



Entomofauna

ZEITSCHRIFT FÜR ENTOMOLOGIE

Band 18, Heft 18: 237-244

ISSN 0250-4413

Ansfelden, 30. Juni 1997

**An update on the Ibero-balearic species of
Xylocopa LATREILLE, 1802,
with new data in Morocco
(Hymenoptera, Anthophoridae)**

F. Javier ORTIZ-SÁNCHEZ

Abstract

This paper deals with the Ibero-balearic species of *Xylocopa* LATREILLE, 1802. In this particular area four species can be found. *X. valga* GERSTÄCKER, 1872 and *X. violacea* (LINNAEUS, 1758) are the most frequent ones. *X. iris* (CHRIST, 1791) is represented by two subspecies, their records being relatively scarce. Although there are few records of *X. cantabrita* LEPELETIER, 1841, it is probably spread all over the Iberian Peninsula. The paper also includes new data on Moroccan species. Finally, a new key for the identification of the species and subspecies has been worked out.

Key-words: *Xylocopa*, *Anthophoridae*, Spain, Portugal, Morocco.

Zusammenfassung

Es werden die ibero-balearischen Arten der Gattung *Xylocopa* LATREILLE, 1802 behandelt. Die Region beherbergt vier Arten: *X. valga* GERSTÄCKER, 1872 und *X. violacea* (LINNAEUS, 1758) sind die häufigsten. *X. iris* (CHRIST, 1791) kommt in zwei Unterarten vor, ihre Nachweise sind spärlich. Obwohl nur wenig Funde von *X. cantabrita* LEPELETIER, 1841 bekannt sind, ist sie wohl über die ganze iberische Halbinsel verbreitet. Die Arbeit enthält auch Angaben über marokkanische Arten. Ein Bestimmungsschlüssel für die Arten und Unterarten wird ausgearbeitet.

Schlüssel-Wörter: *Xylocopa*, *Anthophoridae*, Spanien, Portugal, Marokko.

Resumen

Actualización de las especies ibero-baleares del género *Xylocopa* LATREILLE, 1802, con nuevos datos para Marruecos (*Hymenoptera*, *Anthophoridae*).

Este artículo reúne las especies ibero-baleares del género *Xylocopa*. En dicha área, el género está representado por cuatro especies. *X. valga* GERSTÄCKER, 1872 y *X. violacea* (LINNAEUS, 1758) son las más frecuentes. *X. iris* (CHRIST, 1791) está representada por dos subespecies, siendo sus citas relativamente escasas. Los datos para *X. cantabrita* LEPELETIER, 1841 son escasos, pero la especie debe estar bien repartida por toda la Península Ibérica. También se aporta nuevos datos para Marruecos. Finalmente, se ha confeccionado una nueva clave para la identificación de las especies y subespecies.

Palabras clave: *Xylocopa*, *Anthophoridae*, España, Portugal, Marruecos.

Introduction

The genus *Xylocopa* LATREILLE, 1802 includes bee species called 'large carpenter bees' due to their habit of constructing nests in holes they find in wooden materials and that they are able to enlarge. The 'small carpenter bees' belong to the genus *Ceratina* LATREILLE, 1802. Both genera are included in the subfamily *Xylocopinae*.

The tribe in which *Xylocopa* is comprised (*Xylocopini*) is basically tropical and subtropical, with some species (like the ones in our fauna) that reach temperate areas (MICHENER, 1979).

The number of species of this genus in some West European countries is as follows: four in France, one in Belgium, one in Luxembourg, three in Switzerland (RASMONT et al. 1995); three in Italy (PAGLIANO 1994). Six species have been found in Morocco (DUSMET 1924, 1931) and four in Algeria (VACHAL 1899).

There is no data on the presence of *Xylocopa* bees in the Canary Islands (BAEZ & ORTEGA 1978). This group is very familiar in the Ibero-balearic fauna because of its two most common species, i.e., *X. valga* GERSTÄCKER, 1872 and *X. violacea* (LINNAEUS, 1758). Their main characteristics are: large-sized and deep black-coloured with violet glint. However, two other species occur in our fauna, *X. cantabrita* LEPELETIER, 1841 and *X. iris* (CHRIST, 1791), but they are less known because they are less noticeable (size and colour) and more scarce.

X. violacea has been recorded in 31 Spanish provinces, and *X. valga* in 17. This disproportion in the respective records exists in France as well (for example BENOIST 1930). Portugal shows an extreme situation. In this country the presence of *X. valga* has not been reported yet, but *X. violacea* is '... very frequent all over the country ...' (DINIZ 1959). This leads to the suspicion that both species have been mistaken some times because of their extraordinary similarity with the naked eye. So, little rigorous sampling in the field followed by repetitive bibliography reviews not aided by the study of collections may have caused this situation.

With regard to the less known species in our Peninsula, their records are very scarce and suspiciously concentrated in areas like 'centre of Spain', 'Catalonia' or 'north of Spain'.

The conclusion is clear: the 'popularity' of one species (*X. violacea*) has frequently caused that collectors have not collected any material in the field, ascribing the records directly to this species. Apart from that, there is another fact to take into account: this type of 'contagious' distributions (concentrated around a city or in an area) is directly related to those of collectors and authors, which unfortunately happens to many other insect groups too.

Due to all the aforementioned we have considered it necessary to make this updating

and to add new data to the knowledge of this genus.

Methods

This paper is based on:

- Bibliography review. The previous data about this genus both in Spain and near countries has been examined.
- Study of specimens in several collections. The following ones have been studied: Departamento de Biología Animal y Ecología, Universidad de Granada (CDBA henceforth); Estación Experimental de Zonas Áridas, C.S.I.C., Almería (EEZA); material from the author's collection (JO); material from Mr. Leopoldo CASTRO's collection (LC); Museo Nacional de Ciencias Naturales, C.S.I.C., Madrid (MNCN).
- Field observations. The author provides his own notes, taken during his sampling trips, about plant species visited by *Xylocopa* bees and biotopes in which captures were carried out.

The provinces from which we have studied some specimens are listed in 'Results and Discussion'. However, we specify localities (places) in the cases we provide the first record in the respective province.

Results and Discussion

Subgenus *Rhysoxylocopa* HURD & MOURE, 1963

Xylocopa cantabrita LEPELETIER, 1841

This species was described with material from 'North of Spain'. Scarce data has been given in Spain; it comprises the northern half, plus an isolated record in Granada (VACHAL 1899). The latter was considered doubtful until a few years ago, when ORTIZ (1989) confirmed its presence in that province. There are no records in Balearic and Canary islands.

Apart from Spain, this species has been recorded in the south of France (Perpignan, see BENOIST 1930) and in Portugal (Almendres, Coimbra, see DINIZ 1959). Moreover, DUSMET (1931) mentioned one specimen from the north of Morocco, both without any concrete information.

Material studied: Spain: Almería, Cádiz, Granada, Jaén, Madrid, Segovia, Teruel, Valladolid. Morocco: Azrou, Ketama.

New records: Spain. Almería: 1 ♂, 1 ♀, Cerro del Pontón (María), Sierra de María, 1300 m, 30SWG67, 7-V-1994, JO (on *Asphodelus* sp., pine forest). Cádiz: 1 ♂, Sierra de Zafalgar (P.N. Grazalema), 1000 m, 7-V-1995, JO (on *Salvia* sp.). Jaén: 1 ♂, Loma del Caballo (Cazorla), Sierra de Cazorla, 1380 m, 30SWG19, 26-VI-1994, JO (on *Phlomis herbaventi*, pine forest edge).

Morocco. Azrou, 1 ♂, without date of collection, MNCN (ESCALERA coll.). Zoco Telata, Ketama (Rif), 1 ♂, VI-1932, MNCN (C. BOLÍVAR coll.). Another place communicated by MNCN: Tizi Taka (Middle Atlas, to the south of Boumia), (1 specimen).

The data above considerably enlarges the known range of this species in the south of the Iberian Peninsula, and confirms its presence in Morocco.

Subgenus *Copoxyla* MAA, 1954

Xylocopa iris (CHRIST, 1791)

Some previous records for this species in Western Europe have been given under the name of its synonym *X. cyanescens* BRULLÉ, 1832 (synonymy given by MAA 1954).

According to WARNCKE (1982), the populations of this species are divided into three subspecies:

***X. iris cupreipennis* SMITH, 1874**

It occurs in northwestern Africa. The specimens from Morocco studied and called *X. cyanaescens* BR. by DUSMET (1923) could belong to this subspecies. We have studied one specimen sent by MNCN: 1 ♀, 'Amis' (it must be Amismiz, in the north face of the High Atlas, south-west of Marraquech), collected by M. de la ESCALERA, without any other information. We do not know this subspecies, so that cannot assert whether the specimen belongs to it or not, though it is similar to the *X. iris uclesiensis* PÉR. specimens from Spain.

***X. iris iris* (CHRIST, 1791)**

The nominal subspecies is distributed from France to Afghanistan, comprising Catalonia and islands such as Corsica, Sardinia, Sicily and Crete.

In Spain this subspecies has concrete records only in Catalonia: Barcelona and Gerona (DUSMET 1923; VERGÉS 1964).

Material studied: Barcelona, Gerona.

The material studied gives no new information different from the already known. It could seem that the Ebro Valley is the southern limit of this subspecies' distribution.

***X. iris uclesiensis* PÉREZ, 1901**

An Iberian endemism considered at specific level until recently. Paradoxically, DUSMET (1923) had cast doubt on that taxonomic status many years before.

This bee had been recorded only in eight Spanish provinces, all of them in the centre of Spain, till ORTIZ (1989) found it in Granada.

Material studied: Albacete, Almería, Ávila, Badajoz, Granada, Huesca, Madrid, Salamanca, Segovia, Sevilla, Teruel, Valencia.

New records. Almería: 1 ♂, Macián (Vélez Blanco), 1200 m, 30SWG69, 4-VIII-91, JO (on *Centaurea calcitrapa* and *Onopordum* sp. next to a source of water). Badajoz: 1 ♀, Los Molinos (Higuera la Real), 500 m, 29SQC02, 20-VIII-1978, LC. Huesca: 1 ♀, R. Españañador (Peñalba), 260 m, 30TBF59, 11-IV-96, LC. Salamanca: 4 ♀♀, Peñaranda de Bracamonte, without date of collection, MNCN (MORENA PADIN coll.). Sevilla: 1 ♀, Sevilla, 7-V-93, MNCN. Teruel: 1 ♀, Fuente de la Cera (Noguera), 1550 m, 30TXK28, 18-VIII-1993, LC; 1 ♂, Monte Azú (Gea), 1030 m, 30TXK37, 2-VIII-84, LC (on *Onopordum* sp.); 1 ♀, Bronchales, without date of collection, MNCN. Valencia: 1 ♂, Cañada (Rincón de Ademuz), without date of collection, MNCN (GINER MARÍ coll.); 1 ♀, Godelleta, 3-VI-1929, MNCN (F.Z. CERVERA coll.).

These records enlarge the known range of this subspecies towards the north-east (perhaps delimiting its area of contact with the nominal subspecies), east, and south-west of Spain. The record in Badajoz, plus a previous one in Zamora, make its presence in Portugal likely.

Subgenus *Xylocopa* sensu stricto

***Xylocopa valga* GERSTÄCKER, 1872**

Species with a West-palaearctic distribution. As far as we know, it has not been recorded in Portugal yet. However, we must consider its presence in that country nearly certain, taking into account a recent record in Cáceres (ORNOSA 1993). It has not been recorded in any Spanish archipelago yet. In peninsular Spain there are records including a huge part of the territory except for Galicia and Valencia-Murcia.

Material studied: Alicante, Almería, Ciudad Real, Córdoba, Granada, Guadalajara, Jaén, Madrid, Málaga, Teruel, Zaragoza.

New records. Alicante: 1 ♂, Benifallín, 28-IV-1972, EEZA (A. COBOS coll.). Córdoba: 2 ♀♀, Río de la Hoz (Rute), 30SUG83, without date of collection, CDBA; 1 ♂, Sierra de Rute, 30SUG73, 6-IV-1982, CDBA. Guadalajara: 1 ♀, Molina, 30TWL92, 24-IX-1989, LC (D. SANZ coll.). Málaga: 1 ♂, Antequera, 2-V-1975, CDBA.

This new data enlarges this species' known range to the País Valenciano and, in Andalusia, in its western half.

***Xylocopa violacea* (LINNAEUS, 1758)**

Species with a West-palaeartic distribution. Very frequent in the Iberian Peninsula (previous records cover the whole territory) and Balearic Islands (Majorca).

Material studied: Alicante, Almería, Cádiz, Ciudad Real, Córdoba, Granada, Guadalajara, Huesca, Jaén, Madrid, Málaga, Majorca, Murcia, Salamanca.

New records. Córdoba: 1 ♀, Córdoba, IV-1973, CDBA; 1 ♂, Españares, Sierra Morena, 660 m, 30SUH82, 1-V-1994, JO (on *Asphodelus* sp.). Guadalajara: 1 ♀, Molina, 30TWL92, 24-IX-1989, LC (D. SANZ coll.). Málaga: 1 ♂, Antequera, 3-V-1980, CDBA; 1 ♂, Benaoján, 28-V-1971, EEZA (J. SUÁREZ coll.); 1 ♂, Gaucín, 29-V-1971, EEZA (J. SUÁREZ coll.); 1 ♂, Málaga, 23-IV-1978, CDBA; 1 ♀, Molino Canto (Arriate), 660 m, 30SUF17, 1-VI-1984, CDBA. Salamanca: 1 ♀, La Alberca, 15-VII-1972, EEZA (J. SUÁREZ coll.); 1 ♀, Béjar, 17-VII-1972, EEZA (J. SUÁREZ coll.).

This data does not greatly enlarge the known range of the species, but provides information in provinces where, logically, the species was expected to be found.

Comments

The information in this article shows clearly that all *Xylocopa* species in our fauna have a more or less wide range. However, some of them have been rarely recorded, either for the difficulty in collecting specimens (forest habits and high altitude flight, staying on flowers only for a while) or because of the scarcity of collectors and specialists in certain regions or, in the case of *X. valga*, even for having confused it with *X. violacea* in the field.

COMBINATION	LOCALITY
<i>cantabrita - iris uclesiensis</i> <i>- valga - violacea</i>	- Cerro de las Pipas (Monachil, Sierra Nevada, Granada), 1400 m, 30SVG50, 10-V-94, JO. - El Ventorrillo (Sierra Guadarrama, Madrid), 1480 m, 1990, MNCN (Nieves & Rey coll.)
<i>cantabrita - violacea</i>	- Sierra Zafalgar (P.N. Grazalema, Cádiz), 900 m, 30STF87, 7-V-95, JO.
<i>valga - violacea</i>	- Benifallín (Alicante), 28-IV-72, EEZA (A. Cobos coll.). - Molina (Guadalajara), 24-IX-89, LC (D. Sanz coll.). - Silla del Moro (Granada), 8-V-78, CDBA.

Table I. Some combinations of *Xylocopa* Latr. species found together in the same place.

Field observations by the author confirm that some *Xylocopa* species can live together in the same place and at the same period of time in the year, what can lead non-specialists to mistake them. In 'Cerro de las Pipas' (Monachil, Sierra Nevada, 1400 m, 30SVG50, Granada), on 10 May 1994, the author was able to see, at the same time, bees belonging to the four Spanish species in a lucerne field. This crop was close to a pine and *ilex* forest. Moreover, it is relatively frequent to see *X. valga* and *X. violacea* bees in the same place at the same time, as well as other possible combinations. Table I shows some combinations of *Xylocopa* species that have been found together by the author (either in the field or from specimens in collections).

It can be said that the Iberian *Xylocopa* species constitute two groups: two frequent and abundant species (*X. valga* and *X. violacea*), and two relatively frequent but rather scarce ones (*X. cantabrita* and *X. iris*).

We must mention here another species recorded in Spain, *X. olivieri* LEPELETIER, 1841. Its range occupies a strip from Albania to Pakistan. However, there is a record in 'Spain' mentioned by CEBALLOS in his checklist of 1956. No other author has recorded it in Spain afterwards, nor have we found any specimen belonging to this species within the material studied. So, we must understand that the record could be due to a wrong labelling or to a later misinterpretation of the data of location (mistake copied by CEBALLOS), and conclude that this species, if not confirmed, does not exist in the Iberian Peninsula.

Key to the Ibero-Balearic species of *Xylocopa* LATREILLE, 1802

The most recent key for the Spanish species dates from the first quarter of the current century (DUSMET 1923). Besides, in some steps of that key, only one character and, moreover, with high variability (size) and subjective interpretation (colour) was used. In the same way, that author did not take into account a simple but definitive character in order to distinguish between *X. valga* GERST. and *X. violacea* (L.) females. Due to this antecedent, plus the new status of *uclesiensis* PÉR., there was a need for a new key.

♀♀

- 1 Length: 20-27 mm. Deep black integument. Dark wings, with violet glint. At least, 2 longitudinal rows of small teeth on the outer side of the hind tibiae. 2
- Without those characters together. 3
- 2 At least, 3 rows of teeth on the hind tibiae occupying more than half its length and not allowing the presence of a smooth, shining surface among them. First flagellomere equals in length the next two. *valga* GERST.
- Only two rows of teeth forming a strip narrower and shorter and, between them, a smooth, shining surface. First flagellomere equals in length the next three. *violacea* (L.)
- 3 Length: 18-22 mm. Greyish hair, reddish yellow hair on legs and the apex of the metasoma. Transparent wings, with yellowish glint. One row of small teeth on the hind tibiae. *cantabrita* LEP.
- Length: 14-17 mm. Dark wings, with violet glint. 4
- 4 Black integument with metallic blue glint, mainly on the metasoma. Black hair, some greyish hair on head and thorax. *iris* ssp. *iris* (CHRIST)
- Black integument without blue glint. Black hair mixed with brown and/or greyish hair on face-clypeus, thorax, first tergum and sides of the rest, and sterna *iris* ssp. *uclesiensis* PÉR.

♂♂

- 1 Length: 18-25 mm. Deep black integument. Dark wings, with violet glint. 2
- Without those characters together. 3
- 2 Black antennae. First flagellomere equals in length the next two. No spines on the hind coxae. *valga* GERST.
- Black antennae; at least, 9th and 10th flagellomeres reddish yellow (this colour often spreads to other flagellomeres). First flagellomere equals in length the next three. A strong spine on each hind coxa. *violacea* (L.)
- 3 Length: 15-20 mm. Greyish hair, reddish yellow hair on legs and the apex of the metasoma. Transparent wings, with yellowish glint. Hind basitarsi with a bump on the inner side. *cantabrita* LEP.
- Length: 13-17 mm. Dark wings, with violet glint. 4
- 4 Black integument, with metallic blue glint, mainly on the metasoma. Black hair, some grey hair on head and thorax. *iris* ssp. *iris* (CHRIST)
- Black integument, without blue glint. Black hair on legs and 3rd to 7th terga, brown and/or grey on the rest of the body. *iris* ssp. *uclesiensis* PÉR.

Acknowledgements

This study was supported in part by the project "Fauna Ibérica III", SEUI-DGICYT PB-92-0121.

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Author's address:

F. Javier ORTIZ-SÁNCHEZ
Centro Tecnológico F.I.A.P.A.
Ctra. de la Playa s/n.
04120 La Cañada (Almería)
Spain

Literaturbesprechung

HALL, R. & BLUNDELL, D.J. (eds.) 1996: Tectonic Evolution of Southeast Asia. - The Geological Society, London. 566 S.

Der phylogenetisch und zoogeographisch interessierte Entomologe wird immer mit geologischen Gegebenheiten seines Untersuchungsgebietes zu tun haben. Für Europa existieren viele Standardwerke, für tropische Regionen sind solche geologischen Arbeiten eher selten. Der Inhalt dieses Bandes beschäftigt sich mit der Region östlich und südlich von Myanmar (Burma), beinhaltet also Südchina, Laos, Thailand, Kambodscha, Vietnam, Malaysia, Indonesien, die südlichen Philippinen und einen Teil Papua-Neuguineas. Zoogeographisch liegt der Schwerpunkt somit in der Wallacea, dem indoaustralischen Zwischengebiet, einer nicht nur geologisch aktiven Region, sondern auch einer sich ökonomisch rapide entwickelnden Region, deren Fundus im wesentlichen die natürlichen Ressourcen sind. Die beiden Herausgeber sind Mitarbeiter der Southeast Asia Research Group der Londoner Universität und haben in diesem beachtlichen Band 34 hochaktuelle Beiträge zusammengestellt. Die Prozesse der Plattenkollisionen lassen sich in dieser Region besonders gut verfolgen. Alle Beiträge stehen auf hohem Niveau und sind mit Fotos, Grafiken, Tabellen und z.T. farbigen Grafiken hervorragend illustriert. Hervorzuheben sind hier vor allem die Beiträge von Robert HALL "Reconstructing Cenozoic SE Asia", Steven BERGMAN et al. "Tertiary Tectonic and magmatic evolution of western Sulawesi..." und Moyra WILSON & Dan BOSENCE "The Tertiary evolution of South Sulawesi."

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Roland GERSTMEIER

Druck, Eigentümer, Herausgeber, Verleger und für den Inhalt verantwortlich:
Maximilian SCHWARZ, Konsulent für Wissenschaft der O.Ö. Landesregierung,
Eibenweg 6, A-4052 Ansfelden

Redaktion: Erich DILLER, ZSM, Münchenhausenstrasse 21, D-81247 München, Tel. (089) 8107-159

Fritz GUSENLEITNER, Lungitzerstrasse 51, A-4222 St. Georgen / Gusen

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Erika SCHARNHOP, Himbeerschlag 2, D-80935 München, Tel. (089) 8107-102

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Emma SCHWARZ, Eibenweg 6, A-4052 Ansfelden

Thomas WITT, Tengstrasse 33, D-80796 München

Postadresse: Entomofauna (ZSM), Münchenhausenstrasse 21, D-81247 München;

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Jahr/Year: 1997

Band/Volume: [0018](#)

Autor(en)/Author(s): Ornosá Conception, Gamarra Purificación, Ortiz-Sánchez F. Javier

Artikel/Article: [An update on the Ibero-Balearic species of *Xylocopa LATREILLE, 1802*, with new data in Morocco \(Hymenoptera, Anthophoridae\). 237-244](#)