



A noteworthy bat record from São Vicente Island, Cape Verde Archipelago (Mammalia: Chiroptera)

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Abstract: A bat belonging to the family Molossidae was discovered on the eastern shore of São Vicente Island, Cape Verde Archipelago (approx. coordinates 16°50'45'N, 24°52'15'W) on 3 October 2023. The record represents a fourth bat species, and third bat family documented from the north-western island group of the Cape Verde Islands and a second species undoubtedly coming from São Vicente Island. Moreover, it very probably is the eighth species of bat documented from the whole archipelago, as the molossid bat previously recorded from Sal Island seems to belong to a different (but unknown) species. Because only photographs of the dorsal aspect of the newly recorded bat are available, while its proper examination has not been made, an accurate species identification is not possible. However, based on the body size and colouration of the bat, it seems to be clear that it does not comprise *Tadarida teniotis*, the only Palaearctic representative of the family, but most probably a species of the Afro-tropic origin. Possible species affiliation of the bat is discussed.

Keywords: bats, Molossidae, distribution, Macaronesia.

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The Cape Verde Islands are a group of about fifteen rather small volcanic islands situated in the east-central part of the Atlantic Ocean. This archipelago is considerably isolated from other landmasses, it is situated some 700 km west of Africa, the smallest distance (571 km) being between the eastern shore of Boa Vista Island and Cap Vert, the westernmost point of Africa. The islands cover a total area of 4,072 square kilometres, and only nine largest islands – of an area between 67 and 991 square kilometres – are permanently inhabited. The Cape Verde Islands could be divided into three island groups, the north-western (Santo Antão, São Vicente, Santa Luzia, São Nicolau), north-eastern (Sal, Boa Vista), and southern (Brava, Fogo, Santiago, Maio). The islands are covered by arid or semi-arid habitats, they represent the

southernmost part of the Macaronesian biogeographical region, comprising also the Azores, Madeira, the Savage Islands, and Canary Islands (see e.g. Masseti 2010, Florencio et al. 2021, Fernández-Palacios et al. 2024).

As an effect of the geographical isolation and also rather low level of research effort, the known bat fauna of the Cape Verde Islands is quite poor. Altogether, ca. 30 records of seven bat species belonging to five families were documented from nine (inhabited) islands in the period between 1898 and 2018 (Azzaroli Puccetti & Zava 1988, Vasconcelos 2018, Borloti et al. 2020). Generally, bats are considered rare in the islands and mostly, only one or two species per island are reported, just Fogo and Santiago are exceptions where three species are (possibly) present. Most widespread are two vespertilionid bats, *Hypsugo savii* (Bonaparte, 1837) and *Pipistrellus kuhlii* (Kuhl, 1817), that were reported from at least four islands each (Azzaroli Puccetti & Zava 1988, Vasconcelos 2018); viz. Fogo, São Nicolau (both species), São Vicente (both species, but *P. kuhlii* was doubted, see Borloti et al. 2020), Brava (*H. savii*), and Santiago (*P. kuhlii*). On Santo Antão, the westernmost island of the Cape Verde Archipelago, *Miniopterus schreibersii* (Kuhl, 1817) of the Miniopteridae family was repeatedly collected (Azzaroli Puccetti & Zava 1988). *Taphozous nudiventris* Cretzschmar, 1830, a species of the tropical family of Emballonuridae, was found on three southern islands, Maio, Santiago, and Fogo (Travier & de Naurois 1985, Azzaroli Puccetti & Zava 1988, Hazevoet 2015, Borloti et al. 2020). From the latter two islands, also bats of the vespertilionid genus *Plecotus* Geoffroy, 1818 were reported (Dorst & de Naurois 1966, Azzaroli Puccetti & Zava 1988); however, their species identity remains uncertain as they do not resemble *P. teneriffae* Barret-Hamilton, 1907, an endemic of the Canary Islands (see Azzaroli Puccetti & Zava 1988, Benda et al. 2004), but rather *P. austriacus* (Fischer, 1829), a species broadly distributed in Europe and known also from Madeira (Mathias 1988, Juste et al. 2004).

The available results of molecular genetic analyses, assessing phylogenetic relations of three bat species from the Cape Verde Islands (*H. savii*, *M. schreibersii*, *T. nudiventris*), showed that the bat fauna of the north-western group of islands evinces a strong affinity to the Mediterranean populations (of Canary Islands, Morocco, and Iberia), while the fauna of the southern group of islands seems to be affiliated both to the Mediterranean and Afro-tropic regions (Borloti et al. 2020). Although a separate or even endemic status of (some of) the Cape Verdean bat species was sometimes expected, the available data support rather a recent arrival of the bat fauna to the archipelago.

Two additions to the bat fauna of Cape Verde have been made recently on two north-eastern islands of the archipelago, where no bat records were known previously. In 2010, a female of the widespread African fruit bat *Eidolon helvum* (Kerr, 1792) was found on Boa Vista (Jiménez & Hazevoet 2010). It is considered a stray individual that arrived at the Cape Verde Islands from mainland Africa, which is well supported by seasonal migratory habits known in this bat and by findings of other stray individuals in areas adjacent to its regular range of distribution (Richter & Cumming 2006, Ossa et al. 2012, Hurme et al. 2022). This stray bat thus again indicates the affinity of the Cape Verdean bat fauna to Africa.

Most recently, a finding of an unidentified molossid bat from the island of Sal has been made; Hazevoet (2014: 1) described the record as follows: "In September 2014, local inhabitants caught a bat at Ponta Preta, Sal [16°36'20"N, 22°55'43"W]. The animal was released before a naturalist had the opportunity to have a closer look at it. Fortunately a few snap shots documenting the event were made. The animal could readily be identified as a free-tailed bat Molossidae, but, as the number of molossid bats occurring in Africa is considerable and species level identification is not always easy, a more precise ID based on the photographs alone is not possible. This is the first record of a free-tailed bat of any species in the Cape Verde Islands." The report is complemented by two photographs showing a molossid bat lying in a glass mat (ashtray?); thus the body size of the bat can be estimated very roughly, its forearm length is around 50 mm, it is thus a medium-sized member of the family. The dorsal fur colouration of this bat is rusty brown, wing membranes, ears, and face are brown

(or greyish brown) and not deeply dark. In this body size and colouration categories, at least ten various species of three genera of molossid bats (*Mops* s.l., *Nyctinomus*, *Tadarida*) occur in the western part of Africa (see Happold & Cotterill 2013). However, an accurate identification is not possible based on the available pictures, although from the body size and colouration of the bat is clear that it does not comprise *Tadarida teniotis* (Rafinesque, 1814), the only Palaearctic representative of the family, occurring in southern Europe, Maghreb, Canary Islands, and possibly also in Madeira (Allen 1966, Kock & Nader 1983, Mathias 1988). Anyway, the record really represents the seventh species and fifth family of bats known from the Cape Verde Archipelago, and with most probability, another evidence of the affiliation of the Cape Verdean bat fauna to Africa.

Here we present a new finding of a molossid bat from the Cape Verde Islands, with very similar circumstances as the latter record, of which only photographs are available (Figs. 1, 2). The bat was discovered by local children in a room of an old and abandoned house situated between the settlements of Vila Miséria and Calhau on the eastern shore of São Vicente Island (approximate coordinates 16°50'45"N, 24°52'15"W, altitude just at sea level). The bat was found on 3 October 2023, the children presented it to one of the authors (J. Melo) who made the photographs and released the bat on the same day. The site of finding is situated in a very dry part of the island with arid habitats (Fig. 3), with houses scattered on the shore and many of them being old, uninhabited or even abandoned and ruined. The slopes of surrounding hills (inactive volcanos) contain numerous cavities and fissures between hard lava folders. The site of the new finding is situated ca. 820 km west of Cap Vert, the closest point of Africa, and 208 km west of Ponta Preta, Sal Island, the site of the previous record of a molossid bat from the archipelago.

The bat is undoubtedly a member of the family Molossidae, it has a long tail freely projecting by its large portion from the interfemoral membrane and broad folded ears, both characters are family-typical. The individual was not measured before its release and its body size could be only roughly estimated from the photographs – it is in a similar range as in the former molossid bat, with the forearm length being approximately 40–50 mm (i.e. it is a small to medium-sized member of the family). However, the colouration of the newly discovered bat differs from that



Figs. 1 and 2. Photographs of a molossid bat found in a house near Calhau, São Vicente Island, Cape Verde Archipelago. Photo: J. Melo.



Fig. 3. Abandoned old houses between Calhau and Vila Miséria, São Vicente Island, an area of new finding of a molossid bat on the Cape Verde Archipelago. Photo: J. Moravec.

previously documented by Hazevoet (2014); the dorsal pelage is brown (no rusty tinge) with pale hair tips giving a slightly “frosty” shade, i.e. the dorsal hairs are bicoloured, the ears and wing membranes are dark brown. Between the ears, a tuft of dark brown hairs is visible that resembles the interaural crest typical for the representatives of the genus *Mops* Lesson, 1842 formerly assigned to *Chaerephon* Dobson, 1874; the outer sides of the first and fifth toes are fringed by dense crests of pale coloured bristles.

Similarly as in the case of the previous Cape Verdean record of a molossid bat from Sal Island, the individual found on São Vicente Island cannot be identified to the species or even genus level with certainty. Just as in the Sal bat, it is clear, based on the body size and pelage colouration, that the Palearctic species *Tadarida teniotis* is out of the question. The latter species is a large bat (forearm length 55–64 mm [n=95]; see Benda et al. 2012), with a dark and greyish colouration tinge of the pelage and naked parts, it thus does not match the bat from São Vicente in these two characters. On the other hand, several Afro-tropical species whose distribution ranges reach the western parts of Africa, roughly conform to the newly discovered bat in their body measurements and colouration. Although many African molossid species show various types of pale/whitish spottiness of dorsal pelage, in some species this pattern is reported as rather variable in the number and size of spots, and even their presence, spotless individuals are also known and thus, the absence of visible pale spots in the São Vicente bat cannot be considered as an absolute character. In the estimated body size category and with the “frosted” appearance of the dorsal pelage, two species are known to occur in West Africa, *Mops ansorgei* (Thomas, 1913) and *M. bemmeleni* (Jentink, 1879), in addition, without the marked “frosted” shade (when we accept this shade to be a side effect of photographing) also *Mops aloysiisabaudiae* (Festa, 1907), *M. russatus* (Allen, 1917), or *Nyctinomus aegyptiacus* Geoffroy, 1818 (see Happold & Cotterill 2013). We regard any of these species names to be a possible affiliation of the São Vicente molossid bat. Moreover, *N. aegyptiacus* is most widely distributed in West Africa, from southern Morocco and Mauritania south-eastwards through the desert and savanna parts of the continent, and from the biogeographical point of view, it could be a good candidate for a stray arrival to the Cape Verde Archipelago. However, without a proper examination of the bat, any species assignment is impossible, otherwise it remains just a speculation.

Although the exact species identification of the São Vicente molossid bat is not possible, its Afro-tropical origin seems to be well possible, while its arrival from the Canary Islands or the Mediterranean part of the Maghreb is much less probable. In the north-western island group of the Cape Verde Archipelago (Santo Antão, São Vicente, São Nicolau), three bat species are known to occur, *Hypsignathos monstrosus*, *Pipistrellus kuhlii*, and *Miniopterus schreibersii*. From São Vicente two of them were reported, *H. savii* and *P. kuhlii* (Azzaroli Puccetti & Zava 1988), although the only specimen of the latter species has been recently re-identified as *H. savii* (Borloti et al. 2020). The molossid bat reported here represents a fourth bat species (and third bat family) documented from the north-western Cape Verde Islands, a second species undoubtedly coming from São Vicente Island, and the only bat that shows direct affinity to the Afro-tropic instead of the Palearctic biogeographical realm discovered in this island group. With most probability, it represents also the eighth species of bat documented from the whole archipelago.

The two individuals of molossid bats documented from the Cape Verde Islands most probably represent two different species, they could be regarded rather stray individuals brought accidentally to the archipelago by a wind from the African mainland, similarly as is presumed for the fruit bat found in Boa Vista (see above). On the other hand, considering the extremely low number of bat records in the archipelago, when only single specimens from particular islands are known, such a supposition could be eventually shown as incorrect. Local populations of molossids or other species which just remain unnoticed could be proven to occur on the archipelago. In that case, existence of endemic populations cannot be excluded. A systematic survey of bats of the Cape Verde Islands is urgently needed for just a fundamental assessment of the local fauna, its ecology, and biogeographic relations.

Anyway, the new record of the molossid bat gives supporting evidence that the bat fauna of the Cape Verde Islands has apparently the Afro-tropic relations besides the Palearctic origin of some taxa, similarly as known in other components of the archipelago biota. On the other hand, it does not contain any endemic form, based on the evidence available so far.

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