

A new species of Large carbender bees *Xylocopa tenuata* (Smith, 1874) from Tamilnadu, India with their notes

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Abstract

A new species of *Xylocopa tenuata* (Smith, 1874) [31] recorded from Madurai, Tamilnadu, India. This the first time observed in this location of carbender bees, the note given details of Morphology, distributions and history of *Xylocopa* genus. The importance of such studies on wild bees in India is important for the melittologists, as it will help in conservation of wild bees. The study is also useful in using large carpenter bees for pollination purpose.

Keywords: New species, first time record, observations, morphology, Tamilnadu

Introduction

Xylocopa class are normally referred to as craftsman honey bees as it abides in the forest, bamboos and, surprisingly, in the ground by making burrows (Lucia, Gonzalez, & Abrahamovich 2015 [19]; Solomon Raju & Purnachandra Rao 2006) [29]. Having a place with the subfamily Xylocopinae, it is separated from different honey bees in having three sub-peripheral cells with second sub-geometrically lengthened, 6-jointed maxillary palpi, back tibiae thickly pubescent, ocelli in a triangle and labrum somewhat applied, as opposed to conspicuous (Bingham 1897) [4]. These are hearty, enormous and bristly honey bees, and are experienced consistently, rummaging on assortments of blossoms both during the day and twilight evening (Solomon Raju & Purnachandra Rao 2006) [29]. It helps in pollinating variety of flowers (Giannini *et al.* 2015) nonetheless, a few animal categories are irritation and threatening to individuals. They produce clearly humming sound while flying and settling. They likewise drill various passages and subsequently, debilitate the settling lumber which might achieve imploding of the designs (Lucia *et al.* 2015) [19].

More literature in North western Himalayas have been conducted in different agroecological areas where different (solitary) bees were reported Worldwide, there are approximately 995 species and 15 genera within the subfamily Xylocopinae, of which 59 species have been reported from India. 19 Of those are situated in the genus *Xylocopa* (ASCHER *et al.*, 2008). Despite conspicuously large size and its ecological and economic importance, no taxonomic study has been done on Carpenter bees in Tamilnadu. This paper reports a species of Large carbender bees *Xylocopa tenuata* (Smith, 1874) [31] from Tamilnadu a new record.

Study area

Large carbender bees *Xylocopa tenuata* (Smith, 1874) [31] from (Coordinates 9.9282, 78.1497), Near vandiyur lake, Madurai district, Tamil Nadu state India. A large carbender bees uploaded and identification submitted in inaturalist website.

<https://www.inaturalist.org/observations/204128490>. A new species first time reported in study area of Madurai, the work will be used for conservation and manipulation of

large carpenter bees for pollination and betterment of agriculture in the region. This work is part of ongoing efforts to understand wild bee pollinators within the region and their possible economic use (Ali *et al.* 2016) [2].

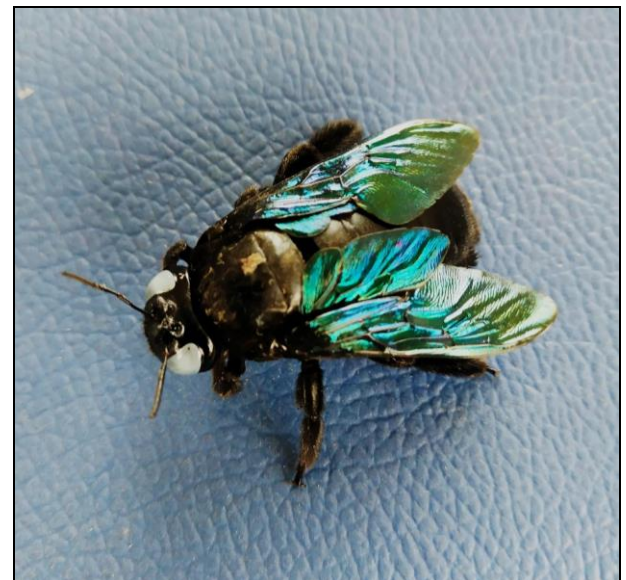


Fig 1: Dorsal view of *Xylocopa tenuata* (Smith, 1874) [31], Madurai, Tamilnadu, India

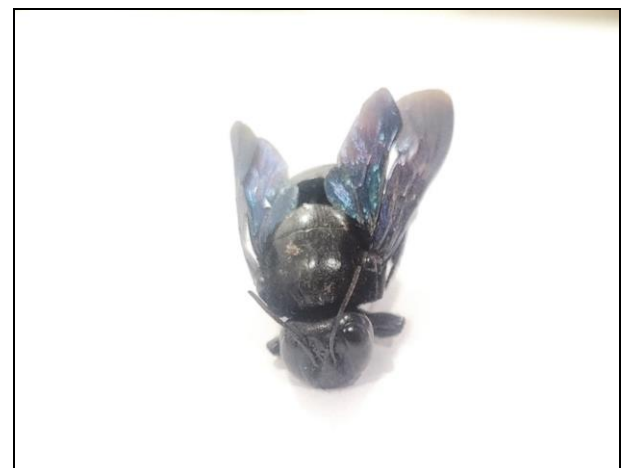


Fig 2: Frontal view of *Xylocopa tenuata*.



Fig 3: Ventral view of *Xylocopa tenuata*.



Fig 4: Side view of *Xylocopa tenuata*.

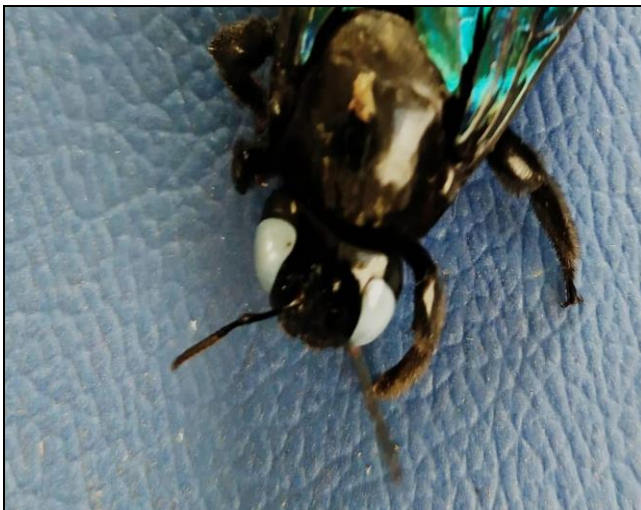


Fig 5: Eye and antennae with broad leg of *Xylocopa tenuata*.



Fig 6: Head with antennae of *Xylocopa tenuata*.

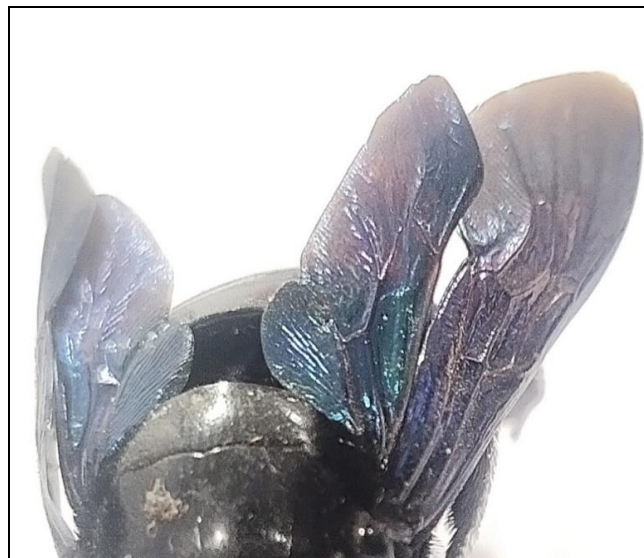


Fig 7: Fore wing, Hind wing of bees.

Diagnostics

Body with black or sooty-brown pubescence; (Fig. 7) head punctured; both eyes are white color, two deep sulcations on the front from below the base of the antennae to beyond the posterior ocelli; scape of the antennae widened towards apex (Fig 2 & 6); with broad leg of *Xylocopa tenuata* (Fig 5). wings dark fuscous, with green, coppery and purple

effulgence changing when light falls (Fig 4). Black, with black pubescence, thick and velvety on the mesonotum anteriorly and long and tufted on the lateral margins of the abdominal segments, Length: 33 mm (Fig 1). In the heads, thoraces, abdomens, and legs of Ontario bees were weighed separately, to determine the contributions of each body part to the wet and dry weights. Linear

measurements were also obtained from these bees. After estimating the thoracic volume for this sample of bees, we applied the density value for mammalian striated muscle, 1.06 g/mL (Dudley, 2000) ^[8], to estimate the mass of the thorax that we would expect for a given set of thoracic linear dimensions, provided that the thorax is composed primarily of muscle.

There are a few examinations on the enormous craftsman honey bees' settling science that normally home in dead wood, bamboo and other settling wooden materials, particularly strong wood (Sihag 1993a ^[30]; Engel *et al.* 2012) ^[9]. In Saudi Arabia, two species, *Xylocopa aestuans* Linnaeus, 1758 and *Xylocopa sulcatipes* Maa, 1970 ^[23], nesting biology was studied (Engel *et al.* 2012) ^[9]. A few animal types construct unbranched or direct homes while others fabricate spread homes (Gerling *et al.* 1989) ^[12]. In South Asia, some bee biologists (Maeta *et al.* 1985) ^[21], Kapil and Dhaliwal (1968) ^[18] and (Hongjamrassilp & Warrit, 2014) ^[16] studied large carpenter bees' nesting biology. *X. pubescens* belongs to the subgenus *Koptortosoma* and is very similar with another species of the same genus *X. aestuans* (Mordechai *et al.* 1978 ^[22]; Engel *et al.* 2012) ^[9], whereas *X. fenestrata* Fabricius, 1798, belongs to the subgenus *Ctenoxylocopa* and is very confused with *X. sulcatipes* (Maa, 1970) ^[23]. Both *X. aestuans* and *X. sulcatipes* have not been recorded so far from Pakistan. All four species could be distinguished by the structure of the male genitalia (Maa 1970 ^[23]; Engel *et al.*, 2012 ^[9]; Guershon and Ionescu-Hirsch 2012) ^[13]. *Xylocopa ruficornis* Fabricius, 1804) ^[28] female found in Tamil Nadu (Selvaraj Selvamurugan 2023) ^[28], Here, report of *Xylocopa tenuata* (Smith, 1874) ^[31] from Madurai, In tamilnadu, India (Fig.1,2, &3).

Discussions

However, no species of *Xylocopa* is yet known to have multiyear diapause that would facilitate extensive long distance/time travel in wood; all such species winter as prepupae while members of the subfamily Xylocopinae typically overwinter in adult groups containing both males and females (reviewed by Danforth *et al.*, 2019) ^[6]. Michener (Michener 1979 ^[24], Michener 2007) ^[25] indicated that few bee species are likely capable of natural long distance dispersal by flight, typically favouring larger species (e.g., Araújo *et al.*, 2004 ^[2], Greenleaf *et al.*, 2007) ^[14], partially explaining why most oceanic islands are naturally depauperate of apoid species. Longer distance dispersal by bees is more likely facilitated by nest transport, thus favouring species like carpenter bees that nest in wood or other movable substrates (Michener 1979) ^[24], and smaller bees, such as *Hylaesus* Fabricius, 1793 (Colletidae) are probably more suitable for long distance travel than larger bees (Michener 1979 ^[24], Daly and Magnacca 2003) ^[7].

Much faster travel time of materials containing bee nests is obtained via commerce, which is likely the main means of introduction today. Recently, a carpenter native to Japan and China was found in California (Dahlberg *et al.* 2013) ^[10], suggesting that commerce is likely important. There are also historic records of other native North American species of *Xylocopa* being intercepted at other locations; Hurd (1961) ^[17] (citing Dover 1924) indicated that *X. virginica* was collected in Nottingham England from nests built in wood. (Groom *et al.*, 2017) ^[15] suggest that early Polynesian

seafarers could have transported wood containing nests to several islands at a rate that would promote establishment, but also suggested that more recent and purposeful introduction of this species for passionfruit pollination may have occurred. However, this species was introduced on several Pacific Islands some time ago (i.e., Smith 1874 ^[31], Cockerell 1919, Timberlake 1922) ^[34], though this species was not recorded in any of the South Pacific regions covered by (Michener, 1965) ^[26]. Incidentally, nests of smaller bee species would also be harder to detect in materials inspection at international borders; in Canada, at least 20 species of wood- or stem-nesting bees, most of them small, have been introduced and established (see Sheffield *et al.*, 2011 ^[32], Gibbs and Dathe 2017 ^[11], Martins *et al.* 2017 ^[20], Normandin *et al.* 2017) ^[27]. Other larger species (i.e., *Megachile xylocopoides* Smith, 1853 (Megachilidae)) have been intercepted at the Canadian border, but have not been recorded as established (Sheffield *et al.* 2011) ^[32].

Once arriving to a new location, some bee species can succeed even with very low numbers of colonizers. (Zayed *et al.*, 2007) ^[35] showed that some bee species may be able to successfully establish and become widespread with very few individuals introduced to a new area, possibly even a single mated female. Carpenter bees (*Xylocopa ruficornis* Fabricius, 1804) ^[28] female. A new record in Tamil Nadu (Selvaraj Selvamurugan 2023) ^[28], Here, in this species record in first time found *Xylocopa tenuata* (Smith, 1874) ^[31] from Madurai, Tamilnadu, India. In this location have distributed in species, need to more survey of carpenter species.

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