

— Short Communication —

THE LARGE CARPENTER BEES (HYMENOPTERA: APIDAE: XYLOCOPA SPP.) OF NUEVO LEÓN, MÉXICO

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Abstract—There is a severe information gap regarding wild bees in northern Mexico. The present study is a contribution to knowledge of the distribution, habitat preferences and floral usage patterns of bees of the genus *Xylocopa* in the state of Nuevo León. Field sampling was done using aerial net and pan traps (yellow, blue, white and pink) at 35 sites throughout the state. *Xylocopa* species were found at only seven of these sites. Four of the five species, previously reported for the state were collected plus two new state records (*Xylocopa micans* and *X. strandi*), bringing the total number of species in the state to seven. Individuals were collected visiting only flowers of the Fabaceae and Bignoniaceae families, and they occurred primarily in shrub lands and disturbed areas.

Keywords: pollination, native bees, biodiversity, conservation, inventory

INTRODUCTION

Xylocopa is a cosmopolitan genus of approximately 470 species of medium to very large bees (Michener 2007). All *Xylocopa* are believed to be polylectic and are commonly associated with large and showy flowers with abundant pollen and nectar (Hurd 1956). *Xylocopa* is currently considered to be the sole member of the tribe Xylocopini in the subfamily Xylocopinae of the family (Michener 2007). With 36 species reported from Mexico, *Xylocopa* is one of the more diverse Mexican genera of bees (Ayala et al. 1996). Five species of *Xylocopa* have been reported from the state of Nuevo León: *X. fimbriata*, *X. mexicanorum* and *X. tabaniformis*, *X. lateralis* and *Xylocopa californica* (Ayala et al. 1996; Ascher & Pickering 2011). Unfortunately, most of these records lack precise locality data.

It is alarming for a country such as Mexico with high level of complexity of topography, climate and biodiversity to find large zones where little is known about the diversity and distribution of its native bees (Ayala et al. 1996). For example, we have very few bee specimens in entomological collections from the state of Nuevo Leon (Ramírez-Freire 2008). The objective of the present work is to contribute to our knowledge of *Xylocopa* species for Nuevo Leon, providing data about vegetation on in which they occur and the plant species they visit, with the ultimate goal of assembling a formal collection of native bees for the state.

MATERIAL AND METHODS

Area of study

The state of Nuevo León is located in the northeast of the Mexican republic (Figure 1), total extension of the state is 64 555.94 km², with elevations ranging from 200 to 3 700 meters. It is divided into three physiographic regions: Planicie Costera del Golfo (Gulf coastal plains), Sierra Madre Oriental (Eastern main mountains) and Altiplano Mexicano (Mexican high land plateau) (Alanís-Flores et al. 1996). The main climatic types for the state are dry and semi-dry with highly variable precipitation ranging from 300 mm to 600 mm. The Sierra Madre Oriental in the central part of the state is relatively temperate and cool while the regions in the north and south are more arid. The main vegetation type for the state is desert shrub, with high variability on its composition while forest can only be found in the Sierra Madre Oriental area. There are also several sites with saline or gypsophilous vegetation within the state with high levels of plant endemism (Treviño-Garza et al. 2001). For a more detailed vegetation description, see Velazco-Macías et al. (2011).

The study was carried out between February 2009 and May 2010. Taxonomic literature about the genus *Xylocopa* was gathered and the following data base were consulted: Colección Hymenoptera del Museo de Zoología “Alfonso L. Herrera” de la Facultad de Ciencias, Universidad Nacional Autónoma de México, México, Colección Nacional de Insectos (CNIN), Bee Species Database, American Museum of Natural History, from Snow Entomology Collection,

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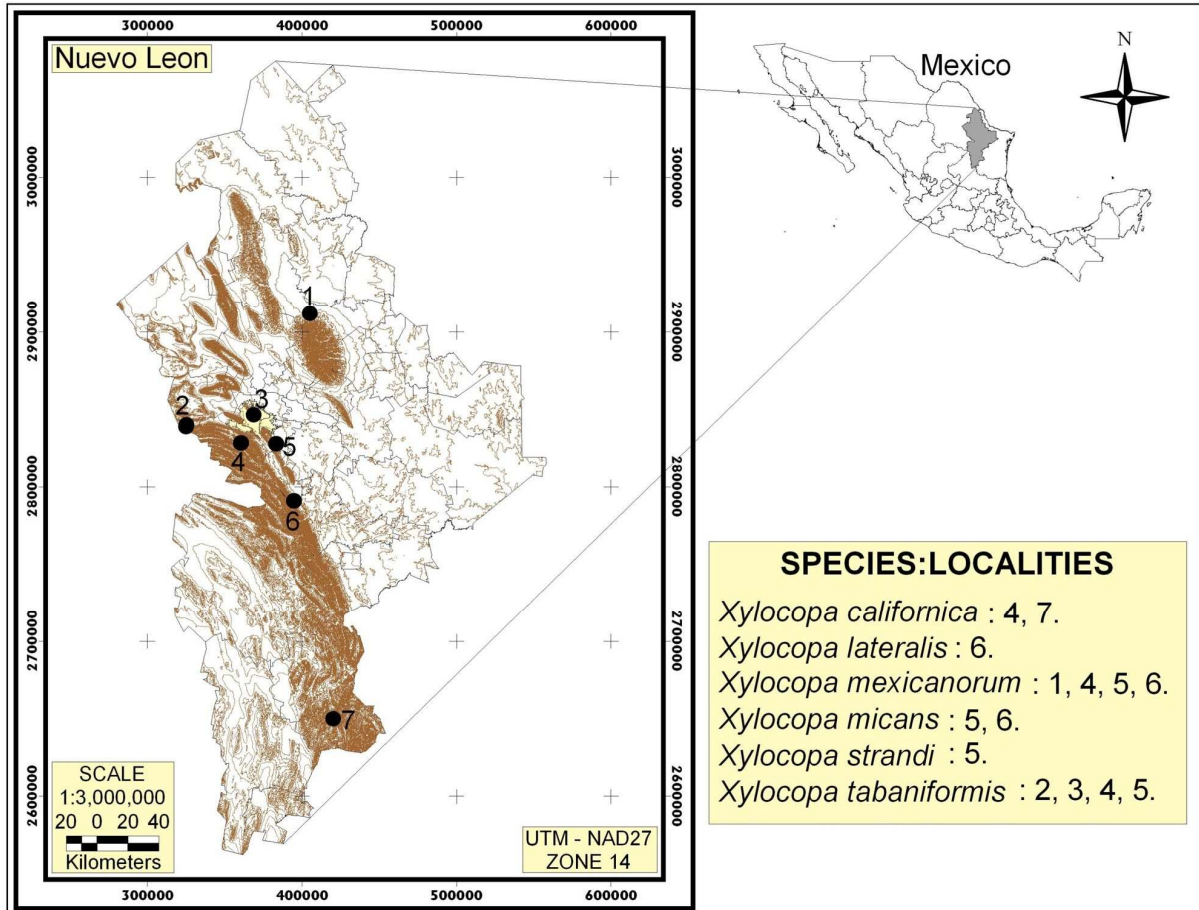


Figure 1. Sampling sites and distribution of *Xylocopa* species at Nuevo Leon, México.

University of Kansas Natural History Museum (Ascher & Pickering 2011). Field work was done in 35 localities at 20 municipalities within the state of Nuevo León. Sites were distributed across the state from north to south and were picked, in part, on the basis of accessibility. None of these sites had been previously sampled for bee species. Sampling was done using aerial entomological nets for 30 minutes periods on each flowering plant species at the sampling site. Pan traps were also used at each site, with 120 traps of four different colours (yellow, blue, white and pink / 30 traps each) with soapy water set in an 1 000 m² area and with a trap sampling period from 8:00 am to 6:00 pm (Kaerns & Inouye 1993; McIntyre & Hostetler 2001; Campbell & Hanula 2007; Wilson et al. 2008; Droege 2008; Droege et al. 2009). Bee specimens collected by net were killed with acetone and mounted on entomological pins on the same day. Pan trap specimens were processed according to Droege (2008). Bee identification was made using keys from Hurd (1955), Michener et al. (1994) and Ascher & Pickering (2011); two species (*X. lateralis* and *X. strandi*) were identified by Dr. John L. Neff at Central Texas Melittological Institute. Along with bee specimens, plant material was collected and processed to get proper identification of species visited by bees, vegetation type at the sampling sites were defined according to INEGI (1986).

RESULTS

Xylocopa was collected at only seven of the 35 sites. A total of 38 specimens were collected: 25 females and 13 males. Six species were identified from field collected specimens: *Xylocopa californica* (1♀, 2♂), *X. mexicanorum* (16♀, 4♂), *X. tabaniformis* (4♀, 3♂), *X. lateralis* (1♂) which had previously been reported from the state, and two additional species, *X. micans* (3♀, 3♂) and *X. strandi* (1♀), as new state records. With adding *X. fimbriata* which has been reported by literature for Nuevo Leon, but not collected during this survey, this brings the total number of species of *Xylocopa* in the state of Nuevo León to seven.

All specimens but one (collected in a yellow pan trap), were collected at flowers: *Caesalpinia mexicana*, *Dalea formosa*, *Sophora secundiflora* (Fabaceae) and *Tecoma stans* (Bignoniaceae) (Table 1). In addition *X. mexicanorum* was observed twice to rob nectar from *Cordia boissieri* and *Nicotiana glauca*. Distribution of the genus appears restricted to the Sierra Madre Oriental (brown parts Figure 1), and preferred vegetation types are shrub and disturbed sites with secondary vegetation (Table 2).

TABLE 1. Plant species visited by *Xylocopa* on sampled sites.

Bee species	Plant species
<i>X. californica</i>	<i>Caesalpinia mexicana</i> , <i>Tecoma stans</i>
<i>X. lateralis</i>	<i>Caesalpinia mexicana</i>
<i>X. mexicanorum</i>	<i>Caesalpinia mexicana</i>
<i>X. micans</i>	<i>Caesalpinia mexicana</i> <i>Dalea sp.</i> , <i>Sophora secundiflora</i> ,
<i>X. tabaniformis</i>	<i>Caesalpinia mexicana</i>
<i>X. strandi</i>	<i>Caesalpinia mexicana</i>

DISCUSSION

There is little and scattered information regarding *Xylocopa* in northern Mexico, for example, even if most species were previously reported for the state, all specimen records from database lacked information regarding specific locality and municipality, only a *X. tabaniformis* record from "Colección Nacional de Insectos" collected ten years ago in Cola de Caballo, Santiago municipality. No specimen record from American Museum of Natural History had any information on locality. The previously reported species *Xylocopa fimbriata* (Ayala et al. 1996), which we were not able to observe, has no data about the collection. The two new state records are reported by the same authors for the neighboring state of Tamaulipas. Other species like *X. muscaria* and *X. nautlana* may occur in Nuevo Leon, since they are common in the neighboring states of Tamaulipas and San Luis Potosí (Ascher & Pickering, 2011).

While *Xylocopa* is known as polylectic (Porter, 1981), in this study the bees were mainly collected from species of the Fabaceae family (Table 1). Fabaceae being the third largest family within the Nuevo Leon state (Villarreal & Estrada, 2008; Velazco-Macías 2009), this could place *Xylocopa* as one of the most important pollinators for plant species in shrub vegetation in northeast Mexico. We can also conclude the best way to collect *Xylocopa* is areal nets instead of bow traps.

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TABLE 2. *Xylocopa* species according to collection site, vegetation types and number of individuals at each site.

Locality #	Locality name/municipality	Vegetation type	Species present	Number of individuals
1	Ejido Rancho Nuevo, Agualeguas	Tamaulipan thorn shrub	<i>X. mexicanorum</i>	1
2	Corral de los Bandidos, García	Microphyllous desert shrub	<i>X. tabaniformis</i>	2
3	Desert Botanic Garden UANL, San Nicolás de los Garza	Disturbed area (Secondary vegetation)	<i>X. tabaniformis</i>	1
4	La Huasteca Canyon, Sta. Catarina	Pied mont shrub	<i>X. californica</i> , <i>X. mexicanorum</i> <i>X. tabaniformis</i>	2 14 3
5	Santa Ana Canyon, Juárez	Disturbed area (Secondary vegetation)	<i>X. mexicanorum</i> <i>X. micans</i> <i>X. tabaniformis</i> <i>X. strandi</i>	4 3 1 1
6	Road Raíces-La Trinidad, Allende	Disturbed area (Secondary vegetation)	<i>X. mexicanorum</i> <i>X. micans</i> <i>X. lateralis</i>	2 3 1
7	Road to La Encantada, Zaragoza	Conifer forest	<i>X. californica</i>	1

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