. Ent. Soc. Phil., 4: 176.  
*Megachile nigriceps* Friese, 1903. Z. f. Syst. Hym., 3: 277.  
*Megachile atriceps phenacosoma* Cockerell, 1937. African bees, p. 146.  
*Megachile atriceps rukuruensis* Cockerell, 1937. ibid, p. 146.

The largest species in the genus in Cuba.

**Geographic range:** Zaire, East Africa, West Indies (introduced from Africa).

**Distribution:** Has only been collected at forested localities of Havana province, Santiago de Las Vegas, Laguna de Ariguanabo and San Antonio de Los Baños.

**Seasonal occurrence:** Collected in April and May and from August to October.

**Nesting behavior:** Cresson (1865) reported it (as *M. atriceps*) making the nest in dry wood. One specimen in the AMNH collection was obtained as inquiline from a clay nest of *Sceliphron* sp. (Montserrat, West Indies, 21.iii. 1894).

*Megachile (Carinula) torrida* Smith

- Megachile torrida* Smith, 1853. Cat. Hym. Brit. Mus. 1: 156.  
*Megachile solitaria* Smith, 1879. Descr. new spec. hym. p. 80.  
*Megachile pachingeri* Friese, 1903. Z. f. Syst. hym., 3: 297.  
*Megachile torula* Vachal, 1910. Ann. Soc. Ent. Belg., 54: 312.  
*Megachile rhodotrichura* Cockerell, 1933. Ann. Mag. Nat. Hist. 11: 208.  
*Megachile* sp. A Alayo, 1976. Ser. Biol. 68: 24.

Pasteels (1965) considers two subspecies in Africa, according to hair's color of apical metasomal terga. The Cuban form belongs to the nominal subspecies.

**Geographic range:** Ghana, Liberia, Congo, Uganda; West Indies (introduced from Africa).

**Distribution:** Examined specimens come from the southern part of Santiago de Cuba province, where Hymenoptera have been intensely collected. It is possibly present in other localities.

**Seasonal occurrence:** Specimens have been taken from November to July.

*Megachile (Pseudomegachile) lanata* (Fabr.)

- Apis lanata* Fabr., 1775. Syst. Entomol. p. 385.  
*Apis purpurae* Christ., 1791. Naturgesch. Insekt. Bienen, Wespen u. Ameisengeschl., p. 168.  
*Megachile martindalei* Fox, 1891. Trans. Amer. Entomol. Soc. 18: 344.

**Geographic range:** India, West Indies and Madagascar (introduced), and Florida (probably introduced from Cuba) (Pasteels 1965, Krombein *et al.* 1979).

**Distribution:** It has been collected throughout Cuba and at the Isle of Youth.

**Seasonal occurrence:** Has been collected yearround.

**Nesting behavior:** Females built cells in natural pre-existing cavities. At Caimito beach and San Nicolas de Bari, La Havana, this species has been observed nesting within the wooden parts of houses. At Cienfuegos Botanical Garden it nested in old clay nests of the sphecid wasp *Sceliphron assimile* (Dahlbom) (Genaro 1994). The vespid *Pachodynerus nasidens* (Latr.) nested in *M. lanata* old cells built in *S. assimile*'s nest. At this last locality the species also nested in tunnels built by the larvae of *Rhinostalmus oblitus* (Duval) (Coleoptera) in *Coripha umbraculifera* Jacq. (Arecaceae). Closing plugs were of clay, with the external part smooth and concave, while the inner side was rugose. The average diameter of seven closing plugs was  $8.3 \pm 0.6$  mm (range: 7.5 -9.1 mm) and thickness was  $3.8 \pm 0.4$  mm (range: 3.1-4.0 mm). Other bees, *Megachile (Pseudocentron) poeyi* Guérin and *M. armaticeps* nested with *M. lanata*. The species also nested at Cienfuegos Botanical Garden (vi. 89) in five trap nests made of thin bamboo sticks, placed under a bridge. These had an entry diameter of 0.8 mm, and an average length of  $15.8 \pm 3.5$  cm (range: 12-20 cm). Cells were arranged linearly in the stem. The distance from closure plug to entrance averaged  $7.2 \pm 4.7$  mm (range: 4-15 mm, N=5). Clay cells had adopted the same form as the tubular cavity, with smooth walls. The cell's bottom was narrower, and was inserted in the entrance of the contiguous one, being tightly united. Cells ranged in length from 12.0 to 24.4 mm ( $x=16.9 \pm 2.9$  mm, N=31). Out of five completely finished nests only one had seven cells; the rest had six. All nests had from one to seven vestibular cells, except one lacking them altogether. Length of vestibular cells varied from 3 to 16 mm ( $x= 10.1 \pm 3.7$  mm, N=14)

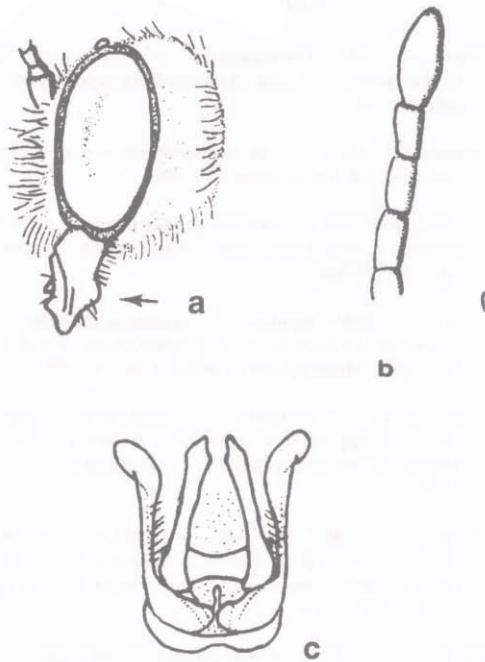


Fig. 2. *Megachile armaticeps* male. a. Lateral view of head showing mandible with triangular process at midlength (arrow). b. Apex of antenna. c. Dorsal view of genitalia.

and were separated by clay divisions, which had the inner part covered with a clear secretion. Average thickness of clay divisions was  $1.3 \pm 1.1$  mm (range: 0.3-4.1 mm, N=14).

**Parasitoids:** A chrysidid wasp, *Chrysis insularis* Guérin emerged from a brood cell.

*Megachile (Chelostomoides) armaticeps*  
Cresson

*Megachile armaticeps* Cresson, 1869. Trans. Amer. Entomol. Soc.: 2: 296.

**Geographic range:** Endemic of Cuba (Snelling 1990).

**Distribution:** Alayo (1976) states that this species occupies only the territory of southern Santiago de Cuba province. Later collections have showed that it also lives throughout the Island (Guanahacabibes peninsula, Cienfuegos Botanical Garden, Yaguajay and Ciego de Avila).

**Seasonal occurrence:** The species has been found from January to April.

**Cephalic projections:** Facial configuration of females, given by the lateral projections of the clypeus and the central zone (Fig.3) are the most unfrequent observed modifications in the subgenus *Chelostomoides* (Snelling 1990). Three of 11 examined females had some broken central projections. One specimen had the curved process broken near base, and also the T-shaped protuberance; the two remaining

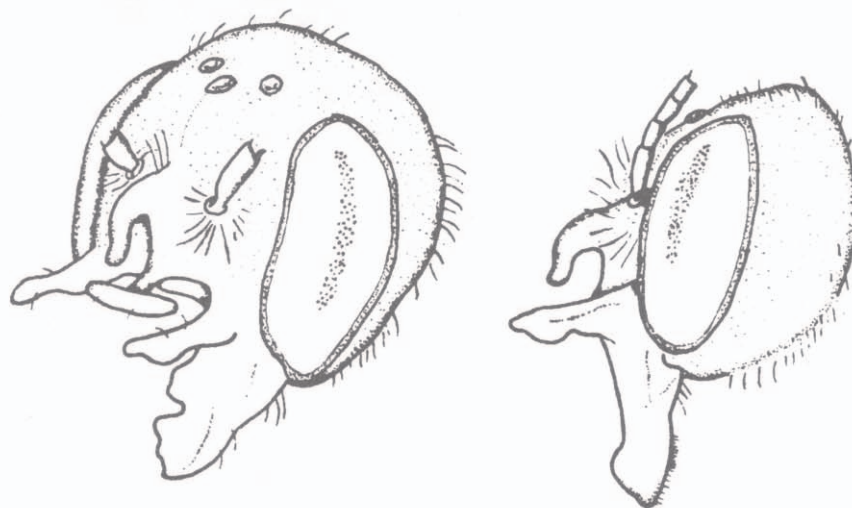


Fig. 3. Frontal and lateral view of head of female of *Megachile armaticeps*.



specimens had the T-shaped projection broken before the bifurcation. All three specimens had worn wings, which indicate aging. Perhaps the lost of these structures is related with the nesting behavior.

The male genitalia has not been previously illustrated. Gonocoxites were long and narrow beyond base, with inner surface setose (Fig. 2c).

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#### RESUMEN

Las abejas megaquilidas del grupo *Chalicodoma* incluyen cuatro especies en Cuba: *Megachile armaticeps*, *M. lanata*, *M. rufipennis* y *M. lanata*. Las últimas tres especies son introducidas, mientras que *M. armaticeps* es endémica. Se presenta una clave ilustrada para especies.

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