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(Hymenoptera: Pemphredonidae) in Puerto Rico, the Antilles,
and notes on the nesting behavior

Julio A. Genaro
Florida State Collection of Arthropods
1911 SW 34th Street
Gainesville, FL 32608-1268, USA

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First record of *Xysma dominicum* Antropov, 1995 (Hymenoptera: Pemphredonidae) in Puerto Rico, the Antilles, and notes on the nesting behavior

Julio A. Genaro

Florida State Collection of Arthropods
1911 SW 34th Street
Gainesville, FL 32608-1268, USA
polimita@hotmail.com

Abstract. *Xysma dominicum* Antropov (Hymenoptera: Pemphredonidae) is recorded for the first time in Puerto Rico. It was found nesting in vertical banks in dry forest habitat in Guánica, Ponce. Notes about the nesting behavior are presented. The female, previously unknown, is described and illustrated.

Key words. Wasps, taxonomy, nest, thrips, West Indies.

Resumen. Se registra por primera vez a *Xysma dominicum* Antropov (Hymenoptera: Pemphredonidae) para Puerto Rico. La especie fue encontrada nidificando en paredes verticales, en el bosque seco de Guánica, Ponce. Se presentan notas sobre la conducta de nidificación. Se describe e ilustra a la hembra, previamente desconocida.

Palabras clave. Avispas, taxonomía, nidos, trips, las Antillas.

Introduction

Xysma Pate is composed of small wasp species between 2 and 3 mm in length. It is known from the New World and South Africa (Bohart and Menke 1976; Pulawski 2019), although in a more recent study the South African species were regarded as *Telexysma* Leclercq, the original genus to which they have been assigned (Antropov 1995).

Morphologically it is mainly characterized by the following features, which together constitute a diagnosis for the genus: the mandible has two apical teeth; the lower frons has a weak longitudinal ridge; the compound eyes have undulate inner margins but are essentially parallel; the occipital carina is absent; the pronotum has a transverse carina; the notauli are absent; there is no acetabular carina, scrobal sulcus, or hypersternaulus; in the fore wing R1 is absent beyond the stigma and the marginal cell is thus open anteriorly, there are no closed submarginal cells, the first discoidal cell is complete and the second is absent; the gaster is immotile; and the female pygidial plate is absent (Pate 1937; Bohart and Menke 1976).

The genus has been reported from Ecuador (Cooper 1993) and Costa Rica (Hanson and Menke 1995) but no species have been identified. Antropov (1995) described a new species from Dominica in the Lesser Antilles based on one male, which was poorly preserved. Antropov and Cambra (2003) described another species from Panama. One species is known from the eastern USA (Bohart and Menke 1976). Pulawski (2019) presented the most up-to-date information about the genus, showing four described species (because this author recognized the African species as belonging to *Xysma* genus).

Genaro and Torres (1999) mentioned the presence of a “new species” of *Xysma* observed in Puerto Rico in their description of the natural history of *Pseudomethoca argyrocephala* (Gerstaecker) (Hymenoptera: Mutilidae), without giving further details. For this reason and because no additional information on species of the genus *Xysma* in the region has since appeared in the literature, herein the identity of the species is revealed, a description of the female, which was previously unavailable for this species, is presented, and some notes are provided on its nesting behavior.

Materials and Methods

Nesting behavior was studied within the Guánica State Forest, near the office at the reserve, during the day on October 17th and 23rd, 1997. Specimens were collected with an entomological net and by hand during nests excavation. Voucher specimens are deposited in the author's personal collection (JAG, 2 females, 1 male; Toronto, Canada) and the National Museum of Natural History, Smithsonian Institution, USA (3 females, NMNH). The male holotype of *X. dominicum*, deposited at NMNH was studied.

For the higher classification of the wasps I followed Sann et al (2018).

Results

Xysma dominicum Antropov 1995: 115. Male.

(Fig. 1, 4, 6)

Description of the female. Body length 2.6–3.0 mm. Fore wing length 1.5–1.7 mm ($n = 5$).

Integument coloration. Black except the following areas yellow: flagellum, clypeus, mandible except apex, propleuron, pronotum, pronotal lobe, legs, including coxae; and tegula. Some terga and sterna laterally and apically reddish brown. Wings clear, hyaline throughout, veins pale yellow, stigma light reddish brown.

Pubescence. Inconspicuous; with scattered short pale hairs throughout, densest on mandibles, legs, and posterior metasomal segments, especially T5 and T6.

Surface sculpture. Weak except propodeum strongly sculptured. Frons, vertex, gena, pronotum, mesoscutum, scutellum, metanotum, and mesepisternum coriaceous. Gena with scattered, irregular punctures. Basal area of propodeum with striae diverging laterally; two parallel longitudinal carinulae enclosing short transverse parallel striae medially; striated laterally with subparallel striae, some of which extend to the lateral margin of the propodeum (Fig. 3, 5). Posterior surface of propodeum with median groove, laterally striated, some branched; mostly coriaceous towards the ventral area. First tergum polished; terga microstriate or microcoriaceous, micropunctate. Sterna shiny and glabrous.

Structure. Medial clypeal lobe convex with broad apical emargination; inner eye orbits slightly converging above; vertex prominent. Gena slightly broader than eye. Front legs with spines of tarsus not forming tarsal rake. Wings venation as in Fig. 6.

Differential diagnosis. *Xysma dominicum* is more closely related to Central American species than to the North American species [*X. ceanothae* (Viereck)]. It differs from *X. ceanothae* through its densely sculptured head and mesosoma, longer pronotal collar, and basal area of propodeum without a longitudinal medial carina. *Xysma panamense* Antropov and Cambra has the pronotal collar not emarginate medially, the basal area of propodeum with weaker striate lateral portions, and the carina bordering the propodeal posterior side is dorsally interrupted. Conversely, in *X. dominicum*, the pronotal collar emarginates, has stronger striate lateral portions in the basal area of propodeum, and the carina bordering the propodeal posterior side is entire, dorsally.

Association of female with male of *Xysma dominicum*

Male body length 2.7 mm. Forewing length 1.7 mm (Fig. 2, 3 and 5).

In terms of secondary sexual characteristics, females differ from males most notably in that only the clypeus of the face is yellow (Fig. 1), whereas in males the entire lower half of the face and genal area are yellow (Fig. 2, 5). Males have 13 antennal segments (females with 12) and seven exposed metasomal terga (females with six).

Specimens examined. PUERTO RICO, Guánica, Ponce, x.1998, coll. J. A. Genaro (3 females, NMNH; 2 females and 1 male, JAG); DOMINICA, W. I. S. Chiltern Est[ate]., 20.ii.1965, coll. W. W. Wirth (male holotype, NMNH).

Distribution. Puerto Rico and Dominica (Fig. 8).

Nesting behavior

The nests were built in a shaded vertical bank, consisting of a white clay-like substrate, which was very loose. Other Hymenoptera, including the bees *Anthophora tricolor* (Fabricius) and *Lasioglossum* sp. and the wasp *Liris* sp., nested in this area.

Females of *Xysma* constantly overflowed the nesting area, keeping their body almost vertical (with the metasoma down), with zigzag movements before entering the nest. They generally landed a few centimeters from the entrance before walking inside, although at other times they flew in directly. The females remained inside the nests when resting and perhaps during the night. There was internal closure, made with soil, during the time that females remained inside the nest.

Females grabbed the prey with their mandibles, holding them by one of the forelegs or neck, with the ventral region facing upwards. The prey consisted of immature thrips (Thysanoptera).

The average diameter of the entrance was 2.5 mm (n=8, range=2.0–3.2 mm, SD=0.5). Nests were short, with an approximate depth of 3 cm (n=4), with the entrance on the same plane as the substrate. The absence of a foretarsal rake and pygidial plate means that females are poorly equipped for digging, but in this case the friable substrate perhaps facilitated excavation.

Due to a shortage of time and the difficulty of digging in this substrate, little attention was paid to the excavation of the nests without knowing the number of cells they possibly contained. Cocoons were stuck to the substrate, and usually observed attached together (in twos, threes and sometimes fours) (Fig. 7). Cocoon size ranged from 2.8 to 3.1 mm (x=3.0 mm, SD=0.1, n=5).

It seems that the females covered the cells with some substance, likely silk; it is known that other members of the subtribe Spilomenina: *Spilomena* Shuckard, *Arpactophilus* F. Smith and *Microstigmus* Ducke use silk in nesting (Matthews and Naumann 2002).

Species of subtribe Spilomenina (of which *Xysma* is also a member) are of considerable interest as they include some of the few apoid wasps that exhibit a high degree of social behavior and because adult females are able to spin silk from specialized setae on the sixth tergum, which they use in nest construction (Melo 1997; Serrão and de Oliveira 2000; Ohl and Bennett 2009; Breitzkreuz et al. 2016).

These observations are consistent with what little has been published on the nesting behavior of *Xysma* species (Krombein 1958; Bohart and Menke 1976).

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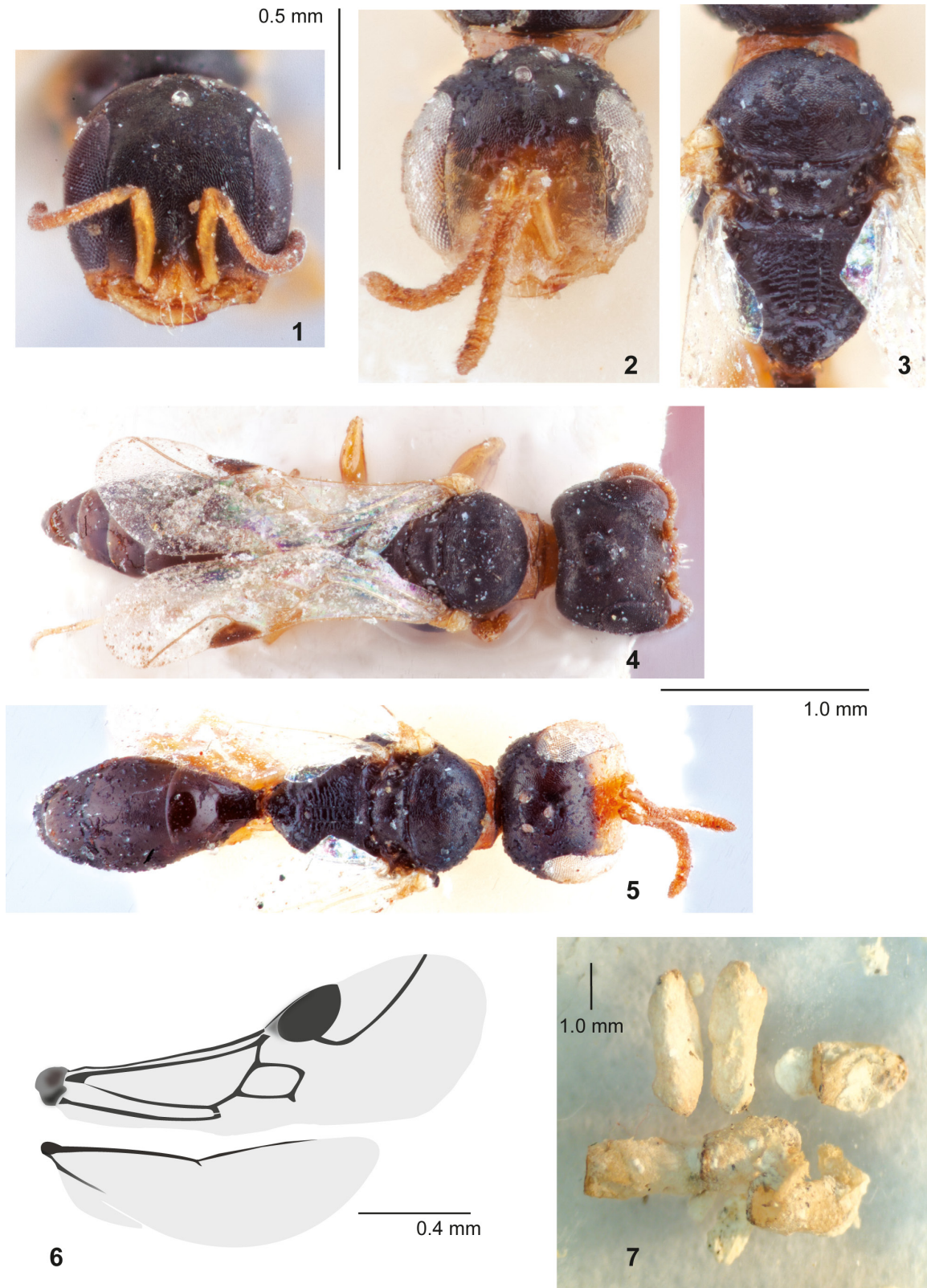
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Figures 1–7. *Xysma dominicum* Antropov. 1–2) Face (in frontal view). 1) Female. 2) Male. 3) Mesosoma of the male (in dorsal view). 4–5) Habitus images. 4) Female. 5) Male. 6) Illustrations of the fore- and hindwings. 7) Emerged cocoons obtained from nests.

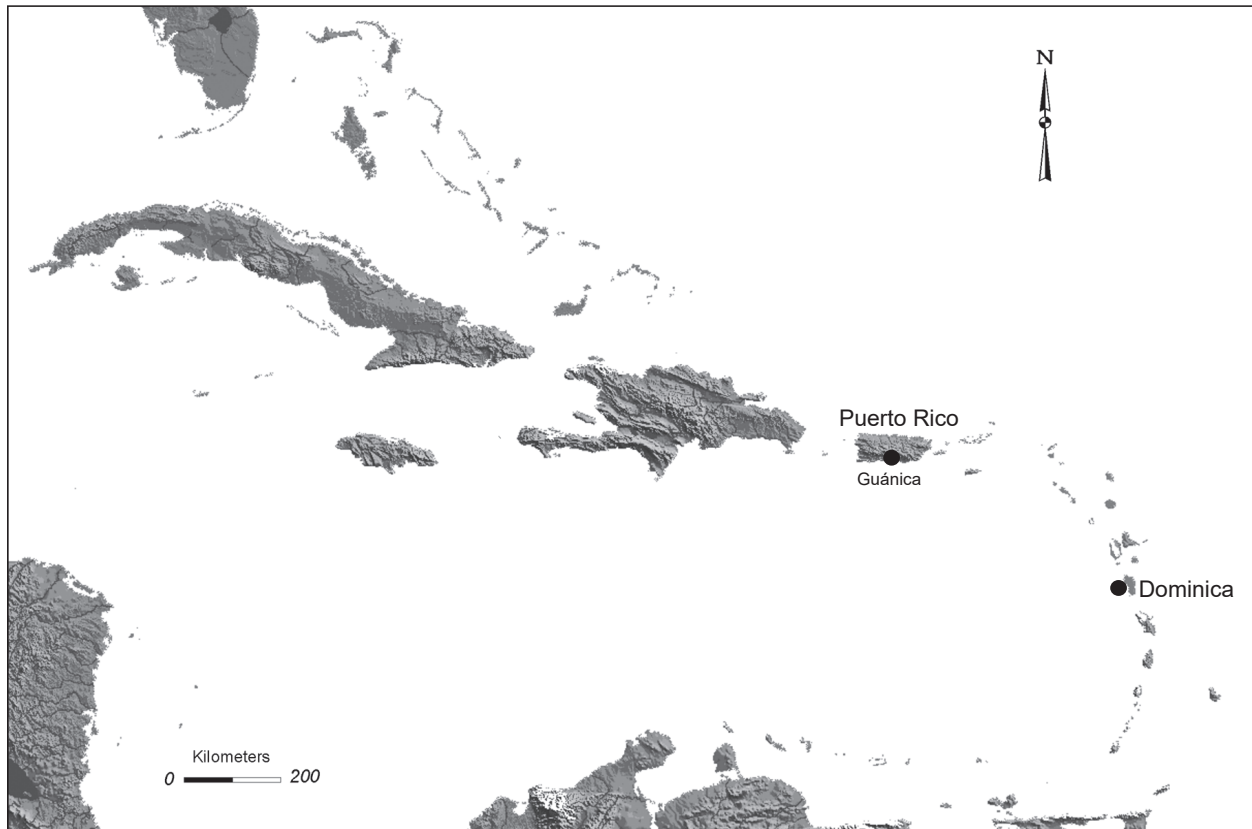


Figure 8. *Xysma dominicum* Antropov distribution map.