



A survey and phenotypic study of carpenter bee species recorded in Kzo village and its environs / Dohuk Governorate – Iraq

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Abstract. All studies were conducted during the years 2020-2021 in the village of Kzo and its environs of Dohuk Governorate / northern of Iraq, the results of the survey led to the collection of 42 samples, Samples which all belongs to the genus *Xylocopa* , Six samples represent four species from all samples were sent to Dr Munazah Associate Professor, Department of Entomology, University of Agriculture and Science and Technology of Kashmir, India for classification , The result of classification showed that three of them were belong to the sub-genus *Xylocopa* represent two species, one male of species *Xylocopa varentzowi* The main character is that the front legs were contained a dense group of long white hairs on the outer part of the tibia, Male and female of species *Xylocopa violacea* the female were contained a density of black hairs on the front legs and more on the hind legs, The males of this species are distinguished by their antenna, in which the flagella consists of 11 segments and its segments is brown, but the ninth and tenth segments (9-10) which were characterized by their yellowish-orange color, and the other three specimens were belong to the sub-genus *Proxylocopa* represent two species, one female of species *Xylocopa rufa* were characterized by the calyx sita or hairs which covering edges of the abdominal region which were interrupted and unconnected in the middle, male and female of species *Xylocopa olivieri* were characterized by the hairs which were covered the edges of the abdominal tergite segments, pale yellow color, continuous and unbroken in the middle, The results of phenotypic studies of male and females samples of the four species *Xylocopa varentzowi*, *Xylocopa violacea*, *Xylocopa rufa* and *Xylocopa olivieri* is reported for the first time from the high altitudes of Duhok Governorate(more than 1,140 m above sea level), Iraq.

Keywords: *Xylocopa*, *Proxylocopa*, carpenter bees.

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Introduction

The large carpenter bee species *Xylocopa* is a strong bee diffused around the world, with a length of 13-30 mm, black, blue, green, metallic or yellow mostly tropical and subtropical (Michener, 2007 and Terzo et al., 2007). Özbek (2013a) studied Confirmed the importance and role of many species of *Xylocopa* in the pollination of different cultivated plants, such as alfalfa, sunflower, and various fruit trees, as agricultural pollination is the first and indispensable step in a process that leads to the production of fruits, vegetables, nuts and seeds, and thus Agriculture largely depends on the pollination of insects, especially wild bees, as it is believed that they

fulfill 75% of the requirements for cross-pollination of crops, for fruit crops due to their specialized behaviors on flowers and flower persistence (Dar et al., 2020). *Xylocopa varentzowi* is very low distributed in the Palearctic and reported here for the first time from the Dohuk Governorate in Iraq. Its presence is known from Asia and Middle East (Afghanistan, Iran, Palestine, Turkmenistan, and Turkey), (Ascher and Pickering, 2021; Terzo and Rasmont, 2011; Terzo & Rasmont, 2014), The genus *Xylocopa* contains 31 subgenus, and about 470 species of subfamily Xylocopinae, *Xylocopa* is one of the main insect groups on which studies of social evolution depend (Michener, 2007), The species of *Xylocopa* (Hymenoptera: Apoidea: Apidae: Xylocopinae) recorded so far in Iraq is *Xylocopa aestuans* (Linnaeus, 1758) listed by Khalaf and Al-Omar (1974), *Xylocopa fenestrata* (Fabricius, 1798) listed by Derwesh (1965), *Xylocopa pubescens* Spinola, 1838 listed by Swailem et al. (1974) , *Xylocopa olivieri* Lepelletier, 1841 listed

byDerwesh (1965) , *Xylocopa rufa* Friese, 1901 listed byDerwesh (1965) , *Xylocopa violacea* (Linnaeus, 1758) listed by Swailem et al. (1974) and last species *Xylocopa varentzowi* Morawitz, 1895 listed by Amin (2015) .

Materials and Methods

Exploring the colonies

A number of areas where the spread of bees was observed, including the village of Kzo, bablo and Badi was conducted to survey the wood and fruit trees that the insect preferred to build their nests, such as the poplar and willow tree, and through the survey that was conducted, which was field survey of other areas. In order to collect bee samples, two species of *X. olivieri* and *X. violacea* bees were followed, the first species is the one that builds nesting in the soil and the second species that builds nesting and establishes the colonies on the dead wood and on human construction , where a complete colony was found with its larvae, eggs and adults, and it was brought and preserved in a place that was controlled and recorded observations through the daily follow-up of the colony.

Processing of specimens

The collected specimens were killed by freezing them, then pinned and hanged using wooden hardness, Tongue, mandibles, antennae, legs and wings were stretched properly. The processed specimens were permanently labelled giving details of locality, date of collection, and collector name. Specimens examined and classify were deposited in the Division of Entomology, SKUAST-

K, India by Dr Munazah Yaqoob and Umer Bin Farook.

Results and discussion

The Diagnostics of phenotypic and morphological studies of male samples of the species *Xylocopa varentzowi* showed that there diagnostic character the front legs which they were contained a dense group of long white hairs on the outer part of the tibia, and the length of the hairs was about 1.8 mm, and it was noted with less density and shorter length on the femur with a length of 1.5 mm, while the female samples of the species *X. violacea* was distinguished by its large size, with a body length of 23-28 mm, the flagellum in the antenna consists of 10 segments, the density of black hairs on the front legs and more on the hind legs, The males of this species are distinguished by their antenna, in which the flagella consists of 11 segments and its segments is brown, but the ninth and tenth segments 9-10 which were characterized by their yellowish-orange color,

As for the species *X. rufa* was characterized by the second thorax area, which had circular spot devoid of capillary hairs. As for the calyx sita or hairs which covering edges of the abdominal region were Interrupted and unconnected in the middle. As for the females of the species *X. olivieri*, the hairs were covered the edges of the abdominal tergite segments, which where pale yellow color and they are continuous and unbroken in the middle. (figure, 1-a, f).

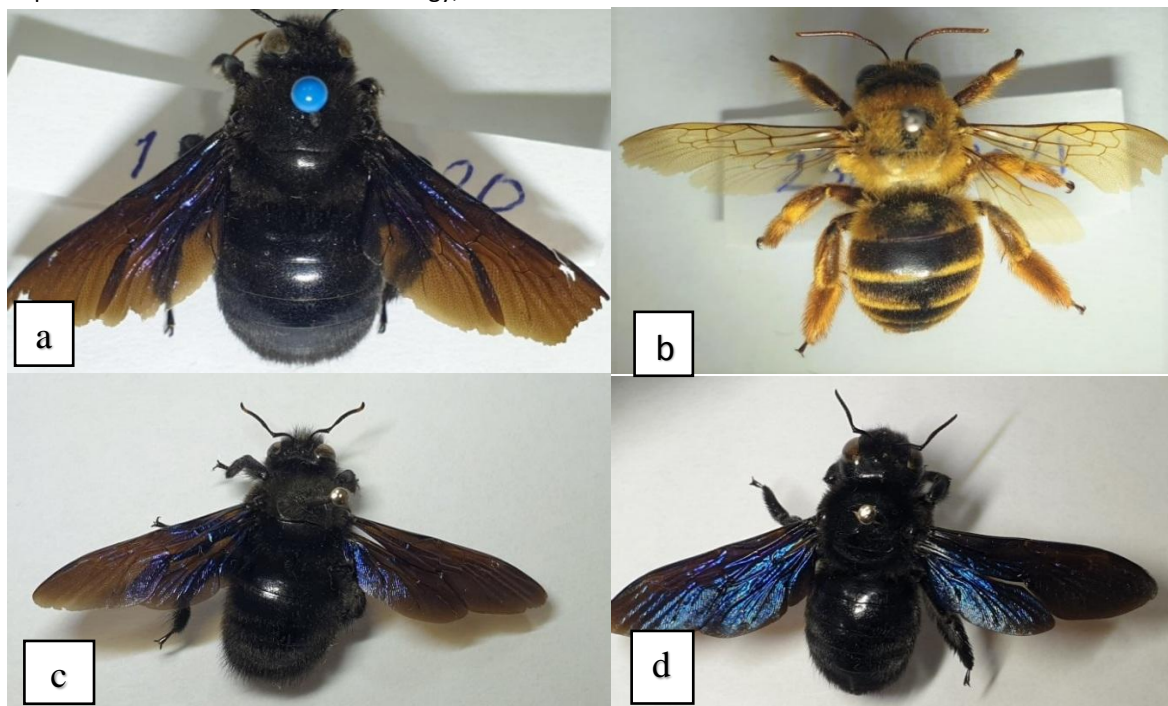




Figure 1. shape of the body for the:

- a. male ♂ *Xylocopa varentzowi*, b. Female ♀ of *X. rufa* .
 c. male ♂ *X. violacea*, d. Female ♀ of *X. violacea* .
 e. male ♂ *X. olivieri*, f. Female ♀ *X. olivieri*

The study revealed the occurrence and very little presence of *Xylocopa varentzowi* for the first time in Dohuk Governorate, Samples were collected from the following sites; Bablo, Badi and Kzo. Overall, 3 specimens of *Xylocopa varentzowi*, and the same for *X. rufa* that we collected 5 specimens , *X. violacea* we have collected 18 specimens and for the species we collected 16 specimens. All

specimens that we were collected, It was from three locations located between 942 and 1140 m above sea level, foraging on 2 wild and grown plant taxa belonging to two plant families Rosaceae and Capparaceae Family, both males and females collected specimens, see (Table, 1).

Table 1. Materials examined from Dohuk Governorate/ Iraq.

Site of sampling	<i>Xylocopa varentzowi</i>		Altitude (m)	Geographical coordinates	Name of collector	Host plants
	Females (♀♀)	Males (♂♂)				
Bablo	0	1	1118	36°52'23.3"N 43°07'50.4"E	Rawshan bamarni	<i>Prunus dulcis</i> L.
Badi	0	1	942	36°54'27.8"N 43°06'13.5"E	Rawshan bamarni	<i>Prunus dulcis</i> L.
Kzo	0	1	1140	36°52'05.9"N 43°08'03.6"E	Rawshan bamarni	<i>Papparis spinosa</i> L.
	<i>X. violacea</i>					
Bablo	2	4	1118	36°52'23.3"N 43°07'50.4"E	Rawshan bamarni	<i>Prunus dulcis</i> L.
Badi	1	1	942	36°54'27.8"N 43°06'13.5"E	Rawshan bamarni	<i>Prunus dulcis</i> L.
Kzo	3	7	1140	36°52'05.9"N 43°08'03.6"E	Rawshan bamarni	<i>Papparis spinosa</i> L.
	<i>X. rufa</i>					
Bablo	1	0	1118	36°52'23.3"N 43°07'50.4"E	Rawshan bamarni	<i>Prunus dulcis</i> L.
Badi	0	0	942	36°54'27.8"N 43°06'13.5"E	Rawshan bamarni	<i>Prunus dulcis</i> L.
Kzo	4	0	1140	36°52'05.9"N 43°08'03.6"E	Rawshan bamarni	<i>pyrus malus</i> L.
	<i>X. olivieri</i>					
Bablo	3	1	1118	36°52'23.3"N 43°07'50.4"E	Rawshan bamarni	<i>Prunus dulcis</i> L.
Badi	2	1	942	36°54'27.8"N 43°06'13.5"E	Rawshan bamarni	<i>Prunus dulcis</i> L.
Kzo	7	2	1140	36°52'05.9"N 43°08'03.6"E	Rawshan bamarni	<i>Papparis spinosa</i> L..

results of the food predilection of carpenter bees and through field monitoring of flowering fields in various plants during the several months of the year showed that the bees preferred to visit the pear and Zavselaq flowers, which bloomed during the month of March in order to provide their food from pollen that is important to supply the larvae with the necessary food inside the nest, The different stages of growth, as well as obtaining the necessary nectar for both adults and larvae in feeding and necessary to produce the energy needed to accomplish various vital activities, With the advance of the spring season and the

beginning of the opening of cherry and apple trees in the month of April, it was noticed that carpenter bees visited them and collected pollen and nectar in order to meet their nutritional needs necessary for the growth and development of individuals inside the nest, and to store enough to meet the needs of the nest after the absence of flowers, While it was observed that the workers returned to the fields in the flowering fields, including the rose of the Dog rose, the Eleaq and the Capar, whose flowering extended until early September, in order to store enough food to raise the subsequent generations during the autumn

months before entering the winter season and after the absence of flowers from the fields completely (He and Zhu, 2020, Huflejt and Gutowski, 2016 and Suhri et al., 2020).

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