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Birds of the archipelagos of Madeira and the Selvagens III – New records and checklist update (2010-2020)

BY CATARINA CORREIA-FAGUNDES ¹*, HUGO ROMANO ¹, FRANCIS ZINO ² & MANUEL BISCOITO ³

With 7 figures and 3 tables

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ABSTRACT: The present paper summarizes the checklist of the birds of the archipelagos of Madeira and Selvagens published in 2010 and its updates published in 2011 and 2013 with a revision of the bird records from 2014 until the 31st of December 2020. From the new total of 371 species and subspecies recorded on the archipelago, six are new and one was added as an unconfirmed record but the frequency / abundance of several species have been updated. The list of breeding birds was updated and upgraded with the distribution of each species through the group of islands where they are known to nest.

Keywords: Checklist, birds, new records, archipelago of Madeira.

RESUMO: Este trabalho resume a lista de aves dos arquipélagos da Madeira e das Selvagens publicada em 2010 e suas atualizações publicadas em 2011 e 2013 e acrescenta os registos de aves desde 2014 até 31 de Dezembro de 2020. Do novo total de 371 espécies e subespécies observadas no arquipélago, seis são novos registos e um foi adicionado como não confirmado. Várias espécies foram atualizadas relativamente à sua frequência / abundância. A tabela das aves nidificantes no arquipélago foi igualmente atualizada, incluindo agora o grupo de ilhas onde é conhecida a nidificação da espécie.

Palavras-chave: Checklist, aves, novos assinalamentos, arquipélago da Madeira.

INTRODUCTION

The archipelago of Madeira was discovered in 1418, when the discoverers set foot on Porto Santo and the first reference of a list of bird species of Madeira dates from 1456 (CA'DA MOSTO, 1455-6). Since then, a few other publications added or completed data about the bird species observed in the islands of Madeira and Porto Santo and the sub-archipelagos of Desertas and Selvagens. All these old publications and data were gathered, summarized and presented as a bird checklist by ZINO *et al.* (1995). Since then, a revised update to that checklist was published in 2010 by ROMANO *et al.* and two subsequent updates were released in 2011 and in 2013 (CORREIA-FAGUNDES *et al.*, 2011 and 2013). In this paper, the authors condense and update the previous checklists and add the data collected between 2014 and 2020.

Although Madeira archipelago, situated in the north-east Atlantic Ocean, is out of the main bird migratory routes, except for some *Procellariiformes*, the number of bird species recorded in these islands continues to rise, not only due to the growth of observer effort (as an increasing number of birdwatchers visit the island) but also, we believe, due to climate change.

METHODS

The information in this paper was obtained from the authors' records, observations by other birdwatchers shared with the authors, by a careful search through the available bibliography and birdwatching news websites.

As per the previous checklists (ZINO *et al.*, 1995 and ROMANO *et al.*, 2010), the bird species listed have been divided into four groups. An abundance / frequency index was attributed to each species and a level of confidence was assigned to each record (Table 1).

Table 1 – Categorization of the records.

Category	Abundance / Frequency	Confidence
Breeding species	Very common; Common; Rare; Very rare.	Accepted records; Unconfirmed records; Dubious records.
Possible breeding species		
Vagrants	Frequent; Seasonal; Occasional; Exceptional; Only 1 record.	
Extinct	n/a	n/a

A new column was added to the list of the breeding birds, registering the islands or sub-archipelagos in which each species breeds, using the following abbreviations: M – Madeira; P – Porto Santo; D – Desertas; S – Selvagens.

On the present paper 5 newly discovered extinct endemic species were added: *Otus mauli*, *Coturnix lignorum*, *Coturnix alabrevis*, *Rallus lowei* and *Rallus adolfocaesaris* as per RANDO *et al.*, (2012 and 2020) and ALCOVER *et al.* (2015) who studied the fossils of these birds.

Categories

Breeding species are those breeding regularly in the archipelagos.

Possible breeding species are those reported to have bred in the past, but with no recent records and those in which there is strong evidence that they breed, but this has not been confirmed.

As Madeira and the Selvagens are not on the main migratory routes, except for some seabirds, all non-breeding records are considered vagrants.

Extinct species are those which have bred in the archipelago and may be locally or globally extinct.

Abundance / frequency

Breeding species and possible breeding species:

Very common – Species with large populations and/or widespread throughout the islands of the archipelagos;

Common – Species with large populations and/or occurring in most parts of the islands of the archipelagos;

Rare – Species with small populations and/or occurring in specific parts of the archipelagos;

Very Rare – Species with very small populations and/or restricted to small areas.

Vagrants:

Frequent – Species occurring throughout the year and/or staying for long periods in the archipelagos;

Seasonal – Species occurring seasonally and in general for short periods;

Occasional – Species occurring seasonally, but only during unusual weather conditions;

Exceptional – Species recorded less than 5 times in the last 50 years;

Only 1 record – Species that have been recorded only once.

Confidence

Without a bird in the hand, a Museum specimen or a good photograph, the record of new species relies totally on the expertise of the observer. This is the case for most records published prior to 1995 and accepted in the previous checklists (ZINO *et al.*, 1995; ROMANO *et al.*, 2010).

For the purpose of the present checklist and with the increase of regular bird observations on the islands, together with the evolution of technology such as the common use of high definition cameras and other recording hardware, the bird records were classified as:

Accepted records

– those documented with specimens, photographs, videos and/or call records allowing the confirmation of the identification by others.

Unconfirmed records

– those reported by ornithologists or experienced birdwatchers, but not documented as above.

Dubious records

– those for which the above conditions are not fulfilled. Also included in this category are accurately recorded species whose natural occurrence in the wild is considered so unlikely that they may be regarded as escaped cage birds.

The taxonomic arrangement and most of the English names in the present checklist follow GILL *et al.* (2020). The exceptions on the English names are for the different subspecies which follow SNOW *et al.* (1998) and SVENSSON *et al.* (2009). In the case of *Anthus berthelotii* we follow BANNERMAN & BANNERMAN (1965) who considers two subspecies: *A. b. berthelotii* and *A. b. canariensis*.

Abbreviations used:

CF – Catarina Correia-Fagundes;

FZ – Francis Zino;

HR – Hugo Romano;

MB – Manuel Biscoito;

MMF – Natural History Museum of Funchal.

New records

Lesser Scaup, *Aythya affinis* (Eyton, 1838)

A single female was observed by Claudia Freitas and Manuel Ribeiro on the 27th of December 2020 at Tanque reservoir, in Porto Santo.



Fig. 1 – Lesser Scaup *Aythya affinis* at Tanque reservoir, Porto Santo. Photos by Cláudia Freitas.

Barnacle Goose *Branta leucopsis* (Bechstein, 1803)

On the 6th of June 2018, Michel de Lange and Hugo Wieleman, from the Netherlands, while seawatching at Porto Moniz, observed a bird flying west. The observers said that due to the short observation time, a hybrid could not be excluded. The confirmation of this record was made on the 14th of November 2019 when a single bird was observed at the mouth of Ribeira da Janela by CF, HR and other birdwatchers. Since then another 3 birds were recorded at Faial on the 3rd of February 2020 by CF and HR, video documented CORREIA-FAGUNDES & ROMANO (2020c).



Fig. 2 – Barnacle Goose *Branta leucopsis* at Faial.



Fig. 3 – Great Cormorants *Phalacrocorax carbo maroccanus* and juvenile of *P. carbo carbo* at Selvagem Pequena.

Great Cormorant

Phalacrocorax carbo maroccanus Hartert, 1906

A bird was observed and photographed by FZ, on Selvagem Pequena on the 13th of July 2018, together with a juvenile of *P. carbo carbo*.

As per BERGIER *et al.*, 2013 who state: “The adult Moroccan endemic form *maroccanus* is characterized by the pure white of the throat, while foreneck and upper breast are white with varying degrees of black at the tips of the feathers (Hartert 1906). Adults *lucidus* are similar to *maroccanus* (white throat and foreneck), but white parts extend lower down to the breast and sometimes even all over the belly. (...) The difficulty of distinguishing *lucidus* and *maroccanus* is reflected in the geographical distributions attributed to them in the literature, e.g. in Clément (2000): *maroccanus*: coastal northwest Africa (Morocco to Mauritania) and *lucidus*: Africa south of the Sahara.”

For this identification the authors of this paper considered the pure white throat, visible on the photo below, which contrasts a bit with the ‘dirty’ white of the foreneck extending only to the upper breast and the location of Selvagens Islands which are much closer to coastal Northwest Africa.

White-rumped swift

Apus caffer (Lichtenstein, MHK, 1823)

On the 23rd of May 2015, Barry Collison from the UK photographed a single bird, flying together with 3 Plain Swifts at Estrada Monumental, opposite Forum Madeira shopping.



Fig. 4 – White-rumped swift *Apus caffer* flying above Estrada Monumental, Funchal. Photo by Barry Collison.

Common Firecrest

Regulus ignicapilla (Temminck, 1820)

On the 12th of January 2018 at Chão da Ribeira, Madeira, CF and HR together with a German birdwatcher, Hays Diecks, observed a Common Firecrest fluttering near the top of a pine tree *Pinus pinaster*, in which *R. madeirensis* was also present. The bird called about 3 times and for about 30 seconds, so it was relatively easy to compare their calls and behaviour which helped to distinguish the *R. ignicapilla* from the *R. madeirensis*.

As video evidence by CORREIA-FAGUNDES & ROMANO (2020a) and Fig. 5, despite not being sharp, shows the main characteristics of the specimen (broad white supercilium, white wing-bars like an arrowhead with less black outside them and a more yellowish look in general).



Fig. 5 – Common Firecrest *Regulus ignicapilla* at Chão da Ribeira, Seixal.

Common Chaffinch *Fringilla coelebs* Linnaeus, 1758

On the 8th of February 2018, at Quinta do Santo da Serra, Madeira, a male Common Chaffinch *Fringilla coelebs* was observed by CF, HR, Bram Wickel from Holland and Paul Aubrey from the United Kingdom. The bird was feeding on the ground with 3 *Fringilla coelebs maderensis*, 2 males and 1 female, allowing for very good observation and identification as shown on the video by CORREIA-FAGUNDES & ROMANO (2020b) and on the photo below.



Fig. 6 – Common Chaffinch *Fringilla coelebs* (left) and Madeira Chaffinch *F. c. maderensis* (right) at Quinta do Santo da Serra.

The several checklists of the avifauna of Madeira, including ZINO *et al.* (1995), only refer to *Regulus ignicapillus madeirensis* and to *Fringilla coelebs maderensis* as breeding species and there is no mention of their nominate species, *Regulus ignicapilla* nor *Fringilla coelebs* as vagrants. Also, all the *Regulidae* specimens in the Natural History Museum of Funchal are of the Madeira endemic species and the

specimens of *Fringilla coelebs* are all from the Madeira subspecies *F. c. maderensis*. In fact, ROMANO *et al.* (2010) when researching and writing the 'Birds of the Archipelagos of Madeira and the Selvagens. II – New records and checklist update (1995-2010)', felt this was a necessary clarification. Whenever possible, the subspecies must be recorded so that future taxonomic changes can be traceable.

Unconfirmed record

Western Black-eared Wheatear *Oenanthe hispanica* (Linnaeus, 1758)

Thomas Pettersson, from Sweden reported a sighting of 2 Western Black-eared Wheatear at Paúl da Serra on the 4th of September 2011. Considering the experience of the observer and the distribution of the species it may well be considered but as no photos or any other kind of records were made to confirm this identification it was decided to include this species on the list as an unconfirmed record.

Additions and status changes of breeding species to the previous checklist (ROMANO *et al.*, 2010)

Long-eared Owl *Otus otus* (Linnaeus, 1758)

On the 17th of October 2015 FZ observed and photographed an adult bird on Selvagem Grande, thus confirming the record from GODMAN, 1872 which was considered dubious by ZINO *et al.* 1995.



Fig. 7 – Long-eared Owl *Otus otus* at Selvagem Grande.

On the 3rd of August 2019 juvenile birds were heard by HR and CF at Pico do Areeiro. Later, on the 7th and the 8th of August 2019, VAN BEMMELEN *et al.* (2020) documented a similar acoustic observation at the same spot, which they considered a proof of breeding of the species in Madeira.

A year later, on the 16th of July 2020 HR, CF and a German birdwatcher sighted a juvenile bird perched near Pico do Areeiro car park. Considering the size and plumage of the observed bird, it could only have recently fledged, thus re-confirming the breeding record.

In mid-June 2020 an adult bird with 3 juveniles were observed in Porto Santo (Henrique Sousa Lino, *in litt*).

Rose-ringed Parakeet

Psittacula krameri (Scopoli, 1769)

ROCHA *et al.*, 2020 states that this species is most probably breeding since 2008 in Santa Catarina Park in Funchal but it was only documented in 2013.

Collared Dove

Streptopelia decaocto (Frisch, 1838)

ROMANO *et al.*, 2010 considered this species as a possible breeder as by then it was localized in Caniçal village and Porto Santo but its population is increasing rapidly and spreading around both inhabited islands and the authors finally observed some juveniles being fed which confirms its breeding status.

Turtle Dove *Streptopelia turtur* (Linnaeus, 1758)

For more than 10 years a Turtle Dove has not been recorded in Madeira and considering its global decreasing population the authors decided to take this species out of the breeding birds list, so any future record will be considered as a vagrant bird.

Mistle Thrush *Turdus viscivorus* Linnaeus, 1758

ZINO *et al.*, 1995 considered this species as a possible breeding bird as it was regularly observed within the Ecological Park of Funchal and adults were seen carrying food, a nest was never found. In the last 15 years, at least, there was no record of a Mistle Thrush in Madeira thus the authors decided to exclude this species as a possible breeder.

Only the following species remain as possible breeders: Storm Petrel *Hydrobates pelagicus* (Linnaeus, 1758), Swinhoe's Storm Petrel, *Oceanodroma monorhis* (Swinhoe, 1867).

The new checklist of the Birds of Madeira and the Selvagens is on the table below which includes all updates from 2010 to 2020: (ROMANO *et al.*, 2010), (CORREIA-FAGUNDES *et al.*, 2011) and (CORREIA-FAGUNDES *et al.*, 2013), seven new records and one unconfirmed record.

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Table 2 – List of the breeding birds of the archipelago of Madeira and its distribution.

(* Endemic species; ** Endemic subspecies; M – Madeira; P – Porto Santo; D – Desertas Islands; S – Selvagens Islands).

<i>Alectoris rufa</i> (LINNAEUS, 1758)	Reg-legged Partridge <i>Perdiz</i>	M, P
<i>Coturnix coturnix coturnix</i> (LINNAEUS, 1758)	Common Quail <i>Codomiz</i>	M, P, S
<i>Cairina moschata</i> Linnaeus, 1758	Muskovy Duck <i>Pato-do-mato</i>	M, P
<i>Aix galericulata</i> (LINNAEUS, 1758)	Mandarin Duck <i>Pato-mandarin</i>	P
<i>Anas platyrhynchos</i> Linnaeus, 1758	Mallard <i>Pato-real</i>	M, P
<i>Apus unicolor</i> JARDINE, 1830	Plain Swift <i>Andorinha</i>	M, P, D
<i>Apus pallidus brehmorum</i> HARTERT, 1901	Pallid Swift <i>Andorinha</i>	M, P
<i>Columba livia</i> GMELIN, 1789	Common Pigeon <i>Pombo da rocha</i>	M, P, D
<i>Columba trocaz</i> HEINEKEN, 1829 *	Trocaz Pigeon <i>Pombo trocaz</i>	M
<i>Streptopelia decaocto</i> (FRIVALDSZKY, 1838)	Eurasian collared dove <i>Rola-de-colar</i>	M, P
<i>Gallinula chloropus</i> (LINNAEUS, 1758)	Common Moorhen <i>Galinha d'Água</i>	M, P
<i>Fulica atra</i> LINNAEUS, 1758	Eurasian Coot <i>Galeirão</i>	M, P
<i>Charadrius alexandrinus</i> LINNAEUS, 1758	Kentish Plover <i>Rolinha da Praia</i>	P
<i>Scolopax rusticola</i> LINNAEUS, 1758	Eurasian Woodcock <i>Galinholá</i>	M
<i>Larus michahellis atlantis</i> NAUMANN, 1840	Yellow-legged Gull <i>Gaivota de patas amarelas</i>	M, P, D, S
<i>Onychoprion fuscatus</i> (LINNAEUS, 1766)	Sooty Tern <i>Garajau escuro</i>	S
<i>Sterna dougallii</i> MONTAGU, 1813	Roseate Tern <i>Garajau rosado</i>	M, S
<i>Sterna hirundo</i> LINNAEUS, 1758	Common Tern <i>Garajau comun</i>	M, P, D, S
<i>Pelagodroma marina hypoleuca</i> (WEBB, BERTH. & MOUQ. TANDON, 1841)	White-faced Storm-petrel <i>Calcamar</i>	S
<i>Oceanodroma castro</i> (HARCOURT, 1851)	Madeiran Storm-petrel <i>Roque-de-Castro</i>	M, P, D, S
<i>Pterodroma madeira</i> MATHEWS, 1934 *	Zino's Petrel <i>Freira da Madeira</i>	M
<i>Pterodroma feae</i> (SALVADORI, 1899) / <i>P. deserta</i> (MATHEWS, 1934)	Fea's Petrel / Deserta Petrel <i>Freira do Bugio</i>	D
<i>Calonectris borealis</i> (CORY, 1881)	Cory's Shearwater <i>Cagarra</i>	M, P, D, S
<i>Puffinus puffinus puffinus</i> (BRÜNNICH, 1764)	Manx Shearwater <i>Patagarro</i>	M
<i>Puffinus baroli</i> (BONAPARTE, 1857)	Barolo's Shearwater <i>Pintainho</i>	M, P, D

<i>Bulweria bulwerii</i> (JARDINE & SELBY, 1828)	Bulwer's Petrel <i>Alma-negra</i>	M, P, D, S
<i>Accipiter nisus granti</i> (LINNAEUS, 1758)	Eurasian Sparrowhawk <i>Fura-bardos</i>	M
<i>Buteo buteo buteo</i> (LINNAEUS, 1758)	Common Buzzard <i>Manta</i>	M, P, D
<i>Tyto alba schmitzi</i> HARTERT, 1900 **	Western Barn Owl <i>Coruja</i>	M, P, D
<i>Asio otus</i> (Linnaeus, 1758)	Long-eared Owl <i>Bufo-pequeno</i>	M, P
<i>Upupa epops</i> LINNAEUS, 1758	Eurasian Hoopoe <i>Poupa</i>	P
<i>Falco tinnunculus canariensis</i> (KOENIG, 1890)	Canarian Kestrel <i>Francelho</i>	M, P, D
<i>Psittacula krameri</i> (Scopoli, 1769)	Rose-ringed Parakeet <i>Periquito-rabijunco</i>	M
<i>Sylvia atricapilla heineken</i> (JARDINE, 1830)	Eurasian Blackcap <i>Toutinegra</i>	M, P
<i>Curruca conspicillata orbitalis</i> (WAHLBERG, 1854)	Spectacled Warbler <i>Cigarrinho</i>	M, P
<i>Regulus madeirensis</i> HARCOURT, 1851 *	Madeira Firecrest <i>Bis-bis</i>	M
<i>Turdus merula cabreræ</i> HARTERT, 1901	Common Blackbird <i>Melro preto</i>	M, P
<i>Erithacus rubecula rubecula</i> (LINNAEUS, 1758)	European Robin <i>Papinho</i>	M
<i>Passer hispaniolensis</i> TEMMINCK, 1820	Spanish Sparrow <i>Pardal espanhol</i>	M, P
<i>Petronia petronia petronia</i> (LINNAEUS, 1766)	Rock Sparrow <i>Pardal da terra</i>	M, P
<i>Estrilda astrild</i> (LINNAEUS, 1758)	Common Waxbill <i>Bico de Lacre</i>	M, P
<i>Motacilla cinerea schmitzi</i> TSCHUSI, 1900 **	Madeiran Grey Wagtail <i>Lavandeira</i>	M, P
<i>Anthus berthelotii berthelotii</i> BOLLE, 1862	Berthelot's Pipit <i>Corre-caminhos</i>	S
<i>Anthus berthelotii madeirensis</i> HARTERT, 1905 **	Madeiran Berthelot's Pipit <i>Corre-caminhos da Madeira</i>	M, P, D
<i>Fringilla coelebs maderensis</i> SHARPE, 1888 **	Madeiran Chaffinch <i>Tentilhão</i>	M
<i>Chloris chloris</i> (LINNAEUS, 1758)	European Greenfinch <i>Verdilhão</i>	M
<i>Linaria cannabina guentheri</i> WOLTERS, 1953	Common Linnet <i>Pintarroxo</i>	M, P
<i>Carduelis carduelis parva</i> TSCHUSI, 1901	European Goldfinch <i>Pintassilgo</i>	M, P
<i>Serinus canaria</i> (LINNAEUS, 1758)	Atlantic Canary <i>Canário da terra</i>	M, P, D
<i>Carduelis spinus</i> (LINNAEUS, 1758)	Eurasian Siskin <i>Lugre</i>	M

Table 3 – Checklist of the birds of Madeira, including the Selvagens (* Recorded only from the Selvagens; ** Breeds only in the Selvagens; Breeding and possible breeding species in bold; N = No; Y = Yes; ? = Possible).

Scientific name	English name	Specimen in MMF	Breeder	Original reference	Frequency or abundance
NUMIDIDAE					
<i>Numida meleagris</i>	Helmeted Guineafowl	N	N	SARMENTO, 1936	Extinct
PHASIANIDAE					
<i>Alectoris barbara</i>	Barbary Partridge	N	N	SARMENTO, 1936	Extinct
<i>Alectoris rufa</i>	Reg-legged Partridge	Y	Y	SLOANE, 1707	Common
<i>Coturnix coturnix coturnix</i>	Common Quail	Y	Y	HARCOURT, 1851	Rare
<i>Coturnix lignorum</i>		Y	N	RANDO <i>et al.</i> , 2020	Extinct
<i>Coturnix alabrevis</i>		Y	N	RANDO <i>et al.</i> , 2020	Extinct
<i>Phasianus colchicus</i>	Common Pheasant	N	N	SLOANE, 1707	Extinct
<i>Pavo cristatus</i>	Indian Peafowl	N	N	SLOANE, 1707	Extinct
ANATIDAE					
<i>Branta bernicla</i>	Brant Goose	N	N	TAROZZI, 2006	Exceptional
<i>Branta leucopsis</i>	Barnacle Goose	N	N	DE LANGE, M. & H. WIELEMAN, <i>in litt</i>	Exceptional
<i>Anser anser</i>	Greylag Goose	Y	N	SCHMITZ, 1896	Exceptional
<i>Anser fabalis</i>	Taiga Bean Goose	N	N	HARCOURT, 1851	Exceptional
<i>Anser brachyrhynchus</i>	Pink-footed Goose	Y	N	BANNERMAN & BANNERMAN, 1965	Occasional
<i>Anser albifrons</i>	Greater White-fronted Goose	Y	N	SCHMITZ, 1908	Exceptional
<i>Cygnus olor</i>	Mute Swan	N	N	CORREIA-FAGUNDES <i>et al.</i> , 2013	Dubious record
<i>Tadorna tadorna</i>	Common Shelduck	Y	N	MAUL, 1948	Exceptional
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Y	N	MAUL, 1948	Occasional
<i>Cairina moschata</i>	Muscovy Duck	N	Y	ROMANO <i>et al.</i>, 2010	Common
<i>Aix sponsa</i>	Wood Duck	N	N	ROMANO <i>et al.</i> , 2010	Exceptional
<i>Aix galericulata</i>	Mandarin Duck	N	Y	CORREIA-FAGUNDES <i>et al.</i>, 2013	Very Rare
<i>Spatula querquedula</i>	Garganey	N	N	CORREIA-FAGUNDES <i>et al.</i> , 2011c	Exceptional
<i>Spatula discors</i>	Blue-winged Teal	N	N	ROMANO <i>et al.</i> , 2010	Only 1 record
<i>Spatula clypeata</i>	Northern Shoveler	N	N	SCHMITZ, 1905	Occasional
<i>Mareca strepera</i>	Gadwall	Y	N	ROMANO <i>et al.</i> , 2010	Occasional
<i>Mareca penelope</i>	Eurasian Wigeon	Y	N	HARCOURT, 1851	Seasonal
<i>Mareca americana</i>	American Wigeon	N	N	ROMANO <i>et al.</i> , 2010	Seasonal
<i>Anas platyrhynchos</i>	Mallard	Y	Y	HARCOURT, 1851	Rare
<i>Anas acuta</i>	Northern Pintail	Y	N	SCHMITZ, 1896	Occasional
<i>Anas crecca</i>	Eurasian Teal	Y	N	HARCOURT, 1851	Seasonal
<i>Anas carolinensis</i>	Green-winged Teal	N	N	ROMANO <i>et al.</i> , 2010	Exceptional
<i>Marmaronetta angustirostris</i>	Marbled Duck	N	N	SCHMITZ, 1899	Only 1 record
<i>Aythya ferina</i>	Common Pochard	Y	N	SCHMITZ, 1905	Exceptional
<i>Aythya collaris</i>	Ring-necked Duck	Y	N	ZINO <i>et al.</i> , 1995	Occasional
<i>Aythya fuligula</i>	Tufted Duck	N	N	SCHMITZ, 1908	Occasional
<i>Aythya marila</i>	Greater Scaup	N	N	ZINO <i>et al.</i> , 1995	Exceptional
<i>Aythya affinis</i>	Lesser Scaup	N	N	FREITAS C. & M. RIBEIRO, <i>in litt</i>	Only 1 record
<i>Melanitta perspicillata</i>	Surf Scoter	Y	N	ZINO <i>et al.</i> , 1995	Only 1 record
<i>Melanitta nigra</i>	Common Scoter	Y	N	SCHMITZ, 1899	Occasional
<i>Clangula hyemalis</i>	Long-tailed Duck	N	N	SCHMITZ, 1909	Exceptional
<i>Bucephala clangula</i>	Common Goldeneye	N	N	SARMENTO, 1936	Exceptional
<i>Mergus merganser</i>	Common Merganser	N	N	CORREIA-FAGUNDES <i>et al.</i> , 2011c	Exceptional
<i>Mergus serrator</i>	Red-breasted Merganser	N	N	SCHMITZ, 1908	Only 1 record
CAPRIMULGIDAE					
<i>Caprimulgus ruficollis</i>	Red-necked Nightjar	N	N	NORONHA & SCHMITZ, 1902	Only 1 record
<i>Caprimulgus europaeus</i>	European Nightjar	N	N	HARCOURT, 1851	Exceptional
APODIDAE					
<i>Tachymartus melba</i>	Alpine Swift	Y	N	NORONHA & SCHMITZ, 1902	Occasional
<i>Apus apus</i>	Common Swift	N	N	SCHINDLER, 1960	Seasonal
<i>Apus unicolor</i>	Plain Swift	Y	Y	JARDINE, 1830	Common
<i>Apus pallidus brehmorum</i>	Pallid Swift	Y	Y	HARCOURT, 1851	Common
<i>Apus affinis</i>	Little Swift	N	N	MOUGIN <i>et al.</i> , 1987	Exceptional
<i>Apus caffer</i>	White-rumped Swift	N	N	Barry Collison, <i>in litt</i>	Only 1 record
OTIDIDAE					
<i>Tetrax tetrax</i>	Little Bustard	N	N	SCHMITZ, 1899	Exceptional
CUCULIDAE					
<i>Clamator glandarius</i>	Great Spotted Cuckoo	Y	N	BANNERMAN & BANNERMAN, 1965	Exceptional
<i>Cuculus canorus</i>	Common Cuckoo	Y	N	HARCOURT, 1851	Occasional
COLUMBIDAE					
<i>Columba livia</i>	Rock Dove	Y	Y	HARCOURT, 1851	Common
<i>Columba palumbus palumbus</i>	Common Woodpigeon	N	N	MOUGIN <i>et al.</i> , 1987	Exceptional
<i>Columba palumbus maderensis</i>	Madeiran Woodpigeon	Y	N	HARCOURT, 1851	Extinct
<i>Columba trocaz</i>	Trocaz Pigeon	Y	Y	CA' DA MOSTO, 1455	Common
<i>Streptopelia turtur</i>	European Turtle Dove	Y	N	ZINO, 1991	Occasional
<i>Streptopelia decaocto</i>	Eurasian Collared Dove	Y	Y	FOLMER & ORTVAD, 1992	Common
<i>Spilopelia senegalensis</i>	Laughing Dove	N	N	ROCHA, 2013	Exceptional
RALLIDAE					
<i>Rallus aquaticus</i>	Water Rail	N	N	NORONHA & SCHMITZ, 1904	Only 1 record
<i>Rallus lowei</i>		Y	N	ALCOVER <i>et al.</i> , 2015	Extinct
<i>Rallus adolfocaesaris</i>		Y	N	ALCOVER <i>et al.</i> , 2015	Extinct
<i>Crex crex</i>	Corn Crake	Y	N	HARCOURT, 1851	Exceptional
<i>Porzana carolina</i>	Sora	N	N	ROMANO <i>et al.</i> , 2010	Only 1 record
<i>Porzana porzana</i>	Spotted Crake	Y	N	SCHMITZ, 1899	Occasional
<i>Paragallinula angulata</i>	Lesser Morhen	N	N	MATIAS, 2009	Only 1 record

Table 3 (continued).

Scientific name	English name	Specimen in MMF	Breeder	Original reference	Frequency or abundance
<i>Gallinula chloropus</i>	Common Moorhen	Y	Y	HARCOURT, 1851	Rare
<i>Fulica atra</i>	Eurasian Coot	Y	Y	HARCOURT, 1851	Rare
<i>Fulica americana</i>	American Coot	N	N	CORREIA-FAGUNDES <i>et al.</i> , 2013	Only 1 record
<i>Porphyrio alleni</i>	Allen's Gallinule	Y	N	SCHMITZ, 1908	Exceptional
<i>Porphyrio martinica</i>	Purple Gallinule	Y	N	ZINO <i>et al.</i> , 1995	Exceptional
<i>Porphyrio porphyrio</i>	Western Swampphen	N	N	SARMENTO, 1936	Occasional
<i>Zapornia pusilla</i>	Baillon's Crake	N	N	HARCOURT, 1851	Exceptional
<i>Zapornia parva</i>	Little Crake	N	N	SARMENTO, 1936	Exceptional
GRUIDAE					
<i>Grus grus</i>	Common Crane	N	N	ZINO <i>et al.</i> , 1995	Exceptional
PODICIPEDIDAE					
<i>Tachybaptus ruficollis</i>	Little Grebe	N	N	MAUL, 1948	Exceptional
<i>Podiceps auritus</i>	Horned Grebe	N	N	SCHMITZ, 1899	Exceptional
<i>Podiceps nigricollis</i>	Black-necked Grebe	Y	N	SCHMITZ, 1908	Exceptional
BURHINIDAE					
<i>Burhinus oediconemus</i>	Eurasian Stone-curlew	Y	N	HARCOURT, 1851	Exceptional
HAEMATOPODIDAE					
<i>Haematopus moquini</i>	African Oystercatcher	N	N	SARMENTO, 1936	Only 1 record
<i>Haematopus ostralegus</i>	Eurasian Oystercatcher	Y	N	NORONHA & SCHMITZ, 1902	Occasional
RECURVIROSTRIDAE					
<i>Himantopus himantopus</i>	Black-winged Stilt	Y	N	SCHMITZ, 1899	Occasional
<i>Recurvirostra avosetta</i>	Pied Avocet	Y	N	BANNERMAN & BANNERMAN, 1965	Occasional
CHARADRIIDAE					
<i>Vanellus vanellus</i>	Northern Lapwing	Y	N	HARCOURT, 1851	Seasonal
<i>Pluvialis apricaria</i>	European Golden Plover	Y	N	HARCOURT, 1851	Occasional
<i>Pluvialis fulva</i>	Pacific Golden Plover	N	N	ROMANO <i>et al.</i> , 2010	Only 1 record
<i>Pluvialis dominica</i>	American Golden Plover	N	N	ROZEMEIJER, 2008	Exceptional
<i>Pluvialis squatarola</i>	Grey Plover	Y	N	SCHMITZ, 1899	Occasional
<i>Charadrius hiaticula</i>	Common Ringed Plover	Y	N	HARCOURT, 1851	Occasional
<i>Charadrius dubius curonicus</i>	Little Ringed Plover	N	N	OGILVIE-GRANT, 1896	Occasional
<i>Charadrius vociferus</i>	Killdeer	N	N	JOHNSON, 1885	Exceptional
<i>Charadrius alexandrinus</i>	Kentish Plover	Y	Y	SCHMITZ, 1894	Very Rare
<i>Charadrius morinellus</i>	Eurasian Dotterel	Y	N	MAUL, 1948	Occasional
SCOLOPACIDAE					
<i>Bartramia longicauda</i>	Upland Sandpiper	Y	N	ZINO <i>et al.</i> , 1995	Exceptional
<i>Numenius phaeopus phaeopus</i>	Whimbrel	Y	N	HARCOURT, 1851	Frequent
<i>Numenius hudsonicus</i>	Hudsonian Whimbrel	N	N	RENDEL, 2008	Occasional
<i>Numenius arquata</i>	Eurasian Curlew	Y	N	HARCOURT, 1851	Occasional
<i>Limosa lapponica</i>	Bar-tailed Godwit	Y	N	SCHMITZ, 1897b	Occasional
<i>Limosa limosa</i>	Black-tailed Godwit	Y	N	HARCOURT, 1851	Occasional
<i>Arenaria interpres</i>	Ruddy Turnstone	Y	N	HARCOURT, 1851	Frequent
<i>Calidris canutus</i>	Red Knot	Y	N	HARCOURT, 1851	Seasonal
<i>Calidris pugnax</i>	Ruff	Y	N	HARCOURT, 1851	Occasional
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	N	N	MØLGAAARD, 2010	Only 1 record
<i>Calidris ferruginea</i>	Curlew Sandpiper	Y	N	BANNERMAN & BANNERMAN, 1965	Seasonal
<i>Calidris alba</i>	Sanderling	Y	N	HARCOURT, 1851	Seasonal
<i>Calidris alpina alpina</i>	Dunlin	Y	N	HARCOURT, 1851	Frequent
<i>Calidris alpina schinzii</i>	Baltic Dunlin	Y	N	MEINERTZHAGEN, 1925	Seasonal
<i>Calidris maritima</i>	Purple Sandpiper	N	N	SILVEIRA & SCHMITZ, 1910	Exceptional
<i>Calidris minuta</i>	Little Stint	N	N	BANNERMAN & BANNERMAN, 1965	Occasional
<i>Calidris fuscicollis</i>	White-rumped Sandpiper	Y	N	ZINO <i>et al.</i> , 1995	Exceptional
<i>Calidris subruficollis</i>	Buff-breasted Sandpiper	N	N	ROMANO <i>et al.</i> , 2010	Exceptional
<i>Calidris melanotos</i>	Pectoral Sandpiper	N	N	BANNERMAN & BANNERMAN, 1965	Occasional
<i>Calidris pusilla</i>	Semipalmated Sandpiper	N	N	ZINO <i>et al.</i> , 1995	Occasional
<i>Calidris mauri</i>	Western Sandpiper	Y	N	ZINO <i>et al.</i> , 1995	Exceptional
<i>Limnodromus sp.</i>	Dowitcher	N	N	JENSEN, 1981	Only 1 record*
<i>Scolopax rusticola</i>	Eurasian Woodcock	Y	Y	HEINEKEN, 1832	Rare
<i>Lymnocyrtus minimus</i>	Jack Snipe	Y	N	SCHMITZ, 1899	Occasional
<i>Gallinago media</i>	Great Snipe	N	N	HARCOURT, 1851	Occasional
<i>Gallinago gallinago</i>	Common Snipe	Y	N	HARCOURT, 1851	Seasonal
<i>Gallinago delicata</i>	Wilson's Snipe	N	N	CORREIA-FAGUNDES <i>et al.</i> , 2013	Only 1 record
<i>Phalaropus tricolor</i>	Wilson's Phalarope	N	N	SILVEIRA & SCHMITZ, 1910	Exceptional
<i>Phalaropus lobatus</i>	Red-necked Phalarope	N	N	HOLMES, 1939	Only 1 record
<i>Phalaropus fulicarius</i>	Red Phalarope	Y	N	SCHMITZ, 1899	Occasional
<i>Actitis hypoleucos</i>	Common Sandpiper	Y	N	HARCOURT, 1851	Seasonal
<i>Actitis macularia</i>	Spotted Sandpiper	N	N	BANNERMAN & BANNERMAN, 1965	Occasional
<i>Tringa ochropus</i>	Green Sandpiper	Y	N	SARMENTO, 1936	Occasional
<i>Tringa solitaria</i>	Solitary Sandpiper	N	N	SCHIEKERMANN, MUDER & CAZEMIER, 2010	Exceptional
<i>Tringa flavipes</i>	Lesser Yellowlegs	N	N	ZINO <i>et al.</i> , 1995	Exceptional
<i>Tringa totanus</i>	Common Redshank	Y	N	SCHMITZ, 1899	Occasional
<i>Tringa stagnatilis</i>	Marsh Sandpiper	N	N	ROMANO <i>et al.</i> , 2010	Only 1 record
<i>Tringa glareola</i>	Wood Sandpiper	N	N	SCHMITZ, 1900	Occasional
<i>Tringa erythropus</i>	Spotted Redshank	Y	N	MEINERTZHAGEN, 1925	Exceptional
<i>Tringa nebularia</i>	Common Greenshank	N	N	HARCOURT, 1851	Occasional
GLAREOLIDAE					
<i>Cursorius cursor</i>	Cream-coloured Courser	N	N	SCHMITZ, 1903	Only 1 record

Table 3 (continued).

Scientific name	English name	Specimen in MMF	Breeder	Original reference	Frequency or abundance
<i>Glareola pratincola</i>	Collared Pratincole	Y	N	SARMENTO, 1936	Exceptional
LARIDAE					
<i>Rissa tridactyla</i>	Black-legged Kittiwake	Y	N	HARCOURT, 1851	Occasional
<i>Xema sabini</i>	Sabine's Gull	N	N	ZINO <i>et al.</i> , 1995	Occasional
<i>Chroicocephalus philadelphia</i>	Bonaparte's Gull	N	N	ROMANO <i>et al.</i> , 2010	Exceptional
<i>Chroicocephalus ridibundus</i>	Black-headed Gull	Y	N	SARMENTO, 1936	Frequent
<i>Hydrocoloeus minutus</i>	Little Gull	N	N	ZINO <i>et al.</i> , 1995	Exceptional
<i>Leucophaeus atricilla</i>	Laughing Gull	N	N	ROMANO <i>et al.</i> , 2010	Exceptional
<i>Leucophaeus pipixcan</i>	Franklin's Gull	N	N	HOOGENDOORN & STEINHAUS, 1990	Exceptional
<i>Ichthyaeus melanocephalus</i>	Mediterranean Gull	N	N	BANNERMAN & BANNERMAN, 1965	Seasonal
<i>Ichthyaeus ichthyaeus</i>	Pallas' Gull	N	N	LOWE, 1934	Only 1 record
<i>Larus canus</i>	Mew Gull	N	N	SILVEIRA & SCHMITZ, 1910	Occasional
<i>Larus delawarensis</i>	Ring-billed Gull	N	N	BOURNE, 1984	Occasional
<i>Larus marinus</i>	Great Black-backed Gull	Y	N	SCHMITZ, 1899	Occasional
<i>Larus hyperboreus</i>	Glaucous Gull	Y	N	SCHMITZ, 1905	Exceptional
<i>Larus glaucoides</i>	Iceland Gull	Y	N	SCHMITZ, 1908	Occasional
<i>Larus argentatus</i>	European Herring Gull	N	N	SWASH, 1986	Occasional
<i>Larus michahellis atlantis</i>	Yellow-legged Gull	Y	Y	HARCOURT, 1851	Very Common
<i>Larus fuscus</i>	Lesser Black-backed Gull	N	N	SCHMITZ, 1899	Frequent
<i>Gelochelidon nilotica</i>	Gull-billed Tern	N	N	SCHMITZ, 1900	Exceptional
<i>Hydroprogne caspia</i>	Caspian Tern	N	N	ZINO <i>et al.</i> , 1995	Exceptional
<i>Thalasseus sandvicensis</i>	Sandwich Tern	N	N	SCHMITZ, 1897a	Occasional
<i>Sterna albigrons</i>	Little Tern	N	N	GODMAN, 1872	Exceptional
<i>Onychoprion fuscatus</i>	Sooty Tern	N	Y	ROUX, 1983	Very Rare
<i>Sterna dougallii</i>	Roseate Tern	Y	Y	OGILVIE-GRANT, 1890	Rare
<i>Sterna hirundo</i>	Common Tern	Y	Y	HARCOURT, 1851	Common
<i>Sterna paradisaea</i>	Arctic Tern	N	N	SWASH, 1986	Seasonal
<i>Chlidonias hybrida</i>	Whiskered Tern	Y	N	BANNERMAN & BANNERMAN, 1965	Exceptional
<i>Chlidonias leucopterus</i>	White-winged Tern	N	N	BANNERMAN & BANNERMAN, 1965	Only 1 record
<i>Chlidonias niger</i>	Black Tern	Y	N	HARCOURT, 1851	Exceptional
STERCORARIIDAE					
<i>Stercorarius macconnicki</i>	South Polar Skua	N	N	Flood <i>et al.</i> , 2013	Only 1 record
<i>Stercorarius skua</i>	Great Skua	Y	N	HARCOURT, 1851	Frequent
<i>Stercorarius pomarinus</i>	Pomarine Jaeger	N	N	SCHMITZ, 1899	Seasonal
<i>Stercorarius parasiticus</i>	Parasitic Jaeger	N	N	SCHMITZ, 1899	Seasonal
<i>Stercorarius longicaudus</i>	Long-tailed Jaeger	N	N	ZINO <i>et al.</i> , 1995	Seasonal
ALCIDAE					
<i>Alle alle</i>	Little Auk	Y	N	MAUL, 1948	Exceptional
<i>Pinguinus impennis</i>	Great Auk	N	N	PIEPER, 1985	Extinct
<i>Fratercula arctica</i>	Atlantic Puffin	Y	N	SCHMITZ, 1899	Occasional
PHAETHONTIDAE					
<i>Phaethon aethereus</i>	Red-billed Tropicbird	Y	N	SCHMITZ, 1894	Occasional
GAVIIDAE					
<i>Gavia arctica</i>	Black-throated Loon	N	N	SARMENTO, 1936	Dubious record
<i>Gavia immer</i>	Great Northern Loon	Y	N	HARCOURT, 1851	Seasonal
OCEANITIDAE					
<i>Oceanites oceanicus</i>	Wilson's Storm Petrel	N	N	DALGLEISH, 1890	Seasonal
<i>Pelagodroma marina hypoleuca</i>	White-faced Storm-petrel	Y	Y	OGILVIE-GRANT, 1896	Common**
<i>Fregatta tropica</i>	Black-bellied Storm Petrel	N	N	CORREIA-FAGUNDES & ROMANO, 2011	Only 1 record
HYDROBATIDAE					
<i>Hydrobates pelagicus</i>	European Storm Petrel	Y	?	BANNERMAN, 1914	Seasonal
<i>Oceanodroma castro</i>	Madeiran Storm Petrel	Y	Y	HARCOURT, 1851	Common
<i>Oceanodroma monorhis</i>	Swinhoe's Storm Petrel	N	?	JAMES & ROBERTSON, 1985	Occasional
<i>Oceanodroma leucorhoa</i>	Leach's Storm Petrel	N	N	HARCOURT, 1851	Seasonal
PROCELLARIIDAE					
<i>Fulmarus glacialis</i>	Northern Fulmar	Y	N	SHIRIHAI, 2008	Exceptional
<i>Pterodroma mollis</i>	Soft-plumaged Petrel	N	N	JEPSON & ZONFRILLO, 1988	Dubious record
<i>Pterodroma madeira</i>	Zino's Petrel	Y	Y	SCHMITZ, 1905	Very rare
<i>Pterodroma feae/ P. deserta</i>	Fea's/Desertas Petrel	Y	Y	DALGLEISH, 1891	Rare
<i>Calonectris diomedea</i>	Scopoli's Shearwater	N	N	ROMANO <i>et al.</i> , 2010	Occasional
<i>Calonectris borealis</i>	Cory's Shearwater	Y	Y	HARCOURT, 1851	Very common
<i>Calonectris edwardsii</i>	Cape Verde Shearwater	N	N	Fagundes <i>et al.</i> , 2012	Exceptional
<i>Ardenna grisea</i>	Sooty shearwater	N	N	AUDENHOVE & AUDENHOVE, 2005	Occasional
<i>Ardenna gravis</i>	Great Shearwater	N	N	SARMENTO, 1936	Seasonal
<i>Puffinus puffinus puffinus</i>	Manx Shearwater	Y	Y	HARCOURT, 1851	Common
<i>Puffinus mauretanicus</i>	Balearic Shearwater	N	N	JEPSON & ZONFRILLO, 1988	Occasional
<i>Puffinus baroli</i>	Barolo Shearwater	Y	Y	HARCOURT, 1851	Very rare
<i>Bulweria bulwerii</i>	Bulwer's Petrel	Y	Y	JARDINE & SELBY, 1828	Very common
CICONIIDAE					
<i>Ciconia nigra</i>	Black Stork	N	N	HARCOURT, 1851	Exceptional
<i>Ciconia ciconia</i>	White Stork	Y	N	SCHMITZ, 1899	Occasional
FREGATIDAE					
<i>Fregata magnificens</i>	Magnificent Frigatebird	N	N	PORTER & MAVOR, 2008	Unconfirmed
SULIDAE					
<i>Morus bassanus</i>	Northern Gannet	Y	N	SCHMITZ, 1899	Occasional
<i>Sula leucogaster</i>	Brown Booby	N	N	BERLIJN, 2009	Exceptional

Table 3 (continued).

Scientific name	English name	Specimen in MMF	Breeder	Original reference	Frequency or abundance
PHALACROCORACIDAE					
<i>Phalacrocorax carbo</i>	Great Cormorant	Y	N	SCHMITZ, 1897a	Occasional
<i>Phalacrocorax carbo maroccanus</i>	Great Cormorant	N	N	New Record	Only 1 record
<i>Phalacrocorax aristotelis</i>	European Shag	N	N	ZINO <i>et al.</i> , 1995	Occasional
THRESKIORNITHIDAE					
<i>Plegadis falcinellus</i>	Glossy Ibis	Y	N	SCHMITZ, 1899	Occasional
<i>Platalea leucorodia</i>	Eurasian Spoonbill	Y	N	SCHMITZ, 1896	Occasional
ARDEIDAE					
<i>Botaurus stellaris</i>	Eurasian Bittern	Y	N	HARCOURT, 1851	Occasional
<i>Ixobrychus minutus</i>	Little Bittern	Y	N	HARCOURT, 1851	Occasional
<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	Y	N	HARCOURT, 1851	Occasional
<i>Nyctanassa violacea</i>	Yellow-crowned Night Heron	N	N	CORREIA-FAGUNDES <i>et al.</i> , 2011b	Only 1 record
<i>Butorides virescens</i>	Green Heron	N	N	MATIAS, 2010	Only 1 record
<i>Ardeola ralloides</i>	Squacco Heron	Y	N	SCHMITZ, 1899	Occasional
<i>Bubulcus ibis</i>	Western Cattle Egret	Y	N	SCHMITZ, 1899	Occasional
<i>Ardea cinerea</i>	Grey Heron	Y	N	HARCOURT, 1851	Frequent
<i>Ardea purpurea</i>	Purple Heron	Y	N	HARCOURT, 1851	Occasional
<i>Ardea alba</i>	Great White Egret	N	N	ROMANO & CORREIRA-FAGUNDES, 2014	Exceptional
<i>Egretta garzetta</i>	Little Egret	Y	N	SCHMITZ, 1899	Frequent
<i>Egretta gularis</i>	Western Reef Heron	N	N	SCHMITZ, 1903	Only 1 record
PANDIONIDAE					
<i>Pandion haliaetus</i>	Western Osprey	N	N	SCHMITZ, 1903	Occasional
ACCIPITRIDAE					
<i>Neophron percnopterus</i>	Egyptian Vulture	N	N	HARCOURT, 1851	Exceptional
<i>Pernis apivorus</i>	European Honey Buzzard	N	N	SWASH, 1986	Only 1 record
<i>Hieraetus pennatus</i>	Booted Eagle	N	N	TAYLOR, 2008	Occasional
<i>Aquila fasciata</i>	Bonelli's Eagle	N	N	ROMANO <i>et al.</i> , 2010	Unconfirmed
<i>Accipiter nisus granti</i>	Eurasian Sparrowhawk	Y	Y	FORSTER, 1777	Rare
<i>Circus aeruginosus</i>	Western Marsh Harrier	N	N	SILVEIRA & SCHMITZ, 1910	Occasional
<i>Circus cyaneus</i>	Hen Harrier	N	N	CORREIA-FAGUNDES <i>et al.</i> , 2011a	Exceptional
<i>Circus pygargus</i>	Montagu's Harrier	Y	N	MAUL, 1948	Occasional
<i>Milvus milvus</i>	Red Kite	N	N	SARMENTO, 1936	Occasional
<i>Milvus migrans</i>	Black Kite	N	N	FOLMER & ORTVAD, 1992	Occasional
<i>Buteo lagopus</i>	Rough-legged Buzzard	N	N	MUCHAXO <i>et al.</i> , 2011	Only 1 record
<i>Buteo rufinus</i>	Long-legged Buzzard	N	N	MOUGIN <i>et al.</i> , 1987	Occasional
<i>Buteo buteo buteo</i>	Common Buzzard	Y	Y	HARCOURT, 1851	Common
TYTONIDAE					
<i>Tyto alba schmitzi</i>	Western Barn Owl	Y	Y	HARCOURT, 1851	Rare
STRIGIDAE					
<i>Otus scops</i>	Eurasian Scops Owl	Y	N	SCHMITZ, 1899	Occasional
<i>Otus maui</i>	Madeiran Scops Owl	Y	N	RANDO <i>et al.</i> , 2012	Extinct
<i>Strix aluco</i>	Tawny Owl	N	N	CORREIA-FAGUNDES <i>et al.</i> , 2013	Only 1 record
<i>Asio otus</i>	Long-eared Owl	N	Y	GODMAN, 1872	Very rare
<i>Asio flammeus</i>	Short-eared Owl	Y	N	OGILVIE-GRANT, 1896	Occasional
UPUPIDAE					
<i>Upupa epops</i>	Eurasian Hoopoe	Y	Y	BANNERMAN & BANNERMAN, 1965	Common
CORACIIDAE					
<i>Coracias garrulus</i>	European Roller	Y	N	SARMENTO, 1936	Exceptional
ALCEDINIDAE					
<i>Alcedo atthis</i>	Common Kingfisher	Y	N	HARCOURT, 1851	Occasional
MEROPIDAE					
<i>Merops persicus</i>	Blue-cheeked Bee-eater	N	N	ROMANO <i>et al.</i> , 2010	Only 1 record
<i>Merops apiaster</i>	European Bee-eater	Y	N	HARCOURT, 1851	Occasional
PICIDAE					
<i>Jynx torquilla</i>	Eurasian Wryneck	Y	N	SCHMITZ, 1897a	Exceptional
FALCONIDAE					
<i>Falco naumanni</i>	Lesser Kestrel	N	N	SWASH, 1986	Exceptional
<i>Falco tinnunculus tinnunculus</i>	Common Kestrel	Y	N	BANNERMAN & BANNERMAN, 1965	Occasional
<i>Falco tinnunculus canariensis</i>	Canarian Kestrel	Y	Y	HARCOURT, 1851	Very common
<i>Falco vespertinus</i>	Red-footed Falcon	N	N	SARMENTO, 1936	Occasional
<i>Falco eleonorae</i>	Eleonora's Falcon	N	N	MOUGIN <i>et al.</i> , 1987	Occasional
<i>Falco columbarius</i>	Merlin	N	N	SARMENTO, 1906	Exceptional
<i>Falco subbuteo</i>	Eurasian Hobby	Y	N	GODMAN, 1872	Occasional
<i>Falco rusticolus</i>	Gyr Falcon	N	N	CORREIA-FAGUNDES <i>et al.</i> , 2013	Unconfirmed
<i>Falco peregrinus peregrinus</i>	Peregrine Falcon	N	N	ZINO <i>et al.</i> , 1995	Frequent
<i>Falco peregrinus pelegrinoides</i>	Barbary Falcon	N	N	MOUGIN <i>et al.</i> , 1987	Occasional
PSITTACULIDAE					
<i>Psittacula krameri</i>	Rose-ringed Parakeet	N	Y	ROMANO <i>et al.</i>, 2010	Very rare
LANIIDAE					
<i>Lanius collurio</i>	Red-backed Shrike	N	N	CÂMARA & TEIXEIRA, 1980	Only 1 record*
<i>Lanius senator</i>	Woodchat Shrike	Y	N	SCHMITZ, 1899	Occasional
ORIOIIDAE					
<i>Oriolus oriolus</i>	Eurasian Golden Oriole	Y	N	HARCOURT, 1851	Exceptional
CORVIDAE					
<i>Coloeus monedula</i>	Western Jackdaw	Y	N	SARMENTO, 1936	Only 1 record
<i>Corvus frugilegus</i>	Rook	N	N	SCHMITZ, 1903	Only 1 record

Table 3 (continued).

Scientific name	English name	Specimen in MMF	Breeder	Original reference	Frequency or abundance
<i>Corvus corone</i>	Carrion Crow	N	N	FORSTER, 1777	Dubious record
<i>Corvus cornix cornix</i>	Hooded Crow	Y	N	ROMANO <i>et al.</i> , 2010	Only 1 record
<i>Corvus ruficollis</i>	Brown-necked Raven	N	N	SCHMITZ, 1899	Dubious record
<i>Corvus corax</i>	Northern Raven	N	N	HARCOURT, 1851	Exceptional
ALAUDIDAE					
<i>Lullula arborea</i>	Woodlark	N	N	ROMANO <i>et al.</i> , 2010	Exceptional
<i>Alauda arvensis</i>	Eurasian Skylark	Y	N	FORSTER, 1777	Seasonal
<i>Calandrella brachydactyla</i>	Greater Short-toed Lark	N	N	ZINO <i>et al.</i> , 1995	Occasional
<i>Melanocorypha calandra</i>	Calandra Lark	Y	N	BANNERMAN & BANNERMAN, 1965	Occasional
<i>Alaudala rufescens</i>	Lesser Short-toed Lark	N	N	CORREIA-FAGUNDES <i>et al.</i> , 2013	Exceptional
HIRUNDINIDAE					
<i>Riparia riparia</i>	Sand Martin	N	N	OGILVIE-GRANT, 1896	Occasional
<i>Hirundo rustica</i>	Barn Swallow	Y	N	GODMAN, 1872	Seasonal
<i>Ptyonoprogne rupestris</i>	Eurasian Crag Martin	N	N	MOUGIN <i>et al.</i> , 1987	Occasional
<i>Delichon urbicum</i>	Common House Martin	Y	N	HARCOURT, 1851	Seasonal
<i>Cecropis daurica</i>	Red-rumped Swallow	N	N	BACALLADO & OROMI, 1978	Seasonal
PHYLLOSCOPIDAE					
<i>Phylloscopus sibilatrix</i>	Wood Warbler	Y	N	OGILVIE-GRANT, 1890	Exceptional
<i>Phylloscopus bonelli</i>	Western Bonelli's Warbler	N	N	SCHMITZ, 1909	Exceptional
<i>Phylloscopus inornatus</i>	Yellow-browed Warbler	N	N	SCHMITZ, 1900	Occasional
<i>Phylloscopus trochilus</i>	Willow Warbler	N	N	SCHMITZ, 1897b	Occasional
<i>Phylloscopus collybita</i>	Common Chiffchaff	Y	N	SCHMITZ, 1897a	Seasonal
<i>Phylloscopus ibericus</i>	Iberian Chiffchaff	N	N	ROMANO <i>et al.</i> , 2010	Exceptional
<i>Phylloscopus plumbeitarsus</i>	Two-barred Warbler	N	N	VALKENBURG, 2008	Exceptional
ACROCEPHALIDAE					
<i>Acrocephalus arundinaceus</i>	Great Reed Warbler	Y	N	SARMENTO, 1936	Exceptional
<i>Acrocephalus schoenobaenus</i>	Sedge Warbler	N	N	SCHMITZ, 1905	Exceptional
<i>Acrocephalus scirpaceus</i>	Eurasian Reed Warbler	N	N	SCHMITZ, 1905	Occasional
<i>Acrocephalus palustris</i>	Marsh Warbler	N	N	SCHMITZ, 1908	Exceptional
<i>Iduna pallida</i>	Eastern Olivaceous Warbler	N	N	MOUGIN <i>et al.</i> , 1987	Exceptional*
<i>Hippolais polyglotta</i>	Melodious Warbler	N	N	SCHMITZ, 1905	Exceptional
<i>Hippolais icterina</i>	Icterine Warbler	N	N	FOLMER & ORTVAD, 1992	Exceptional*
LOCUSTELLIDAE					
<i>Locustella naevia</i>	Common Grasshopper Warbler	N	N	CÂMARA & TEIXEIRA, 1980	Only 1 record*
CISTICOLIDAE					
<i>Cisticola juncidis</i>	Zitting Cisticola	N	N	SCHMITZ, 1909	Dubious record
SYLVIIDAE					
<i>Sylvia atricapilla heineken</i>	Eurasian Blackcap	Y	Y	HARCOURT, 1851	Very common
<i>Sylvia borin</i>	Garden Warbler	N	N	SCHMITZ, 1908	Exceptional
<i>Curruca curruca</i>	Lesser Whitethroat	N	N	SCHMITZ, 1908	Exceptional
<i>Curruca hortensis</i>	Western Orphean Warbler	N	N	SCHMITZ, 1897a	Exceptional
<i>Curruca melanocephala</i>	Sardinian Warbler	N	N	OGILVIE-GRANT, 1890	Occasional
<i>Curruca cantillans</i>	Eastern Subalpine Warbler	N	N	HUNTER <i>et al.</i> , 1986	Exceptional
<i>Curruca communis</i>	Common Whitethroat	N	N	SCHMITZ, 1897a	Exceptional
<i>Curruca conspicillata orbitalis</i>	Spectacled Warbler	Y	Y	HARCOURT, 1851	Rare
REGULIDAE					
<i>Regulus ignicapilla</i>	Common Firecrest	N	N	New Record	Only 1 record
<i>Regulus madeirensis</i>	Madeira Firecrest	Y	Y	HARCOURT, 1851	Very common
TROGLODYTIDAE					
<i>Troglodytes troglodytes</i>	Eurasian Wren	N	N	HARCOURT, 1851	Exceptional
STURNIDAE					
<i>Acridotheres tristis</i>	Common Myna	N	N	ROMANO <i>et al.</i> , 2010	Only 1 record
<i>Pastor roseus</i>	Rosy Starling	N	N	SCHMITZ, 1908	Exceptional
<i>Sturnus vulgaris</i>	Common Starling	Y	N	HARCOURT, 1851	Seasonal
<i>Sturnus unicolor</i>	Spotless Starling	N	N	JENSEN, 1981	Exceptional
<i>Lamprotornis chalybaeus</i>	Greater Blue-eared Starling	N	N	ZINO <i>et al.</i> , 1995 (<i>as L. purpureus</i>)	Exceptional
TURDIDAE					
<i>Hylocichla mustelina</i>	Wood Thrush	N	N	ZINO <i>et al.</i> , 1995	Only 1 record
<i>Turdus torquatus alpestris</i>	Ring Ouzel	Y	N	ZINO <i>et al.</i> , 1995	Exceptional
<i>Turdus merula cabreræ</i>	Common Blackbird	Y	Y	SLOANE, 1707	Very common
<i>Turdus ruficollis</i>	Red-throated Thrush	N	N	SCHMITZ, 1903	Only 1 record
<i>Turdus pilaris</i>	Fieldfare	Y	N	SCHMITZ, 1896	Occasional
<i>Turdus iliacus</i>	Redwing	Y	N	HARCOURT, 1851	Occasional
<i>Turdus philomelos</i>	Song Thrush	Y	N	HARCOURT, 1851	Exceptional
<i>Turdus viscivorus</i>	Mistle Thrush	N	?	BOURNE, 1984	Occasional
MUSCICAPIDAE					
<i>Erythropygia galactotes</i>	Rufous-tailed Scrub Robin	Y	N	BANNERMAN & BANNERMAN, 1965	Exceptional
<i>Muscicapa striata</i>	Spotted Flycatcher	N	N	SCHMITZ, 1897a	Occasional
<i>Erithacus rubecula rubecula</i>	European Robin	Y	Y	HARCOURT, 1851	Common
<i>Luscinia svecica</i>	Bluethroat	N	N	CORREIA-FAGUNDES <i>et al.</i> , 2013	Exceptional
<i>Luscinia megarhynchos</i>	Common Nightingale	N	N	SCHMITZ, 1899	Exceptional
<i>Ficedula hypoleuca</i>	European Pied Flycatcher	Y	N	SARMENTO, 1936	Occasional
<i>Ficedula parva</i>	Red-breasted Flycatcher	N	N	ZINO <i>et al.</i> , 1995	Only 1 record
<i>Phoenicurus ochruros</i>	Black Redstart	Y	N	SCHMITZ, 1903	Occasional
<i>Phoenicurus phoenicurus</i>	Common Redstart	Y	N	OGILVIE-GRANT, 1890	Occasional
<i>Monticola saxatilis</i>	Common Rock Thrush	N	N	MOUGIN <i>et al.</i> , 1987	Only 1 record

Table 3 (continued).

Scientific name	English name	Specimen in MMF	Breeder	Original reference	Frequency or abundance
<i>Monticola solitarius</i>	Blue Rock Thrush	N	N	POESCH, 1961	Exceptional
<i>Saxicola rubetra</i>	Whinchat	N	N	SCHMITZ, 1909	Occasional
<i>Saxicola torquatus</i>	African Stonechat	Y	N	SARMENTO, 1936	Occasional
<i>Oenanthe oenanthe leucorhoa</i>	Greenland Wheatear	Y	N	BANNERMAN & BANNERMAN, 1965	Seasonal
<i>Oenanthe oenanthe oenanthe</i>	Northern Wheatear	Y	N	SCHMITZ, 1899	Seasonal
<i>Oenanthe isabellina</i>	Isabelline Wheatear	N	N	BOURNE, 1984	Occasional
<i>Oenanthe deserti</i>	Desert Wheatear	Y	N	TSCHUSI, 1901	Occasional
<i>Oenanthe hispanica</i>	Western Black-eared Wheatear	N	N	PETTERSSON T., <i>in litt</i>	Unconfirmed
PASSERIDAE					
<i>Passer domesticus</i>	House Sparrow	Y	N	HARCOURT, 1851	Exceptional
<i>Passer hispaniolensis</i>	Spanish Sparrow	Y	Y	OGILVIE-GRANT, 1890	Rare
<i>Petronia petronia</i>	Rock Sparrow	Y	Y	HARCOURT, 1851	Rare
PLOCEIDAE					
<i>Euplectes afer</i>	Yellow-crowned Bishop	N	N	HEIDE, 2008	Only 1 record
<i>Euplectes hordeaceus</i>	Black-winged Red Bishop	N	N	SCHMITZ, 1900	Dubious record
ESTRILDIDAE					
<i>Estrilda astrild</i>	Common Waxbill	N	Y	CÂMARA, 1997	Common
PRUNELLIDAE					
<i>Prunella modularis</i>	Duncock	N	N	CHARLES & QUINTAL, 2006	Exceptional
MOTACILLIDAE					
<i>Motacilla flava flavissima</i>	Yellow-crowned Wagtail	N	N	CORREIA-FAGUNDES <i>et al.</i> , 2011a	Only 1 record
<i>Motacilla flava flava</i>	Western Yellow Wagtail	N	N	NORONHA & SCHMITZ, 1902	Occasional
<i>Motacilla flava iberiae</i>	Iberian Yellow Wagtail	N	N	ROMANO <i>et al.</i> , 2010	Occasional
<i>Motacilla flava cinereocapilla</i>	Ashy-headed Wagtail	N	N	ROMANO <i>et al.</i> , 2010	Occasional
<i>Motacilla flava thunbergi</i>	Dark-headed Wagtail	N	N	ROMANO <i>et al.</i> , 2010	Occasional
<i>Motacilla citreola</i>	Citrine Wagtail	N	N	CORREIA-FAGUNDES <i>et al.</i> , 2011a	Only 1 record
<i>Motacilla cinerea schmitzi</i>	Madeiran Grey Wagtail	Y	Y	HARCOURT, 1851	Common
<i>Motacilla alba yarrellii</i>	Pied Wagtail	Y	N	ROMANO <i>et al.</i> , 2010	Seasonal
<i>Motacilla alba alba</i>	White Wagtail	Y	N	HARCOURT, 1851	Seasonal
<i>Anthus campestris</i>	Tawny Pipit	N	N	SWASH, 1986	Occasional
<i>Anthus pratensis</i>	Meadow Pipit	Y	N	SCHMITZ, 1897a	Occasional
<i>Anthus trivialis</i>	Tree Pipit	N	N	SCHMITZ, 1905	Exceptional
<i>Anthus cervinus</i>	Red-throated Pipit	N	N	ZINO <i>et al.</i> , 1995	Only 1 record
<i>Anthus berthelotii berthelotii</i>	Berthelot's Pipit	Y	Y	OGILVIE-GRANT, 1896	Common*
<i>Anthus berthelotii madeirensis</i>	Madeiran Berthelot's Pipit	Y	Y	HARCOURT, 1851	Common
FRINGILLIDAE					
<i>Fringilla coelebs coelebs</i>	Common Chaffinch	N	N	New Record	Only 1 record
<i>Fringilla coelebs maderensis</i>	Madeiran Chaffinch	Y	Y	HARCOURT, 1851	Very common
<i>Fringilla montifringilla</i>	Brambling	N	N	SCHMITZ, 1897b	Exceptional
<i>Coccothraustes coccothraustes</i>	Hawfinch	Y	N	SCHMITZ, 1908	Occasional
<i>Chloris chloris</i>	European Greenfinch	Y	Y	ZINO, 1969	Rare
<i>Linaria cannabina guentheri</i>	Common Linnet	Y	Y	HARCOURT, 1851	Rare
<i>Loxia pytyopsittacus</i>	Parrot Crossbill	N	N	SILVEIRA & SCHMITZ, 1910	Only 1 record
<i>Loxia curvirostra</i>	Red Crossbill	Y	N	BANNERMAN & BANNERMAN, 1965	Exceptional
<i>Carduelis carduelis parva</i>	European Goldfinch	Y	Y	HARCOURT, 1851	Common
<i>Serinus serinus</i>	European Serin	N	N	JENSEN, 1981	Only 1 record
<i>Serinus canaria</i>	Atlantic Canary	Y	Y	SLOANE, 1707	Very common
<i>Carduelis spinus</i>	Eurasian Siskin	N	Y	JENSEN, 1981	Rare
CALCARIIDAE					
<i>Plectrophenax nivalis</i>	Snow Bunting	Y	N	SCHMITZ, 1907	Occasional
EMBERIZIDAE					
<i>Emberiza calandra</i>	Corn Bunting	N	N	CORREIA-FAGUNDES <i>et al.</i> , 2011a	Exceptional
<i>Emberiza schoeniclus</i>	Common Reed Bunting	N	N	ROMANO <i>et al.</i> , 2010	Only 1 record
<i>Emberiza pusilla</i>	Little Bunting	N	N	TIPPER <i>et al.</i> , 2020	Only 1 record
PARULIDAE					
<i>Setophaga ruticilla</i>	American Redstart	N	N	ZINO <i>et al.</i> , 1995	Only 1 record*
<i>Setophaga petechia</i>	Mangrove Warbler	N	N	DU RAU <i>et al.</i> , 1994	Exceptional



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New records hidden in museum collections – the case of *Acrothoracica* (Arthropoda, Cirripedia, Crustacea) at Madeira Island (NE Atlantic Ocean)

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With 3 figures

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ABSTRACT: Burrows of *Acrothoracica* were found in a gastropod shell in the collection of Funchal Natural History Museum (MMF). No *Acrothoracica* have previously been recorded from Madeira. The species recorded belongs to the family Lithoglyptidae but no further identification is currently possible.

Keywords: hermit crab symbionts, Seine Seamount, Lithoglyptidae.

RESUMO: O presente trabalho relata a presença de *Acrothoracica* na concha de um gastrópode da coleção do Museu de História Natural do Funchal (MMF). É a primeira vez que os *Acrothoracica* são assinalados para a Madeira. Os espécimes encontrados pertencem à família Lithoglyptidae, mas não é possível de momento identificar a espécie.

Palavras-chave: simbioses, caranguejo-eremita, Banco Seine, Lithoglyptidae.

INTRODUCTION

The marvellous publication by CHAN *et al.* (2021) on the evolutionary diversity of barnacles made us realize that no Acrothoracica have as yet been recorded from Madeira Island. Acrothoracicans are known from Norway to the tropics in the eastern Atlantic (KOLBASOV, 2015). They were therefore unlikely to be truly absent from Madeira – they were merely awaiting their discovery.

MATERIAL AND METHODS

Acrothoracica are mostly burrowers in calcareous substrata, including rocks, calcareous shells of other invertebrates and also in corals. When associated with molluscs they leave visible traces in the shells they inhabit. These shells are mostly from gastropods inhabited by hermit crabs, whence they are in this case truly hermit crabs associates. We therefore searched the shell collection of the Funchal Natural History Museum (MMF) for traces of acrothoracican burrows in the mouth area of gastropod shells occupied by hermit crabs. We did not break open the shells and thus did not check for Acrothoracica that live in the columella of gastropod shells.

RESULTS

A *Charonia lampas* (Linnaeus, 1758) shell, originally occupied by a large individual of *Dardanus arrosor* (Herbst, 1796), had several acrothoracican burrows visible in the inner, dorsal side of the mouth area (Fig. 1, 2 and 3). The specimen has the collection number MMF 36241 and is preserved in alcohol. It was collected with a trap in 200 m depth at Seine Seamount (33° 45.60' N, 14° 22.80' W) on 03-11-2004.

DISCUSSION

There are approximately 70 species of Acrothoracica in 11 genera and three families (KOLBASOV, 2015). No species of Acrothoracica has previously been recorded from the Azores, from Madeira Island or from the Canary Islands; one species has been recorded from the Cape Verde Islands (KOLBASOV, 2015).

The three acrothoracid families can be recognized by burrow shape (TOMLINSON, 1969). The Lithoglyptidae have burrow apertures in the shape of slits several times longer than wide; the Cryptophialidae have short, almost round slits; the species of the family Trypetesidae usually

live in the columella of gastropod shells occupied by hermit crabs and have long slits bent at the end. The acrothoracids found by us clearly belong to the family Lithoglyptidae but no further identification is currently possible.

ACKNOWLEDGEMENTS

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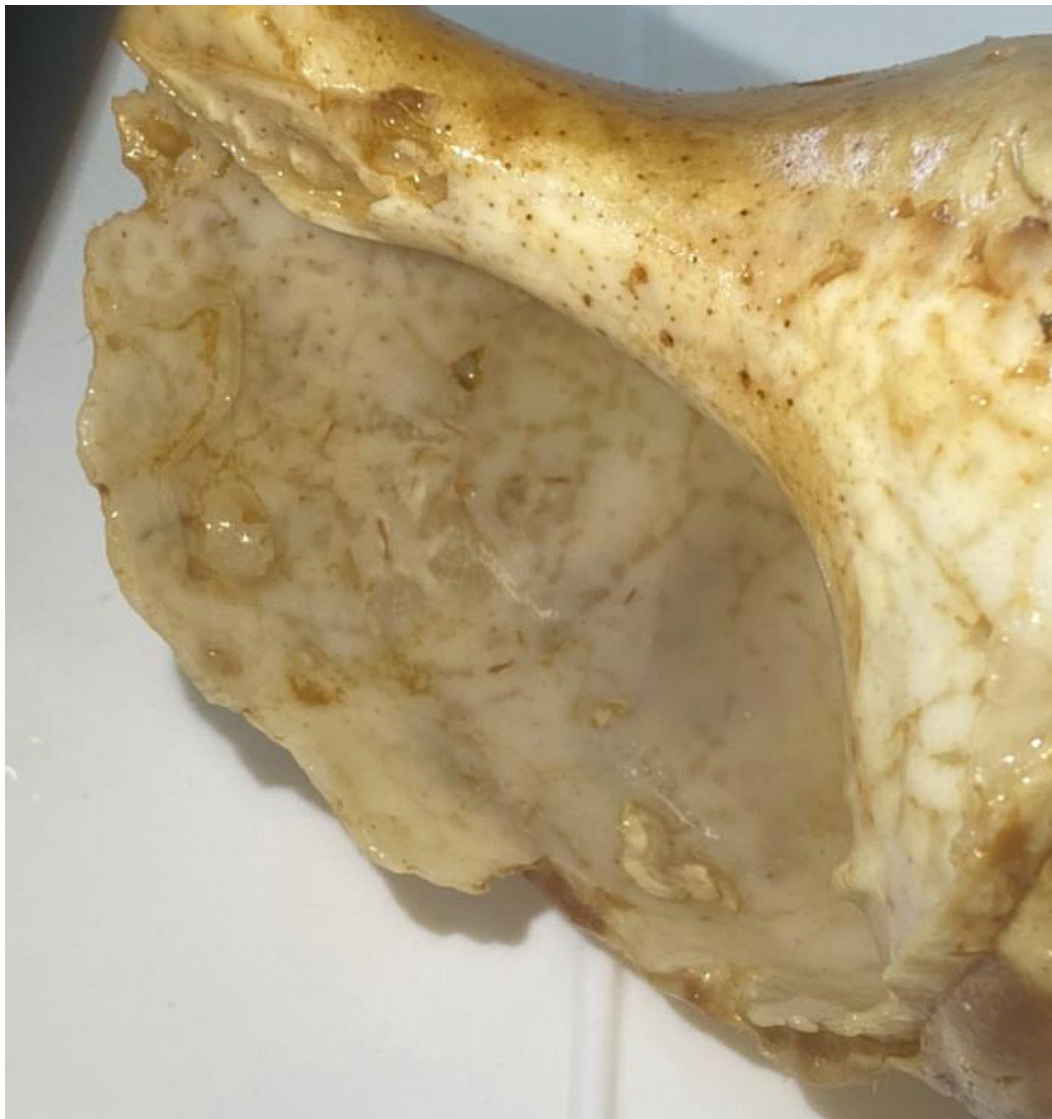


Fig. 1 – Interior of mouth area of *Charonia lampas* shell (MMF 36241) with burrows of *Acrothoracica* (photo: Diana Ramos).

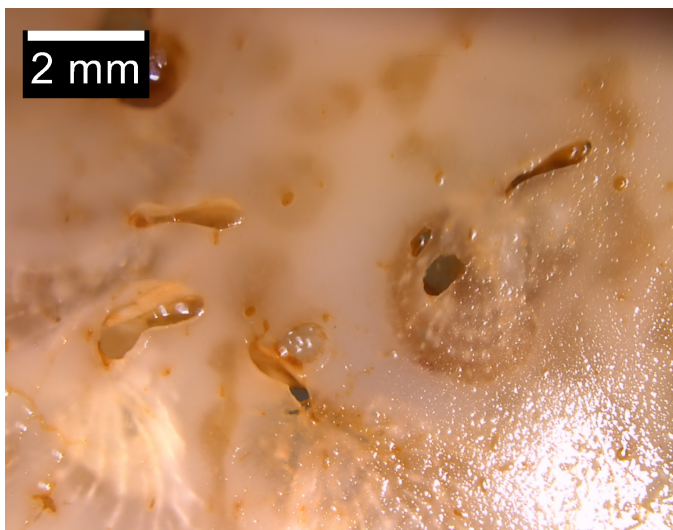


Fig. 2 – Traces of *Acrothoracica* in the mouth area of a *Charonia lampas* shell (MMF 36241) (photo: Pedro Neves).

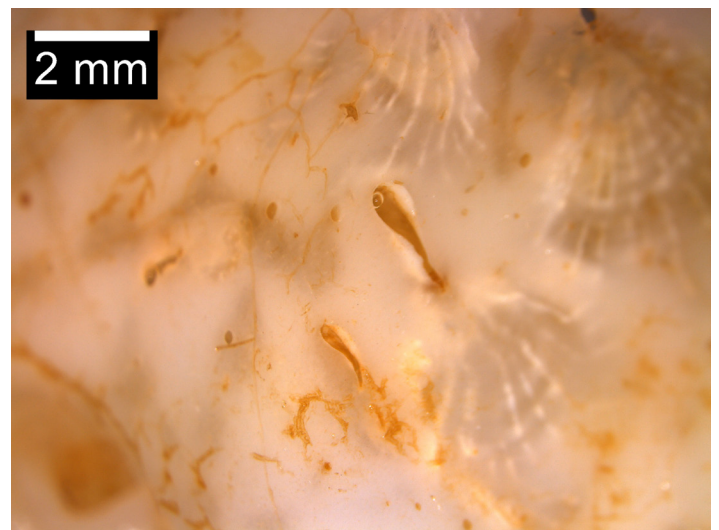


Fig. 3 – Openings of *Acrothoracican* burrows in the mouth area of a *Charonia lampas* shell (MMF 36241) (photo: Pedro Neves).