



Large carpenter bees in Argentina: systematics and notes on the biology of *Xylocopa* subgenus *Neoxylocopa* (Hymenoptera: Apidae)

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Table of contents

Abstract	201
Introduction	201
Material and methods	202
Results	204
Systematics	204
Genus <i>Xylocopa</i> Latreille, 1802	204
Subgenus <i>Neoxylocopa</i> Michener, 1954	204
Key to species of the <i>Xylocopa</i> (<i>Neoxylocopa</i>) present in Argentina	204
<i>Xylocopa</i> (<i>Neoxylocopa</i>) <i>atamisquensis</i> Lucia & Abrahamovich, 2010	205
<i>Xylocopa</i> (<i>N.</i>) <i>augusti</i> Lepeletier, 1841	208
<i>Xylocopa</i> (<i>N.</i>) <i>eximia</i> Pérez, 1901	212
<i>Xylocopa</i> (<i>N.</i>) <i>frontalis</i> (Olivier, 1789)	216
<i>Xylocopa</i> (<i>N.</i>) <i>mendozaana</i> Enderlein, 1913	220
<i>Xylocopa</i> (<i>N.</i>) <i>nigrocincta</i> Smith, 1854	222
<i>Xylocopa</i> (<i>N.</i>) <i>tacanensis</i> Moure, 1949	225
Biological notes	230
Discusion	235
Acknowledgements	235
References	236

Abstract

A systematic revision of the species of the genus *Xylocopa* subgenus *Neoxylocopa* in Argentina is provided. Seven species are included: *X. atamisquensis* Lucia & Abrahamovich, *X. augusti* Lepeletier, *X. eximia* Pérez, *X. frontalis* (Olivier), *X. mendozaana* Enderlein, *X. nigrocincta* Smith and *X. tacanensis* Moure. The males of *X. eximia* and *X. nigrocincta* are described for the first time. *Xylocopa jujuyensis* Brèthes is a new junior synonym of *X. nigrocincta*. Photographs, occurrence maps, and identification keys for the species are presented. Information on the nest architecture and substratum preference are also given.

Key words: Anthophila, nesting behavior, pollinators, South America, taxonomy

Introduction

The subfamily Xylocopinae (Apidae) includes four tribes: Ceratinini, Manuelini, Allodapini and Xylocopini; the latter consists of a single genus, *Xylocopa* Latreille, which are commonly known as carpenter bees because they usually nest within dead wood, except for the subgenus *Xylocopa* (*Proxylocopa*) that nest in the ground (Hurd & Moure 1963). Frequently, the substrate is dead wood, hollow stems of plants and structural timbers of construction (Hurd & Moure 1963; Camillo & Garófalo 1982; Camillo *et al.* 1986; Caicedo *et al.* 1995); however, some species

may nest in living trees (Hurd 1978a; Sakagami & Laroca 1971; Ramalho *et al.* 2004; Lucia 2011). The social behavior of carpenter bees varies across species, ranging from entirely solitary to parasocial (Gerling *et al.* 1989; Michener 1990) (as well as different periods in the same species). Most species are polylectic, but some of them are important pollinators of plants and have been used for horticultural pollination in tropical regions (Gerling *et al.* 1989). *Xylocopa* is represented by 31 subgenera worldwide, with roughly 470 described species, most of them occurring in tropical and subtropical areas of the world (Michener 2007). They are large, robust, hairy bees, usually with black or metallic green or blue integument, and often with different colors of pubescence. In the Neotropics, 111 species in 12 subgenera have been recorded (Michener 2007; Moure, 2008, Lucia & Abrahamovich 2010; Zanella & Silva 2010) and the subgenus *Neoxylocopa* Michener is the most diverse and abundant, with 50 species recorded from a great variety of habitats. *Xylocopa* (*Neoxylocopa*) is characterized by the contrast between dark-colored females and the usually yellow or testaceous-colored males (Michener 2007). This is the largest and perhaps taxonomically the most difficult subgenus of carpenter bees in the Western Hemisphere (Hurd 1978a). It ranges from southwestern United States to Argentina, is present on several archipelagos of the Pacific Ocean, and occurs throughout the West Indies (Hurd 1978a). As in many regions across America, little is known about the species of *Xylocopa* from Argentina. One of the most important taxonomic studies of *Xylocopa* is that of Brèthes (1916), which includes the only key to the Argentinian species. However, that work is poorly illustrated and unquestionably outdated. Information on behavioral and ecological aspects of bees is valuable to our knowledge of their adaptations to the environment, as well as for a better understanding of their phylogeny and coevolutionary patterns with plants and parasites (Michener 2007). The nesting habits and characteristics of the nesting substrates of *Xylocopa* (*Neoxylocopa*) have been studied in Brazil, Perú, Paraguay, and Colombia (Strand 1912; Janvier 1955; Hurd 1958; Sakagami & Laroca 1971; Camillo & Garófalo 1982; Viana *et al.* 2002; Oliveira-Filho & Freitas 2003; Bernardino & Gaglianone 2008; Gonzalez *et al.* 2009; Marchi & Melo 2010; Pereira & Garófalo 2010). To date, no studies of these biological aspects exist for the Argentinian species. Herein, a systematic and biological revision of the Argentinian species of *Xylocopa* subgenus *Neoxylocopa* is presented. We provide comparative diagnosis, descriptions, illustrations, and occurrence maps for each species as well as identification keys for both males and females. The male of *X. eximia* and *X. nigrocineta* are described for the first time. We document for the first time the nest architecture and characteristics of the nesting substrates for five of the seven species that occur in Argentina.

Material and methods

Systematics. Specimens examined herein were loaned by the following institutions and curators (in parentheses): **Col. Zelich**—Private collection “Dr. Mateo Zelich”, Entre Ríos, Argentina (M.Zelich); **BMNH**—British Museum Natural History, Londres, UK (D.Notton); **DZUP**—Departamento de Zoología. Universidade Federal do Paraná, Curitiba, Brazil (G.Melo); **FAUBA**—Facultad de Agronomía Universidad de Buenos Aires, Buenos Aires, Argentina (J.P.Torretta); **IADIZA**—Instituto Argentino de Investigaciones de las Zonas Áridas, Mendoza, Argentina (G.Debandi); **IFML**—Fundación Miguel Lillo, San Miguel de Tucumán, Argentina (M.V.Colomo de Correa); **MACN**—Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”, Buenos Aires, Argentina (A.Roig Alsina); **MIZS**—Museo Regionale di Scienze Naturali, Torino, Italy (L.Picciau); **NHMW**—Naturhistorisches Museum Wien, Wien, Austria (D.Zimmermann); **MIZ**—Museum e Institute of Zoology Polish Academy of Sciences, Warszawa, Poland (T.Huflejt); **MLP**—Museo de La Plata, La Plata, Argentina (N.Diaz); **MMP**—Museo Municipal de Ciencias Naturales “Lorenzo Scaglia”, Mar del Plata, Argentina (J.Farina); **MNCN**—Museo Nacional de Ciencias Naturales, Madrid, España (M.Paris) and **MNHN**—Muséum National d'Histoire Naturelle, Paris, France (C.Villemant). External morphological structures were studied using a Nikon SMZ 745T stereomicroscope and photographs were taken with a Canon Power Shot® A520 digital camera attached to it. Digital images were assembled using CombineZM open software (Hadley 2011). For examination with scanning microscope (SEM) Jeol-JSM-6360MV, genitalia were mounted on metal studs and coated with gold-palladium. The terminology used in this work is that proposed by Hurd & Moure (1963) and Michener (2007). All measures are given in millimeters and were taken using an ocular micrometer attached to a stereomicroscope. The following abbreviations are used: T, S, F, and MOD for metasomal terga and sterna, flagellar segments, and maximum diameter of the median ocellus, respectively. Total body length was measured in lateral view, from head

to apex of metasoma; forewing length was measured at anterior margin from the costal esclerite to the wing apex. Mesosoma width was measured between the outer borders of tegulae and metasoma width across T2. Type labels were copied literally using // to separate multiple labels. Sex association was made when both sexes were collected inside the nest; nests of *X. tacanensis* and *X. mendozana* were not found in this study. Maps were built using CorelDRAW® X3.

Biology. Nests were collected between 2007 and 2011 in different localities in Argentina (Table 2). To study the internal nest architecture, we made three-dimensional molds with liquid silicone rubber. The first step in the construction of the molds was to add natural or prevulcanized latex to prevent the adhesion of silicone rubber to the walls of the nest, then we poured liquid silicone rubber (mixed with the corresponding catalyst) directly into the nest entrance until the tunnels were filled. After allowing the rubber to dry for 12–24 hours, the nest was broken and the mold removed.

This technique allowed us to measure the internal diameters of the cells and tunnels more accurately than previous methods (i.e., opening the nest and taking measurements from pieces of opened tunnels and cells). Whenever possible, the following nest data were recorded: *Internal structures*: 1) number, width, and length of tunnels and cells; 2) length of vestibule (space measured from the entrance to the beginning of the first tunnel). *External structures*: 1) entrance orifice diameter [horizontal and vertical axis (the first refers to the perpendicular axis to the wood fibers and the second to the parallel axis)]; 2) diameter of branch or trunk containing the nest. Measures of the nest structures were taken with a mechanical caliber and nest photographs were taken with a Panasonic® FZ18 digital camera. Adults found inside the nests were collected, killed, and deposited as vouchers in the entomological collection of Museo de La Plata, Argentina (MLP).

TABLE 1. Summary of species of *Xylocopa* subgenus *Neoxylocopa* present in Argentina with information on altitude in Argentina and general distribution. Province abbreviations used: BA: Buenos Aires; CAT: Catamarca; CHA: Chaco; COR: Córdoba; CTE: Corrientes; ERI: Entre Ríos; FOR: Formosa; JUY: Juyuy; LPA: La Pampa; LRJ: La Rioja; MZA: Mendoza; MIS: Misiones; NQ: Neuquén; RN: Río Negro; SJU: San Juan; SLU: San Luis; STA: Salta; SGO: Santiago del Estero; SFE Santa Fe; TUC: Tucumán. ?= province cited in bibliography, but not confirmed in this study. General distributions were obtained from Moure (2008), Montalva *et al.* 2013 and the present study.

Species	Altitude (m.a.s.l) in Argentina	Province in Argentina	General distribution
<i>X. atamisquensis</i> Lucia & Abrahamovich	0–2200	BA, CAT, CHA, COR, FOR, LPA, LRJ, MZA, NQ, RN, SGO, SJU, SLU, TUC.	Argentina
<i>X. augusti</i> Lepeletier	0–800	BA, CAT?, CHA, CTE, COR, ERI, FOR, JUY, LPA, MIS, MZA, RN, SFE, SLU, TUC	Argentina, Brazil, Chile, Paraguay and Uruguay.
<i>X. eximia</i> Pérez	50–2200	CAT, JUY, SFE, STA, TUC.	Argentina, Bolivia and Peru.
<i>X. frontalis</i> (Olivier)	0–250	BA, COR, ERI, MIS, STA?, SJU?, SFE.	Argentina, Mexico, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, El Salvador, Guayana Francesa, Guatemala, Guyana, Honduras, Nicaragua, Panama, Paraguay, Peru, Trinidad & Tobago, Uruguay and Venezuela.
<i>X. mendozana</i> Enderlein	150–2500	CAT, COR, LPA, LRJ, MZA, RN, SGO, SLU, SJU, STA, TUC.	Argentina and Bolivia?
<i>X. nigrocincta</i> Smith	50–500	BA?, COR?, CHA, CTE, ERI, FOR, JUY, LRJ?, MIS, STA, SFE, TUC	Argentina, Brazil and Paraguay.
<i>X. tacanensis</i> Moure	70–2000	COR, JUY, MIS, TUC.	Argentina and Brazil.

Results

Systematics

Genus *Xylocopa* Latreille, 1802

Subgenus *Neoxylocopa* Michener, 1954

Ancylsoma Dalla Torre, 1896. See Michener (1997:7)

Xylocopa (*Neoxylocopa*) Michener, 1954: 157. Type species: *Apis brasilianorum* Linnaeus, 1767, by original designation.

Xylocopa (*Megaxylocopa*) Hurd and Moure, 1963: 151; synonymized by Minckley (1998). Type specie: *Apis frontalis* Olivier, 1789, by original designation.

Diagnosis. Subgenus characterized by the usually dark-colored females and the often yellow or testaceous-colored males. Females can be distinguished by the following combination of characters: two teeth on the apical margin of the mandible, a continuous impunctate ridge along the epistomal sulcus, and a strong median carina along metasomal sterna. The males are distinguished by their yellow-testaceous vestiture (most species), the beginning of the posterior thoracic declivity on the propodeum and the reservoir of male mesosomal gland extremely large.

Key to species of the *Xylocopa* (*Neoxylocopa*) present in Argentina

Females

1. Pubescence in part ferruginous on mesosoma or metasoma 2
- Pubescence entirely black 4
2. Ferruginous pubescence restricted along sides and apex of metasoma (Fig. 9) *X. augusti*
- Ferruginous pubescence restricted to mesosoma 3
3. T2-T3 with median pubescence short, 0.3–0.6 times MOD; gena narrow and densely punctate; tegula dark brown
. *X. tacanensis*
- T2-T3 with median pubescence long, 1.1–1.3 times MOD; gena wide and sparsely punctate; tegula ferruginous or light brown
. *X. eximia*
4. Integument of metasomal terga I–IV or I–V with reddish bands (Figs. 11, 12), if the integument is completely black, then
scutellum is angled as seen in profile 5
- Integument of metasomal terga without reddish bands, completely black, scutellum not angled in profile 6
5. Face with conspicuous carina below lateral ocelli (Fig. 4); scutellum gently rounded as seen in profile; T2–T3 with short and
scattered hairs, generally specimens more than 30 mm long. *X. frontalis*
- Face without conspicuous carina below lateral ocelli; scutellum angle as seen in profile; T2–T3 with short and abundant hairs,
generally specimens less than 30 mm long *X. nigrocincta*
6. T2 and basal third of T3 with median pubescence very short, barely exiting the insertion puncture, 0.2–0.4 times MOD,
remaining of T3 with hairs 3–4 times longer than those on T2; supraorbital area wide (3.5–4.1 times DOM) *X. mendozana*
- T2–T3 with median pubescence short, hairs 0.3–0.5 times MOD, noticeably surpassing the insertion puncture; supraorbital
area narrow (2.4–2.8 times DOM) *X. atamisquensis*

Males

Note: the male of *X. tacanensis* is unknown. Plumose hairs intermixed with simple hairs can be found on T2–5 in all males studied.

1. T2–T3 with small contiguous punctures and median pubescence very short, barely surpassing the insertion puncture and appar-
ently hairless (Fig. 25) *X. mendozana*
- T2–T3 with punctures separated by one or more times puncture width, but never contiguous; median pubescence variable . . . 2
2. T2–T3 with median pubescence short (0.1–0.3 times MOD); ventral surface of posterior tibia with pubescence distributed
throughout the surface (Fig. 30). Specimens more than 30 mm long. Genitalia, in dorsal view, with sphata strongly curved (Fig.
36) *X. frontalis*
- T2–T3 with median pubescence long, abundant and dense; ventral surface of posterior tibia with pubescence distributed either
basally, medially or subapically. Specimens less than 30 mm long Genitalia, in dorsal view, with sphata not strongly curved .
. 3
3. T2–T3 with median pubescence short, (0.4–0.7 times MOD); ventral surface of the posterior tibia with pubescence restricted to
the basal and median parts (Fig. 32). Genitalia, in dorsal view apex of pennis valve abruptly narrowed (Fig. 56)
. *X. nigrocincta*

- T2–T3 with median pubescence long more than 0.7 times MOD; ventral surface of the posterior tibia with pubescence variable 4
- 4. Ventral surface of the posterior tibia with pubescence forming two separate tufts (basal and subapical) and median small notch on the posterior edge (Fig. 28) *X. augusti*
- Ventral surface of the posterior tibia with pubescence forming one tuft (Fig. 27, 29); posterior tibia without a median small notch on the posterior edge 5
- 5. T6–7 with dark brown to black pubescence (Fig. 23); ventral surface of the posterior tibia with pubescence restricted to the base (Fig. 29). Genitalia, in ventral view, with apex of gonostyle as in figure 47 *X. eximia*
- T6–7 with ferruginous pubescence (Fig. 21); ventral surface of the posterior tibia with pubescence forming one tuft (basal-middle) (Fig. 27). Genitalia, in ventral view, with apex of gonostyle as in figure 45. *X. atamisquensis*

***Xylocopa (Neoxylocopa) atamisquensis* Lucia & Abrahamovich, 2010**

(Figures 1, 8, 15, 21, 27, 33, 39, 45, 51, 62)

Xylocopa atamisquensis Lucia & Abrahamovich, 2010: 244. Holotype: MLP, ♀, N° 5420/1. Type locality: Predio Isla Verde, Dto. Atamisqui, Santiago del Estero province, Argentina.

Diagnosis. The female of this species can be distinguished from other Argentinian large carpenter bees by the following combination of characters: integument black, T2–T3 with median pubescence short, hairs 0.3–0.5 times MOD, and supraorbital area narrow (2.4–2.8 times DOM). The male can be recognized by T2–T3 with median pubescence long, with hairs 0.7–0.9 times MOD, T4–6 with median pubescence longer than T2–T3 (2 or 3 times longer than T2). The female of this species is easily distinguished from all other *Neoxylocopa* occurring in Argentinian by its general black appearance (pubescence and integument). Externally, it resembles *X. mendozana*, but it can be readily distinguished by on T2–3 the dense punctation and pubescence very short, barely surpassing the insertion puncture.

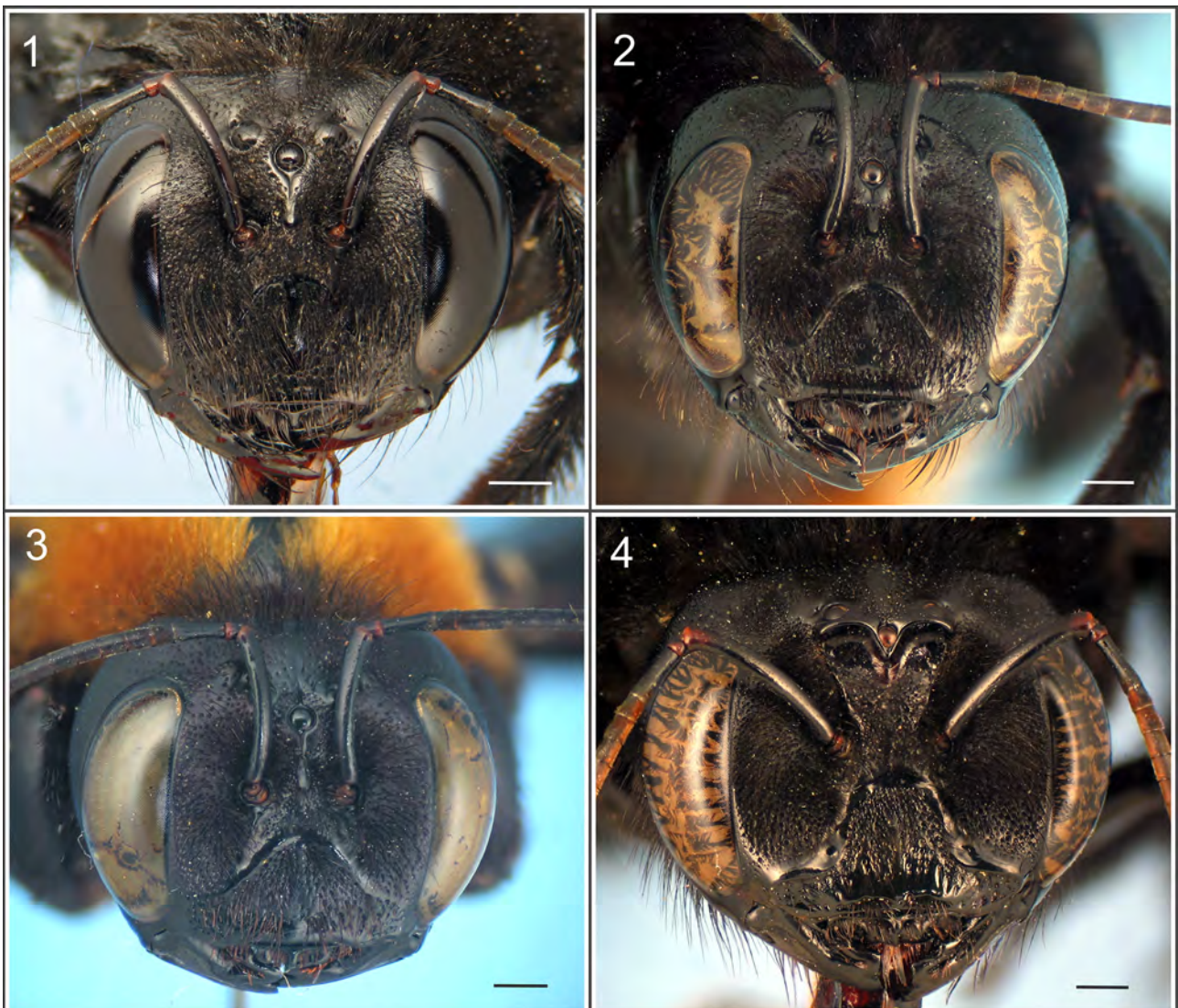
Comments. Earlier records of *X. ordinaria* and *X. brasilianorum* from Argentina (Jörgensen 1912, Enderlein 1913, Brethes 1916, Moure 1947, 1949) are in fact records for *X. atamisquensis*. Likewise, Dusmet & Alonso (1924) recorded a female specimen from Chaco de Santiago del Estero (Río Salado) (Argentina) as *X. rotundiceps*, but it belongs to *X. atamisquensis*. In the MNCN, specimens identified by Friese in 1903 as *X. mendozana* and *X. brasilianorum* are also *X. atamisquensis*.

Distribution (Fig. 62): **ARGENTINA:** Buenos Aires, Catamarca, Chaco, Córdoba, Formosa, La Pampa, La Rioja, Mendoza, Neuquén, Río Negro, San Juan, San Luis, Santiago del Estero and Tucumán. Its distribution comprises part of Monte, Prepuneña, Chaqueña, Patagonia and Pampeana biogeographic provinces and the southernmost record of this species is North of Río Negro province, approximately parallel 40°.

Additional examined material. A total of 365 specimens (318♀ and 47♂) from ARGENTINA. **BUENOS AIRES.** 1♀, Trenque Lauquen, 8-XI-1974, Tesón-Dagoberto (MLP). **CATAMARCA.** 1♂, Ambato La Puerta, -I-1979, R.E. Madueño (IFML); 1♂, Andalgalá, 4-II-1974, J.L.Neff (IFML); 1♂, Catamarca, -III-1942, B. Schaeffer (MLP); 1♂, Andalgalá, II-1986, Fritz (MLP); 2♀1♂, Los Nacimientos de Abajo, 16-31-X-1968, Willink-Terán-Stange (IFML); 9♀, Dpto. del Alto, -I-1950, Argañaraz (IFML); 5♀, Dpto. del Alto, 1-II-1953, Argañaraz (IFML); 2♀, Dpto. del Alto, 5-V-1958, Argañaraz (IFML); 1♀, Dpto. del Alto, 9-I-1955, Argañaraz (IFML); 1♀, Belén, 7-II-1966, A. Willink-Wayrauch (IFML); 1♀, Catamarca, (MLP); 1♀, Chumbicha, -XI-1947, V.Llano (MLP); 1♀, Andalgalá, 19-XI-1944, (MLP); 1♀, Catamarca, -1942, Schaefer (MLP); 4♀, Catamarca, -I-1942, B.Schaefer (MLP); 1♀, Catamarca, (MLP); 4♀, Hualfin (Los nacimientos aguas termales), 21-IX-1953, S.Piereti (IFML); 2♀, Ampajango, 7-IV-1968, Willink-Terán (IFML); 2♀, El Rodeo, 16-IV-1972, C.Porter (IFML); 1♀, Andalgalá, 28-X-1972, L.Stange (IFML); 2♀, Andalgalá, 20-XII-1972, J.L.Neff (IFML); 11♀, Concepción, 15-I-1960, Willink (IFML); 2♀, Ambato (La Puerta), -I-1979, R.E.Madueño (IFML); 1♀, Joyuango, 29-X-1972, L.Stange (IFML); 2♀, Andalgalá, -II-1986, Fritz (MLP); 2♀, Munancalá, -V-1959, Argañaraz (IFML); 1♀, Capillita (2600 m.a.s.l.), -II-1987, Fritz (MLP); 3♀, Mina La Alumbra, 27°21'25,6"S 66°33'0,7"W, 2134 m.a.s.l, 10-XII-2007, M.Lucia (MLP); 1♀, Río Vis-Vis, 27°25'52,5"S 66°31'49,7"W, 1764 m.a.s.l, 6-XII-2007, M.Lucia (MLP); 4♀, Luciano Mansilla, 2-XII-1940, (MLP); 1♀, Santa María, 20-II-1967, Willink-Terán (IFML); 1♀, Santa María, 6-IV-1968, Willink-Terán (IFML); 2♀, Pirquitas, 13-II-1958, R.Golbach (IFML); 1♀, San Antonio, 6-18-II- 1958, Golbach (IFML). **CÓRDOBA.** 3♀, El Sauce (Calamuchita), -XII-1939, 1-II-1940, Ex. Col Viana (MACN); 1♀, Alta Gracia, (MLP); 1♀, Córdoba, (MLP); 1♀, Bajo grande, 6-IX-1939, Maldonado (MLP); 1♀, Quilima, 3-XII-1941, (MLP);

1♀, Capilla de los remedios, 22-VIII-1939, Maldonado (MLP); 1♀, Bajo grande, 17-VIII-1939, Maldonado (MLP); 1♀, Cabana, 4-6-II-1937, Birabén (MLP); 1♀, Santo Tomé, 26-XI-1945, A.Martínez (MLP); 1♀, Quilino, 3-XII-1942, (MLP); 3♀, Copacabana, -II-1980, Fritz (MLP); 3♀, Quilino, 2-XII-1942, A.Ogloblin (MLP); 1♀, Bialet Massé, 11-I-3-II-1976, A.Willink (IFML); 1♀, Capital, 19-XII-1949, P.López (IFML); 1♀, Santa María del Río Seco, 15-II-1955, Willink-Monrós (FML); 1♀, Guanaco Muerto, Martínez, (MLP); 1♂, San Roque, 7-XI-1942, (MLP); 1♂, Villa Regina, -1960, Velázquez (MLP); 1♀, Cosquín, (MNCN); 1♀, Reserva provincial "Los Pocitos", 7-11-X-1991, J.L.Farina (MMP); 1♀, Yacanto de San Javier, 23-I-1958, Willink-Tomsic (IFML). **CHACO.** 1♂, Charata, X-1924, (MLP); 1♀, Resistencia, 14-II-1936, Denier (MLP); 7♀, Paraje el Pintado, (E.G.B 245, 10 Km E. Picada Barilari, (25°17'50.9"S 63°1'21.2"W; 260 m.a.s.l.), 10/18-I-2007, M.Lucia. (MLP); 1♀, Tres Mojones, 28-XI-1952, R.Aguilar (IFML). **FORMOSA.** 2♀, Depto. Pilcomayo Laguna Blanca, -XII-1948, I.Morel (IFML); 4♀1♂, Ing. G.N.Juárez, 7-I-1949, Golbach (IFML). **LA PAMPA.** 3♀, La Gloria, -1943, J.Fortuna, (MLP); 1♀, Santa Rosa, 29-X-1984, (MLP); 1♀, 100 Km Río Colorado, -I-1985, Fritz (MLP); 2♀, Renancó, 14-II-1977, D.T.J.L (MLP). **LA RIOJA.** 3♀1♂ R. Peñaloza (El Rosillo Ca. de Chepes), 22-X-1997, S.Roig (IADIZA); 1♀, 20 Km N de Chepes, 11-X-1998, S. Roig (IADIZA); 1♀1♂ R. Peñaloza (El Rosillo Ca. de Chepes), 11-X-1997, S.Roig (IADIZA); 19♀3♂, La Rioja, -III-1934, (MACN); 2♂, Illar, -1934, Gómez (MACN), 6♀, Anillaco, (28° 48' 46" S 66° 56' 9.3" W, 1376 m a.s.l.), 17-X-2006, M.Lucia-A.H.Abrahamovich-E.Jiménez (MLP); 3♀, Anillaco, (28° 48' 46" S 66° 56' 9.3" W, 1376 m a.s.l.), 18-X-2006, M.Lucia-A.H.Abrahamovich-E.Jiménez (MLP); 2♀, Anillaco, (28° 48' 46" S 66° 56' 9.3" W, 1376 m a.s.l.), 19-X-2006, M.Lucia-A.H. Abrahamovich-E.Jiménez (MLP); 1♀, Patquia, 25-I-1947, Hayward-Willink (IFML); 1♀, Guayapa-Patquia, -X-1948, Argañaraz (IFML); 2♀, Sebila, 22-XI-1944, (MLP); 1♀, Olta, 14-III-1940, Birabén (MLP); 1♀, La Torre, 28-II-1959, Torres-Gordella (MLP); 1♀, Pinchas, 27-II-1939, Birabén-Scott (MLP); 2♀, Cuesta la Aguada (9 Km S de Angulos), 2-XII-1977, Willink-Fidalgo (IFML); 1♀, Patquia, -X-1988, Fritz (MLP); 1♀, Punta de las llamas, 12-XI-1944, A.Ogloblin (MLP); 1♀, Famatina, 23-XI-1975, Stange (IFML); 1♀, Cuesta Miran de Puerto Alegre, 16-x-1997, S.Roig (IADIZA); 2♂, La Rioja, Giacomelli (MNCN). **MENDOZA.** 3♂, Mendoza Capital, (Rva. Divisadero Largo), 18-X-2002, G.Debandi (IADIZA); 1♂, Mendoza Capital, (Rva. Divisadero Largo), 1-X-2002, G.Debandi (IADIZA); 10♀5♂, Mendoza, C.S. Reed (MLP); 2♀2♂, Mendoza, (MLP); 1♂, Mendoza, 27-X-1906, (MLP); 1♀, Uspallata, 16-XII-1954, (MLP); 1♀, Godoy Cruz, 20-X-1997, Blendinger (IADIZA); 1♀, Las Heras, Pto. San Isidro, 15-X-1994, G.Debandi (IADIZA); 1♀, Godoy Cruz, Pto. Chambón, 16-II-1995, G.Debandi (IADIZA); 1♀, San Rafael, 6 Km. Punta del Agua, 14-XII-1998, Flores-Roig (IADIZA); 1♀, Zoológico (Ciudad), -2000, (IADIZA); 1♀, Uspallata, -I-1947, Hayward-Willink (IFML); 3♀, Potrerillos, 1500 msnm, 21-I-1957, Hayward-Willink (IFML); 1♀, Mendoza, 10-II-1909, (MLP); 1♀, Mendoza, 5-II-1906, (MLP); 1♀, Tupungato (Cerrillos de Tupungato), 26-I-1977, Willink (IFML); 1♀, Mendoza, 5-XII-1906, Jörgensen (MLP); 1♀, Mendoza, 27-VI-1906, (MLP); 1♀, Mendoza, 20-XI-1941, (MLP); 3♀, Chacras de Coria, 31-I-1974, Willink (IFML); 1♀, Pie de Cerro de la Gloria, 14-20-1977, A.Willink (IFML); 1♀, Godoy Cruz, -XI-1985, (IADIZA); 1♀, Mendoza, 25-X-1906, Jörgensen (MLP); 1♀, Mendoza, (MNCN); 2♀, Mendoza, -XI-, H.Roller (MNCN); 1♀, Mendoza, -X-, (MNCN); 1♂, Mendoza, -XI- (MNCN). **NEUQUÉN.** 1♂, 8-XI-1955, A.Giai (MLP); 2♀, Arroyito (Río Limay), 23-I-1975, Willink-Claps (IFML). **RÍO NEGRO.** 1♂, General Roca, -X-1945, (MLP); 5♀, Coronel Gómez, -II-1946, A.J.Grasso (MLP); 1♀, Cipolletti, 26-II-1957, S. Schajovskoy (MLP); 1♀, Río Colorado, -II-1943, J.Bosq (MLP); 1♀, Cipolletti, 4-X-1959, S.Schajovskoy (MLP); 1♀, 20 Km N. San Antonio Oeste, 28-II-1980, Willink-Fidalgo-Claps-Domínguez (IFML); 3♀, Luis Beltram, -XI-1987, Fritz (MLP); 2♀, Darwin, -XII-1984, Fritz (MLP); 2♀, Luis Beltram, -I-1973, Fritz (MLP); 1♀, Chimpay (Ruta La Irma), 4-X-1993, J.L.Farina (MMP). **SALTA.** 1♀1♂, Güemes, 16-II-1956, Monrós-Willink (IFML); 2♀1♂, Rosario de Lerma, -X-1984, Fritz (MLP); 4♀1♂, Rosario de Lerma, -VIII-1986, Fritz (MLP); 1♀1♂, Tablillas, -I-1945, A. Martínez (MLP); 1♀, La Viña, -III-1984, Fritz (MLP); 1♀, Cafayate, 9-10-1960, Aymat-Bennesat (IFML); 1♀, Yacochuya (2400 m.a.s.l.), 4-IV-1969, A.Willink (IFML); 3♀, Gral. Ballivián, 18-XI-1941 (MLP); 2♀, Cafayate, 4-10-II-1951, Hayward (IFML); 3♀, Yacochuya (Cafayate, 1950 m.a.s.l.), 16-30-IX-1968, Willink-Terán-Stange (IFML); 1♀, Alemania, -I-1983, Fritz (MLP); 3♀, Rosario de Lerma, -XI-1983, Fritz (MLP); 2♀, Rosario de Lerma, -XII-1987, Fritz (MLP); 2♀, Cafayate (Yacochuya), 6-IV-1968, Stange-Willink (IFML); 2♀, Rosario de Lerma, -X-1986, Fritz (MLP); 1♀, Gral. Ballivián, 9-XI-1942 (MLP); 1♀, Chicoana, -I-1989, Fritz (MLP); 1♀, Rosario de Lerma, -IX-1986, Fritz (MLP); 1♀, Rosario de Lerma, -X-1985, Fritz (MLP); 1♀, Rosario de Lerma, -IX-1987, Fritz (MLP); 1♀, Rta. 34 (12 Km NE Urundel Arroyo Riacho Seco), 24-19-VII-1978, Porter-Fidalgo (IFML); 1♀, La Viña, -XII-1983, Fritz (MLP); 3♀, Rosario de Lerma, -III-1987, Fritz (MLP); 1♀, Rosario de Lerma, -II-1988, Fritz (MLP); 1♀, Salta (Salta

Capital), 12-IX-2009, J.Meriggi-L.Álvarez (MLP). **SAN LUIS.** 1♂, San Gerónimo, -XI-1972, G.J.Wiilliner (MLP); 5♀, San Luis, -II-1974, H. Martínez (MLP); 1♀, Potrero de Funes, 14-XI-1941, A.Ogloblin (MLP); 1♀, San Luis, (MLP). **SANTIAGO DEL ESTERO.** 11♀7♂, La Banda, 1977, Colungo (MLP); 1♀, Los Tigres, 11/16-I-1970, R. Golbach (FML); 5♀4♂, Warner (MLP); 1♀, Termas de Río Hondo (Dique frontal), 3-V-1972, C.Porter (IFML); 1♀, 18-X-1939, Maldonado (MLP); 2♀, San Gregorio, -IV-1977, Colunga (MLP); 1♀, Añatuya, III-1979, Fritz (MLP); 1♀, Tapso, 22-V-1951, A.Ogloblin (MLP); 1♀, Río Hondo, 14-II-1948, R.Golbach (IFML); 5♀, Cuesta Río Salado, Gómez (MACN); 1♀, Mistal Paso Río Salado (Cerca Icaño), 1927-1929, E.Wagner (MACN). **SAN JUAN.** 9♀, Ruta 510 (30 Km E. del Valle Fértil, 24-XI-1977, Willink-Fidalgo (IFML); 1♀, Tupungato, 22-II-1938, (MLP). **TUCUMÁN.** 1♂, Tucumán, -I-1962, W.Wayrauch (IFML), 1♀, Famaillá (San Ramón) -XI-1947, B.García (IFML); 3 ♀, Los Zazos (Río Amaicha) (26°36'19.3"S, 65° 53'25.8"W; 2089 m a.s.l.), 21-X-2006, M.Lucia-A.Abrahamovich-E. Jiménez (MLP); 1♀, Las Cañas, 10-I-1960, Terán-Willink (IFML); 1♀, Dique el Cadillal, 9-XI-2008, M.Lucia-B. Defea (MLP); 1♀, San Pedro de Colalao, 9-X-2008, M.Lucia-B. Defea (MLP); 1♀ San Pedro de Colalao, 1-III-1953, Terán (IFML); 1♀, Amaicha, 27-XI-1965, L.Stange (IFML); 2♂, Tucumán, 30-I-1965 (430m), W.Weyrauch (IFML); 1♀, Siambón (Dpto. de Tafí), 3-IV-1946, D.Olea (IFML); 1♀, La Mesada, Dto. Burruyacú, 11-X-1947, Ares (IFML).



FIGURES 1–4. Head of female, frontal view. 1, *Xylocopa atamisquensis*; 2, *Xylocopa augusti*; 3, *Xylocopa eximia*; 4, *Xylocopa frontalis*. Scale bars: 1 mm.

***Xylocopa (N.) augusti* Lepeletier, 1841**
(Figures 2, 9, 16, 22, 28, 34, 40, 46, 52, 57)

Xylocopa augusti Lepeletier, 1841: 187. Holotype: see below in comments. Type locality: Brazil.

Xylocopa ferruginea Lepeletier, 1841: 187; synonymized by Hurd & Moure, 1961: 89 (Holotype: ♀, deposited at MIZS, examined).

Xylocopa augusti pterochloris Brèthes, 1916: 414; synonymized by Hurd & Moure, 1961: 414 (Holotype: ♀, deposited at MACN, examined)

Xylocopa guaranitica Brèthes, 1916: 415; synonymized by Hurd & Moure, 1961: 415 (Holotype: ♀, deposited at MACN, examined)

Xylocopa (Neoxylocopa) augusti, Hurd & Moure, 1963: 151.

Diagnosis. The female of this species can be distinguished from all other Argentinian large carpenter bees by the integument black with conspicuous ferruginous hairs along the sides and apex of the metasoma (Fig. 9). The male can be easily recognized by the pubescence of the ventral surface of the posterior tibia forming two separate tufts (basal and subapical part) and the posterior tibia with a median small notch on the posterior edge (Fig. 28). The ferruginous hairs along sides of the metasoma is a character not shared with other species of this subgenus.

Female: Approximate body length 26 (25–28); head length 6.2 (6.1–6.6); head width 7 (6.8–7.4); mesosoma width 8.9 (8.2–9.6); metasoma width 10.2 (9.6–10.6); forewing length 20.5 (20–21.5); forewing width 6.4 (6.4–6.6). **Coloration.** Integument black. Tegula black. Wing dark brown with violet iridescent. **Pubescence** predominantly black, except ferruginous on sides of T2–6 and apical margin of S3–6. Head with abundant hairs, scattered on vertex and inner part of gena; median longitudinal area of vertex and clypeus hairless (Fig. 2). Mesosoma with abundant plumose hairs, except hairless on disc and posterior area of scutum and anterior area of scutellum. Metasoma with long hairs laterally; T1 with intermixed plumose and simple hairs; T2 with median pubescence short, 0.4–0.6 times MOD; T3 with median pubescence longer than on T2 (1.5–2 times); T4–6 with long hairs (4–5 times longer than on T2) (Fig. 9). **Sculpturing.** Head regularly and densely punctate, vertex and inner part of gena sparsely punctate; median longitudinal area of vertex and clypeus smooth, weakly defined. Scutum densely punctate, except impunctate on disc and posteriorly. Metasomal terga regularly and densely punctate, T1 with punctures denser than on remaining terga. **Structure.** Head broader than long (proportion 1.1–1.2:1); inner orbits weakly incurved dorsally, proportion of upper to lower interocular distance 0.9–1:1; middle interocular distance 4.9–5.4 mm. Vertex broad, ocellocipital distance (to median ocellus) 3.8–4.8 times MOD; orbitocipital distance long, 1.6–2 mm. Lateral ocelli below supraocular line, approximately 0.3 times MOD. Proportions of interocellar to ocelocular distance 0.7–0.9:1, interocellar to ocellocipital 0.5–0.6:1, ocelocular to alveolocellar 1–1.1:1, orbitocipital to ocelocular 1.4–1.7:1, alveolocellar to interalveolar 1.1–1.2:1. Proportion of clypeocellar distance to distance between median ocellus and posterior margin of head: 0.9–1:1. Frontal carina moderately elevated, long 0.9–1 mm, apex scarcely exceeding upper level of antennal sockets. Clypeus broader than long (proportion 2.1–2.4:1). Proportion of length of scape, pedicel and first four flagellomeres 3–3.3:0.3–0.4:1: 0.4–0.4:0.4–0.5:0.4–0.5. Labrum broader than long, with a basal protuberance and a lateral globular structure. Scutellum gently rounded as seen in profile. Apex of basitibial plate beyond middle length of tibia, asymmetrically bifid, posterior apical lobe rounded, distinctly shorter than anterior lobe.

Male: As in the female, except as follows: approximate body length 25 (23–26); head length 4.7 (4.3–4.9); head width 5.7 (5.4–5.8); mesosoma width 8.9 (8.4–9.2); metasoma width 10 (9.6–10.4); forewing length 19.6 (18.7–20.5); forewing width 5.2 (5–5.6). **Coloration.** Integument predominantly brown yellowish, except dark brown as follows: latero-basal side of clypeus, subantennal sulcus, apical portion of mandible; coxa, trochanter, anterior and middle tibia basally, median and posterior femur, propodeum and apical margin on T1–5. Tegula yellowish anteriorly, otherwise translucent brown. Wings entirely infusate with golden iridescent. **Pubescence.** Yellowish (varying from ferruginous to yellow); T6–7 with ferruginous pubescence (Fig. 22). Head, clypeus with short and scattered hairs. Pubescence on posterior legs darker than on remaining legs; pubescence of the ventral surface of the posterior tibia forming two separate tufts (basal and subapical) (Fig. 28). T1 with plumose hairs; T2 with median pubescence long, with hairs one time MOD; T3–4 with median pubescence longer than on T2 (1.5–2 times); T5–7 with long with hairs at least 4 times longer than on T2. **Sculpturing.** Head, irregular and scattered punctation on clypeus. Metasomal terga homogeneously and densely punctate (Fig. 16). **Structure.** Head broader than long (proportion 1.2–1.3:1). Proportion of upper to lower interocular distance 1:1; upper interocular distance

5.8–7.3 times MOD and middle interocular distance 3.4–3.7 mm. Vertex broad, distance ocelloccipital (to median ocellus) 2.2–2.6 times MOD, orbitoccipital distance longer 1–1.1 mm. Lateral ocelli located just above or on the tangent supraocular. Proportions of interocellar to ocelocular distance 0.9–1.2:1, interocellar to ocelloccipital 0.9–1.1:1; ocelocular to alveolocellar 0.7–0.9:1; orbitoccipital to ocelocular 1.2–1.6:1; alveolocellar to interalveolar 1–1.4:1. Proportion of clypeocellar distance to distance between median ocellus and posterior margin of head (1.1–1.4:1). Frontal carina, short 0.8–0.9 mm, apex reaching middle portion between upper and lower level of antennal sockets. Clypeus broader than long (proportion 1.5–1.7:1). Proportion of length of scape, pedicel and first four flagellomeres 2.7–3.1:0.3–0.4:1:0.3–0.4:0.4–0.5:0.4–0.5. Labrum broader than long with median basal triangular process well defined. Genitalia as in figures 34, 40, 46 and 52.

Comments. In some females from Misiones (Piñalito locality) we observed that the ferruginous hairs on the side of metasoma extended nearly to the dorsal mid-line and possessed a group of ferruginous hair below the basitibial plate (as seen in the species *Xylocopa haematospila* Moure). Also, we examined two specimens from Formosa and Entre Ríos provinces that do not have ferruginous hairs on the lateral side of metasoma but agree with this species in other structural features. Such differences might represent a geographical variation.

Note on the type of *Xylocopa augusti*. In the original description of *X. augusti*, Lepeletier described a female collected in “Du Brésil” (=Brazil) and, according with the author, it was deposited in the collection of MNHN. In this Museum, a female specimen labeled as “COTYPE” has the following labels: Museum Paris-EY0000001756// Cotype [red label]// Capite de Montevideo [handwritten-round label]// Capite de Montevideo [rectangular label]// agosto [handwritten]//. The labels clearly indicate that the bee was collected in Uruguay and not in Brazil, as Lepeletier cited in the original description. Therefore, the specimen deposited at MNHN and labeled as “COTYPE” is not the type of *X. augusti*, however, this specimen was apparently collected by Augusto during the same voyage (see last label “Augusto”). Also, we examined eight specimens of *Xylocopa augusti* from Brazil deposited in the same museum while looking for the female type described by Lepeletier. However, none of these specimens are labeled as collected by Auguste de Saint-Hilaire and the localities do not coincide with that indicated by Lepeletier. Continuing the search for the type of *X. augusti* in the Spinola collection deposited in the MIZS, where part of the material of Lepeletier collection is preserved, we found a specimen of *Xylocopa augusti* from Brazil with the following data label: St Paul [handwritten-rectangular label]// MZUT-MRSN Torino Coll.Spinola Box 128// *Xylocopa Augusti*, Lep. ♀ Coll. Serville. Brésil. The specimen is in poor condition; terga III–VI and protarsomeres are missing and the left forewing is broken.

Casolari & Casolari (1980) cited that the the most important French hymenopterological collections at least two, namely by Lepeletier de Saint Fargeau and Serville’s have come together in the Spinola collection... The first one was given to Spinola in 1845 after probably a first choice made by Museum of Paris, the second was sold directly to Spinola by Serville in 1847. In conclusion, the specimen deposited in the collection of the MIZS could be the type specimen of *X. augusti* described by Lepeletier and may have reached the Spinola collection when it was sold, moreover it is the only specimen studied that has a label that coincides with the type locality described by Lepeletier in his original description of *X. augusti*.

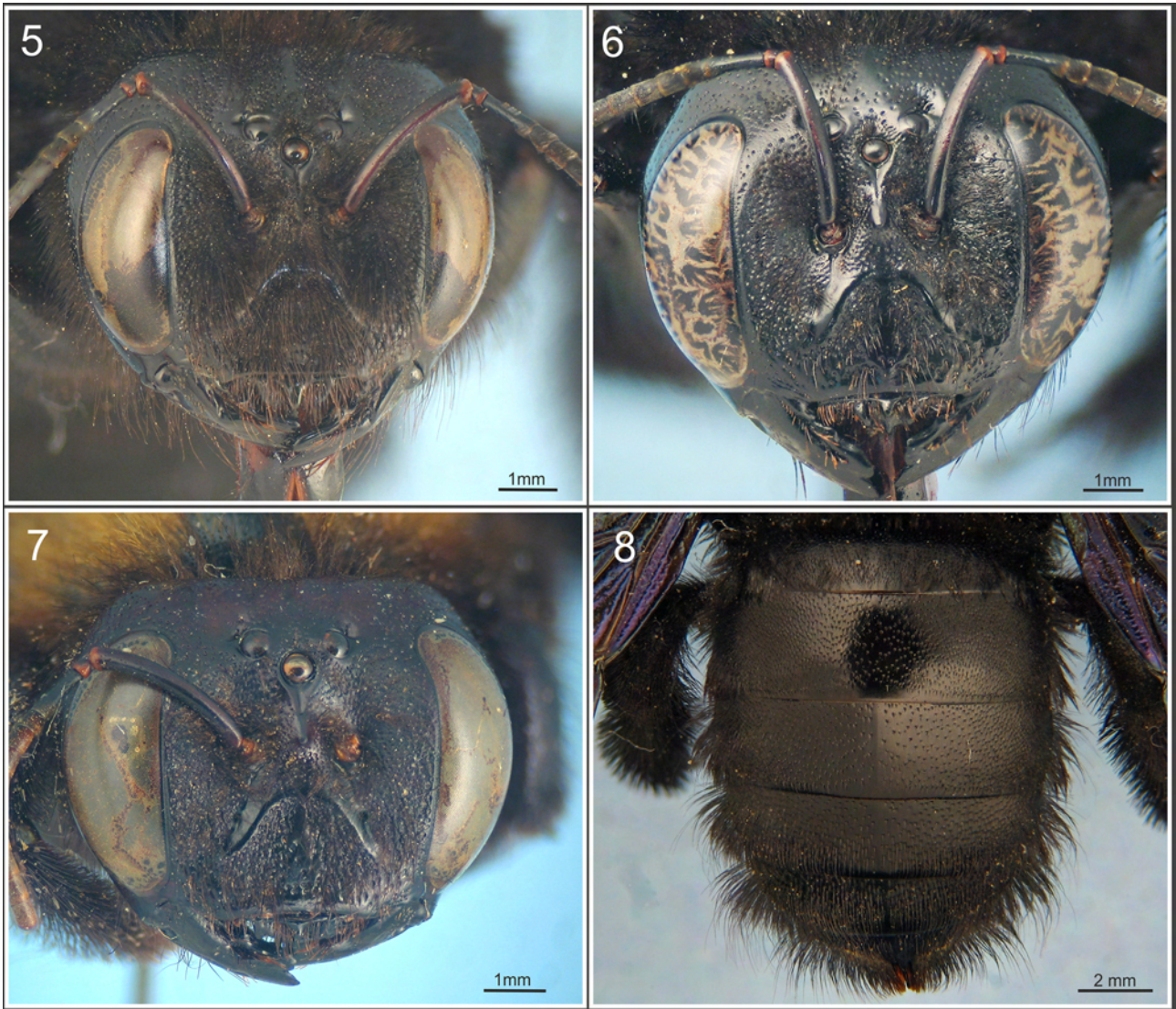
Note on the type of *Xylocopa ferruginea*. The type of this species has been cited as deposited at the MNHN (Lepeletier 1841, Hurd 1978; Moure 2008), however, is deposited in (MIZS). The specimen labeled as *X. ferruginea* from Bengale and deposited at MIZS has the following labels: *Xylocopa ferruginea*, Lep. Mihi hand diversa a *Xyloc. Augusti* Lep ♀ Coll. Serville Bengale// MZUT-MRSN Torino Coll.Spinola Box 129. This female was considered Holotype (see Moure 1961:190); however, at the same institution, there is another female with the following labels: // *Xylocopa ferruginea*, ♀ Coll. Serville Senegal//. Lepeletier in the original description described a single female from “Bengale”, and never refers to a female from “Senegal”, so it does not belong to the type series of *X. ferruginea* as noted Moure (1961:190).

Distribution (Fig. 57): **ARGENTINA:** Buenos Aires, Chaco, Corrientes, Córdoba, Entre Ríos, Formosa, Jujuy, La Pampa, Mendoza, Misiones, Río Negro, San Luis, Santa Fe and Tucumán. Its distribution comprises part of Monte, Paranaense, Chaqueña and Pampeana biogeographic provinces and the southernmost record of this species is North of Río Negro province, approximately parallel 40°. Montalva *et al.* 2013 recorded this species from Brazil, Chile, Uruguay and Paraguay.

Additional material. A total of 490 specimens (389♀ and 101♂) from ARGENTINA. 1♀, Argentina, (MNCN). **BUENOS AIRES.** 3♀1♂, La Soberana (Pdo. Gral. Dorrego, Cuartel 4) (38°52'37"S, 61°27'41" W, 32 m.a.s.l), 17-IV-2006, M.Lucia (MLP); 1♀1♂, La Soberana (Pdo. Gral. Dorrego, Cuartel 4) (38°52'37"S, 61°27'41"

W, 32 m.a.s.l), 4-IV-2007, M.Lucia (MLP); 1♀, La Plata, 4-XI-2008, M.Lucia (MLP); 1♀, Punta Lara (Berisso), 6-XI-2007, M.Lucia (MLP); 1♀, La Plata, 4-III-2008, M.Lucia (MLP); 1♀, La Plata, 17-II-2008, M.Lucia (MLP); 1♀, La Plata, 3-III-2008, M.Lucia (MLP); 1♀, La Plata, 15-XII-2009, M.Lucia (MLP); 1♀, La Plata, 15-II-2010, M.Lucia (MLP); 1♀, La Plata, 15-XII-2010, M.Lucia (MLP); 1♀, La Plata, 6-IX-2007, M.Lucia (MLP); 2♀, Punta Lara, 6-XI-2007, M.Lucia (MLP); 2♂, Berisso (Los Talas), -IV-2008, M.Lucia (MLP); 1♂, La Plata, 11-VIII-2010, M.Lucia (MLP); 1♂, La Plata, -IV-2008, M.Lucia (MLP); 1♂, La Plata, 2-II-2009, M.Lucia (MLP); 1♂, La Plata, 9-X-1984, A. H. Abrahamovich (MLP); 1♂, Villa Devoto, 25-XII-1938, (MLP); 3♀, La Plata, 22-XII-1985, A.H.Abrahamovich (MLP); 3♀1♂, Zelaya, -XI-1939, H.Hepper (MACN); 1♀, Gral. Mansilla, 5-XII-1985, A.H.Abrahamovich (MLP); 21♀, Magdalena, 26-IX-1986, A.H.Abrahamovich (MLP); 1♀, Gral. Mansilla, 5-XII-1985, A.H.Abrahamovich (MLP); 5♀, Gral. Mansilla, 24-XI-1985, A.H.Abrahamovich (MLP); 3♀, Los Polvorines, -X-1986, A.H.Abrahamovich (MLP); 6♀5♂, Magdalena, 30-XII-1986, A.H.Abrahamovich (MLP); 2♀, Magdalena, 18-XII-1986, A.H.Abrahamovich (MLP); 7♀, Magdalena, 6-XI-1986, A.H.Abrahamovich (MLP); 2♀1♂, Magdalena, 26-IX-1986, A.H.Abrahamovich (MLP); 10♀5♂, Moreno, -IV-1978, Fritz (MLP); 1♂, Moreno, -IX-1976, Fritz (MLP); 3♀, Bellocq (C.Casares), 5-XII-1972, L.T.L (MLP); 5♀, Bellocq (C.Casares), 6-XII-1972, L.T.L (MLP); 3♀, La Balandra (Berisso), 12-XII-1986, A.H.Abrahamovich (MLP); 4♀, La Balandra (Berisso), 12-XII-1998, A.H.Abrahamovich (MLP); 4♀, Gral. Mansilla, 5-XII-1985, A.H.Abrahamovich (MLP); 3♀, Gral. Mansilla, 30-XII-1984, A.H.Abrahamovich (MLP); 3♀, Gral. Mansilla, 14-XII-1984, A.H.Abrahamovich (MLP); 2♀, Gral. Mansilla, 24-XI-1985, A.H.Abrahamovich (MLP); 2♀, San Martin, 31-V-1941, Maldonado (MLP); 1♀1♂, Bella Vista, 8-XII-1950, (MLP); 4♀, La Plata, (MLP); 1♀, Buenos Aires, (MLP); 3♀1♂, Berazategui, 4-XII-1987; A.H.Abrahamovich (MLP); 1♀, Berazategui, 1-XI-1987, (MLP); 1♂, Berazategui, 29-X-1987, A.H.Abrahamovich (MLP); 2♀, Temperley, 16-XI-1987 (MLP); 1♀, Gral. Mansilla, A.H.Abrahamovich (MLP); 1♀, Gral.Mansilla, 11-I-1985, A.H.Abrahamovich (MLP); 1♀, José C.Paz, 15-X-1939 (MLP); 1♀, Miramar, 22-I-1971, L.Stange (FML); 1♀, La Prida, 9-II-1985 (MLP); 1♀, La Prida, 31-I-1985 (MLP); 2♀, La Prida, 30-II-1984 (MLP); 1♀, La Prida, 23-X-1984, A.H.Abrahamovich (MLP); 1♀, La Prida, 1-II-1983, (MLP); 1♀, Gral.Mansilla, 23-IX-1984, A.H.Abrahamovich (MLP); 7♀, Gral.Mansilla, 30-IX-1984, A.H.Abrahamovich (MLP); 2♀1♂, La Plata, 9-X-1984, A.H.Abrahamovich (MLP); 1♀, Gral.Mansilla, 11-X-1984, A.H.Abrahamovich (MLP); 1♀, Gral. Mansilla, 18-V-1985, A.H.Abrahamovich (MLP); 2♂, Los Talas, -IV-2008, M.Lucia (MLP); 1♂, La Plata, -X-2008, M.Lucia (MLP); 2♂, City Bell, 30-XII-2002, A.H.Abrahamovich (MLP); 1♀, Mercedes, 12-X-2008, M.Lucia (MP); 1♀, Río Luján, -XII-1976, (IFML); 5♀, Glew, X-1976-III-1977, Dr. Carpintero (IFML); 1♀, Zelaya, -VII-1939, H.Hepper, (MACN); 3♀, Zelaya, -VII-1935, H.Hepper (MACN); 3♀, Quequén, 17-III-1928, M.D.Jurado-Botta (MACN); 1♀, Lomas de Zamora, 12-I-1970, Vardy-Arguindeguy (BMNH); 1♀, Punta Lara (La Plata), 12-13-I-1970, Vardy-Arguindeguy (BMNH); 1♀, Punta Lara (La Plata), 30-XII-1969, Vardy-Arguindeguy (BMNH); 1♀, Lomas de Zamora, 15-I-1970, Vardy-Arguindeguy (BMNH); 1♀, Ajo (Mar de Ajo), VII-IX-1919, H.E.Box (BMNH); 1♀, Costa Río Salado, -III-1935, Castillo (MLP); 1♀, Zarate Brazo Largo, -IX-1941, Castillo (MLP); 9♀3♂, Zarate Brazo Largo, -II-1940, Castillo (MLP); 3♀, Saavedra, II-1936, Castillo (MLP); 1♀, Buenos Aires, Domínguez (MNCN); 1♀, Mar del Plata, 4-XI-1983, P.C.Straccia (MMP); 4♀6♂, Mar del Plata (Bosque Peralta Ramos), 9-XIII-1996, J.L.Farina (MMP); 2♀, Pdo. General Pueyrredón, 8-III-1989, Farina-Abdala (MMP); 2♀, Mar del Plata (Pdo. General Pueyrredón), -II-1987, J.L.Farina (MMP); 1♀, Mar del Plata (Pdo. General Pueyrredón), 21-X-1987, J.L.Farina (MMP); 2♀, Laguna de los padres, 13-XII-1988, J.L.Farina (MMP); 1♀, Mar del Plata (Pdo. General Pueyrredón), 22-X-1991, J.L.Farina (MMP); 1♀, Gral. Pueyrredón, -XI-1987, Col.V.Herrera (MMP); 1♀, Laguna de los padres, 11-12-III-1994, J.L.Farina (MMP); 1♀, Santa Clara del Mar, 2-V-1994, J.L.Farina (MMP); 1♀, Arroyo Lobería, I-1997, F.A.Farina (MMP); 2♀3♂, Felix Camet, 11-VII-1990, J.L.Abdala (MMP); 1♀, Mar del Plata (Pdo. General Pueyrredón), 20-XII-1988, J.L.Farina (MMP); 1♀, Sierra de los padres, 24-X-1992, J.L.Farina (MMP); 1♀, Arroyo Lobería, 4-IV-1989, J.L.Farina (MMP); 1♀, Mar del Plata, -II-1987, J.F.Farina (MMP); 1♀, Mar Chiquita, 1-I-1986, J.L.Farina (MMP); 1♂, Mar del Plata, J.Farina (MMP); 1♂, Felix Camet, 8-XI-1988, J.L.Abdala (MMP); 1♂, Mar del Plata, 22-X-1991, J.Farina (MMP); 1♂, Nahuel Puca, 14-X-2004, J.L.Farina (MMP); 1♂, Laguna de Los Padres, 18-XI-1995, Farina-Vosano (MMP); 2♂, Chapalmalal, 13-XI-1994, Farina-Vorano (MMP); 1♀, Mar del Plata, 2-I-1981, J.L.Farina (MMP); 1♂, Mar del Plata, 26-X-1992, F.L.Farina (MMP); 1♂, Mar del Plata, 17-IX-1995, F.L.Farina (MMP); 1♂, Rta. Naci 226 Km 22,7 Ea. Paititi, -III-2006, J.L.Farina (MMP); 1♀, Sierra de la Ventana, 17-18-X-2001, J.Farina-A.Cicchino-O.Scaglia (MMP); 1♀, “Sierra Bachicha” R.N 226, 17-19-XII-2001, J.L.Farina-J.A.Farina-A.C.Cicchino (MMP); 1♂, Mar del Plata, 29-XI-2008, M.Toglioretti (MMP); 1♂, Mar del Plata, 23-X-

1984, J.L.Farina (MMP); 1♀, Punta Lara, 22-XII-1999, N.H.Montaldo (FAUBA); 1♀, Estancia Carretero (Magdalena), 30-X-2000, A.Basilio-J.P.Torretta (FAUBA); 1♂, Ciudad Autónoma de Buenos Aires (Fca. de Agronomía), 31-X-2002, M.Michetti (FAUBA); 1♀, Balcarce, 11-I-2004, D.Medan- M.Devoto- A.M.Chamer- M.Bianchi- G.Speroni (FAUBA); 1♀, Balcarce, 27-I-2005, J.P.Torretta-M.Devoto (FAUBA); 1♀, Buenos Aires, 22-I-1917, J.Brèthes (MACN); 1♀, Luján, 7-II-1904, J.Brèthes (MACN); 5♀, Delta, -XII-1941, Obreki (MACN); 1♀, Tuyuparé, -III-1907, J.Brèthes (MACN); 1♀, Tuyuparé, 26-II-1911, J. Brèthes (MACN); 1♀, Tuyuparé, 2-I-1905, J.Brèthes (MACN); 1♀, Mar del Plata, -XII-2003, González Vaquero (MACN); 5♀, Delta Arroyo Chana, (MACN); 1♀, Cañuelas, 12-XII-1918, (MACN); 1♀, Arroyo Chana, 18-X-1918, (MACN); 1♀, Zelaya, -1935, (MACN); 3♀1♂, Islas del delta, (MACN); 12♀3♂, Tigre, 1939, (MACN); 1♂, Capital Federal, 5-XI-1923, (MACN); 1♂, Sierra de La Ventana, (MACN); 1♀, Sierra de La Ventana, -I-1985, A.Oliva (MACN); 2♀, San Pedro, 18-X-1918, (MACN); 1♂, Buenos Aires, 13-X-1900, (MACN); 2♂, La Plata, -X-1969, A. Cicchino (MLP); 1♂, Punta Lara, 10-XI-1964, Martínez Flores (MLP); 1♂, La Plata, -1948, (MLP); 1♂, José C. Paz, -XII-1937, (MLP); 1♂, Villa Devoto, 2-III-1942, A.Ogloblin (MLP); 1♂, Bernal, -XI-1970, A.Cicchino (MLP); 1♂, Sáenz Peña (Partido de San Martín), 8-X-1950, Maldonado-Bruzzzone (MLP); 1♀, Buenos Aires, 8-I-1907, J.Brèthes (MACN). **CHACO.** 1♀, Colonia Bransen, 17-I-1951, B.Torres-A.Argemi (MLP); 1♀, Dto.Resistencia, Fonti Meyer (MACN); 1♀, Charata, 10-30-II-1994, M.Amela (MACN); 1♀, Colonia Benítez, 19-V-1934, J.B.Daguerre (MACN). **CÓRDOBA.** 1♀, 5 Km de Realicó, 19-XII-2006, J.Torretta-G.Cilla-N.H.Montaldo (FAUBA). **CORRIENTES.** 1♀, Mocoretá, 13-II-1987, A.H.Abrahamovich (MLP); 1♀, Colonia Carlos Pellegrini, 15-XII-2002, M.Lucia (MLP); 1♀1♂, Laguna Ibera, 2-5-XI-2005, J.L.Farina (MMP); 1♀, San Roque, -II-1920, (MACN). **ENTRE RÍOS.** 1♀, Arroyo El Brasilerero, 14-XI-2009, M.Lucia (MLP); 1♀, Chajarí, 23-III-2010, M.Lucia-L.Álvarez (MLP); 4♀, Salto Grande, -IV-1978, Fritz (MLP); 1♀, Chajari, -IX-1978, Fritz (MLP); 2♀2♂, Pronunciamiento, Zelich (MLP); 2♀2♂, Dto. Colón, Zelich (MLP); 2♀, Palmar (Colón), -XII-1978, Fritz (MLP); 4♀2♂, Villa Elisa, 11-II-1974, L.Gontero (IFML); 1♀, Puerto Constanza, 21-XII-1941, Birabén-Bezzi (MLP); 1♂, 1 de Mayo, 10-X-1941, (MLP); 2♀, Paranacito, -I-1933, Daguerre (MACN); 2♂, Liebig, 6-XI-2003, Zelich (Col. Zelich); 1♂, Liebig, 7-X-2005, Zelich (Col.Zelich); 2♀, Liebig, 13-IX-2001, Zelich (Col. Zelich); 1♀, Liebig, 24-IV-2001, Zelich (Col.Zelich); 2♀1♂, Ibicuycito, 13-II-1938, Castillo (MLP); 1♀4♂, Federal, -I-1970, (MLP); 9♀, Paranacito, III-1940, Castillo (MLP); 1♀1♂, Ibicuycito, IX-1939, Castillo (MLP); 1♀, La Paz (Los Algodonillos), -I-1952, R.L.Orfila (MACN). **FORMOSA.** 1♂, Espinillo, 29-IX-1950, Monrós-Willink (IFML); 1♀, Laguna Blanca (Dto.Pilcomayo), -IX-1948, I.Morel (FML). **JUJUY.** 1♀, Jujuy, D.E.Travi (MACN). **LA PAMPA.** 1♂, Santa Rosa, -X-1987, (MLP); 3♀, Santa Rosa, Lag. Don Tomas, 21-XII-2006, Martínez (MACN). **MENDOZA.** 1♀, Dto. Godoy Cruz, 14-X-1994, G.Flores (IADIZA). **MISIONES.** 9♀, Piñalito, 15-17-XI-2007, (53°50'18"W, 26°25'19"S, 713 m.a.s.l), M.Lucia-L.Álvarez (MLP); 2♀, San Pedro, 19-22-XI-2007, (54°6'13,1"W 26°37'52"S, 545 m.a.s.l), M.Lucia-L.Álvarez (MLP); 3♀, San Pedro, 16-XI-1973, Willink-Tomsic (IFML); 2♀, Dos de Mayo, 18-XI-1973, Escobar-Claps (IFML); 1♀, San Ignacio, 8-XII-1941, Birabén-Bezzi (MLP); 4♀, Loreto, A.Ogloblin (MLP); 1♀, Misiones, A.Ogloblin (MLP); 1♀, Misiones, 3-IX-1909, A.Ogloblin (MLP); 1♀, Misiones, 18-XII-1909, A.Ogloblin (MLP); 1♀, Misiones, 24-II-2010, (MLP); 1♀, Misiones, -X-1910, (MLP); 2♀, Misiones, 12-I-1910, (MLP); 1♀, Loreto, -V-1946, J.T (MLP); 1♀, Misiones, 29-I-1910, (MLP); 1♀1♂, Bompland, 5-VIII-1909, Jörgensen (MLP); 2♀, Posadas, 3-VI-1909, (MLP); 1♀, Misiones, 13-III-1909, (MLP); 1♀, Misiones, (MLP); 1♀, Misiones, 4-IX-1909, (MLP); 1♀, L.N.Alem, 20-X-1950, Komilev (MACN); 1♀, Posadas, 14-II-1934, (MACN); 7♀, Apostoles, 9-1936, Castillo (MLP); 9♀, Posadas, 1-III-1934 (MLP); 2♂, Loreto, A.Ogloblin (MLP); 1♂, Misiones, 3-IX-1909, (MLP); 1♀, Misiones (MACN); 1♀1♂, Posadas, -1935, Rodríguez (MACN); 2♀, Misiones, Rodríguez, (MACN); 1♀, Posadas, Rodríguez (MACN); 1♀, San Pedro (Arroyo Biguá), 14-IV-1983, (MACN). **SAN LUIS.** 1♀, San Luis, Almandoz (MLP). **SANTA FE.** 8♀, Isla Los Laureles, 7-II-1940, Alberti (MACN); 3♀, Cerro Redondo, 23-III-1959, (MLP); 2♀, Santa Fe, -1947, (MLP); 3♀, Santa Fe, -1946, Castillo (MLP); 1♀, Castellanos (Sunchales), 15-XII-2005, J.P.Torretta-N.H.Montaldo (FAUBA); 1♀, Castellanos (Sunchales), 17-XII-2005, J.P.Torretta-N.H.Montaldo (FAUBA); 3♀, Esperanza, 28-II-1974, M. de la Peña (MLP); 1♂, Helvecia, -X-1970, A.Cicchino (MLP); 1♀, Reconquista, 19-XI-2004, J.P.Torretta-D.Medan (FAUBA); 2♀, Rosario, -II-1930, M.Stevenin (MACN); 2♀, Santa Fe, 5-IV-1939, (MACN); 1♀, Rosario, 2-X-1918, (MACN); 1♂, Rosario, 2-XI-1915, (MACN). **RIO NEGRO.** 1♂, Isla Choele-Choel, 6-I-1944, Maldonado R (MLP); 1♀, Gral. Roca, -II-2007 (MLP). **TUCUMÁN.** 1♂, Tafí Viejo, 4-X-2007, M.Lucia (MLP); 1♂, Trancas (Tacanas), -XI-1946, R.Golbach (IFML).



FIGURES 5–8. Head of female, frontal view (5–7). 5, *Xylocopa mendozana*, 6, *Xylocopa nigrocincta*, 7, *Xylocopa tacanensis*; 8, metasoma of female of *Xylocopa atamisquensis*, dorsal view.

***Xylocopa* (N.) *eximia* Pérez, 1901**

(Figures 3, 10, 17, 23, 29, 35, 41, 47, 53, 60)

Xylocopa eximia Pérez, 1901: 87. Holotype: ♀, deposited at MNHP, Type locality: Bolivia (examined).

Xylocopa (*Neoxylocopa*) *eximia*, Hurd & Moure, 1963: 151.

Diagnosis. The female of this species can be distinguished from other Argentinian large carpenter bees by the following combination of characters: integument black, mesosomal dorsum densely covered with ferruginous pubescence (Fig. 3), tegula ferruginous or light brown; T2–T3 with median pubescence long, 1.1–1.3 times MOD; and gena wide and sparsely punctate. The male can be easily recognized by the T1–6 with black integument bands occupying approximately the apical half and T6–7 with brown to black pubescence (Fig. 23). The female of this species resembles that of *X. tacanensis* in the pubescence ferruginous on the dorsum of mesosoma; however, it differs from that species in the length of the median pubescence on T2–T3.

Female. Approximate body length 26 (25–28); head length 6 (5.9–6.4); head width 7 (6.6–7.4); mesosoma width 9 (8.6–10); metasoma width 9.7 (9.2–10.6); forewing length 21 (20.7–23.3); forewing width 6.1 (6–6.6).

Coloration. Integument black; antenna dark brown. Tegula ferruginous or light brown (in some specimens are

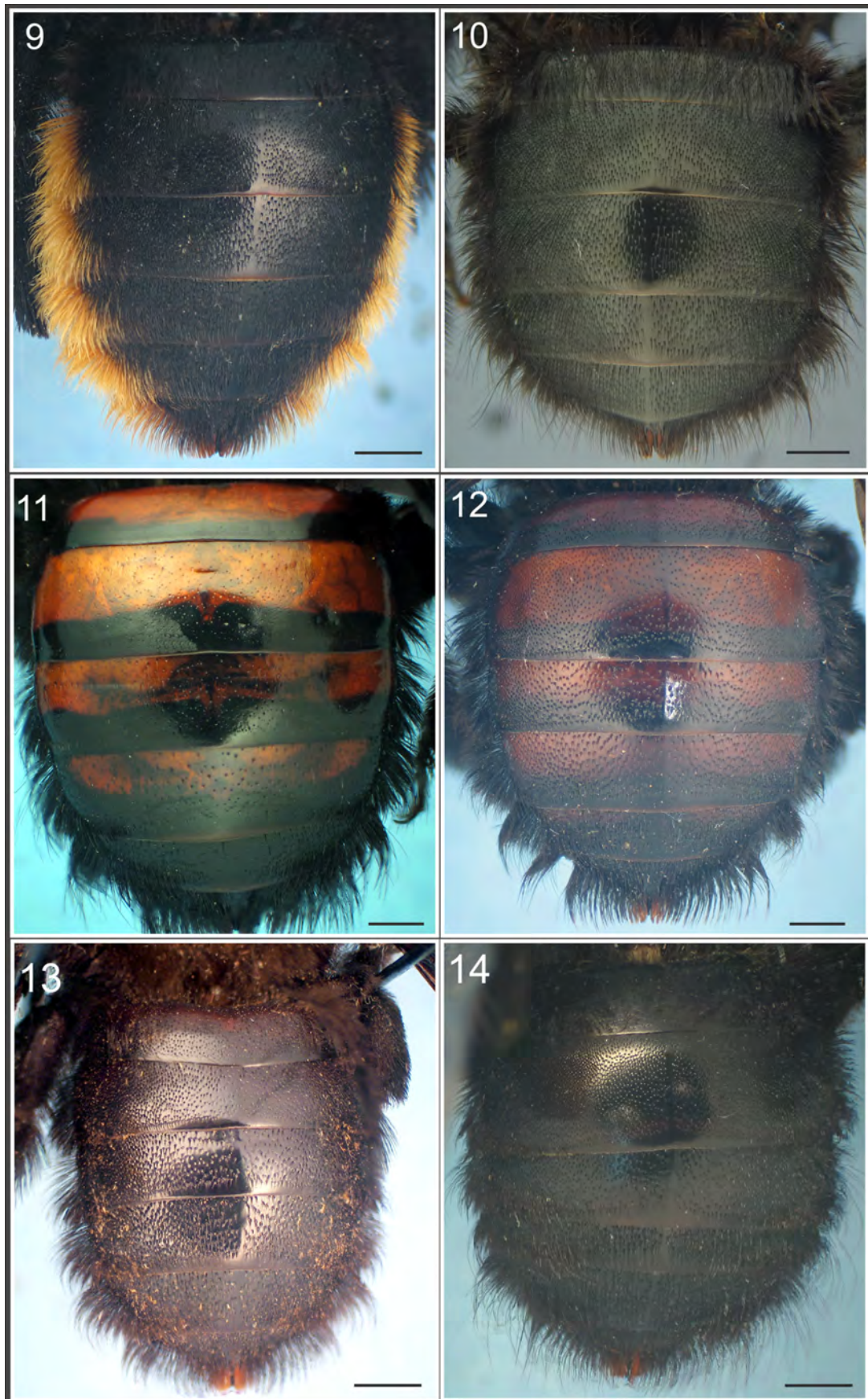
dark brown). Wing dark brown with violet iridescent. *Pubescence*. Predominantly black, except ferruginous on scutum, scutellum, metanotum, propodeum, mesepisternum below the tegula and pronotal lobe. Head with abundant hairs, scattered on supraocular area and upper and inner part of gena (Fig. 3). Mesosoma with abundant plumose hairs, except on the disc and posterior area of scutum. Metasoma with long hairs laterally; T1 with intermixed plumose and simple hairs; T2–T3 with median pubescence long, 1.1–1.3 times MOD; T4 with median pubescence longer than T2 (1.2–1.3 times); T5–T6 with long hairs (1.5–1.7 times longer than in T2) (Fig. 10). *Sculpturing*. Head regularly and densely punctate, supraorbital area and genae with regular and very sparsely punctate; median longitudinal area of vertex and clypeus smooth, weakly defined. Scutum densely punctate, except impunctate on disc and posteriorly. T1–2 regularly and densely punctate, remaining terga with punctate dense on lateral side and dispersed on the center. *Structure*. Head broader than long (proportion 1.1–1.2:1); inner orbits weakly incurved dorsally, proportion of upper to lower interocular distance 0.9–1:1; middle interocular distance 4.6–5.2 mm. Vertex broad, distance ocellocipital (to median ocellus) 3.8–4.7 times MOD; orbitoccipital distance long, 1.4–1.7 mm. Lateral ocelli below supraocular line, approximately a MOD. Proportions of interocellar to ocelocular distance 0.7–0.8:1, interocellar to ocellocipital 0.5–0.7:1, ocelocular to alveolocellar 0.9–1:1, orbitoccipital to ocellocular 1.1–1.4:1, alveolocular to interalveolar 1–1.2:1. Proportion of clypeocellar distance to distance between median ocellus and posterior margin of head (0.9–1.1:1). Frontal carina moderately elevated, long 1–1.2 mm, apex scarcely exceed upper level of antennal sockets. Clypeus broader than long (proportion 2–2.4:1). Proportion of length of scape, pedicel and first four flagellomeres 3–3.3:0.3–0.5:1:0.4–0.5:0.4–0.5:0.4–0.5. Labrum broader than long, with three basal protuberances the middle elongated and triangular shape, the laterals twice wider than the median. Scutellum gently rounded as seen in profile. Apex of basitibial plate beyond middle length of tibia, asymmetrically bifid, posterior apical lobe rounded, distinctly shorter than anterior lobe.

Male: Description. As in the female, except as follows: approximate body length 25 (24–27); head length 4.6; head width 5.9 (5.8–6); mesosoma width 9.8 (9.4–10.6); metasoma width 10.4 (10–11); forewing length 21; forewing width 5.2 (5–5.4). *Coloration*. Integument predominantly brown yellowish, except dark brown as follows: latero-basal side of clypeus, subantennal sulcus, middle and apical portion of mandible, dorsal face of antenna; coxa, trochanter, middle and posterior tibia basally, middle and posterior femur, propodeum, bands on apical half of T1–6. Tegula yellowish anteriorly, otherwise translucent brown. Wings dark yellow with golden iridescent. *Pubescence*. Yellowish (varying from ferruginous to yellow); T6–7 with dark brown to black pubescence (Fig. 23). Pubescence of ventral of posterior tibia forming a tuft restricted to the base (Fig. 29). T1 with plumose hairs; T2–T3 with median pubescence long with hairs approximately one MOD; T4 with median pubescence longer than on T2 (1.5 times); T5–T7 with long and decumbent hairs (3 times or more than T2). *Punctation*. Head regularly and densely punctate, scattered in the clypeus; internal lower part of genae impunctate. Metasomal terga homogeneously and densely punctate. *Structure*. Head broader than long (proportion 1.2–1.3:1). Proportion of upper to lower interocular distance 0.9–1:1; upper interocular distance 5.6–6.4 times MOD; middle interocular distance 3.6–3.7 mm. Distance ocellocipital (to median ocellus) 2.2–2.6 times MOD, orbitoccipital distance long 1–1.1 mm. Proportions of interocellar to ocelocular distance 1.1–1.6:1, interocellar to ocellocipital 0.8–1.1:1; ocellocular to alveolocellar 0.7:1; orbitoccipital to ocellocular 1.5–1.7:1; alveolocular to interalveolar 1.1–1.3:1. Proportion of clypeocellar distance to distance between median ocellus and posterior margin of head (1.1–1.3:1). Frontal carina, short 0.8–1 mm, apex not exceed lower level of antennal sockets (barely exceeds the half of the antennal sockets). Clypeus broader than long (proportion 1.7–1.8:1). Proportion of length of scape, pedicel and first four flagellomeres 2.9–3.1:0.3–0.4:1:0.3–0.5:0.4–0.5:0.4–0.5. Labrum broader than long with median basal triangular process well defined. Genitalia as in figures 35, 41, 47 and 53.

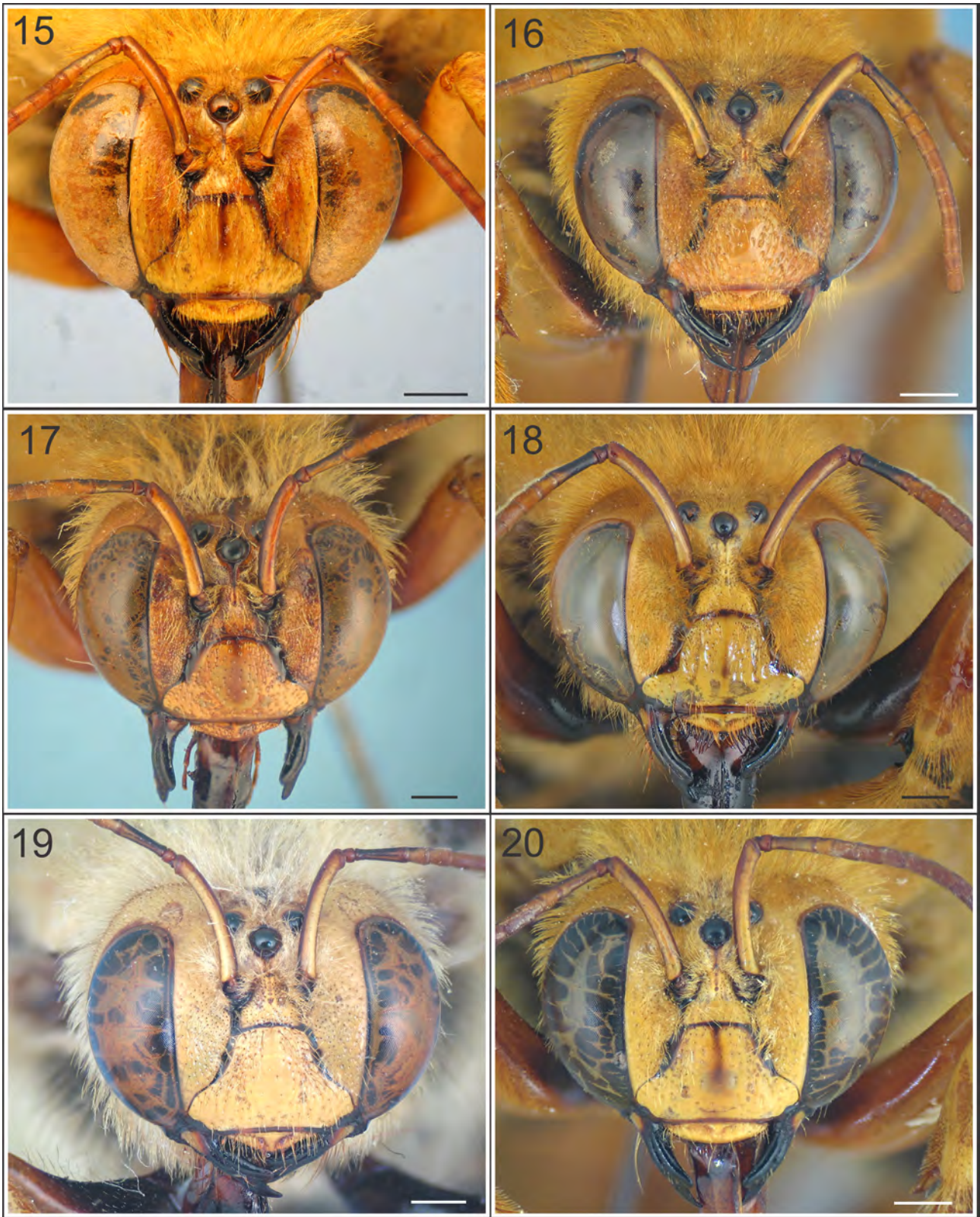
Comments. This species does not show considerable variation in the color pattern. In some females the following areas have a brown integument: legs, genae, scutellum and metasomal terga. In the holotype from Bolivia the tegula is light brown; however, in the Argentinian specimens (except some females from Jujuy province) the color of the tegula varies from light to dark brown.

Observations. In Argentina this species was listed as *X. aurulenta* (Fabricius, 1804) (see Moure 2008).

Distribution (Fig. 60): **ARGENTINA:** Catamarca, Jujuy, Salta, Santa Fe and Tucumán. Its distribution comprises part of Yungas and Chaqueña biogeographic provinces and the southernmost record of this species is the locality of Villa Guillermina in the Santa Fe province, approximately parallel 30°. Moure (2008) recorded this species from Perú and Bolivia.



FIGURES 9–14. Metasoma of female, dorsal view. 9, *Xylocopa augusti*; 10, *Xylocopa eximia*; 11, *Xylocopa frontalis*; 12, *Xylocopa nigrocincta*; 13, *Xylocopa tacanensis*; 14, *Xylocopa mendozana*. Scale bars: 2 mm.



FIGURES 15–20. Head of male, frontal view. 15, *Xylocopa atamisquensis*; 16, *Xylocopa augusti*; 17, *Xylocopa eximia*; 18, *Xylocopa frontalis*; 19, *Xylocopa mendozana*; 20, *Xylocopa nigrocincta*. Scale bars: 1 mm.

Type material. Holotype female (MNHP) labeled: Bolívia [handwritten]//Museum Paris/Coll.J. Pérez 1915//Museum Paris/EY0000001757//Type//HOLOTYPE [red label]//eximia J.P [handwritten].

Additional examined material. A total of 146 specimens (139♀ and 7♂) from ARGENTINA. **CATAMARCA.** 1♀, Yunka-Sunaj, 15-XII-1949, Budin-Pieretti (IFML). **JUJUY.** 1♀, San Lorenzo, -1911, Jörgensen (MLP); 1♀, Ledesma, -XI-1978, Fritz (MLP); 1♀, Los Perales, 6-II-1950, Monrós-Willink (IFML); 1♀, Jujuy, -II-1946, Birabén (MLP); 1♀, La Esperanza, 3-III-1955, J.Fonder (MLP); 1♀, El Carmen, 13-IX-2009, L.Álvarez-J.Meriggi (MLP); 1♀, Termas de Lambrisca, 27-I-1948, Monrós-Willink (IFML); 4♀, Jujuy, 11-XII-1925, Pozzi-Sota (MACN). **SANTA FE.** 6♀, Villa Guillermina, 21-II-1946, Hayward-Willink (IFML); 1♀, Villa Ana, 18-II-1946, Hayward-Willink (IFML). **SALTA.** 3♀, San Lorenzo, 1-X-1911, Jörgensen (MLP); 1♀, Chicoana, 2-II-1974, J.L.Neff (IFML); 4♀, Río Pescado (near to Orán), 19-VII-1971, C.Porter-L.Stange (IFML); 1♀, Río Pescado (Est. Y.P.F), 22-XI-1967, Porter-Willink (IFML); 1♀, Dto. Orán, Ruta Nac.57 Km 33 “Angosto del Pescado”, 26-27-X-9-XI-1978, (700 m), P.Fidalgo (IFML); 1♀, Cuesta del Obispo, II-1986, (2200 m), Fritz (IFML); 1♀, Cuesta del Obispo, II-1985, (2500 m), Fritz (IFML); 1♀, Rosario de Lerma, -IX-1982, Fritz (MLP); 1♀, Pocitos, -XI-1978, Fritz (MLP); 1♀, Güemes, -II-1944, Martínez (MLP); 2♀, Rosario de Lerma, -X-1981, Fritz (MLP); 2♀, El Naranjo, -XII-1942, Martínez (MLP); 2♀, El Naranjo, -II-1944, Martínez (MLP); 1♀, Rosario de Lerma, XII-1986, Fritz (MLP); 2♀, Aguas Blancas, 10-XII-1987, J.L.Farina-L.González-R.Piñero (MMP); 1♀, Aguas Blancas, -XII-1997, (MMP); 1♀, Aguas Blancas, 2-9-II-2001, J.L.Farina-Romero (MMP); 1♀, Salta capital, 12-XI-2009, L.Álvarez-J.Meriggi (MLP); 1♀, Oran-24 Km de Aguas Blancas, 9-V-1969, Terán-Willink (IFML). **TUCUMÁN.** 3♀, Horco Molle, 16-IX-2005, (26°47'36"S, 65°19'1"W, 720 m.a.s.l), M.Lucia (MLP); 5♀2♂, Sala de San Javier, 15-VIII-2008, A.H.Abrahamovich (MLP); 8♀, Raco, 28-IX-2006, (26°39'55.6"S, 65°24'19.9"W, 1085 m.a.s.l), M.Lucia-A.H.Abrahamovich-E.Jiménez (MLP); 1♀, San Pedro de Colalao, 9-X-2008, (26°37'11,2"S, 65°11'44,2"W, 667 m.a.s.l), M.Lucia-B.Defea (MLP); 1♀, Horco Molle, 22-XII-1965, L.Stange (IFML); 1♀, Trancas, -IV-1946, (1280 m.a.s.l), Bellomo (IFML); 3♀, Depto. Tafí Siambón, -II-1945, D.Olea (IFML); 1♀, Tucumán, 27-X-1967, (430 m.a.s.l), W.Weyrauch (IFML); 1♀, San Javier (Ciudad Universitaria), 15-I-1972, A.Willink (IFML); 1♀, Villa P.Monti, 1-XII-1971, A.Willink (IFML); 1♀, Quebrada de Lules, 14-IV-1966, L.Stange (IFML); 1♀, Quebrada de Lules, -I-1942, Monrós (MLP); 1♀, Quebrada de Lules (MLP); 1♀, San Pedro de Colalao, -III-1979, Fritz (MLP); 1♀, San Javier, 21-IV-1968, A.Willink (IFML); 2♀, Salas de Tucumán, 16-X-2007, A.H.Abrahamovich (MLP); 2♀, Camino a Villa Nogues, 13-XI-2008, A.H.Abrahamovich (MLP); 2♀, Tafí Viejo, 19-IX-2007, (26°44'15,7"S, 65°17'29"W, 755 m.a.s.l) M.Lucia (MLP); 2♀, Dique el Cadillal, 9-X-2008, (26°37'11,2"S, 65°11'44,2"W, 667 m.a.s.l), M.Lucia-B.Defea (MLP); 1♀1♂, Horco Molle, 8-X-2008, (26°46'41,5"S, 65°19'34,5"O, 719 m.a.s.l), M.Lucia-B.Defea (MLP); 1♀, Quebrada del Funicular (near to Horco Molle), 15-18-VII-1978, Porter-Fidalgo (IFML); 1♂, Tafí Viejo, 17-IX-2008, (26°44'15,7"S, 65°17'29"O, 755 m.a.s.l) M.Lucia (MLP); 1♂, Tucumán, -III-1964, Santilli (IFML); 1♂, Tucumán (Ciudad), 24-XI-1966, (IFML); 1♀, Ruta a Tafí (Km 20 C/Indio), 23-24-IV-1987, (MMP); 1♀, Ciudad Capital, IX-1951, Willink (IFML); 2♀, Tafí del Valle, 12-IX-1945, Hayward (IFML); 2♀, Dpto. de Burruyacú, Villa Padre Monti, -II-1948, R.Golbach (IFML); 2♀1♂, Tucumán, -1945, (IFML); 1♀, Dpto. Burruyacú (La Mesada), 11-X-1947, Ares (IFML); 1♀, Tucumán, -I-1947, Córdoba (IFML); 1♀, Sala Ancajuli, -IX-1944, D.Olea (IFML); 1♀, Dpto.Río Chico (Los Sarmientos), 30-I-1948, Ares (IFML); 2♀, Tucumán, 28-II-1947, J.Córdoba (IFML); 1♀, Los Nogales, -III-1947, Ares (IFML); 1♀, Dpto Tafí, Siambón,-V-1946, D.Olea (IFML); 1♀, Dpto. Río Chico (Monte Bello), 18-IV-1946, A.Willink (IFML); 5♀, Dpto. Tafí Siambón, -IX-1945, D.Olea (IFML); 1♀, Tucumán Trancas-Tacanas, -II-1951, J.M.Arnau (IFML); 1♀, Horco Molle, 5-X-1955, R. Golbach (IFML); 9♀, Siambón, 4-II-1946, D.Olea (IFML); 1♀, Dpto. de Tafí Siambón, -XII-1945, D.Olea (IFML); 11♀, Dpto. de Tafí Siambón, -IV-1945, D. Olea (IFML); 1♀, Trancas-Tacanas, -I-1947, J.M.Arnau (IFML); 1♀, Tafí-Raco, -XII-1955, M.A.T de Colombres (IFML); 2♀, San Pedro de Colalao, 1-III-1953, Terán (IFML); 2♀, Tucumán, Girard (MACN); 1♀, Tucumán, -X-1932, (MACN).

***Xylocopa (N.) frontalis* (Olivier, 1789)**

(Figures 4, 11, 18, 24, 30, 36, 42, 48, 54, 58)

Apis frontalis Olivier, 1789: 64 (primary homonym of *Apis frontalis* Villers, 1789). Holotype: ♀, whereabouts unknow. Type locality: French Guiana, Cayenne

Xylocopa fasciata Lapeletier, 1841: 202. synonymized by Smith 1874: 284

Xylocopa nitens Lapeletier, 1841: 176. synonymized by Hurd 1978: 81

Xylocopa frontalis quadrimaculata Meunier, 1890: 64. synonymized by Hurd 1978: 81

Xylocopa morio callichlora Cockerell, 1911: 287. synonymized by Hurd 1978: 81
Xylocopa frontalis var. *coeruleomicans* Enderlein, 1913:158. synonymized by Hurd 1978: 81
Xylocopa frontalis var. *viridimicans* Enderlein, 1913:158. synonymized by Hurd 1978: 81
Xylocopa frontalis fabricii Cockerell, 1926: 658. synonymized by Hurd 1978: 81
Xylocopa frontalis trinitatis Cockerell, 1926: 658. synonymized by Hurd 1978: 81
Xylocopa frontalis roseata Cockerell, 1926: 658. synonymized by Hurd 1978: 81
Xylocopa frontalis var. *obscuripennis* Cockerell, 1949: 484. synonymized by Hurd 1978: 81
Xylocopa frontalis var. *purpureipennis* Cockerell, 1949: 484. synonymized by Hurd 1978: 81
Xylocopa americana Prance, 1976: 238 (nom. nud.).
Xylocopa (Megaxylocopa) frontalis, Hurd & Moure, 1963: 151; Minckley 1998: 151

Diagnosis. The female of this species can be distinguished from other Argentinian large carpenter bees by the following combination of characters: conspicuous carinae below lateral ocelli (Fig. 4), T1–4 with reddish bands, and T2–T3 with short and scattered hairs (Fig. 11). The male can be easily recognized by T2–T3 with median pubescence short, 0.1–0.3 times MOD (Fig. 24), large black bands on metasomal terga and the lateral ocelli above supraocular line. The female of this species resembles that of *X. nigrocincta* in the reddish bands on the metasomal terga; however, it differs from that species in the presence of the carina located below the lateral ocelli.

Female. Approximate body length 30 (26.7–38); head length 7.7 (7.2–8.4); head width 8.5 (8–9); mesosoma width 10.4 (9–12); metasoma width 11.5 (10.6–14); forewing length 25.3 (24.3–27.3); forewing width 7.4 (7–8).

Coloration. Integument predominantly black, except T1–4 and S1–3 with ferruginous bands (Fig. 11), tegula dark. Wing dark brown with green iridescent. **Pubescence.** Black, head with abundant hairs scattered on ocellular and supraocular area and inner part of gena; distal area of clypeus and below lateral ocelli hairless (Fig. 4). Mesosoma with abundant plumose hairs, except hairless on disc and posterior area of scutum. Metasoma with long hairs laterally; T1 with some plumose hairs in the basal half and scattered simple hairs in the apical; T2–T3 with short and scattered hairs; T4–6 with long hairs; sterna with long and decumbent hairs (Fig. 11). **Sculpturing.** Head regularly and densely punctate; punctate on internal part of the gena dispersed. Ocellular and supraocular area impunctate. Scutum densely punctate, except impunctate on disc and posteriorly. Metasomal terga regularly and sparsely punctate, densely punctated on lateral side. **Structure.** Head broader than long (proportion 1.1–1.2:1); inner orbits incurved, proportion of upper to lower interocular distance 1:1; middle interocular distance 6–8 mm. Vertex broad, distance ocelloccipital (to median ocellus) 4.1–5.1 times MOD; orbitoccipital distance long 1.7–2.2 mm. Lateral ocelli above supraocular line, proportions of interocellar to ocellular distance 0.8–0.9:1, interocellar to ocelloccipital 1–1.3:1, ocellular to alveolocellar 0.7–0.9:1, orbitoccipital to ocellular 1–1.2:1, alveolocellar to interalveolar 1.2–1.4:1. Proportion of clypeocellar distance to distance between median ocellus and posterior margin of head (1.4–1.6:1). Conspicuous carinae below lateral ocelli (Fig. 4). Clypeus broader than long (proportion 2–2.2:1), dorsolateral sides quite abruptly elevated above adjacent parocular areas; proportion of length of scape, pedicel and first four flagellomeres 3.2–3.5:0.2–0.3:1:0.3–0.4:0.3–0.4:0.3–0.4. Labrum broader than long, with three basal protuberances the laterals more developed than the median. Scutellum gently rounded as seen in profile. Apex of basitibial plate beyond middle length of tibia, asymmetrically bifid, posterior apical lobe rounded and just shorter or same development than anterior lobe.

Male: As in the female, except as follow: Approximate body length 32 (29–33); head length 5.5 (5.3–5.5); head width 7 (6.6–7.2); mesosoma width 10.8 (9.8–11.6); metasoma width 12 (11.4–12.6); forewing length 25.5 (23–26.7); forewing width 6.9 (6.6–7.4). **Coloration.** Integument predominantly brown yellowish, dark brown except as follows: edges of clypeus, subantennal sulcus, middle and apical portion of mandible, ventral face of F1; coxa, trochanter, femur, propodeum, T2–6 apically, on T1 less notorious. Tegula yellowish in anterior part, otherwise translucent brown. Wings light yellow with golden iridescent. **Pubescence.** Yellowish (varying from ferruginous to yellows); T6–7 with dark brown to black pubescence (Fig. 24). Head with long hairs, short and scattered on the clypeus; short and abundant on the median and internal portion of the gena; pubescence of ventral surface of posterior tibia distributed throughout the surface (Fig. 30). Metasoma with short hairs laterally, T1 with plumose hairs; T2 on basal half with plumose and simple hairs; T2–T3 with median pubescence short, 0.1–0.3 times MOD; T4–5 with short hairs in middle and long and abundant hairs laterally; T6–T7 with long and decumbent hairs. **Sculpturing.** T2–5 sparsely punctate, T1 and T6–7 densely punctate. **Structure.** Head broader than long (proportion 1.2–1.3:1). proportion of upper to lower interocular distance 1–1.1:1; upper interocular distance 7.5–8.7 times MOD; middle interocular distance 4.3–4.7 mm. Distance ocelloccipital (to median ocellus) 2.3–2.8 times MOD, orbitoccipital distance longer 1.2–1.4 mm. Lateral ocelli above supraocular line. Proportions of

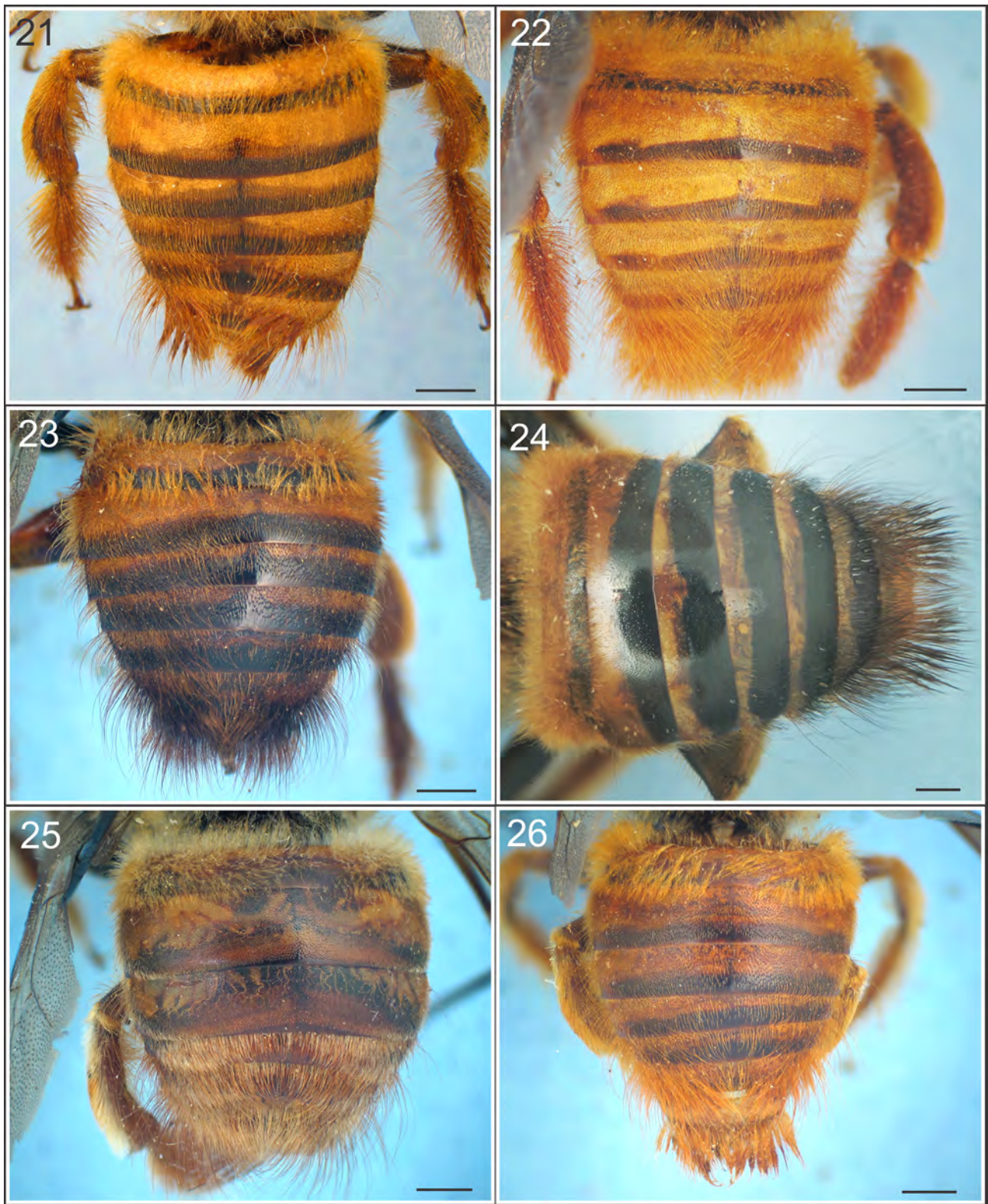
interocellar to ocelocular distance 0.8–1.1:1, interocellar to ocelloccipital 0.9–1.3:1; ocelocular to alveolocellar 1–1.5:1; orbitocipital to ocellocular 1.2–1.4:1; alveolocular to interalveolar 1.3–1.7:1. Proportion of clypeocellar distance to distance between median ocellus and posterior margin of head (1.2–1.5:1). Frontal carina absent replaced by a linear frontal line. Clypeus broader than long (proportion 1.6–1.8:1). Proportion of length of scape, pedicel and first four flagellomeres 2.5–3.1:0.2–0.4:1:0.3–0.4:0.4–0.5:0.4–0.5. Labrum broader than long with median basal triangular process well defined. Genitalia as in figures 36, 42, 48 and 54.

Comments. In some females the ferruginous bands on T1–4 vary from light to dark in coloration. We have not seen in Argentina darker specimens (metasomal terga without ferruginous bands) as recorded for other countries (some synonyms of this species have not bands ferruginous on the metasomal terga)

Distribution (Fig. 58): **ARGENTINA:** Buenos Aires, Corrientes, Entre Ríos, Misiones, and Santa Fe. Its distribution comprises part of Pampeana and Paranaense biogeographic provinces and the southernmost record is the cost of Río de La Plata in the Buenos Aires province, approximately parallel 36°. Moure (2008) recorded this species from México, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, El Salvador, Guayana Francesa; Guatemala; Guyana; Honduras, Nicaragua, Panamá, Paraguay, Perú, Trinidad y Tobago, Uruguay and Venezuela.

Additional examined material. A total of 168 specimens (140♀28♂) from ARGENTINA. 4♀, Argentina, H.Fruhstofer (MNCN); **BUENOS AIRES.** 1♀, La Plata (Bosque), 10-X-2009, M.Lucia (MLP); 5♀, Zelaya, -XI-1939, H.Hepper (MACN); 1♀, La Balandra, 12-XII-1986, A.H.Abrahamovich (MLP); 1♀, La Plata, A.R.Bezzi (MLP); 4♀2♂, La Plata (MLP); 1♀, P.Iraola, -II-1964, Carpintero (IFML); 1♀, La Plata, Oscar de Fonnanis (MLP); 1♀, La Plata, -XII-1971, A.Cicchino (MLP); 1♀, Pacheco, 9-II-1928, Bridarolli (MLP); 3♀, Punta Lara, 6-II-2007, M.Lucia (MLP); 1♀2♂, Berisso (Los Talas), -IX-2008, L.Álvarez (MLP); 1♂, Berisso, 15-XI-2009, M.Lucia (MLP); 1♂, Loreto, 24-X-2008, M.Lucia-L.Álvarez (MLP); 1♀, Capital Federal, 31-X-2002, M.Chamer (FAUBA); 1♀, Capital Federal, 16-I-2005, M.Chamer (FAUBA); 1♀, Capital Federal, 17-I-2006, M.Chamer (FAUBA); 2♀, Capital Federal, 18-IX-2006, J.P.Torretta (FAUBA); 1♀, Luján, H.H.Maristas, 1♀, San Isidro, H.H.Marista; 8♂, Arroyo Correa (Delta), M.Jurado- J.B. Daguerre (MLP); 3♀, San Fernando, 18-XI-1928, Doello-Jurado (MACN); 1♀, Islas del Delta, J.Brèthes (MACN); 1♀, San Isidro, 20-XI-1921, J.B (MACN); 1♀, Parque Sarmiento, 19-XI-1928, Doello-Jurado (MACN); 1♀, Punta Lara, -XI-1925, (MACN); 1♀, Delta del Paraná (Río Sarmiento), -IV-1976, A.Oliva (MACN); 1♀, San Isidro, 17-I-2004, González V.-Rodríguez (MACN); 10♀, San Fernando, 18-XI-1928, Doello-Jurado (MACN); 1♀, Buenos Aires, -II-1932, Doello-Jurado (MACN); 2♀1♂, Buenos Aires (Delta), -XII-1941, Obroki (MACN); 3♀, Río Las Conchas, 6-XII-1919, Frers (MACN); 1♀, Buenos Aires, 15-II-1932, Doello-Jurado (MACN); 1♀, Tigre, 29-I-1929, Fincheira (MACN); 1♀, Martínez, 28-I-1926, Bridarolli (MACN); 1♀, Delta Río Sarmiento (La ursulina), 19-XI-2001 (MACN); 3♀, Tigre, -1939, (MACN). **CORRIENTES.** 1♀, Ituzaingó, -IX-1982, Fritz (MLP); 1♀, Mocoretá, 24-III-2010, M.Lucia-L.Álvarez (MLP); 2♀, Yapeyú, 25-III-2010, M.Lucia-L.Álvarez (MLP); 2♀, Santo Tomé, -I-1928, (MACN). **ENTRE RÍOS.** 3♀, Arroyo El Brasilerero, (33°47'S, 58°33'W, 6 m.a.s.l) 14-IX-2009, M.Lucia (MLP); 10♀, Palmar (Colón), -XII-1978, Fritz (MLP); 3♀, Dto. Colón, Zelich (MLP); 2♀1♂, Pronunciamento, Zelich (MLP); 1♀, Salto Grande, -IV-1978, Fritz (MLP); 1♀, Villa Elisa, 11-II-1974, L.Gontero (MLP); 1♀, Primero de Mayo, 20-XII-1963, (IFML); 2♂, Dto. Colón, Fritz (MLP); 2♂, Dto. Colón, Fritz (MLP); 2♀, Liebig, 13-IV-2001, Zelich (Col. Zelich); 1♀, Liebig, 21-XII-2002, Zelich (Col.Zelich); 1♀, Liebig, 12-IV-2001, Zelich (Col.Zelich); 3♂, Liebig, 12-XII-2002, Zelich (Col.Zelich); 1♂, Liebig, 17-XI-2003, Zelich (Col.Zelich); 1♂, Liebig, 28-XI-2001, Zelich (Col.Zelich); 2♀, Paranacito, -I-1933, Daguerre, (MACN); 3♀, Río Ceibo (Delta), 10-XI-1950, R. Ronderos (MLP); 1♀, Paranacito, -III-1940, Castillo (MLP); 3♀, Ibicuycito, 13-II-1938, Castillo (MLP); 1♀, Colón, -XII-1988, (MACN); 2♀, La Paz (Los Algarrobos), -I-1952, R.L.Orfila (MACN). **MISIONES.** 2♀, San Ignacio, 20-X-2008, M.Lucia-L.Álvarez (MLP); 1♀, El Soberbio, (26°16'39"S, 54°11'34"W, 139 m.a.s.l), 19-22-XI-2007, M.Lucia-L.Álvarez (MLP); 1♀, Bompland, 19-22-XI-2007, (27°29'S, 55°28'W, 174 m.a.s.l), M.Lucia-L.Álvarez (MLP); 1♂, Loreto, 24-X-2008, M.Lucia-L.Álvarez (MLP); 1♀1♂, Puerto Iguazú, -X-1982, Carpintero (MLP); 1♀, Puerto Esperanza, -X-1978, Fritz (MLP); 2♀, Puerto Esperanza, -XII-1976, Fritz (MLP); 1♀, Loreto, A.Ogloblin (MLP); 1♀, Loreto, -1946, J.T (MLP); 1♀, P. Iguazú, 10-IV-1985, A.H.Abrahamovich (MLP); 1♀, Misiones, 4-I-1910, Jörgensen (MLP); 1♀, Misiones, 28-X-1910, Jörgensen (MLP); 1♀, Misiones, 16-III-1910, Jörgensen (MLP); 1♀, Misiones, 28-II-1910, Jörgensen (MLP); 1♀, Misiones, 24-II-1910, Jörgensen (MLP); 1♀, Misiones, 14-III-1910, Jörgensen (MLP); 1♀, Misiones, 19-I-1910, Jörgensen (MLP); 1♂, Posadas, 10-XI-1970, C.Porter-L.Stange (IFML); 1♀, Apóstoles (entre Azara y Tres Capones), 20-IV-2007, J.P. Torretta (FAUBA); 1♀, Cabure-I, 18-VIII-1980, J.L.Farina-L.N.Farina (MMP); 1♀, Parque Nac. Iguazú, -XII-1979, Carpintero-Sjuberg (MACN); 3♀, Misiones, 14-II-1934,

(MACN); 3 ♀, Posadas, 17-XI-1942, Rodríguez (MACN); 1 ♀, Colonia Santa María, -XI-1943, M.Viana (MACN); 1 ♀, Puerto Londera (Dpto. San Javier) -IX-1947, M.Viana (MACN); 1 ♀, Arroyo Biguá, 14-IV-1983, (MACN). SANTA FE. 6 ♀, Isla Los Laureles (label says Entre Ríos) 7-II-1940, C.A.Alberti (MACN); 1 ♀, Rosario, Stevenin (MACN).



FIGURES 21–26. Metasoma of male, dorsal view. 21, *Xylocopa atamisquensis*; 22, *Xylocopa augusti*; 23, *Xylocopa eximia*; 24, *Xylocopa frontalis*; 25, *Xylocopa mendozana*; 26, *Xylocopa nigrocinta*.

***Xylocopa (N.) mendozana* Enderlein, 1913**

(Figures 5, 14, 19, 25, 31, 37, 43, 49, 55, 59)

Xylocopa mendozana Enderlein, 1913a: 130. Syntype: 3♀, 3♂ see Enderlein 1913:131–132, deposited at MIZ. Type locality: Mendoza, Argentina. (Not examined)

Xylocopa (Neoxylocopa) mendozana, Hurd & Moure, 1963: 151.

Diagnosis. The female of this species can be distinguished from other Argentinian large carpenter bees by the following combination of characters: integument black; T2 and basal third of T3 with median pubescence very short, 0.2–0.4 times MOD and barely protruding from the insertion puncture; rest of T3 with hairs 3–4 times longer than those on T2; supraorbital area wide (3.5–4.1 times DOM). The male can be easily recognized by T2–T3 with median pubescence very short, the hairs barely protruding from the insertion puncture, T2 densely punctate, and metasomal terga with brown apical bands. Females of *X. mendozana* can be distinguished from all other Argentinian *Xylocopa* by the punctation and pubescence on T2–3.

Female. Approximate body length 27 (25–29.3); head length 6.6 (6.2–7); head width 7.6 (7–8.2); mesosoma width 9.6 (8.8–10.4); metasoma width 11 (10.4–11.8); forewing length 22.7 (21–24.3); forewing width 6.6 (6.4–6.8). **Coloration.** Integument predominantly black, except scape brown; tegula dark. Wing dark brown with violet-green iridescent. **Pubescence.** Black, head with abundant hairs scattered and short in vertex and median and inner part of gena (Fig. 5). Mesosoma with abundant plumose hairs, except hairless on disc and posterior area of scutum. Metasoma with long hairs laterally; T1 with plumose hairs; T2 and basal third of T3 with median pubescence very short, 0.2–0.4 times MOD, the hairs barely protruding from insertion puncture; rest of T3 with hairs 3–4 times longer than T2; T4–T6 with long hairs (5–6 times longer than in T2) (Fig. 14). **Punctation.** Head regularly and densely punctate; dispersed on vertex, supraorbital area and median and inner part of gena. Median longitudinal area of vertex smooth well defined. Scutum densely punctate, except impunctate on disc and posteriorly. Metasomal terga regularly and densely punctate, T1–3 finely punctate and T4–6 with large punctures. **Structure.** Head broader than long (proportion 1–1.2:1); inner orbits incurved, proportion of upper to lower interocular distance 1:1; middle interocular distance 5–5.8 mm. Vertex broad, distance ocelloccipital (to median ocellus) 4.3–4.8 times ocellar diameter (median ocellus); orbitoccipital distance long 1.8–2.3 mm. Lateral ocelli below supraocular line, proportions of interocular to ocelocular distance 0.6–0.8:1, interocular to ocelloccipital 0.4–0.5:1, ocelocular to alveolocellar 1–1.2:1, orbitoccipital to ocelocular 1.4–1.6:1, alveolocellar to interalveolar 1.2–1.3:1. Proportion of clypeocellar distance to distance between median ocellus and posterior margin of head (0.7–0.8:1). Frontal carina moderately elevated, long 1.2–1.3, apex reaching the middle portion between upper and lower level of the antennal sockets. Clypeus broader than long (proportion 2.2–2.3:1); proportion of length of scape, pedicel and first four flagellomeres 2.9–3.1:0.2–0.3:1:0.3–0.4:0.4–0.5:0.4–0.5. Labrum broader than long, with three basal protuberances, the median most developed, the laterals cariniform. Scutellum gently rounded as seen in profile. Apex of basitibial plate beyond length middle of tibia, asymmetrically bifid, posterior apical lobe rounded and shorter than anterior lobe.

Male. As in the female, except as follows: Approximate body length 25 (21.7–26.7); head length 4.9 (4.6–5.3); head width 6 (5.6–6.4); mesosoma width 9.5 (9–10); metasoma width 11.2 (10.2–12.5); forewing length 21.3 (18.7–23.3); forewing width 5.7 (5.2–6.2). **Coloration.** Integument predominantly brown yellowish, except dark brown as follows: edges of clypeus, subantennal sulcus, middle and apical portion of mandible, coxa, trochanter, femur and propodeum. Apical bands on metasomal terga brown. Tegula yellowish, otherwise translucent brown. Wings hyaline, yellowish with golden iridescent. **Pubescence.** Yellowish (varying from ferruginous to yellows); T6–7 with yellowish to ferruginous pubescence (Fig. 25). Head with long hairs, scattered on median area of clypeus, superior part of paraocular area and median and internal portion of gena (Fig. 19); scutellum hairless; pubescence of the ventral surface of the posterior tibia restricted to the base (Fig. 31). T2–T3 with median pubescence very short; T4–7 with long and abundant hairs (5–6 times longer than in T2–3). **Sculpturing.** Head, median longitudinal area of clypeus impunctate. Metasomal terga regularly and densely punctate, T2–3 finely punctate and T1, 4–6 with large punctures. **Structure.** Head broader than long (proportion 1.2–1.3:1); proportion of upper to lower interocular distance 1–1.1:1; upper interocular distance 5.8–7 times MOD; middle interocular distance 4.2–3.5 mm. Distance ocelloccipital (to median ocellus) 2.3–2.9 times MOD, orbitoccipital distance longer 1.1–1.4 mm. Proportions of interocular to ocelocular distance 0.9–1:1, interocular to ocelloccipital 0.6–0.8:1; ocelocular to alveolocellar 0.8–1.1:1; orbitoccipital to ocelocular 1.5–1.8:1; alveolocellar to interalveolar

1.1–1.4:1. Proportion of clypeocellar distance to distance between median ocellus and posterior margin of head (1–1.3:1). Frontal carina long 0.9–1.2 mm, apex scarcely exceed upper level of antennal sockets. Clypeus broader than long (proportion 1.6–1.8:1). Proportion of length of scape, pedicel and first four flagellomeres 2.5–3:0.2–0.4:1:0.3–0.5:0.4–0.5:0.4–0.5. Labrum broader than long with median basal triangular process well defined. Genitalia as in figures 37, 43, 49 and 55.

Variations. Like other black species, this species does not show considerable variation in the color pattern. However, some female specimens have integumental dark brown color in the following areas: legs, genae, scutellum and metasomal terga.

Comments. The syntype (s) of *X. mendozana* could not be examined; the type series were borrowed to P.J. Moure in the 1960's and they were never returned to MIZ (Tomasz Huflejt, pers. inf.). As we have not examined the syntype series, our interpretation of this species is based on the original description.

Distribution (Fig. 59): **ARGENTINA:** Catamarca, Córdoba, La Pampa, La Rioja, Mendoza, Río Negro, Salta, San Juan, San Luis y Santiago del Estero. Its distribution comprises principally the Monte and part of the Prepuneña, Chaqueña, Patagonia and Pampeana biogeographic provinces and the southernmost record of this species is North of Río Negro province, approximately parallel 40°. Ascher & Pickering (2011) recorded this species for Bolivia.

Type material. 3♀, 3♂ see Enderlein 1913: 131–132. Type locality: Mendoza, Argentina, the specimens were collected by Jensen-Haarup.

Additional examined material. A total of 187 specimens (162♀ and 25♂) from ARGENTINA. **CATAMARCA.** 3♀, Río Vis-Vis, (27°25'52,5"S, 66°31'49,7"W, 1768 m.a.s.l), 6-XII-2007, M.Lucia (MLP); 3♀, 13 Km E. Belén, 6-X-1971, C.Porter-L.Stange (IFML); 1♀, 6 Km E.Belén, 14-XII-1973, L.Stange (IFML); 1♀, Cuesta de la Chilca, 13-X-1968, Willink-Stange (IFML); 2♀1♂, Andalgalá, 5-X-1973, J.L.Neff (IFML); 1♀, Ruta Andalgalá-Belén, -II-1968, A. y E.Willink (IFML); 5♀, El Rodeo, -I-1942, B.Schol (MLP); 3♀, La Ciénaga, -II-1987, Fritz (MLP); 1♀1♂, Copacabana, 17-XI-1944, Jörgensen col. (MLP); 1♀, Belén Quebrada, -II-1986, Fritz (MLP); 1♀, 6 Km N.Belén (1245 m), 1-15-II-1969, Willink-Terán-Stange (IFML); 1♀1♂, Santa María, 27-IX-1944, Hayward (IFML); 1♀, Andalgalá, -I-1942, B.Schol (IFML); 1♀, Santa María, 19-I-1968, Golbach-Terán, Willink (IFML); 4♀3♂, Santa María, 20-II-1967, Willink-Terán (IFML); 3♀, Los Nacimientos de Abajo, 16-31-XII-1969, Willink-Terán-Stange (IFML); 1♀, Hualfin, 18-XII-1948, Ares (IFML); 2♀, Tinogasta, 23-IV-1960, Tomsic-Willink (IFML); 4♀, 10 Km de Andalgalá, 8-II-1968, A. y E.Willink (IFML); 1♀, Loro Huasi (25 Km de Fiambalá), 21-I-1969, A.Terán-A.Willink (IFML); 1♀, 10 Km Tinogasta, 9-II-1966, Willink-Stange (IFML); 1♀, Concepción, 15-I-1960, Willink (IFML); 1♀, Santa María, 20-II-1967, Willink-Terán (IFML); 1♀1♂, 10 Km de Belén, 10-X-1968, Willink-Stange (IFML); 1♂, Catamarca, -III-1942, B.Schaefer (MLP); 1♂, 30 Km hacia Belén, 11-X-1968, A.Willink-Stange (IFML); 1♂, Andalgalá (ruta Aimogasta-Tinogasta), 23-III-1973, A.Terán-A.Willink (IFML); 1♂, Andalgalá, 16-X-1973, J.L.Neff (IFML); 1♂, Andalgalá, 13-X-1973, J.L.Neff (IFML); 1♂, 10 Km de Belén, 11-X-1968, Willink-Stange (IFML); 2♀, Rodeo, 20-28-I-1958, R.Golbach (IFML); 2♀, Valle Viejo, -I-1947, I.Morales (FML); 1♀, Mutquin, -VI-1953, O de Ferraris (MLP); 2♀, Concepción, 15-III-1928, M.P.Gómez (MACN); 6♀, Catamarca (MACN); 2♀, Catamarca, 14-X-1931, (MACN). **CÓRDOBA.** 1♀, Ciudad, 27-XI-1927, M.Gómez (MACN). **LA PAMPA.** 4♀3♂, La Gloria, -1943, J.Fortuna (MLP); 1♀, Lihuel Calel, 15-II-1977, D.T.U.L (MLP); 9♀, La Pampa, (MACN); 1♀, La Pampa, R.Navone (MACN). **LA RIOJA.** 2♀2♂, Anillaco, 17-X-2006, (28°48'46"S, 66°56'9.3"W, 1376 m.a.s.l), M.Lucia-A.H.Abrahamovich-E.Jiménez (MLP); 6♀, La Rioja, -III-1934, (MACN); 1♀, Dto de San Blas (Schaqui), 15-I-197?, Zalazar (IADIZA); 1♀, Chilecito, (MLP); 1♀, La Rioja, (MLP), 1♀, Chilecito, 17-X-1969, C.Porter (IFML); 1♀, Patquia, 25-I-1947, Hayward-Willink (IFML); 1♀, Guayapa, 4-X-1954, Hayward (IFML); 1♀, 50 Km Tinogasta camino Chilecito, 10-II-1966, Willink (IFML); 2♀, Villa Unión, 12-XII-1971, Porter-Stange (IFML); 1♂, R.Peñaloza El Rosillo (Cerca Chepes), 22-X-1997, S.Roig (IADIZA); 1♀, Patquia, -XII-1942, A.Breyer (MLP); 2♂, Punta de los Llanos, 12-X-1944, A.Ogloblin (MLP); 3♀, Iliar, -1934, M.Gómez (MACN); 1♀, La Rioja, -I-1955, M.P.Gómez (MACN); 1♀, Famatina, 1-II-1966, Stange-Willink (IFML); 2♀, Chilecito (Samai Huasi), 11-II-1966, Weyrauch-Willink (FML); 2♀, La Rioja, M.Gómez (MACN); 2♀, La Rioja, I-1929, M.Gómez (MACN); 1♂, La Rioja, XII-1903, De Giacomelli (MACN); 2♀, La Rioja, -I-1923, (MACN); 1♀, Los Sauces, -X-1954 (MACN). **MENDOZA.** 2♀, Mendoza, Jörgensen (MLP); 3♀, Mendoza, C.S.Reed (MLP); 3♀, Ñacuñán, 4-XI-1992, S.Roig (IADIZA); 1♀, Telteca, 18-III-1994, G.Flores (IADIZA); 1♀, Santa Rosa (Ñacuñán), 14-16-VII-1997, S.Roig (IADIZA); 1♀, Santa Rosa (Camino YPF a Carrizal, 730 m), 3-X-2002, G.Debandi (IADIZA); 1♀, Telteca, 01-III-1994, G.Flores (IADIZA), 1♂, Mendoza,

27-X-1906, (MLP); 1♂, Mendoza, 26-XII-1906, (MLP). **SALTA.** 3♀, Cafayate, 9-10-II-1960, Asmet-Bennasot (IFML); 1♀, Cafayate, -II-1988, Fritz (IFML); 1♀, Cafayate, 4-10-II-1951, Hayward (IFML); 1♀, Cafayate, 10-II-1951, K.J.Hayward (IFML); 1♀, Rosario de Lerma, -XI-1986, Fritz (IFML); 1♀, Rosario de Lerma, -X-1985, Fritz (MLP); 1♀, Rosario de Lerma, -XI-1983, Fritz (MLP); 1♀, Cafayate, 15-II-1992, Navarro-Claps (IFML); 1♀, Molinos, 29-I-1950, Monrós-Willink (IFML); 1♀, Los Sauces (2000 m), 22-I-1968, Golbach-Terán-Willink (IFML); 2♀, Coronel Moldes, 7-II-1948, Willink-Monrós (IFML); 1♀, Yacochuya, (8 Km Cafayate), 22-I-1968, Terán-Willink (IFML); 1♀, Cafayate, 1-II-1928 (MACN). **SAN JUAN.** 2♀, Ruta 510 30 Km Sur de Valle Fértil, 24-XI-1977, Willink-Fidalgo (IFML); 5♀, Ruta 510 25 Km Norte de Valle Fértil, 24-XI-1977, Willink-Fidalgo (IFML); 1♂, San Juan, C.S.Reed (MLP), 1♀, Valle Fértil, -I-1972, Viana (MACN); 1♀, Pocito, (MACN), 1♀, Huaco, (MACN). **SAN LUIS.** 1♀, Sierra Nogoli, Castellano-J.B.Sene (MACN); 1♀, Las Isletas, H.Grelebin (MACN). **SANTIAGO DEL ESTERO.** 5♀, Cuesta, Río Salado, Gómez (MACN). **RÍO NEGRO.** 1♀, Lamarque, -I-1985, Fritz (MLP), 1♀, Luis Beltrán, -I-1988, Fritz (MLP). **TUCUMÁN.** 4♀, Amaicha del Valle, 9-I-1969, A.Willink-A.Terán (FML); 1♀, Monte Bello (Dto. Río Chico), 18-IV-1946, A.Willink (IFML); 1♀, Amaicha, 31-X-1964, Willink (IFML); 3♀, Ampimpa (10 Km Amaicha) 2300 m.a.s.l, 31-XII-1964, Willink (IFML).

***Xylocopa (N.) nigrocincta* Smith, 1854**

(Figures 6, 12, 20, 26, 32, 38, 44, 50, 56, 61)

Xylocopa nigro-cincta Smith, 1854: 354. Holotype: ♀, whereabouts unknown, not in BMNH. Type locality: South America.

Xylocopa schulthesii Dusmet & Alonso, 1924: 52; synonymized by Hurd & Moure, 1963. Holotype: ♀, deposited at MNCN.

Type locality: Brazil, Rio Grande do Sul (examined)

Xylocopa (Neoxylocopa) nigrocincta, Hurd & Moure, 1963: 151.

Xylocopa (Neoxylocopa) jujuyensis Brèthes, 1916. Holotype: ♀, deposited at MACN. Type locality: Jujuy, Argentina. (examined). (**New synonymy**)

Diagnosis. The female of this species can be distinguished from other Argentinian large carpenter bees by the following combination of characters: T1–4 with reddish bands, scutellum angled as seen in profile and T2–T3 with short hairs. The male can be easily recognized by T2–T3 with median pubescence short and pubescence of ventral surface of posterior tibia restricted to basal and median part. The female of this species resembles that of *X. frontalis* in the reddish bands on the metasomal terga; however, differs in the absence of the carina below lateral ocelli.

Female. Approximate body length 28 (25–30.7); head length 5.6 (5.3–6); head width 6.9 (6.4–7.4); mesosoma width 9 (8.2–9.6); metasoma width 9.9 (9.4–10.4); forewing length 22 (20.7–23.7); forewing width 6.2 (5.8–6.6). **Coloration.** Integument predominantly black, except T1–5 and S2–4 with ferruginous bands. Tegula black. Wing dark brown with violet iridescent. **Pubescence.** Black, head with abundant hairs, scattered on vertex and inner part of gena (Fig. 6). Mesosoma with abundant plumose hairs, except hairless on disc, posterior area of scutum and anterior area on scutellum. Metasomal with long hairs laterally; T1 with intermixed plumose and simple hairs; T2–T4 with median pubescence short, 0.2–0.5 times MOD; T5 with median pubescence longer (3 times longer than in T2); T6 with long hairs (5 times longer than in T2) (Fig. 12). **Sculpturing.** Head regularly and densely punctate, vertex and inner part of genae with sparsely punctate; median longitudinal area of vertex and clypeus smooth, weakly defined. Scutum densely punctate, except impunctate on disc and posteriorly. T1 regularly and densely punctate, remaining terga with punctate dense on lateral side and dispersed on center. **Structure.** Head broader than long (proportion 1.2–1.3:1); inner orbits weakly incurved, proportion of upper to lower interocular distance 0.9–1:1; middle interocular distance 4.2–5.1 mm. Vertex broad, distance ocelloccipital (to median ocellus) 4.1–4.8 times ocellar diameter (median ocellus); orbitoccipital distance longer 1.1–1.5 mm. Lateral ocelli below supraocular line, approximately MOD. Proportions of interocellar to ocelocular distance 0.8–0.9:1, interocellar to ocelloccipital 0.6–0.7:1, ocelocular to alveolocellar 0.9–1.1:1, orbitoccipital to ocelocular 1.1–1.2:1, alveolocellar to interalveolar 1.1–1.3:1. Proportion of clypeocellar distance to distance between median ocellus and posterior margin of head (0.9–1:1). Frontal carina moderately elevated, longer 1–1.2 mm, apex reaching middle portion between upper and lower level of antennal sockets. Clypeus broader than long (proportion 2.1–2.2:1). Proportion of length of scape, pedicel and first four flagellomeres 2.9–3.3:0.3–0.4:1:0.3–0.4:0.4–0.50:0.4–0.50. Labrum broader than long with three basal protuberances of similarly development. Scutellum angled as seen in profile.

Apex of basitibial plate beyond middle length of tibia, asymmetrically bifid, posterior apical lobe rounded and shorter than anterior lobe.



FIGURES 27–32. Hind tibia of male, posterior view. 27, *Xylocopa atamisquensis*; 28, *Xylocopa augusti*; 29, *Xylocopa eximia*; 30, *Xylocopa frontalis*; 31, *Xylocopa mendozana*; 32, *Xylocopa nigrocincta*.

Male. Description. As in the female, except as follows: Approximate body length 25.5 (24.7–28.5); head length 4.3 (4–4.7); head width 5.5 (5.2–5.8); mesosoma width 9.1 (8.8–9.4); metasoma width 10 (9.6–10.4); forewing length 20.9 (19.7–21.7); forewing width 5.4 (5.2–5.8). *Coloration.* Integument predominantly brown yellowish, except dark brown as follows: latero-basal side of clypeus, subantennal sulcus, middle and apical portion of mandible, basal median longitudinal area on clypeus; coxa, trochanter, anterior and middle tibia basally and posterior femur, propodeum, and apical bands on T2–5. Tegula yellowish anteriorly, otherwise translucent brown. Wings light yellow with golden iridescent. *Pubescence.* Yellowish (varying from ferruginous to yellows); T6–7 with ferruginous pubescence (Fig. 26). Head with long hairs, scattered on clypeus (Fig. 20). Pubescence of ventral surface of posterior tibia restricted to basal and median part (Fig. 32). T1 with plumose hairs; T2–T3 with median pubescence short, hairs 0.4–0.7 times MOD; T4–7 with median pubescence long (2 times longer than in T2–3). *Sculpturing.* Metasomal terga homogeneously and densely punctate. *Structure.* Head broader than long (proportion 1.2–1.4:1); proportion of upper to lower interocular distance 0.9–1:1; upper interocular distance 6–7.3 times MOD; middle interocular distance 3.1–3.5 mm. Distance ocelloccipital (to median ocellus) 2.2–3 times MOD, orbitoccipital distance longer 0.8–1 mm. Proportions of interocellar to ocelocular distance 1.1–1.3:1, interocellar to ocelloccipital 0.9–1.1:1; ocelocular to alveolocellar 0.7–0.9:1; orbitoccipital to ocelocular 1.3–1.7:1; alveolocellar to interalveolar 0.9–1.2:1. Proportion of clypeocellar distance to distance between median ocellus and posterior margin of head (1.1–1.2:1). Frontal carina short 0.8–1 mm, apex reaching the lower level of

the antennal sockets. Clypeus broader than long (proportion 1.5–1.7:1). Proportion of length of scape, pedicel and first four flagellomeres 2.6–3.1:0.3–0.40:1:0.3–0.5:0.4–0.5:0.4–0.5. Labrum broader than long with median basal triangular process well defined. Genitalia as in figures 38, 44, 50 and 56.

Comments. In some females the ferruginous bands on T1–4 vary from light to dark coloration, mainly in specimens from northern provinces (Jujuy, Salta, Tucumán and Formosa).

Distribution (Fig. 61): **ARGENTINA:** Chaco, Corrientes, Entre Ríos, Formosa, Misiones, Jujuy, Santa Fe, Salta and Tucumán. Its distribution comprises part of Paranaense, Chaqueña, Pampeana and Yungas biogeographic provinces and the southernmost record of this species is the locality of Villa Elisa in the Entre Ríos province, approximately parallel 32°. Moure (2008) recorded this species from Brazil and Paraguay.

Additional examined material. A total of 277 specimens (259♀ and 18♂) from ARGENTINA. **CHACO.** 3♀, San Bernardo, Di Iorio (MLP); 1♀, Charata, 3-22-I-1982, M.Amela (MACN); 2♀, Colonia Bransen, 17-I-1951, B.Torres-A.Argemi (MLP); 1♀1♂, Resistencia, 7-XI-1952, Whack (MLP); 2♀, Roque Sáenz Peña, -1932, Onhneiser (MACN); 1♀, Parque Nacional Chaco, 25-II-2004, Compagnucci (MACN); 1♀, Sáenz Peña, 2-XI-1938, Fortuny Morey (MACN). **CORRIENTES.** 3♀, Yapeyú, 25-III-2010, M.Lucia-L.Álvarez (MLP); 1♀, Ituzaingó, -XI-1985, Fritz (MLP); 1♀, Ituzaingó, -XI-1978, Fritz (MLP); 3♀, Ituzaingó, -XI-1981, Fritz (MLP); 2♀, Ituzaingó, -I-1985, Fritz (MLP); 1♀, Ituzaingó, -III-1984, Fritz (MLP); 1♀, Ituzaingó, -X-1978, Fritz (MLP); 1♀, Colonia Carlos Pellegrini, 14-XI-2008, J. Pisonero (MLP); 4♀, P.N.Mburucuya, 8-I-2008, S.Plischuk (MLP); 2♀, Manantiales, 1-10-III-1959, M.Birabén (MLP); 1♂, Corrientes, -X-1933, Hayward (FML); 1♂, Ituzaingó, -12-1976, Fritz (MLP); 1♀, Laguna Ibera, 2-5-XI-2005, J. Farina (MMP); 1♀, Corrientes, 22-III-1911, Aniceto Soto (MACN); 1♀, Santo Tomé, -I-1928, (MACN); 1♀, Santo Tomé, -I-1924, (MACN). **ENTRE RÍOS.** 2♀, Villa Elisa, 11-II-1974, L.Gontero (IFML). **FORMOSA.** 1♀, Gran Guardia, J. Foerster, (MLP); 1♀, Clorinda, -IX-1947, I.Morel (IFML); 1♀, San Francisco de Laishi (Reserva el Bagual), 19-XIII-2001, J.P.Torretta (FAUBA); 2♀, San Francisco de Laishi (Reserva el Bagual), 21-XIII-2001, J.P.Torretta (FAUBA); 2♀, San Francisco de Laishi (Reserva el Bagual), 2-X-2002, J.P.Torretta (FAUBA). **JUJUY.** 1♀, Yuto, 10-IV-1911, P. Jörgensen (MLP). **MISIONES.** 6♀, L.N.Alem, 19-22-XI-2007, (55°19'15.7"W 27°36'15.8"S, 263 m.a.s.l), M. Lucia-L.Álvarez (MLP); 1♀, San Pedro, 19-22-XI-2007, (54°6'13.1"W 26°37'52"S, 545 m.a.s.l), M.Lucia-L.Álvarez (MLP); 1♀, Piñalito, 15-17-XI-2007, (53°50'18"W, 26°25'19"S, 713 m.a.s.l), M.Lucia-L.Álvarez (MLP); 9♀, El Soberbio, 19-22-XI-2007, (54°11'34"O, 27°16' 39.5"S, 139 m.a.s.l), M.Lucia-L.Álvarez (MLP); 4♀, Bompland, 21-X-2008, (55°28'54.9"W, 27°29'01.1"S, 176 m.a.s.l), M.Lucia-L.Álvarez (MLP); 4♀2♂, San Ignacio, 20-X-2008, (55°28'54.9"W, 27°29'01.1"S, 176 m.a.s.l), M.Lucia-L.Álvarez (MLP); 2♀, Loreto, 23-X-2008, (55°31'56.4"W, 27°20'16"S, 162 m.a.s.l), M.Lucia-L.Álvarez (MLP); 8♀, Puerto Iguazú, 30-I-13-III-1945, Hayward-Willink-Golbach (FML); 1♀, Ruta El Dorado-Irigoyen, 14-XI-1973, Willink-Tomsic (FML); 10♀2♂, Loreto, A.A. Ogloblin (MLP); 2♀, Puerto Esperanza, -X-1978, Fritz (MLP); 1♀, Misiones, 1-XII-1910, Jörgensen (MLP); 1♀, Misiones, 15-III-1909, (MLP); 1♀, Misiones, 4-I-1910, (MLP); 1♀, Misiones, 10-I-1910, (MLP); 1♀, Misiones, 27-III-1909, (MLP); 5♀, Puerto Iguazú, 1-IV-1985, A.H.Abrahamovich (MLP); 1♀, Misiones, 4-II-1910, (MLP); 1♀, Misiones, 3-I-1910, Jörgensen (MLP); 1♀, Misiones, 1-II-1911, (MLP); 1♀, Misiones, I-1910, Jörgensen (MLP); 1♀, Misiones, Jörgensen (MLP); 1♀, Misiones, 28-II-1910, Jörgensen (MLP); 1♀, Loreto, -V-1946, J.T (MLP); 1♀, Loreto, -II-1946, J.Tarahann (MLP); 11♀, San Juan, 24-IX-1924, M. Gómez (MACN); 1♀, Misiones, 2-I-1911, Ogloblin (MLP); 1♀, Misiones, 1-I-1911, (MLP); 1♂, Misiones, 6-IX-1910, Jörgensen (MLP); 3♀7♂, San Javier, 24-IX-1924, M.Gómez (MACN); 2♀, San Javier, -IV-1945, VonBulowl (MLP); 9♀, Puerto Bemberg, 12-29-I-1945, Hayward-Willink-Golbach (IFML); 6♀, Posadas, 1-III-1934, Rodríguez (MACN); 1♀, San Ignacio, -VI-1953, Viana-Decarlo (MACN); 1♀, Arroyo Itaemé, XII-1947, De Carlo-D'Amico (MACN); 5♀, Posadas, 14-II-1904 (MACN); 1♂, Dos de Mayo, 18-XI-1973, Willink-Tomsic (IFML); 1♀, Puerto Bemberg, 29-IV-1950, M.Sala (MACN); 1♀, San Ignacio, 4-5-IV-1974, C & M. Bardy (BMNH); 1♀, Pilcomayo, J.Graham Kerr (BMNH); 1♀, Caraguatay, -I-1960, (MLP); 1♂, Cabure-I, 18-VIII-1980, J.L.Farina-L.Farina (MMP); 71♀, San Juan, (MACN); 2♀, Pindapoy, 7-1943, G.Williner (MACN); 2♀, San Juan, 21-IV-1923, (MACN); 2♀, San Juan, 28-II-1923, Melian (MACN); 2♀, Misiones, 14-XI-1922, (MACN); 1♀, San Juan, 7-XI-1923, (MACN); 1♀, San Juan, 5-X-1924, (MACN); 1♀, Parque Prov. Moconá, 9-XII-2005, Medan (FAUBA); 2♀, Posadas (MACN); 5♀, San Juan, 10-XII-1924, M.Gómez (MACN); 1♀, Santa María (Dpto. de Concepción), -XI-1943, (MACN). **SANTA FE.** 1♀, Villa Guillermina, 25-II-1946, Hayward-Willink (IFML); 2♀, Villa Guillermina, 21-II-1946, Hayward-Willink (IFML); 1♀, Tartagal, 4-III-1946, Hayward-Willink (IFML); 1♀, Villa Ana, 22-I-1957, A.Willink (IFML). **SALTA.** 1♀, Río Piedras, 20-XI-1941, Jörgensen (MLP); 1♀, Gral. Ballivian, 2-6-XII-1941, P. Danier (MLP). **TUCUMÁN.**

1♂, Tucumán (430 m.a.s.l), 30-I-1965, W.Weyrauch (IFML); 1♀, El Manantial, -III-2005, E. Virla (MLP); 1♀, Chilcas (Dto. Burruyacu), 5-VI-1975, C. Golbach (IFML). **FORMOSA.** 1♀, Las Lomitas, 15-XI-2007, Compagnucci (MACN). **JUJUY.** 1♀, Yuto, 28-II-1955, Jörgensen (MLP). **SALTA.** 1♀, Aguas Blancas (Oran), 700 m.a.s.l, Jörgensen (E.O. Vollenweider) (MLP); 1♀, Gral Ballivian, 17-XI-1942, (MLP).

***Xylocopa (N.) tacanensis* Moure, 1949**

(Figures 7, 13, 58)

Xylocopa tacanensis Moure, 1949: 457. Lectotype: ♀, Deposited at DZUP. Type locality: Tucumán (photographs of Lectotype has been examined).

Xylocopa (Neoxylocopa) tacanensis, Hurd & Moure, 1963: 151.

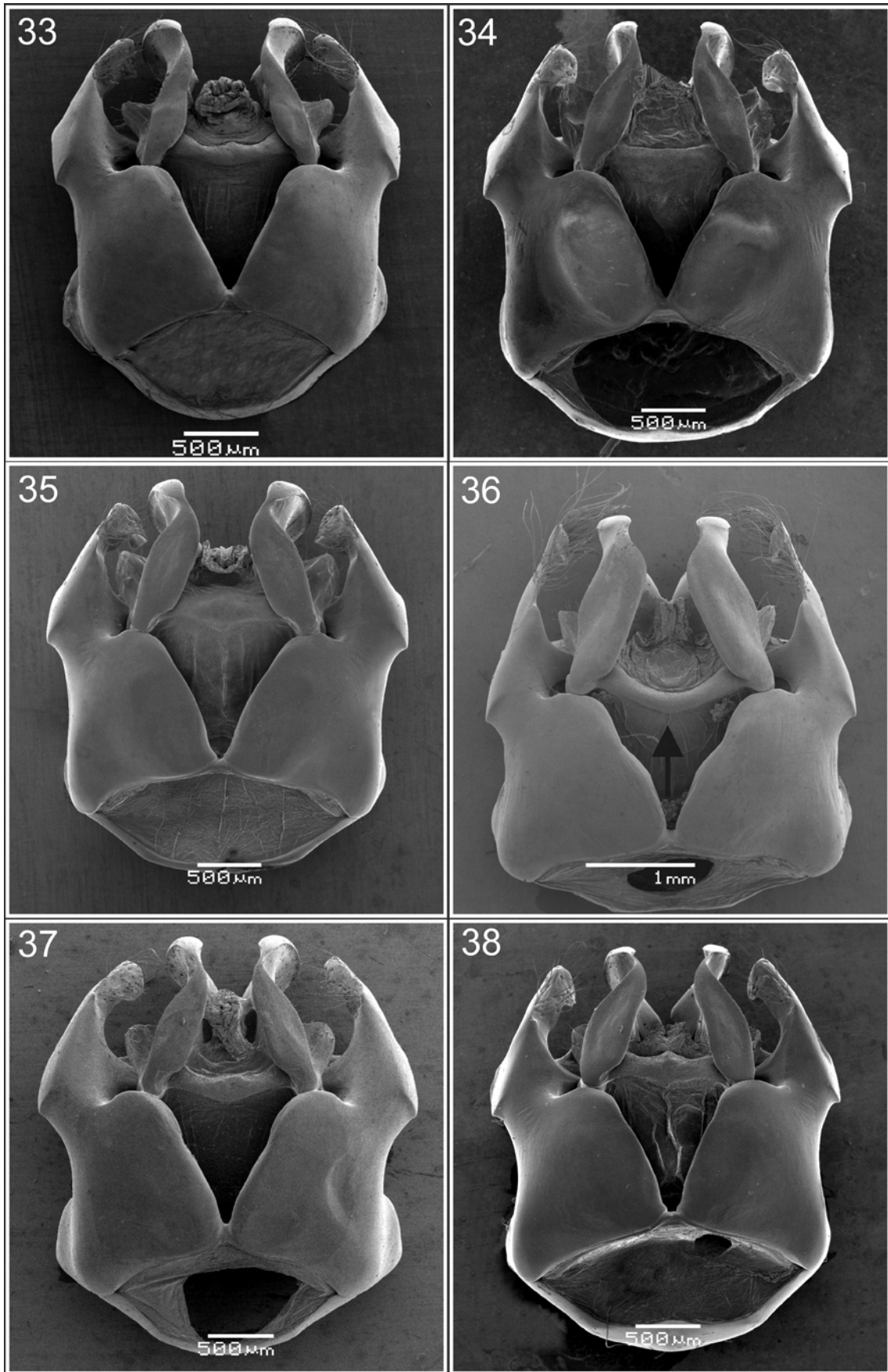
Diagnosis. The female of this species can be distinguished from other Argentinian large carpenter bees by the following combination of characters: integument black, mesosomal dorsum densely covered with ferruginous hairs, T2–T3 with median pubescence short, 0.3–0.6 times MOD; gena narrow and densely punctate; tegula dark brown. The female of this species resembles that of *X. eximia* in the pubescence ferruginous on dorsal of mesosoma; however, it differs from that species in the length of median pubescence on T2–T3 and the color of the tegula. This species is only known from females.

Female. Approximate body length 22 mm (20–23.3); head length 5 (4.6–5.3); head width 5.8 (5.4–6.2); mesosoma width 7.3 mm (6.4–8 mm); metasoma width 8.2 mm (7.2–9.4 mm); forewing length 18 mm (17–19 mm); forewing width 5.5 mm (5.2–5.6 mm). **Coloration.** Integument predominantly black. Antenna and tegula dark brown. Wing dark brown with violet iridescent. **Pubescence.** Predominantly black, except ferruginous on scutum, scutellum, metanotum, propodeum, mesepisternum below tegula and pronotal lobe. Head with abundant hairs, scattered on supraocular area and upper and inner part of the gena (Fig. 7). Mesosoma with abundant plumose hairs, except hairless on disc and posterior area of scutum. Metasoma with long hairs laterally; T1 with intermixed plumose and simple hairs; T2–T3 with median pubescence short, hairs 0.3–0.60 MOD; T4–5 with median pubescence longer than T2 (3 or 4 times); T6 with long hairs (4–5 times longer than in T2) (Fig. 13). **Punctuation.** Head regularly and densely punctate; median longitudinal area of clypeus smooth, weakly defined. Scutum densely punctate, except impunctate on disc and posteriorly. Metasomal terga regularly and densely punctate, except T2 with median area sparsely punctate. **Structure.** Head broader than long (proportion 1.1–1.2:1); inner orbits weakly incurved, proportion of upper to lower interocular distance 0.9:1; middle interocular distance 3.7–4.6 mm. Vertex narrow, distance ocelloccipital (to median ocellus) 3.2–4 times MOD; orbitoccipital distance short 0.9–1.1 mm. Lateral ocelli below supraocular line, approximately MOD. Proportions of interocellar to ocelocular distance 0.8–0.9:1, interocellar to ocelloccipital 0.6–0.7:1, ocelocular to alveolocellar 0.8–1: 1, orbitoccipital to ocelocular 1.1–1.2:1, alveolocellar to interalveolar 1–1.3:1. Proportion of clypeocellar distance to distance between median ocellus and posterior margin of head (1–1.10:1). Frontal carina moderately elevated, short 0.8–1 mm, apex scarcely exceed upper level of antennal sockets. Clypeus broader than long (proportion 1.9–2.3:1). Proportion of length of scape, pedicel and first four flagellomeres 3.1–3.3:0.3–0.45:1:0.3–0.4:0.4–0.5:0.4–0.5. Labrum broader than long, with three basal protuberances the median elongated and triangular shape, the laterals twice wider than median. Scutellum gently rounded as seen in profile. Apex of basitibial plate beyond middle length of tibia, asymmetrically bifid, posterior apical lobe rounded and shorter than anterior lobe.

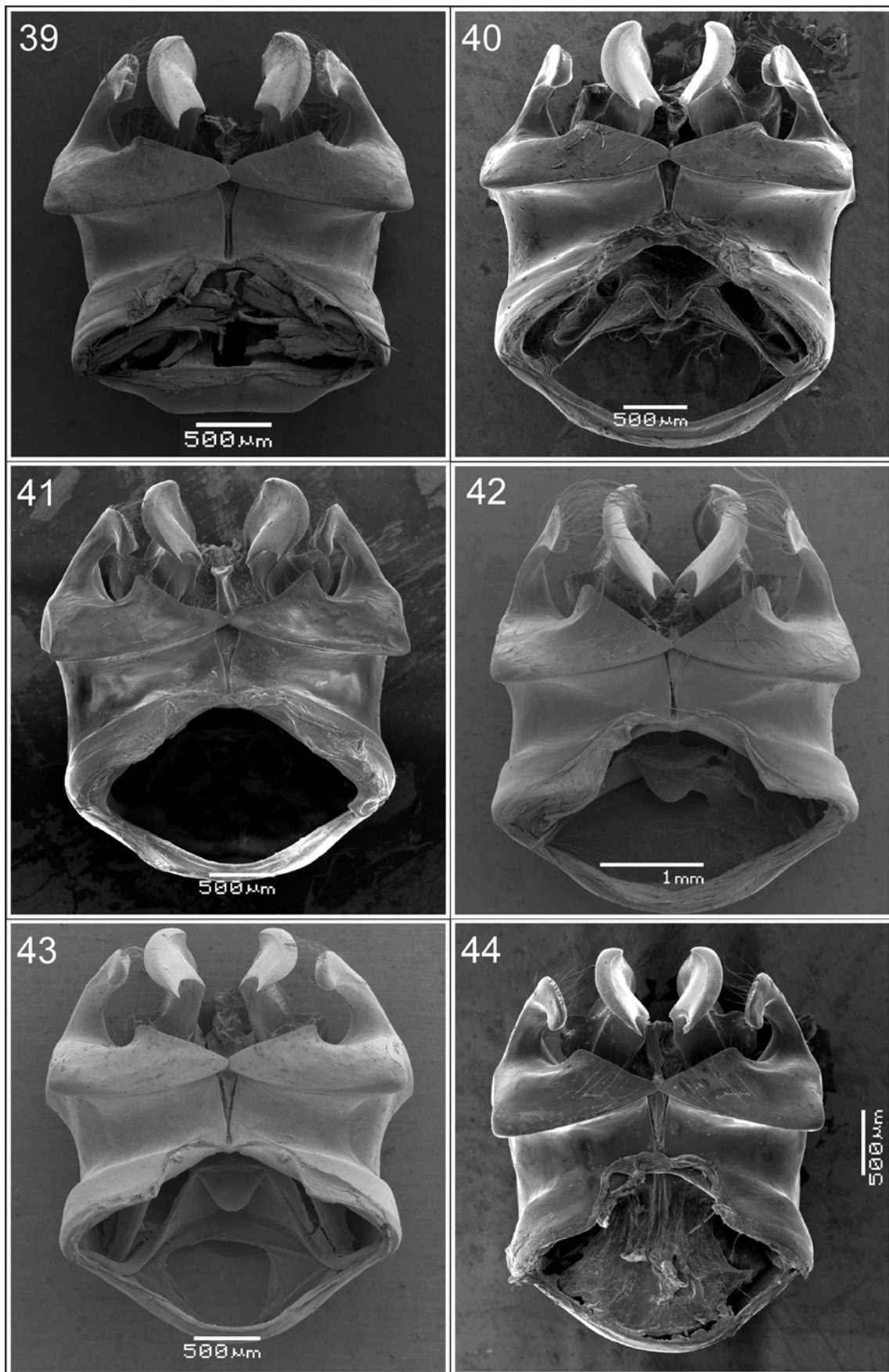
Male: unknown

Comments. This species does not show considerable variation in the color pattern. The following areas are brown in some female studied: legs, genae, scutellum and metasomal terga. We also examined specimens in which the color of the tegula ranges from dark brown to light brown. This species is similar to *X. eximia* and having several characters to differentiate both (see diagnosis), however *X. tacanensis* could be a geographic variation of *X. eximia*. The discovery of the male of *X. tacanensis* may reveal if this “variability” is related to geographical variations or are different species.

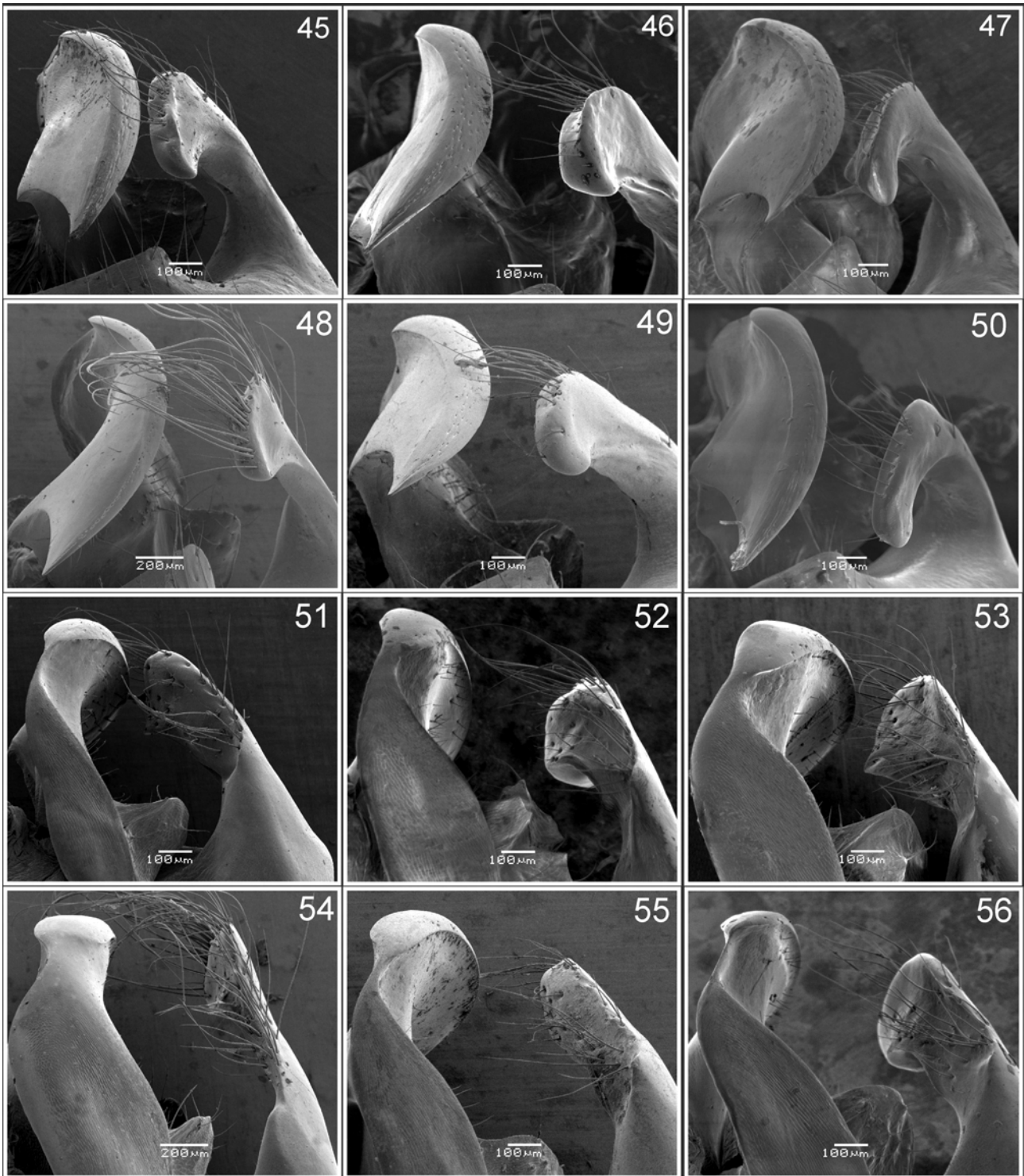
Distribution (Fig. 58): **ARGENTINA:** Tucumán, Corrientes and Misiones. Its distribution comprises part of Yungas and Paranaense biogeographic provinces and the southernmost record of this species is North of Corrientes province, approximately parallel 27°. Moure (2008) recorded this species from Brazil.



FIGURES 33–38. Genitalia male, dorsal view. 33, *Xylocopa atamisquensis*; 34, *Xylocopa augusti*; 35, *Xylocopa eximia*; 36, *Xylocopa frontalis*; 37, *Xylocopa mendozana*; 38, *Xylocopa nigrocincta*.



FIGURES 39–44. Genitalia male, ventral view. 39, *Xylocopa atamisquensis*; 40, *Xylocopa augusti*; 41, *Xylocopa eximia*; 42, *Xylocopa frontalis*; 43, *Xylocopa mendozana*; 44, *Xylocopa nigrocincta*.

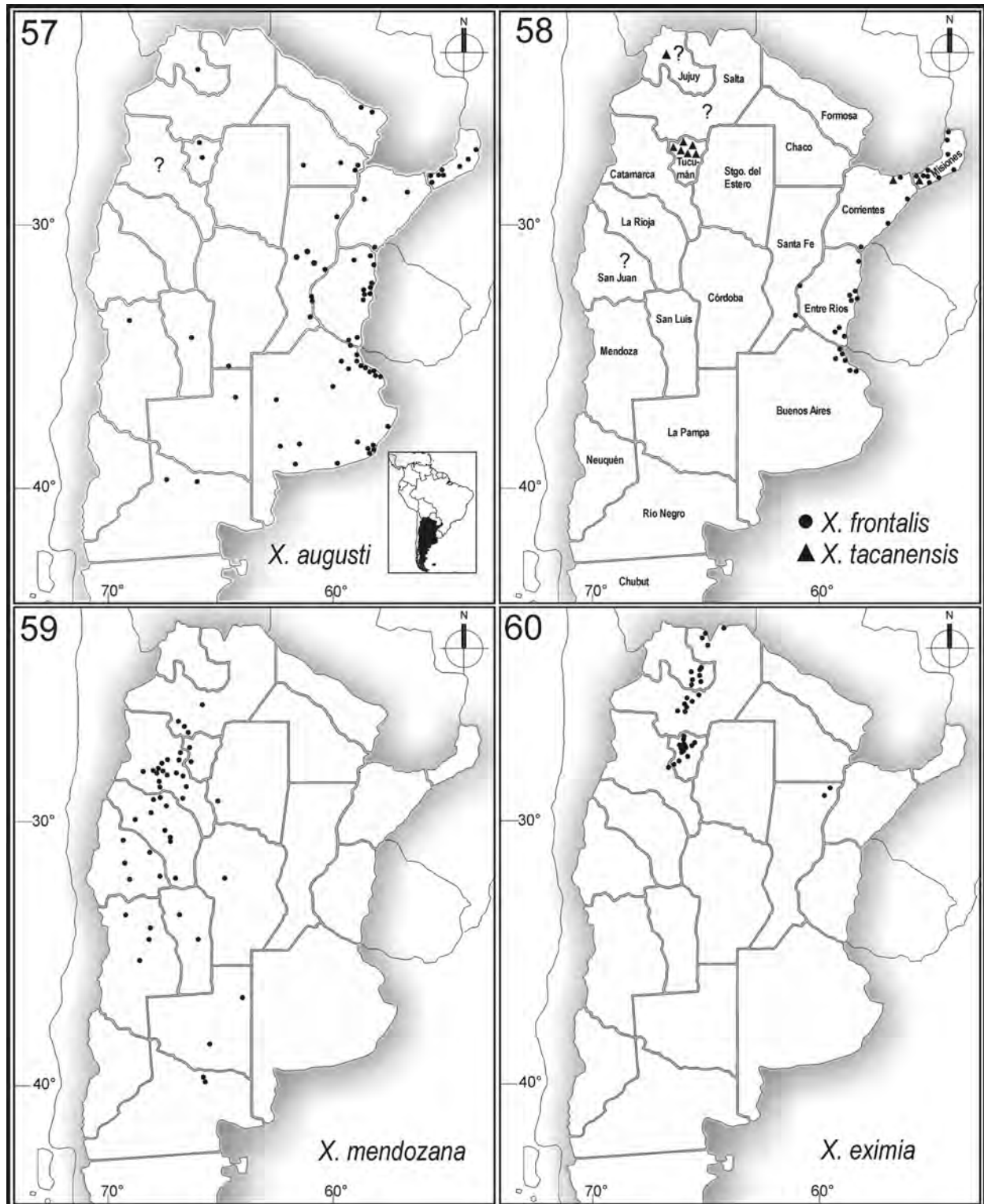


FIGURES 45–56. Gonostyle and pennis valve, ventral view. 45, *Xylocopa atamisquensis*; 46, *Xylocopa augusti*; 47, *Xylocopa eximia*; 48, *Xylocopa frontalis*; 49, *Xylocopa mendozana*; 50, *Xylocopa nigrocincta*. Gonostyle and pennis valve, dorsal view. 51, *Xylocopa atamisquensis*; 52, *Xylocopa augusti*; 53, *Xylocopa eximia*; 54, *Xylocopa frontalis*; 55, *Xylocopa mendozana*; 56, *Xylocopa nigrocincta*.

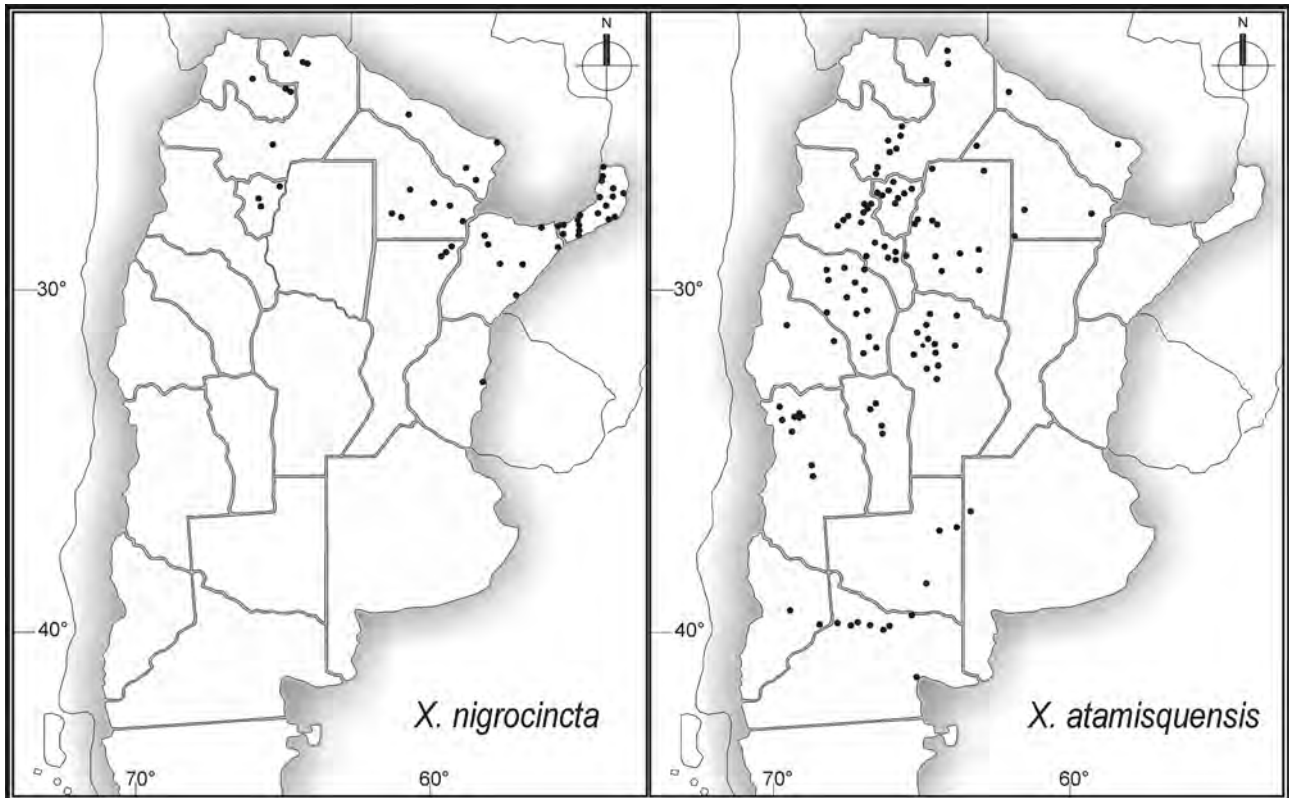
Type material. Lectotype female (DZUP), label data: Tacanas, Arg. I-1948 P.J. Arnau Leg// *Xylocopa tacanensis* Moure 1949 [handwritten]//COTIPO [red label]// LECTOTIPO *Xylocopa tacanensis* Moure, 1949 [red label]. The lectotype of this species was designated by Urban in 2003.

Additional examined material. A total of 25 specimens (25♀) from ARGENTINA. **CORRIENTES.** 1♀, Ituzaingó, -X-1978, Fritz (MLP). **MISIONES.** 1♀, Posadas, (MACN). **TUCUMÁN.** 1♀, Las Cejas, 19-X-1968,

Willink (IFML); 1♀, La Soledad (Cañete) Depto. Cruz Alta, 16-XI-1965, Bucher (IFML); 1♀, Los Nogales, IV-1947, Ares (IFML); 1♀, Tucumán, -X-1941, V.Streikov (MLP); 2♀, Tucumán, -II-1949, (IFML); 1♀, Quebrada Cainzo, 30-IV-¿, G.Golbach (IFML); 1♀, Amaicha del Valle, -IV-1946, Hayward (IFML); 3♀, Tucumán, -I-1947, Córdoba (IFML); 3♀, Famailla, -IV-1947, B.L.García (IFML); 2♀, Tucumán, -III-1946, Folguer (IFML); 1♀, Trancas, -II-1947, Golbach (IFML); 2♀, Cadillal, -XII-1946, De la Sota (IFML); 1♀, Los Bulacios, 30-I-1948, Ares (IFML); 2♀, Vizcacheral, -V-1948, B.L.García (IML); 1♀, San Pedro de Colalao, 30-III-1949, Guanuco (IFML); 1♀, Trancas-San Pedro de Colalao, -I-1953, J.M.Arnau (IFML).



FIGURES 57–60. Occurrence maps. ? = Province cited in bibliography, but not confirmed in this study.



FIGURES 61–62. Occurrence maps.

Biological notes

A total of 35 nests of *Xylocopa* of the following species were collected and studied: 12 nest of *X. augusti*, five of *X. nigrocincta*, seven of *X. eximia*, six of *X. atamisquensis*, and five of *X. frontalis*. Below are comparative comments on the nest structure of each species.

Nest Architecture

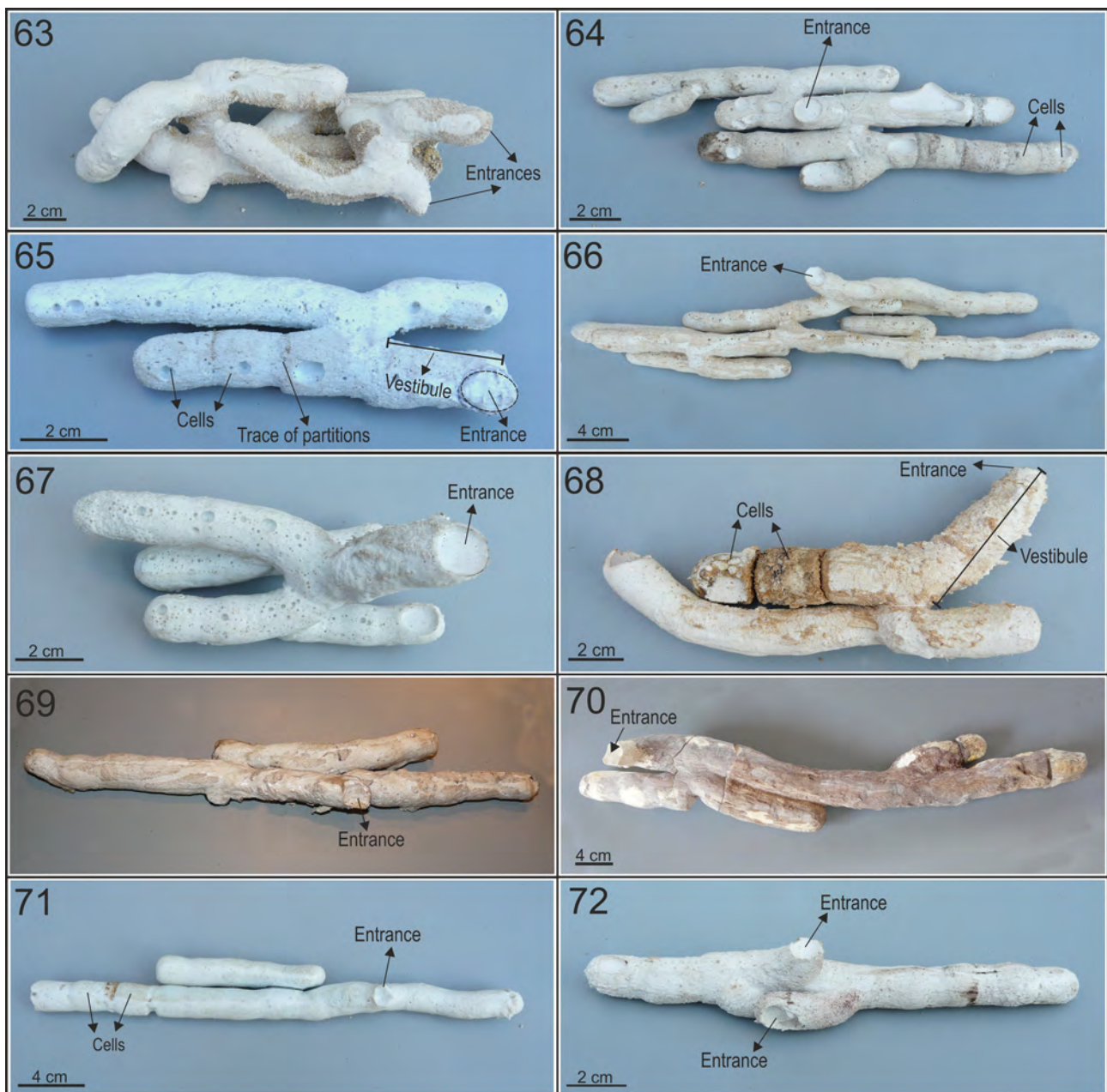
***X. augusti* (Figs. 65–66).** Nests of this species were collected in Buenos Aires and Corrientes provinces. Nests were built in dry wood of trees belonging to 12 botanical families (Table 3). An active nest of this species was also observed in a live trunk of *Celtis ehrenbergiana* (Celtidaceae). Internally, nests are branched, with a single entrance connected to a system of tunnels through a vestibule that vary between 21–80 mm in length ($\bar{x}=46 \pm 20.4$ mm; $n=11$) (Fig. 65–66); brood cells are barrel-shaped, with partitions varying in thickness, wider in contact with the walls of the tunnel (4–6 mm, $\bar{x}=4.5 \pm 0.7$ mm; $n=22$) and thinner towards the center (2–3 mm, $\bar{x}=2.5 \pm 0.5$ mm; $n=22$) (Table 2). Partitions are smooth and concave on outer surface rough and even on inner surface. Tunnels length ranged from 14 mm to 202 mm ($\bar{x}=74 \pm 33.5$; $n=54$) and from 1 to 13 (Table 2) depending on the age of the nest.

***X. nigrocincta* (Figs. 71–72).** Nests of this species were found in Misiones province and were also built in dry wood of trees belonging to three botanical families (Table 3). The structure, cells disposition, and partitions are similar to *X. augusti*, except as follows: the vestibule vary between 7–34 mm in length ($\bar{x}=18.2 \pm 12.5$ mm; $n=5$) (Table 2 and Fig. 71–72). In all cases, nests were located in living trees at heights lower than 3.2 m above the ground. Two or three tunnels were found in nests, each ranging from 52 mm to 137 mm in length ($\bar{x}=81.7 \pm 27.7$) (Table 2). Although a single nest entrance is normally found, we observed two in a nest built in a trunk of *Melia azedarach* (Meliaceae).

***X. eximia* (Figs. 67–68).** Nests of this species were collected in Tucumán province and were built in dry wood of trees belonging to five botanical families (Table 3). The structure, cells disposition, and partitions are similar to

X. augusti, except as follows: vestibule vary from 40–59 mm in length ($\bar{x}=51 \pm 8.1$ mm; $n=5$) (Table 2, Fig. 67–68). The length of the tunnels encountered per nest varied from 35 mm to 153 mm ($\bar{x}=60.7 \pm 30$), the number of tunnels was 1–5 (Table 2). Five of the studied nests were in the same trunk (1.20 m in length), but were not connected. Nests 2 and 3 did not have brood cells and were in an early stage of construction. Pollen masses found in nest 7 were elliptical in shape (not triangular shape as seem in most of species), 13 to 19 mm (major axis) and 12 to 14 mm (minor axis) ($n=7$) (Fig. 67–68), probably because the larvae already have been eaten part of pollen.

X. atamisquensis (Figs. 63–64). Nests of this species were collected in Santiago del Estero province, and were built in dry wood of trees belonging to three botanical families (Table 3). The structure, cells disposition and partitions are similar to *X. eximia*, except as follows: the partitions vary between 3–6 mm ($\bar{x}=4.8 \pm 1.2$ mm; $n=12$) in contact to wall tunnel and the vestibule vary in length between 5–46 mm ($\bar{x}=18.5 \pm 4.5$ mm, $n=8$) (Table 2, Fig. 63–64). The length of the tunnels encountered per nest varied from 20 mm to 93 mm ($\bar{x}=55.7 \pm 18.5$), the number of tunnels was 1–7 (Table 2). Two nest studied were in the same trunk and without connection between them, located in an interval of 42 cm of length.



FIGURES 63–72. Molds of nests of *Xylocopa*. 63–64, *Xylocopa atamisquensis*; 65–66, *Xylocopa augusti*; 67–68, *Xylocopa eximia*; 69–70, *Xylocopa frontalis*; 71–72, *Xylocopa nigrocincta*.

TABLE 2. Measurements of the nest of *Xylocopa augusti* studied. Entrance diameter: H = horizontal V = vertical. Measurements in millimeters.

Diameter of branch	Entrance diameters	Internal tunnels diameter	N° of tunnels	Tunnels length <i>Min–Max</i> ($\bar{x} \pm SD$)	N° of cells	Cell length <i>Min–Max</i> ($\bar{x} \pm SD$)
<i>Xylocopa augusti</i>						
140	H:11 V:13	15.9 ± 0.7	6	25–77 (43 ± 18.8)	8	15–21 (18 ± 2)
90	H:10 V:12	17.7 ± 0.7	3	48–92 (67 ± 22.4)	7	16–18 (17.1 ± 1.1)
110	H: 11 V: 12	18	6	55–100 (85 ± 19)	17	17–21 (19.5 ± 1.3)
94	H:12 V:15	16.1 ± 2.2	2	14–71 (39.3 ± 29)	4	16–19 (17.5 ± 1.7)
94	H: 14 V: 20	16.6 ± 0.9	5	39–102 (67.4 ± 29)	12	16–22 (18 ± 2)
-	H: 13 V: 13	16 ± 1.1	2	30–83 (56.5 ± 37.5)	-	----
-	H: 13 V: 13	16.5 ± 1.1	2	88–90 (89 ± 1.4)	-	----
-	H: 12 V: 13	15.8 ± 0.8	13	34–123 (81.4 ± 33.8)	19	15–22 (18.6 ± 1.9)
65.90	H: 14.50 V: 13.50	17 ± 1.41	4	59–202 (99.6 ± 68.7)	4	18–23.4 (20.5 ± 2.4)
61.75	H: 14.65 V: 15	15 ± 0.8	4	50–92 (70 ± 17.3)	-	----
68.64	H: 13 V: 14	14.3	1	74	-	----
68.64	H: 13 V: 14	17 ± 1.4	5	54–120 (91.6 ± 28.4)	11	17.5–24 (21.7 ± 2.4)
<i>Xylocopa nigrocineta</i>						
39	H:12 V:11	14.4 ± 0.7	3	77–137 (98.7 ± 33.3)	14	12–17 (14.6 ± 1.2)
40	H:12 V:11	-	-	---	-	---
80	H:11 V:10	14.8 ± 0.6	2	---	-	---
56	H:9 V:10	13 ± 0.6	2	52–73 (62.5 ± 14.9)	4	17–19 (17.7 ± 1)
39	H:10 V:10 H:11 V:12	16.4 ± 0.2	2	60–91 (75.5 ± 22)	6	19–20 (18 ± 1.7)
<i>Xylocopa eximia</i>						
112	H:15 V:14	16 ± 1.4	5	36–69 (49 ± 12.3)	8	15–19 (16.3 ± 1.6)
123	H:12 V:12	16.11	1	69 ---	-	----
115	H:12 V:12	15.3	1	20 ---	-	----
132	H:12 V:13	16.2 ± 2	3	35–93 (63 ± 29)	4	15–17 (16.3 ± 1)
140	H:12 V:14	16.6 ± 0.7	5	46–63 (53 ± 7)	7	15–18 (17.1 ± 1.2)
90	H:15 V:17	18 ± 0.5	2	90–153 (122 ± 44.5)	9	15–21 (18.6 ± 2.3)
<i>X. frontalis</i>						
320	H:16 V:17	17 ± 1	6	81–174 (11 ± 33)	13	24 20 (22 ± 1.21)
144	H:16 V:16	22.1 ± 1.7	4	62–232 (111 ± 81)	3	20–21 (20.7 ± 0.6)
95	H:13 V:15	18.2 ± 0.7	3	51–108 (71 ± 32)	-	---
300	H:18 V:17	20.3 ± 1.5	3	62–151 (97.7 ± 47)	3	21–25 (23 ± 2)
300	H:17 V:19	21.7 ± 1	6	110–140 (120 ± 16)	-	---
<i>X. atamisquensis</i>						
77	H:18 V:18 H:12 V:12	15.9 ± 1.1	6	20–62 (49.8 ± 16)	7	14–19 (16.6 ± 1.8)
58	H:11 V:11	14.8 ± 1.2	7	28–93 (61.3 ± 23.7)	13	13–19 (15.7 ± 1.9)
78	H:12 V:11	13	1	18 ---	-	----
47	H:10 V:10	15.5 ± 1.1	2	72–84 (78 ± 8.5)	6	14–18 (15.7 ± 1.4)
47	H:10 V:11	14.1	2	42–49 (45.5 ± 5)	3	16–17 (16.3 ± 0.6)
43	H:10 V:10	15	4	40–65 (49 ± 11.2)	6	14–16 (15.5 ± 0.8)

X. frontalis (Figs. 69–70). Nests of this species were collected in Buenos Aires and Misiones provinces, and were built in dry wood of trees belonging to five botanical families (Table 3). The structure, cells disposition and partitions are similar to *X. augusti*: the partitions vary between 4.5–6 mm in length (\bar{x} =5.5±0.5 mm; n=12) in contact to wall tunnel. The vestibules vary between 32–77 mm in length (\bar{x} =48.7 ±24.7; n=3) (Table 2 and Fig. 69–70). The length of the tunnels encountered per nest varied from 51 mm to 232 mm (\bar{x} =127.4 ±54.3), the number was 3–6 (Table 2).

TABLE 3. Nesting substrates and localities in which *Xylocopa* species nests founded in this study and previously records cited in the bibliography.

Species	Substrates used	Province and Locality	Reference
<i>X. augusti</i>	<i>Ceiba speciosa</i> (Bombacaceae)	Buenos Aires La Plata 34°54'33" S 57°56'13" W, 26 m.a.s.l)	This study
	<i>Celtis tala</i> (Ulmaceae)	Buenos Aires Punta Piedras (35°23'23" S 57°09'23" W, 7 m.a.s.l)	This study
	<i>Cinnamomum glanduliferum</i> (Lauraceae)	Buenos Aires, La Plata (34°54'45" S 57°55'48" W, 26 m.a.s.l)	This study
	<i>Cordyline spectabilis</i> (Ruscaceae)	Buenos Aires Mar del Plata (38°00'18" S 57°32'33" W, 14 m.a.s.l)	This study
	<i>Erythrina crista-galli</i> (Fabaceae)	Buenos Aires, La Plata (34°54'45" S 57°55'48" W, 26 m.a.s.l)	This study
	<i>Eucalyptus</i> sp (Myrtaceae)	Buenos Aires La Plata (34°54'45" S 57°55'48" W, 26 m.a.s.l) Berisso (34°52'21" S 57°53'28" W, 5 m.a.s.l) Bransen (35°10'00" S 58°13'40" W, 19 m.a.s.l)	This study, Abrahamovich & Girarde (1991)
	<i>Parkinsonia aculeata</i> (Fabaceae)	Buenos Aires La Soberana (Pdo. Gral. Dorrego, Cuartel 4) (38°52'37"S, 61°27'41" W, 32 m.a.s.l)	This study
	<i>Fraxinus pennsylvanica</i> (Oleaceae)	Buenos Aires, La Plata (34°54'45" S 57°55'48" W, 26 m.a.s.l) Buenos Aires Berisso (34°52'21" S 57°53'28" W, 5 m.a.s.l)	This study
	<i>Grevillea robusta</i> (Protaceae)	Buenos Aires, La Plata, 34°54'33" S 57°56'13" W, 26 m.a.s.l)	This study
	<i>Jacaranda mimosifolia</i> (Bignoniaceae)	Buenos Aires, La Plata, (34°54'45" S 57°55'48" W, 26 m.a.s.l)	This study
	<i>Myrceugenia glaucescens</i> (Myrtaceae)	Buenos Aires, Berisso 34°52'00" S 57°52'00" W, 5 m.a.s.l)	
	<i>Platanus acerifolia</i> (Platanaceae)	Buenos Aires, La Plata (34°54'45" S 57°55'48" W, 26 m.a.s.l),	This study
	<i>Populus deltoides</i> (Salicaceae)	Buenos Aires Berisso, (34°52'21" S 57°53'28" W, 5 m.a.s.l) Buenos Aires, La Plata (34°54'45" S 57°55'48" W, 26 m.a.s.l)	This study
	<i>Salix</i> sp. (Salicaceae)	Buenos Aires Berisso 34°53'12" S 57°53'41" W , 6 m.a.s.l)	This study
	<i>Salix</i> sp. (Salicaceae)	Buenos Aires	Telleria (1999)
<i>Syagrus romanzoffiana</i> (Arecaceae)	Buenos Aires Mercedes, (34°38'57" S 59°24'50" W, 39 m.a.s.l)	This study	

.....continued on the next page

TABLE 3. (Continued)

Species	Substrates used	Province and Locality	Reference
	Timber of <i>Pinus</i> sp. (post)	Buenos Aires Berisso (34°52'56" S 57°53'44" W, 4 m.a.s.l)	This study
	<i>Tipuana tipu</i> (Fabaceae)	Buenos Aires, La Plata (34°54'16" S 57°56'02" W, 24 m.a.s.l) Corrientes, Monte Caseros 30°14'50" S 57°37'32" W, 43 m.a.s.l)	This study
<i>X. frontalis</i>	<i>Erythrina crista-galli</i> (Fabaceae)	Buenos Aires Berisso 34°53'35" S 57°54'49" W, 6 m.a.s.l)	This study
	<i>Eucaliptus</i> sp (Myrtaceae)	Buenos Aires, Berisso 34°53'12" S 57°53'41" W, 6 m.a.s.l)	This study
	<i>Grevillea robusta</i> (Proteaceae)	Buenos Aires Berisso (34°52'21" S 57°53'28" W, 5 m.a.s.l).	This study
	<i>Hovenia dulcis</i> (Rhamnaceae)	Misiones, Iguazú	This study
	<i>Populus deltoides</i> (Salicaceae)	Berisso (34°52'21" S 57°53'28" W, 5 m.a.s.l).	This study
	<i>Tipuana tipu</i> (Fabaceae)	Buenos Aires, La Plata (34°54'16" S 57°56'02" W, 24 m.a.s.l)	This study
<i>X. nigrocincta</i>	<i>Jacaranda mimosifolia</i> (Bignoniaceae)	Misiones, San Ignacio 27°29'01" S 55°28'54"W, 176 m.a.s.l	This study
	<i>Melia azedarach</i> (Meliaceae)	Misiones Bompland, 27°29'01"S 55°28'54"W, 176 m.a.s.l)	This study
	<i>Platanus acerifolia</i> (Platanaceae)	Misiones Bompland, 27°29'01"S, 55°28'54"W, 176 m.a.s.l)	This study
	<i>Tabebuia</i> sp (Bignoniaceae)	Misiones, San Ignacio 27°29'01" S 55°28'54"W, 176 m.a.s.l	This study
<i>X. eximia</i>	<i>Cedrella balansae</i> (Meliaceae)	Salta, Urundel (23°30'25" S 64°25'41"W, 390 m.a.s.l)	This study
	<i>Citrus</i> sp (Rutaceae)	Tucumán, Horco Molle, (26°47'36"S, 65°19'1"W, 720 m.a.s.l)	This study
	<i>Ceiba chodatii</i> (Bombacaceae)	Tucumán, Horco Molle, (26°47'36"S, 65°19'1"W, 720 m.a.s.l)	This study
	<i>Jacaranda mimosifolia</i> (Bignoniaceae)	Tucumán, Horco Molle 26°47'36"S, 65°19'1"W, 720 m.a.s.l)	This study
	<i>Salix</i> sp (Salicaceae)	Tucumán, San Pedro de Colalao 26°37'11"S, 65°11'44"W, 667 m.a.s.l)	This study
<i>X. atamisquensis</i>	<i>Arundo donax</i> (Poaceae)	Mendoza	Jørgensen, 1909 (cited as <i>X. brasilianorum</i>)
	<i>Salix</i> sp. (Salicaceae)		
	<i>Populus</i> sp. (Salicaceae)		
	<i>Melia azedarach</i> (Meliaceae)	Salta, Morillo (23°28'02" S 62°53'07" W, 225 m.a.s.l)	This study
	<i>Populus nigra</i> (Salicaceae)	Santiago del Estero (Capital), (26°47'60"S, 65°11'58"W, 192 m.a.s.l)	This study
	<i>Stetsonia coryne</i> (Cactaceae)	Santiago del Estero, Villa Atamisqui, (28°27' 36"S, 63° 50'53"W, 123 m.a.s.l)	This study

Discussion

Seven species of *Xylocopa* (*Neoxylocopa*) were recorded in Argentina (Table 1). These species show a particular distribution pattern; some are distributed along the eastern or western of the country while others are only found from the Northern provinces. *Xylocopa eximia* and *X. tacanensis* are known only from above 28°S. The range of *X. eximia* is more extensive in the north-west, from Tucumán to Jujuy provinces, while *X. tacanensis* is restricted to Tucumán. However, both species have isolated records in northern Santa Fe far away from their north-west distribution area (Figs. 58, 60). These species are largely associated to Yungas and urban habitats in the north-west in and likely associated with southern segment of the Oriental Chaco in the north-east, locally known as the Cuña Boscosa Santafesina (translating as Santa Fe Forest Wedge). *Xylocopa frontalis* and *X. augusti* are restricted to the eastern region with records spanning from northern Buenos Aires to northern Misiones. The range of *X. augusti* is more extensive, but it is still restricted to the east; with most localities extending from southern Buenos Aires to northern Formosa, with a few records in other provinces (Fig. 57). Both species are closely associated with riparian forests or associated with urban habitats. In contrast, two species have a restricted distribution in the western and central regions of Argentina: *X. atamisquensis* and *X. mendozana* are distributed from northern Neuquén to northern Salta; however, the first species has a wider distribution including provinces in the central region. These two species are frequently found in urban habitats, but are more abundant in drier environments, characteristic of highland areas of central region and Andean environments in the west. Finally, *X. nigrocincta* is known from the east, with records from Entre Ríos to northern Formosa, and from the north-west, from Tucumán to northern Salta. This species occurs in similar habitats to those of the first four species. The southernmost record of *Xylocopa* (*Neoxylocopa*) in Argentina belongs to *X. atamisquensis* in northern Rio Negro, approximately at 40°S.

All seven species in Argentina build branched nests structurally as in other wood-nesting *Xylocopa*: an entrance hole leading into a system of tunnels. Depending on the substrate, a space of communication or vestibule between the hole and the tunnels might be present. The information obtained on the nest structure of *X. frontalis*, *X. augusti* and *X. nigrocincta* matches previous observations by Schrottky (1904), Strand (1912), Hurd (1958), Sakagami & Laroca (1971) and Camillo & Garófalo (1982) in nests from Paraguay and Brazil. As indicated by Strand (1912) and Sakagami & Laroca (1971), the substrate used by *X. nigrocincta* to build its nests consists of trunks of no more than 10 cm of diameter (Figs. 71–72). For *X. eximia*, only a single nest built in a bamboo cavity in Bolivia was known (Janvier 1955). The nests we studied differed from that described by Janvier mainly in cell length (15–21 mm in this study vs 20–30 mm) and partition thickness (4–6 mm vs 3–4 mm). The nest entrance hole cannot be compared because the bamboo culms described by Janvier already had a certain diameter, suggesting that the entrance hole was not constructed by the bee. The presence of two entrance holes in a nest was observed for *X. nigrocincta* and *X. atamisquensis* in stems of *Melia azedarach* (Meliaceae) and *Stetsonia coryne* (Cactaceae) (Figs. 63 and 72), agreeing with some nests of *X. frontalis* (Hurd, 1958) and *X. hirsutissima* (Sakagami & Laroca 1971) in Brazil.

We also observed cases in which multiple nests of the same species were built in the same branch. We found 2–5 nests of *X. augusti*, 2–4 nests of *X. frontalis* and 2–9 nests of *X. eximia*. Nests of different species using the same branch has also been previously reported, such as the association of *X. augusti* and *X. frontalis* (Moure 1961; Sakagami 1971), the record of *X. eximia* nesting is new. On the other hand, nidification of two different species in the same branch was recorded in *X. augusti*-*X. frontalis*, *X. augusti*-*X. splendidula* and *X. frontalis*-*X. viridis*. The species studied here nested in a wide variety of substrates and are thus classified as eurytopic, nesting in a wide variety of substrates (see Camillo & Garófalo 1982). In Argentina nests of *X. augusti* were built in 18 different substrates in 12 families, *X. atamisquensis* and *X. frontalis* in six substrates of four and five families respectively; *X. eximia* in five substrates of five families and *X. nigrocincta* in four substrates in three families.

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