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EDITORIAL

Introducing *Zoologia Caboverdiana*

When I first visited the Cape Verde Islands, back in 1986 and 1987, I would not have guessed that this marked the beginning of a long and intensive relationship with the islands, their people and their wildlife. In the course of these early visits, which focused on endemic birds and seabirds, it became clear that the situation of many taxa was dramatic and decisive steps to safeguard their continued existence were urgently needed. After consultations with local authorities, it was agreed that an action plan should be drafted and during the following eight years I worked in Cape Verde for prolonged periods each year, engaging both in research and educational activities. One of the outcomes of this was the designation of a number of areas as Natural Reserves protected by law, thus laying the basis of the network of protected areas that we know today.

At the time, the only zoologists present in Cape Verde worked at the agricultural and fisheries institutes and, out of necessity, their activities concerned matters of applied biology only. Laudable as that may have been, it surely felt as a handicap that there was nobody locally who had any idea of the significant number of endemic taxa of birds, lizards and geckos in Cape Verde or the importance of the islands as a breeding place for seabirds, sea turtles and humpback whales. Although the zoology of the islands had been the subject of a number of ship-based scientific expeditions, mainly focusing on marine life, during the 1980s and several international symposia dedicated to the flora and fauna of Cape Verde had been held in Europe, this had raised little or no interest within the islands themselves. Quite understandably, the young republic had other worries and priorities at the time, including the ever present danger of food and water

shortages and, as is often the case in such circumstances, the basic distinction recognized in nature was between edible and non-edible organisms.

This year, Cape Verde will not only celebrate 35 years of independence of the Republic, but also witness the birth of the first scientific society in the country. This is an extraordinary event of which I could only have dreamed during those early years of my involvement with the islands. The establishment of the *Sociedade Caboverdiana de Zoologia* signifies a major step in the development of the country as a grown up nation. It means that a new wave of local zoologists have appeared on stage, taking up the subjects of their studies with endearing and stimulating enthusiasm. There are now local malacologists, ichthyologists, cetologists and other marine biologists, as well as entomologists, ornithologists and conservation biologists, demonstrating that great strides have been made. At the core of these developments has been the integration of the *Instituto Superior de Engenharias e Ciências do Mar* in São Vicente into the newly founded University of Cape Verde. This has caused considerable spin off and has accelerated the spread and depth of zoological research in Cape Verde.

The *Sociedade Caboverdiana de Zoologia* sets itself as a goal to promote zoological research in the broadest sense in Cape Verde. It aims to offer a common platform for zoologists engaging in research on any aspect of the zoology of the Cape Verde Islands, be it on marine or terrestrial organisms or in the realm of paleontology. It is envisaged that organizing symposia and workshops will be amongst the society's future activities. To start things off, a peer-reviewed biannual journal, *Zoologia Caboverdiana*, is being

launched, which will become available free-access online. We hope to have a website ready soon, which will enable the free download of all papers published in the new journal.

Meanwhile, Vol. 1, No. 1 of *Zoologia Caboverdiana* is being distributed amongst a large number of researchers deemed to be interested in this endeavour. The first issue offers papers on a scala of taxa, from birds to dolphins and from butterflies to bivalves. We are proud and happy that among the authors that contributed to this issue is a Cape Verde citizen, hopefully paving the way for many

more to come. There appears to be plenty room for the new journal, offering an outlet for the publication of results of many kinds of zoological research as well as faunistic topics. We strive to maintain the highest scientific standards and the Editorial Board sincerely hopes that you will consider *Zoologia Caboverdiana* when it comes to publishing your work.

Cornelis J. Hazevoet, Ph.D

Editor, *Zoologia Caboverdiana*

Sixth report on birds from the Cape Verde Islands, including records of 25 taxa new to the archipelago

Cornelis J. Hazevoet¹

Keywords: Aves, Cape Verde Islands, distribution, new data

ABSTRACT

Recent data on status and distribution of resident and migrant birds in the Cape Verde Islands are presented, including records of 25 taxa new to the archipelago, viz. *Mareca penelope*, *M. americana*, *Anas carolinensis*, *A. clypeata*, *Pterodroma arminjoniana*, *Sula dactylatra*, *Egretta thula*, *Ardea melanocephala*, *Hieraetus pennatus*, *Porzana porzana*, *Crecopsis egregia*, *Porphyryla martinica*, *Pluvialis apricaria*, *Calidris fuscicollis*, *C. bairdii*, *Gallinago delicata*, *Larus audouinii*, *L. atricilla*, *Streptopelia decaocto*, *Ceryle rudis*, *Ptyonoprogne rupestris*, *Motacilla citreola*, *Erithacus rubecula*, *Oenanthe leucopyga* and *Lanius senator*. The current situation of some endemic taxa is discussed, some of which (e.g. *Ardea bournei*) are critically endangered, while others (e.g. *Acrocephalus brevipennis*) have been shown to be more widespread than previously known.

RESUMO

São apresentados os dados recentes sobre o estado e a distribuição de aves residentes e migratórias nas ilhas de Cabo Verde, incluindo 25 novos registos para o archipélago, nomeadamente *Mareca penelope*, *M. americana*, *Anas carolinensis*, *A. clypeata*, *Pterodroma arminjoniana*, *Sula dactylatra*, *Egretta thula*, *Ardea melanocephala*, *Hieraetus pennatus*, *Porzana porzana*, *Crecopsis egregia*, *Porphyryla martinica*, *Pluvialis apricaria*, *Calidris fuscicollis*, *C. bairdii*, *Gallinago delicata*, *Larus audouinii*, *L. atricilla*, *Streptopelia decaocto*, *Ceryle rudis*, *Ptyonoprogne rupestris*, *Motacilla citreola*, *Erithacus rubecula*, *Oenanthe leucopyga* e *Lanius senator*. Discute-se a situação actual de taxa endémicas, nomeadamente algumas em grande perigo (e.g. *Ardea bournei*) enquanto outras provaram ser mais abundantes do que anteriormente se pensava (e.g. *Acrocephalus brevipennis*).

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INTRODUCTION

This is the sixth – long overdue – supplement to *The Birds of the Cape Verde Islands* (Hazevoet 1995). For previous instalments, see Hazevoet (1997, 1998, 1999a, 2003) and Hazevoet *et al.* (1996). Most data in the current report concern the years 2003-2009, but records from earlier years that came to light after the publication of previous supplements are also included.

During the last decade, the Cape Verde Islands have become an increasingly popular destination for birdwatchers and professional ornithologists alike. This has resulted in an amazing number of rare bird observations and the grand total of species level taxa recorded in the archipelago now stands at 211, an increase of 67 since the publication of the 1995 check-list (not counting a number of introduced taxa that may or may not have established a permanent population or that have disappeared since being introduced). Among these, the number of Nearctic herons and waders that have now been recorded in the islands is particularly impressive, especially in comparison with the modest number of Afrotropical migrants and vagrants.

Amongst studies of local breeding birds, those of Raso Lark *Alauda razae* have already resulted in a steady flow of papers on its ecology and behaviour (Donald *et al.* 2003, 2005, 2007, Donald & Brooke 2006). The discovery of subfossil owl pellets with remains of *razae* on the islands of Santa Luzia, São Vicente and Santo Antão (Mateo *et al.* 2009) sheds new light on the taxon's history in the archipelago. With a 150 m drop in sea level during the last ice age, Raso, Branco, Santa Luzia and São Vicente formed a single island, while the deep channel between São Vicente and Santo Antão would have been even narrower than today. A similar 'ice age distribution' would probably have applied to the Giant Skink *Macrosclincus coctei*, long presumed extinct, of which a maxilla was recently found in a scat of a feral cat on Santa Luzia (see Mateo *et al.* 2004).

Among other passerines, the discovery of a breeding population of the Cape Verde Cane Warbler *Acrocephalus brevipennis* on the island of Fogo (Hering 2008, Hering & Fuchs 2007, 2009, Hering & Hering 2005) has

significantly increased the known population of this endemic bird. Results of raptor studies were published by Ontiveros (2003, 2005) and Palma *et al.* (2004). On the island of Maio, long term studies of Kentish Plover *Charadrius alexandrinus* are being conducted by Tamas Szekely (University of Bath) and his team.

Amongst the most gratifying developments in recent years is the emergence of a number of dedicated local ornithologists. Samir Martins, who is currently preparing his master's thesis, has been studying the Osprey *Pandion haliaetus*, while Aline Rendall has concentrated on the endemic Purple Heron *Ardea bournei* and the Cane Warbler on Santiago. Both have demonstrated great enthusiasm and perseverance and their contributions to the knowledge and conservation of Cape Verde's birds will be especially worthwhile.

Another hopeful development is the emergence of local initiatives promoting the conservation of nature. Established in 2006, the people behind Biosfera I have recently been quite successful in preventing the traditional October raids of fledglings of Cape Verde Shearwater *Calonectris edwardsii* on Raso by fishermen from Santo Antão (see <http://www.biosferaum.org/>). Such private initiatives were unheard of only a few years ago, when culinary books with recipes for shearwaters, petrels and sea turtles were still being published without protest or restraint. Hopefully, the establishment of the *Sociedade Caboverdiana de Zoologia* will also contribute to raising environmental awareness, to the benefit of Cape Verde's wildlife.

Unless stated otherwise, general data on distribution, status, number of records, etc. in the following are taken from Hazevoet (1995, 1997, 1998, 1999a, 2003) and Hazevoet *et al.* (1996). In the taxon accounts, islands are listed in clockwise order, starting with the main island of Santiago. Taxonomy generally follows Hazevoet (1995) and Sangster *et al.* (1999). Records of rare taxa were scrutinized by the author, with the assistance of Nils van Duivendijk, Jan van der Laan and C.S. Roselaar.

ABBREVIATIONS: AK – Andras Kosztolanyi; AQ – Alessio Quaglierini; AR – Aline Rendall; AS – Aat Schaftenaar; AT – Araceli Tico; AX – António Xeira; CBa – Chris Batty; CBe – Chris Bell; CGe – Dirk Colin & Nico Geiregat; CGr – Tim Collins & Mags Grindle; CJH – Cornelis J. Hazevoet; DF – Dick Forsman; DL – Domingos Leitão; DM – Diederik van der Molen; EKR – Gonçalo Elias, Erling Krabbe & Adam Riley; EW – Edwin Winkel; FJ – Flemming Jensen; FV – Frédéric Vanhove; FW – Ferdinand Wegmann; GM – Geir Mobakken; HD – Henk van Dijk; HH – Henk Hendriks; HK – H.G. Karlsson; HN – Roy de Haas & Anja Nusse; IRT – Ian R. Thompson; JA – Janne Aalto; JL – Jan van der Laan *et al.*; JM – James Murray; JO – John Oates; KD – Klaus Drissner; LA – Liz Anderson; LB – Leo Boon; LD – Luuk Draaijer; LLJ – Luis Felipe López Jurado; MB – Mike Brooke; MC – Massimo Marcone & Francesca Cimino; MG – Mike Greenfelder/Lindblad Expeditions; MR – Magnus Robb; PC – Paul Cardy; PD – Paul Donald *et al.*; PH – Peter van Horsen; PLS – Pedro López Suárez; PW – Pim Wolf *et al.*; RB – Robin Brace; RBT – Rubén Barone Tosco; RC – Kris De Rouck & Dirk Colin; RE – Richard Ek *et al.*; REK – Richard & Erica Klim; RK – Robert Kelsh; RP – Robert Payne; RW – Richard White; SA – Sten Asbirk; SD – Simon Davies; SG – Sandra Goetsch; SJB – Saray Jimenez Bordón; SJP – Salvador J. Peris; SM – Samir Martins; SP – Stuart Piner; ST – Simon Tickle; TC – Tony Clarke/Birdquest; TD – Tim Dodman; TS – Tamas Szekely; YBa – Yves Bas; YBe – Yvonne Benting.

BREEDING BIRDS

In this section, additional data on Cape Verde breeding birds are presented, including range expansions within the archipelago, new breeding sites, data on rare

endemic taxa, new or rare records for a particular island, as well as other noteworthy observations.



Fig 1. *Pelagodroma marina*, Laje Branca, Maio, 16 April 2009 (Robert Kelsh)

Pelagodroma marina (Latham, 1790)

BOAVISTA: c. 150 were counted at night at Ilhéu dos Pássaros, 26-27 March 2009 (JL). MAIO: the number of burrows at Laje Branca was estimated independently by two observers at 2,500-5,000 (RK) and c. 3,000 (TS), 16 April 2009.

Elsewhere in the Cape Verdes, White-

headed Storm Petrel breeds on Branco (a few 100 pairs at most) and Ilhéu de Cima (several 1,000s). On Branco (and presumably Ilhéu de Cima as well), trampling of burrows by visiting fishermen is a major problem. A comprehensive count of this and other seabirds at Ilhéu de Cima is long overdue.

Phaethon aethereus Linnaeus, 1758

SANTIAGO: up to 15 birds at the cliffs east of Praia harbour during the years 2004-2009 (many observers); >17 at cliffs east of Cidade Velha, 3 March 2004 (AS), probably constitutes a so far unreported nesting site. SÃO VICENTE: three flying around Ilhéu dos Pássaros, 28 February 2008 (DM), and one there, 18 February 2009 (HD). RASO: a comprehensive count, 20-23 March 2007, yielded 85 occupied burrows, of which 13 had large young (PW). SAL: at least 16 at Ponta da Fragata, 26 March 2003 (LD). BOAVISTA: counts at the colony at Ponta do Sol, 8-19 November 2008, led to an estimate

of 40-50 pairs (FJ), while six were seen at Ilhéu de Curral Velho, 26 March 2009 (JL).

The records from Ilhéu dos Pássaros, São Vicente, are the first there in recent times and an inspection of the islet – situated at the entrance to the main port of Cape Verde and thought to be devoid of seabirds since the mid-19th century – is warranted. The tropicbirds at Ponta do Sol, Boavista, suffer from predation by both humans and feral cats, while on Raso (a Nature Reserve by law) human destruction of tropicbirds is rampant. No recent counts of breeding sites on Brava and Ilhéus do Rombo are available.



Fig. 2. *Phaethon aethereus*, victims of vandalism, Boavista, 5 March 2007 (Pedro López Suárez)

Fregata magnificens Mathews, 1914

There were a few records away from Boavista, where the only breeding site is situated. SÃO VICENTE: a male at Porto Grande, 15 January 2008 (CJH), and one there (sex unknown), 14 July 2009 (CJH); one (sex unknown) off Praia do Norte, 18 February 2008 (HD). SAL: a male near Ilhéu de Rabo de Junco, 1 November 2007 (CJH).

In March 2009, the frigatebird population at Ilhéu de Cural Velho, Boavista, consisted of two males and two females (PLS). Since 2003, there has been no breeding activity at Ilhéu de Baluarte, apparently now a former breeding site (López Suárez *et al.* 2007; PLS).

Bubulcus ibis (Linnaeus, 1758)

SANTIAGO: a count of a roost at Barragem de Poilão yielded 1,344 birds, 1 March 2008 (SG). BOAVISTA: there was a colony with *c.* 60 nests in *Prosopis* trees at Fundo das Figueiras in January-February 2004, but due to constant harassment by local youth not a single young fledged (PLS). MAIO: a

breeding colony with *c.* 25 nests was suspected in palm trees at Casas Velhas in April 2009 (TS).

Cattle Egret is a widespread migrant visitor and scarce breeding bird. These are the first reports of breeding since 1968.

Egretta garzetta (Linnaeus, 1766)

SÃO VICENTE: 60 roosting at dusk at the sewage ponds, 19 July 2005 (PH). Apart from a dubious 19th century record, this is the largest group size on record. Little Egret is a

not uncommon resident throughout the archipelago and possibly a Palearctic winter visitor in small numbers.

Ardea bournei De Naurois, 1966

SANTIAGO: largest numbers counted at the colony at Banana da Ribeira Montanha were *c.* 20 birds, including juveniles, 18-19 October 2003 (EKR), and 46 birds, including 26 juveniles, 31 October 2005 (RC). In 2006, a pair bred at Ribeira Cuba in the Serra Malagueta, *c.* 18 km north of the Banana colony (Cesarini *et al.* 2008). Since March 2000, there have been no reports of herons or active nests from the now apparently abandoned nesting tree at Boa Entrada.

For the first time in many years the population appears to be stable (or at least

not declining) and, like other water birds, the Cape Verde Purple Heron has benefited from the construction of the watershed at Poilão, where some birds are now present almost throughout the year. Nevertheless, with some 10-20 pairs at most, the total population stays at a dangerously low level, especially as vandalism at the nesting site continues, e.g. at least two juveniles at Banana were killed by local youth in February 2005 (CBa) and another in October 2006 (Hering & Barone 2007).

Milvus migrans (Boddaert, 1783)

SAL: one at Espargos, 27-28 March 2007 (TC). BOAVISTA: one at Deserto de Viana, 3 March 2006 (AQ). MAIO: five seen in the air at once, 2 km northeast of Ribeira Dom João, 31 December 2004, and one (a different bird, missing primaries in one wing) at Porto Inglês, 2 January 2005 (CGr); one at Monte Penoso, 18 April 2009 (RK).

Small numbers of Black Kite continue being reported from the three eastern islands, where it historically is the only kite present. Whether these constitute local breeding birds or Palearctic migrant visitors remains a matter of contention. No definite breeding data from the eastern islands are known.

Milvus indet.

SANTO ANTÃO: distant views of kites in the Tarrafal de Monte Trigo area, 22 December (1), 24 December (1), and 29 December 2007 (2) (CGr). Although only identified as *Milvus*, these observations show that kites

still survive on Santo Antão. A survey in April-May 1999 yielded only two sightings of kites on Santo Antão (Hille & Thiollay 2000), while none were seen there during a raptor survey in June 1999 (Palacios 2002).

Coturnix coturnix (Linnaeus, 1758)

RASO: One or more seen and singing on several dates, September-October 2001 (PD); one present, 16 December 2005 (MB); at least 12 males singing (with many more present) and possibly breeding in the unusually long grass, due to heavy rainfall in previous months, in November 2009 (SD).

Quail is a widespread and common breeding bird throughout the islands, but these are the first records for Raso, demonstrating that it may turn up just about anywhere when local circumstances are favourable.

Gallinula chloropus (Linnaeus, 1758)

SANTIAGO: 1-3 adults, two juveniles and one chick at Barragem de Poilão, 3-30 March 2007 (CBe, PC, PW, TC), at least six present, 15-17 December 2007 (CGr), 3-4 adults, 2-3 juveniles and 3-4 chicks, 3-27 February 2008 (FV, HK, SG), c. 10 (including juveniles), 18-19 March 2008 (TC), 1-4 there, 21 March-7 April 2009 (JL, RE). BOAVISTA: at least two adults and a juvenile at the interior part of Ribeira do Rabil, 5 April 2007 (PLS, AR), three juveniles, 13 May 2007, an adult, 24 July 2007, and a dead juvenile, 27 July 2007 (PLS), juveniles had been regularly observed there in previous years (PLS); two at Rabil lagoon, 27 March 2009 (JL); 3-4 at Ribeira do Rabil (interior sector), 9-14 April 2009 (PLS, RE).

During the past few years, the status of Moorhen in Cape Verde has changed

dramatically. While in the previous Cape Verde Bird Report only the second record since 1969 could be reported, there is now evidence for small but substantial breeding populations at two localities, i.e. at the Barragem de Poilão, which has been beneficial for many water birds, and at the interior section of Ribeira do Rabil (aka Monte Trigo) on Boavista. Indeed, it appears altogether possible that Moorhen has maintained a small population at the latter site, which has standing water throughout the year, ever since it was last recorded there during the mid-1960s. Apart from having been only rarely visited during the last decades, the site is difficult to survey and a small population of Moorhen could easily have remained unnoticed.

Himantopus himantopus (Linnaeus, 1758)

SAL: a nest with eggs at the Santa Maria salt pans, 14 May 2007 (AK), and adults with chicks there during the first week of July 2008 (LA). BOAVISTA: 36 at Rabil lagoon, 17 July 2009 (SM), was the largest number recorded away from Sal so far.

Until recently, the only breeding locality in Cape Verde was at the Pedra de Lume

salt pans, Sal, but disturbance due to tourism has now probably reached fatal levels and its future as a viable breeding site for Black-winged Stilt seems doubtful. Elsewhere, parties of up to 10 are regularly seen (but as yet no breeding known) on Boavista and Maio, while small numbers visit Santiago and São Vicente.

Tyto detorta Hartert, 1913

SANTA LUZIA: found breeding in October 1999, while large deposits of pellets provided evidence for the owl's long term presence on the island (Siverio *et al.* 2007). MAIO: a hand reared young close to fledging in December 2004, was said to have been

collected 'north' of Porto Inglês (CGr).

Breeding of the Barn Owl on Santa Luzia had not been established so far, while breeding on Maio was only first reported in March 2000 (Siverio *et al.* 2004).

Halcyon leucocephala (P.L.S. Müller, 1776)

MAIO: one near Casas Velhas, 30 September 2008 (IRT, TS, YBe). A common breeding bird on Santiago, Fogo and Brava, Grey-headed Kingfisher is unknown to occur on any of the other islands. Although it cannot be ruled out that the bird reached Maio

unaided, it is more likely that one was brought there and subsequently released, as this colourful bird is a favorite with local people. Similarly, a dead fledgling found on Sal in 1987 was reckoned to have been man-assisted (cf. Hazevoet 1995).

Eremopterix nigriceps (Gould, 1841)

RASO: nine on 4 November and at least six remaining until 16 November 2006 (MB). SAL: several flocks, varying in size from four to 23 birds, were seen in the dune area near Santa Maria during the first week of July 2008 (LA). Black-crowned Finch Lark is a locally common breeding bird on Santiago,

Fogo, Boavista and Maio, and there are also records from Brava, São Vicente and São Nicolau. The record from Sal, indicating the existence of a local population, is only the third for the island and there was only a single record from Raso.

Ammomanes cincturus (Gould, 1841)

SANTA LUZIA: two on 20 January 2003 (PD). Bar-tailed Desert Lark is a common and widespread breeding bird on Sal, Boavista

and Maio, and locally common on Santiago, Fogo and São Nicolau. There was only a single record from Santa Luzia.

Alaemon alaudipes (Desfontaines, 1789)

SANTIAGO: two at Praia airport, 11 July 2005 (PH). SAL: one in the Ponta da Fragata area, 31 October 2000 (RBT); one at Terra Boa, 11 October 2001 (RBT); two adults feeding a juvenile near Santa Maria, 6 January 2003 (PD); one at Pedra de Lume, 20 February 2004 (AS); two at Santa Maria, 5 November 2005 (RC), and one there, 15 March 2006 (REK); one at the airport, 21 November 2007 (CJH); two north of Palmeira, 4 December 2007 (YBa); three at Santa Maria, 7-10 January 2008 (CGr); altogether eight at various locations, 31 July 2008 (JM); one at

Santa Maria and one north of there, 16 April 2009 (RE); a male singing and displaying near Pedra de Lume, 10 November 2009 (SD).

Hoopoe Lark was first recorded on Sal in 1995, but there have been regular reports since, including breeding records, and a small but apparently growing population appears now to be established. There was only a single tentative record from Santiago. Elsewhere in Cape Verde, Hoopoe Lark is only known from Boavista and Maio, where it is common and widespread.

Acrocephalus brevipennis (Keulemans, 1866)

SANTIAGO: one singing in irrigated fields just south of Tarrafal, 17 October 2006 (EW). FOGO: in October 2004, 32 territories were

counted in the northeast of the island (Hering & Hering 2005), while a subsequent survey in October 2006 located 129 territories at

medium height on the northern slopes (Hering & Fuchs 2007, 2009). BRAVA: no warblers were found during a survey in January 2006 (Hering 2008). SÃO NICOLAU: visits in September-October 2001 and January 2003 to the three sites where *brevipennis* had been recorded in 1998 (cf. Hazevoet *et al.* 1999) yielded 9-10 territories in 2001 and 8-9 territories in 2003, compared

to eight territories in 1998 (Donald *et al.* 2004).

This is the first record of the Cane Warbler from Santiago north of the line Ribeira da Barca-Boa Entrada-Pedra Badejo. The records from Fogo confirm long-standing rumours of its existence there. The population on São Nicolau appears to remain stable at a very low level.

Sylvia atricapilla (Linnaeus, 1758)

RASO: a female, 13 November 2009 (SD), possibly a vagrant from the Palearctic. BOAVISTA: one at João Galego and up to four along the track from João Galego to the eastern shore, 6-8 April 2003 (CGe); one at Deserto de Viana, 11 April 2006 (AX).

The records from Boavista follow those

in 1995, 1998, and 1999, confirming that a small population exists on the island. Elsewhere, Blackcap is common and widespread on Santiago, Fogo, Brava, Santo Antão and São Nicolau. There was one previous record of a possible Palearctic migrant, i.e. one on Maio, 2 January 1987.

Estrilda astrild (Linnaeus, 1758)

SÃO VICENTE: six near the sewage ponds, 13 January 2005 (DF), and again six there, 1 November 2005 (RC). Common Waxbill, an introduced bird, is locally common on

Santiago. Apparently, some were recently released on São Vicente, where it had not been recorded since 1924.

SCARCE AND RARE MIGRANTS

In the following, the numbers in brackets at the beginning of each entry indicate 1) the number of records up to 1 January 1980 and 2) the number of records since that date. Records of taxa, previously included in these reports, of which there are now more than 20 records since 1 January 1980 (viz. *Egretta gularis*, *Platalea leucorodia*, *Circus aeruginosus*, *Calidris alpina*, *Philomachus pugnax*, *Limosa lapponica*, *Tringa totanus*, *T.*

glareola, *Larus ridibundus*) are included only when an observation represents a new island record or when there are otherwise remarkable circumstances (e.g. unusual numbers or date), in which case the total number of records since 1 January 1980 is given as >20. When the number of records before 1 January 1980 is uncertain this is indicated as (--). Taxa new to the archipelago are marked with an asterisk.

****Mareca penelope*** (Linnaeus, 1758)

(0, 1) MAIO: a male at Casas Velhas, 31 December 2004-1 January 2005 (CGr). This is the first record of Eurasian Wigeon for the Cape Verde Islands. In West Africa, it is a

scarce to uncommon Palearctic winter visitor from Mauritania and northern Sénégal to Chad (Borrow & Demey 2001).

****Mareca americana*** (Gmelin, 1789)

(0, 1) MAIO: a male and a female at Casas Velhas, 31 December 2004-1 January 2005 (CGr). This is the first record of American Wigeon for the Cape Verde Islands. In West

Africa, this Nearctic vagrant has been recorded once in Sénégal (Borrow & Demey 2001).



Fig. 3. *Mareca penelope* and *M. americana*, Casas Velhas, Maio, 1 January 2005 (Tim Collins)

Anas crecca Linnaeus, 1758

(2, 11) SANTIAGO: a maximum of 7 (four males and three females) at Barragem de Poilão, 23 November 2007-11 March 2008 (CGr, DL, FV, FW, HK, SG). SÃO VICENTE: a male at the sewage ponds, 1-2 January 2007 (HH). SAL: one at the Pedra de Lume salt pans, 24 October 2003 (EKR), and a male and a female there, 20 February 2004 (AS). BOAVISTA: two at Ribeira do Rabil, 13

December 2003 (LLJ), and a male there, 9 January 2008 (CJH). Common Teal has been recorded (October-March) from Santiago (1), São Vicente (6), Sal (2), and Boavista (4). It cannot be excluded that some records, in particular those of females and molting males, in fact concerned *Anas carolinensis* and records are here accepted as *Anas crecca* (*sensu lato*).

***Anas carolinensis** Gmelin, 1789

(0, 1) SÃO VICENTE: a male at the sewage ponds, 13 January 2005 (DF), and 10 February 2005 (AS). This is the first record of Green-winged Teal for the Cape Verde

Islands. In West Africa, there are as yet no records of this Nearctic duck (cf. Borrow & Demey 2001). See also *Anas crecca* above.

Anas acuta Linnaeus, 1758

(0, 3) SAL: a female at Ribeira da Madama, 4 December 2008 (ST). MAIO: a female between Calheta de Baixo and Ponta de Morro, 30 December 2004 (CGr).

The only previous record of Pintail was of one on Sal in February 1996, at the same location as the one in 2008.



Fig. 4. *Anas carolinensis*, sewage ponds, São Vicente, 13 January 2005 (Dick Forsman)



Fig. 5. *Anas clypeata* and *A. acuta*, Ribeira da Madama, Sal, 4 December 2008 (Simon Tickle)

Anas querquedula Linnaeus, 1758

(0, 2) SAL: two females at Ribeira da Madama, 4 December 2008 (ST). The only previous record of Garganey was of one on São Vicente, 14-18 April 2001.

Anas discors Linnaeus, 1766

(0, 2) SANTIAGO: a female at Barragem de Poilão, 15-17 December 2007 (CGr), and again one there, 9 March 2008 (FW), are here taken as a single record of a long-staying bird. The only previous record of Blue-winged Teal was of one on São Vicente, 12 March 2000.

***Anas clypeata** Linnaeus, 1758

(0, 4) SANTIAGO: a female at Barragem de Poilão, 15-17 December 2007 (CGr), and 3 February 2008 (FV), are here taken as a single record of a long-staying bird. SAL: a female at Ribeira da Madama, 4 December 2008 (ST). These are the first records of Northern Shoveler for the Cape Verde Islands. In West Africa, this Palearctic duck is a locally common winter visitor (Borrow & Demey 2001). SÃO VICENTE: six females at the sewage ponds, 18 December 2007-2 January 2008 (CGr), and a male there, 28 February 2008 (DM).

Aythya collaris (Donovan, 1809)

(0, 3) SÃO VICENTE: two females at the sewage ponds, 12 March 2003 (RP), and again two females there, 10-20 December 2007 (YBa, CGr). Ring-necked Duck has been recorded (November, December, March) from São Vicente (2) and Sal (1).



Fig. 6. *Aythya affinis*, sewage ponds, São Vicente, 13 January 2005 (Dick Forsman)

Aythya affinis (Eyton, 1838)

(0, 2) SÃO VICENTE: a female at the sewage ponds, 13 January-10 February 2005 (AS, DF). The only previous record of Lesser Scaup was of three females in January-February 1999, also at the São Vicente sewage works.

***Pterodroma arminjoniana** (Giglioli and Salvadori, 1869)

(0, 1) BRAVA: one ('intermediate' morph) c. 5 miles off the southern tip of Brava, 30 September 2008 (MG). This is the first record of Trindade Petrel for the Cape Verde Islands. Breeds at Trindade island and the Martin Vaz archipelago in the South Atlantic. In the North Atlantic, it has been recorded off North Carolina from May to September (Patteson & Brinkley 2004) and in the Azores from May to October (Dubois & Seitre 1997, Birding Azores <http://tinyurl.com/yjvja6r>).



Fig. 7-8. *Pterodroma arminjoniana*, off southern Brava, 30 September 2008 (courtesy of Lindblad Expeditions)

Calonectris diomedea (Scopoli, 1769)

(--, 10) CAPE VERDE SEAS: one amongst a party of *C. edwardsii* between Raso and São Nicolau, 8 March 2002 (LB), and again one there, 14 December 2002 (PD); two flying north past Raso, in a steady stream of *C. edwardsii*, 22 March 2007 (PW); one between Raso and São Nicolau, 28 November 2009 (SD). Although probably a regular passage migrant in Cape Verde seas, Cory's and Scopoli's Shearwater *C. diomedea* and *C. borealis* are seldom reported. The last record previously was of one between São Vicente and Santo Antão, 7 March 1996. There are records from November, December, February and March. Records are here accepted as *Calonectris diomedea (sensu lato)*.

Puffinus gravis (O'Reilly, 1818)

(2, 6) CAPE VERDE SEAS: three between São Nicolau and Raso, 4 December 2002 (PD); at least 10 between Raso and São Nicolau, 28 November 2009 (SD). There are records from September (2), October (1), November (2), December (2), and February (1). As there are many records north, west and east of the Cape Verde Islands, Great Shearwater is probably a not uncommon passage migrant.

Puffinus griseus (Gmelin, 1789)

(1, 2) CAPE VERDE SEAS: one between Raso and São Nicolau, 24 March 2009 (JL). Sooty Shearwater has been recorded in March (1) and April (2), but is probably less rare as a passage migrant than the scanty records suggest.

Puffinus puffinus (Brünnich, 1764)

(3, 4) CAPE VERDE SEAS: one between São Vicente and Santo Antão, 24 December 2003 (JA); one off Raso, 22 March 2007 (PW). Manx Shearwater has been recorded in September (1), October (2), November (1), December (2), and March (1). Like other migrant procellarids, it remains largely unreported, but probably is an uncommon passage migrant.

Oceanodroma leucorhoa (Vieillot, 1817)

(--, 5) CAPE VERDE SEAS: one between Raso and São Nicolau, 22 October 2003 (EKR). Leach's Storm-petrel has been recorded from October to May. It probably is a not uncommon winter visitor and there are many sightings, just extralimital, suggesting a regular occurrence.

Sula sula (Linnaeus, 1766)

(0, 5) SANTO ANTÃO: one off Ponta do Sol, 21 July 2005 (PH); the bird was seen during a sea watch and was flying east together with numerous Cape Verde Shearwaters *Calonectris edwardsii* (cf. van Horssen 2007). RASO: a subadult white morph in the Brown Booby *S. leucogaster* colony, 20 November 2009 (SD). CAPE VERDE SEAS: one came aboard *MV Causeway* at c. 17°N, 23°W, just north of Sal island, 17 April 1977 (Nuovo 2008); an immature among a feeding frenzy of Brown Boobies and Cape Verde Shearwaters between Fogo and Brava, 22 October 2009 (MG, RW).
The only previous record of Red-footed Booby was of one at Ilhéu de Cima, 24 August 1986. An immature at 19°45'N, 23°05'W, c. 190 nm northeast of the Cape Verde Islands, 21 October 2007 (RW), was just outside the geographical area considered here.

***Sula dactylatra** Lesson, 1831

(0, 1) BOAVISTA: an adult was regularly present at Ilhéu de Curral Velho during 2003-2005 (PLS). This is the first record of Masked Booby for the Cape Verde Islands. Previously, subfossil (probably Holocene) bones of an unfledged juvenile, indicating local breeding, had been collected on Ilhéu de Cima. Nearest breeding colonies are on Ascension Is., South Atlantic, and Fernando de Noronha, off Brazil. Masked Booby is a rare vagrant off West Africa (Borrow & Demey 2001).

Morus bassanus (Linnaeus, 1758)

(2, 1) BOAVISTA: an immature (probably first winter) off Praia de Chave, 3 March 2006 (AQ). This is the first record of Northern Gannet since 1980. The two previous records concerned the recovery of a ringed bird (location within islands unknown) and an observation at sea south of Santiago island.



Fig 9. *Sula dactylatra*, Ilhéu de Curral Velho, Boavista, 22 April 2005 (Pedro López Suárez)

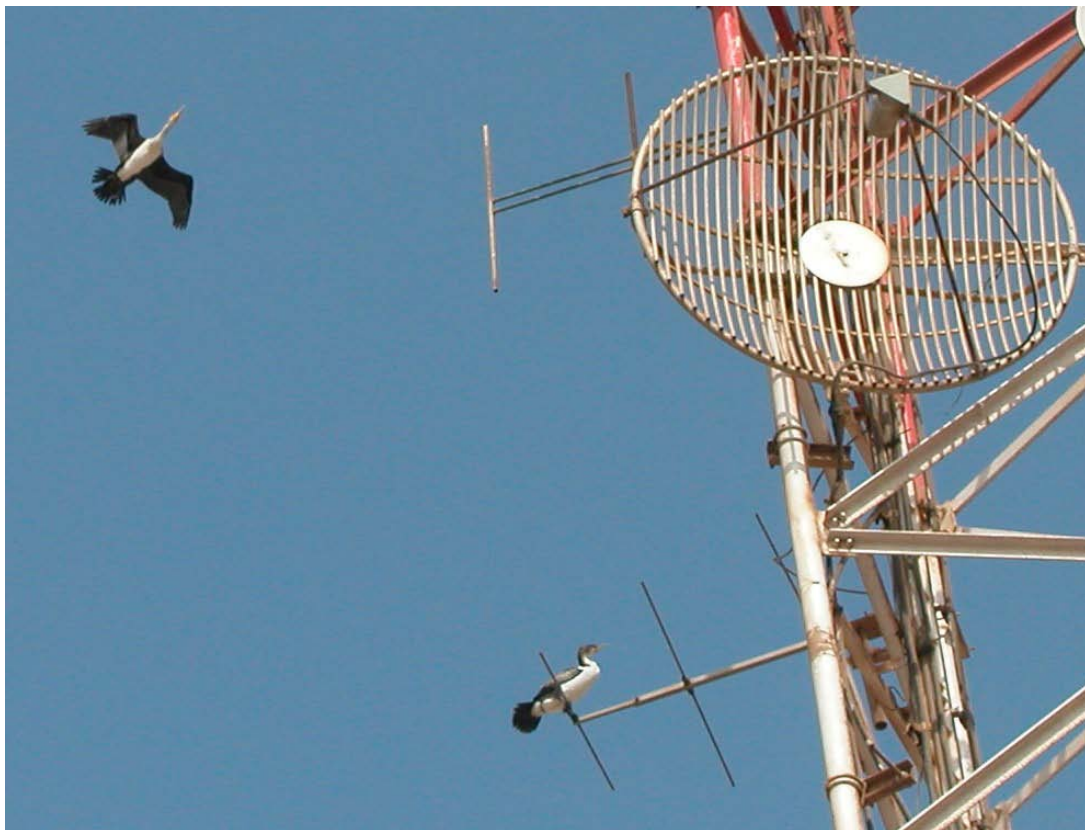


Fig. 10. *Phalacrocorax lucidus*, Sal Rei, Boavista, 28 March 2007 (Pedro López Suárez)

Phalacrocorax lucidus (Lichtenstein, 1823)

(--, 3) SANTIAGO: an immature at Barragem de Poilão was present at least throughout March 2007 (CBe, TC, PC, PW). SAL: an immature at Palmeira, 4 December 2007 (YBa). BOAVISTA: two immatures were seen from early March 2007 onwards, while during May-August 2007 four birds were present, with one still remaining in October 2007 (PLS); these cormorants were mainly seen at Sal Rei and surroundings, but occasionally also along the southern shore.

At least four and possibly six individuals were involved. It seems likely that the bird seen at Palmeira, Sal, was one of the long-staying immatures from Boavista. Quite

possibly, the bird present on Santiago in March moved to Boavista later on, but as there is no certainty about this, each island record is counted separately. These are the first records of White-breasted Cormorant since 1924. There are scanty 19th Century records, lacking in detail, from São Vicente, Raso, São Nicolau and Boavista. The single 20th Century record is of an immature female collected on Boavista, 17 March 1924. *P. lucidus* is a locally common breeding bird from Mauritania to Guinea. Although considered resident, some dispersal evidently takes place, as demonstrated by the 2007 Cape Verde records.



Fig. 11. *Pelecanus onocrotalus*, found at Olho do Mar, Boavista, 12 September 2007 (Pedro López Suárez)



Fig. 12-13. *Pelecanus onocrotalus*, Sal Rei, Boavista, July or August 2000 (photographer unknown)

Pelecanus onocrotalus Linnaeus, 1758

(0, 2) BOAVISTA: a skull was found at Olho do Mar, 12 September 2007 (PLS). As reported previously (Hazevoet 2003), a Great White Pelican was photographed at Sal Rei in July or August 2000, and a pelican skull was kept privately there. It is unclear

whether the skull belonged to the photographed bird or to another individual. As a second skull has now been found, it can be concluded that at least two and perhaps three individuals have occurred on Boavista.

Ixobrychus minutus (Linnaeus, 1766)

(1, 2) SANTIAGO: an immature male at Barragem de Poilão, 22 March 2007 (TC), and one there, 1-19 March 2008 (FW, SG, TC). The only previous record of Little Bittern was of a juvenile collected on Brava,

17 October 1969. Although Frade (1976) assigned this to Afrotropical 'subspecies' *payesii*, subsequent examination of the specimen showed it to be nominate *minutus* (Hazevoet 1999b).

Nycticorax nycticorax (Linnaeus, 1758)

(1, 9) SANTIAGO: five at Barragem de Poilão, 26-30 March 2007 (PW), seven on 15-17 December 2007 (CGr), three, 3 February-11 March 2008 (FV, FW, SG), and 1-2 immatures there, 21 March-7 April 2009 (JL,

RE). BOAVISTA: one at Rabil lagoon, 27-28 March 2007 (TC).

Night Heron has been recorded (October-March) from Santiago (5), São Vicente (1), Raso (1), and Boavista (3).

Ardeola ralloides (Scopoli, 1769)

(2, 8) SANTIAGO: one near Tarrafal, 19-20 October 2003, and one at the Pedra Badejo lagoons, 20 October 2003 (EKR); one at Barragem de Poilão, 4-30 March 2007 (CBe, PW, TC), again one, 9 March 2008 (FW), and two there, 21 March-7 April 2009 (JL, RE). SÃO NICOLAU: one west of Vila da

Ribeira Brava, 27 September 2006 (CJH). BOAVISTA: one at Ribeira do Rabil, 5 April 2007 (AR, PLS).

Squacco Heron has now been recorded (September-November, February-April) from Santiago (7), São Nicolau (1), Sal (1), and Boavista (1).

Egretta ardesiaca (Wagler, 1827)

(0, 2) RASO: one along the shore, 6 March 2007 (CBe, SP). The only previous record of

Black Heron was of one on Boavista in February-March 1985.

***Egretta thula** (Molina, 1782)

(0, 1) SÃO VICENTE: one at the sewage ponds, 1-3 November 2005 (RC). This is the first record of Snowy Egret for the Cape Verde Islands. The bird was stained with oil, possibly the result of a (partly) ship-assisted

journey across the Atlantic. There appear to be as yet no records of this North American heron from the West African mainland (cf. Borrow & Demey 2001).

Egretta intermedia (Wagler, 1829)

(1, 11) SANTIAGO: one at Praia, 28-30 March 2007 (PW). SANTO ANTÃO: one at Coculi, 28 November 2006 (MC). SÃO VICENTE: one at the sewage ponds, 18 April 2003 (CGe), and again one there, 26 December 2003 (JA).

The bird at Praia was seen flying to a roost together with a few *Bubulcus ibis* on 28 March and was subsequently seen together with *Egretta garzetta* on 30 March. Intermediate Egret has been recorded

(November-January, March-May) from (3), Sal (1), and Boavista (3).
Santiago (3), Santo Antão (2), São Vicente

Casmerodius albus (Linnaeus, 1758)

(0, 2) SANTIAGO: 1-2 at Barragem de Poilão, American origin. The only previous record
21 March-7 April 2009 (JL, RE). As the of Great Egret was of one on Boavista, 9
birds had dull dark legs, they likely were of March 1999.
Afrotropical or Palearctic rather than



Fig. 14. *Ardea melanocephala*, Barragem de Poilão, Santiago, 21 March 2009 (Cor Hopman)

****Ardea melanocephala*** Vigors and Children, 1826

(0, 1) SANTIAGO: an immature at Barragem de Poilão, 21 March-7 April 2009 (JL, RE). This is the first record of Black-headed Heron for the Cape Verde Islands, an uncommon to common resident throughout West Africa (Borrow & Demey 2001).

Ardea purpurea Linnaeus, 1766

(2, 6) SÃO VICENTE: an immature at the sewage ponds, 3 December 2006 (MC). BOAVISTA: one at Rabil lagoon, 5 March 2005 (CBa). Purple Heron has been recorded (September, December, January, March, April, July) from Santiago (1), São Vicente (3), and Boavista (4).

Plegadis falcinellis (Linnaeus, 1766)

(1, 5) SANTIAGO: one at Achade Lage, 30 October 2005 (RC), and 1-2 at Barragem de Poilão, 3 February-19 March 2008 (FV, FW, GM, HK, SG, TC). BOAVISTA: one at Ribeira do Rabil, 13 December 2003 (LLJ). Glossy Ibis has been recorded (October, December, February-April) from Santiago (3), Boavista (2), and Maio (1).

Platalea leucorodia Linnaeus, 1758

(4, >20) SANTIAGO: a colour ringed bird at Ilhéu Santa Maria, off Praia, 16 January 2005, was ringed as a nestling on the island of Terschelling (53°25'N, 05°28'E), The Netherlands, 28 May 2003; amongst six at Barragem de Poilão, 25 December 2006 to 30 March 2007, were two colour ringed birds ringed as nestlings at Markiezaat (51°27'N, 04°16'E), The Netherlands, 26 June 2006, and amongst seven at Barragem de Poilão, 15 December 2007 to 19 March 2008, were the same two colour ringed birds seen there in December 2006-March 2007, with one still present there, 15 April 2008. BOAVISTA: one of a group of six at Rabil lagoon, 25 February 2009, was ringed as a nestling on the island of Schiermonnikoog (53°29'N, 06°09'E), The Netherlands, 5 June 2008; one of a group of four at the interior sector of Ribeira do Rabil, 9-14 April 2009, was ringed as a nestling at Markiezaat (51°27'N, 04°16'E), The Netherlands, 9 June 2008. Data courtesy of Working Group Spoonbills International.

These are the third to seventh reports from the Cape Verde Islands of Spoonbills colour ringed as nestlings in The Netherlands. Although there were only four records of Spoonbill before 1980, there have been 60+ records since. The increase in Spoonbill observations is not solely due to the influx of birdwatchers in the islands, but reflects the growth of the Dutch Spoonbill population, from c. 175 pairs in 1960 to 1,894 pairs in 2008 (data Working Group Spoonbills International).

Phoenicopterus roseus Pallas, 1811

(--, 1) BOAVISTA: one at João Barrosa, 17 October 2008 (SJB). This is the first record since 1924. In the past (pre-20th Century), flamingos bred – at least occasionally – on Sal and Boavista and perhaps also on Maio. In West Africa, there are breeding colonies in Mauritania and northern Sénégal, where mainly resident, although some dispersal occurs and migrants from Europe occur during the northern winter (Borrow & Demey 2001).

Circus pygargus (Linnaeus, 1758)

(0, 5) RASO: an immature seen on four days and possibly present throughout, 4-18 November 2006 (MB), and an immature or female there, 24 March 2007 (TC). SAL: an immature at Santa Maria, 16 September 2007 (RB). MAIO: an immature at Morrinho, 30 December 2004 (CGr). Montagu's Harrier has been recorded (September, November, December, March) from Raso (1), Sal (1), Boavista (2), and Maio (1). Apart from these, there are five records of unidentified Montagu's/Pallid Harrier *C. pygargus/macrourus*.

***Hieraaetus pennatus** (Gmelin, 1788)

(0, 2) SANTIAGO: an adult pale morph in display flight at Boa Entrada, 21 March 2007 (TC). SANTO ANTÃO: an adult dark morph at Corda, 22 February 2004 (AS). These are the first records of Booted Eagle for the Cape Verde Islands. It is an uncommon Palearctic migrant to the Sahel zone (Borrow and Demey 2001), frequent to seasonally common in Senegambia (Barlow *et al.* 1997).



Fig. 15. *Phoenicopterus roseus*, João Barrosa, Boavista, 17 October 2008 (Saray Jimenez Bordón)



Fig. 16. *Circus pygargus*, Santa Maria, Sal, 16 September 2007 (Robin Brace)



Fig. 17. *Porzana porzana*, sewage works, São Vicente, 13 January 2005 (Dick Forsman).



Fig. 18. *Crecopsis egregia*, found at Ilhéu dos Pássaros, Boavista, 4 February 2004 (Pedro López Suárez)

***Porzana porzana** (Linnaeus, 1766)

(0, 2) SANTIAGO: one at Barragem de Poilão, 21-22 March 2007 (TC). SÃO VICENTE: one at the sewage ponds, 13 January 2005 (DF). These are the first records of Spotted Crake for the Cape Verde Islands. In West Africa, it is a generally rare Palearctic winter visitor, patchily recorded from Mauritania and Sénégal, where common in the Sénégal River delta (Borrow & Demey 2001).

***Crecopsis egregia** (Peters, 1854)

(0, 1) BOAVISTA: the mummified remains of an adult were found at Ilhéu dos Pássaros, 4 February 2004 (PLS); the skeleton has been deposited at the Biology Department of the University of Las Palmas de Gran Canaria, Spain. This is the first record of African Crake for the Cape Verde Islands. Occurs throughout sub-Saharan Africa. A common to rare resident and intra-African migrant in West Africa, except the arid north and forest (Borrow & Demey 2001). There are three records from the Canary Islands, one in 2001 and two in 2006, all in November (*Ardeola* 50: 134-135, 2003; 55: 269, 2008).

***Porphyryla martinica** (Linnaeus, 1766)

(0, 1) SANTIAGO: a second calendar year bird at Barragem de Poilão, 26 February-19 March 2008 (FW, GM, HK, SG, TC). This is the first record of American Purple Gallinule for the Cape Verde Islands. The taxon is known for its long-distance vagrancy and there are records from the Canary Islands (Ramos 2008), but not from the West African mainland (cf. Borrow & Demey 2001).

Haematopus ostralegus Linnaeus, 1758

(2, 11) SANTA LUZIA: one on 21 January 2003 (PD). Oystercatcher has been recorded (August-April) from Santiago (1), Ilhéu de Cima (1), Santo Antão (1), São Vicente (4), Santa Luzia (1), Branco (1), São Nicolau (1), Sal (1), and Boavista (2).

Recurvirostra avosetta Linnaeus, 1758

(1, 10) SAL: one at the Pedra de Lume salt pans, 15 March 2006 (REK). MAIO: one present for several days at the Porto Inglês salt pans, mid-September 2009 (AT, TS). Avocet has been recorded (October-April) from São Vicente (1), Sal (3), Boavista (3), and Maio (4).

Glareola pratincola (Linnaeus, 1758)

(2, 8) SÃO VICENTE: one at the sewage ponds, 26 December 2003 (JA), and again one there, 21-27 February 2004 (AS). MAIO: one at the salt pans near Porto Inglês, 25-26 September 2007 (PLS, TS), and 1-3 there, 28 September-5 October 2008 (IRT, TS, YBe), one at Casas Velhas, 6 January 2008 (TS), and one at Ribeira da Lagoa, 17-19 April 2009 (RK, TS). Collared Pratincole has been recorded (September-May) from Santiago (2), São Vicente (2), Sal (1), and Maio (5).

Charadrius dubius Scopoli, 1786

(2, 21) SANTIAGO: 2-4 at Barragem de Poilão, 15 December 2007-19 March 2008 (CGr, FV, HK, SG, TC), and one there, 21-22 March 2009 (JL). SÃO VICENTE: two at the sewage ponds, 10 February 2005 (AS), four on 30 November 2006 (MC), two there, 18 December 2007 (CGr), and 3-5 there, 28 February 2008 (DM). SAL: three at the Pedra de Lume salt pans, 21 February 2008 (DM).

Little Ringed Plover has been recorded (August-May) from Santiago (11), São Vicente (9), Sal (1), and Boavista (2). With 21 records since 1980, it is clear that Little

Ringed Plover is a scarce but regular Palearctic migrant visitor. Except for unusual observations (e.g. new island records), the taxon will not be included in future reports.

Charadrius semipalmatus Bonaparte, 1825

(0, 6) SANTIAGO: one at Praia, 11 April 2003 (CGe); one first winter bird at Tarrafal, 30 October 2005 (RC), and again a first winter bird, c. 1 km south of Tarrafal, 17 October 2006 (EW). SÃO VICENTE: one first winter

bird at the sewage ponds, 1-3 November 2005 (RC). Semipalmated Plover has been recorded (October, November, February-April) from Santiago (3), São Vicente (2), and Sal (1).

Pluvialis dominicus (P.L.S. Müller, 1776)

(3, 9) SANTIAGO: one at Praia, 11-12 April 2003 (CGe). SÃO VICENTE: two adults at the sewage ponds, 27 February 2004 (AS), one first winter bird, 1-3 November 2005 (RC), 1-3 (two first winter and an adult) there, 3 December 2006-25 February 2007 (DF, HH,

MC, MR). RASO: one on 21 October 2006 (EW). American Golden Plover has been recorded (October-April) from Santiago (2), Santo Antão (1), São Vicente (8), and Raso (1).

***Pluvialis apricaria** (Linnaeus, 1758)

(0, 1) SANTIAGO: one just south of Tarrafal, 4 March 2006 (REK). The bird was seen in a maize plot at the experimental farm south of the sewage ponds, together with *Vanellus spinosus* (see below). This is the first record

of European Golden Plover for the Cape Verde Islands. In West Africa, the taxon is a rare winter visitor to Mauritania and a vagrant to Senegambia (Lamarche 1988, Borrow & Demey 2001).

Vanellus spinosus (Linnaeus, 1758)

(0, 2) SANTIAGO: one just south of Tarrafal, together with *Pluvialis apricaria* (see above), 4 March 2006 (REK). The only previous

record of Spur-winged Lapwing, a widespread breeding bird in West Africa, was of one on São Nicolau, 11 April 2001.

Calidris canutus (Linnaeus, 1758)

(1, 11) SÃO VICENTE: one at Baía das Gatas, 6 December 2007 (YBa). SAL: an adult and two juveniles at the Santa Maria salt pans, 20-23 October 2007 (JO), and two there, 7 January 2008 (CGr). BOAVISTA: two at the

eastern shore near Antigas Salinas, 8 April 2003 (CGe). Knot has been recorded (October-January, March, April, July) from Santiago (2), São Vicente (2), Sal (2), Boavista (5), and Maio (1).

Calidris pusilla (Linnaeus, 1766)

(0, 3) SÃO VICENTE: three first winter birds at the sewage ponds, 1-3 November 2005 (RC). Semipalmated Sandpiper, a vagrant

from North America, has been recorded (November, March) from São Vicente (2), and Boavista (1).



Fig. 19. *Charadrius semipalmatus*, Tarrafal, Santiago, 17 October 2006 (Edwin Winkel)



Fig. 20. *Pluvialis dominicus*, Raso, 21 October 2006 (Edwin Winkel)



Fig. 21. *Calidris minutilla*, Rabil lagoon, Boavista, 15 April 2009 (Richard Ek)

Calidris minutilla (Vieillot, 1819)

(0, 4) SAL: one at the Pedra de Lume salt pans, 16 April 2009 (RE). BOAVISTA: one at Rabil lagoon, 13-15 April 2009 (RE). Least Sandpiper, a Nearctic vagrant, has been recorded (March-April) from São Vicente (2), Sal (1), and Boavista (1).

****Calidris fuscicollis*** (Vieillot, 1819)

(0, 5) SANTIAGO: one adult winter bird at Praia, 31 October 2005 (RC). SÃO VICENTE: one first winter and two adult winter birds at the sewage ponds, 1-3 November 2005 (RC), and one there, 18 December 2007-2 January 2008 (CGr). SAL: one first winter bird at Santa Maria and another at the Pedra de Lume salt pans, 5 November 2005 (RC). These are the first records of White-rumped Sandpiper for the Cape Verde Islands. In West Africa, there are records of this North American migrant from Ivory Coast and Ghana (Borrow & Demey 2001).

****Calidris bairdii*** (Coues, 1861)

(0, 1) SAL: an adult at the Santa Maria salt pans, 20-22 October 2007 (JO). This is the first record of Baird's Sandpiper for the Cape Verde Islands. In West Africa, this Nearctic vagrant has been claimed (but not substantiated) in Mauritania, Sénégal, and The Gambia (Borrow & Demey 2001).



Fig. 22. *Calidris fuscicollis*, sewage works, São Vicente, 3 November 2005 (Kris De Rouck)



Fig. 23. *Calidris bairdii*, Santa Maria, Sal, 20 October 2007 (John Oates)

Calidris melanotos (Vieillot, 1819)

(0, 2) SANTIAGO: two at Tarrafal, 19-20 October 2003 (EKR). The only previous record of Pectoral Sandpiper was of one near Tarrafal, Santiago, 16-17 October 2001, a remarkable temporal and spatial concurrence in the occurrence of this Nearctic vagrant (see also *Tringa melanoleuca* below).

Calidris temminckii (Leisler, 1812)

(0, 5) SANTIAGO: one at the Pedra Badejo lagoons, 5 March 2006 (REK). SÃO VICENTE: one at the sewage ponds, 3 December 2006 (MC). BOAVISTA: one at Rabil lagoon, 2-3 March 2008 (HK, GM). Temminck's Stint has been recorded (November, December, March) from Santiago (1), São Vicente (1), Sal (1), and Boavista (2).

Lymnocyptes minimus (Brünnich, 1764)

(0, 2) SANTIAGO: one at Barragem de Poilão, 15-17 December 2007 (CGr). The only previous record of Jack Snipe was of one on Maio, 26 August 1986. The taxon may well be under-recorded due to its skulking habits.

Gallinago gallinago (Linnaeus, 1758)

(0, 23) SANTIAGO: 1-2 at Barragem de Poilão, 3-30 March 2007 (CBe, PW, TC), five there, 15-17 December 2007 (CGr), 3-5 there, 27 February-19 March 2008 (SG, TC), seven there, 21-22 March 2009 (JL), and one there, 6-7 April 2009 (RE). SÃO VICENTE: one at the sewage ponds, 27 February 2004 (AS), and again one there, 11 March 2006 (REK). SAL: two at Ribeira da Madama, 4 December 2008 (ST). BOAVISTA: one at Ribeira do Rabil (interior part), 9 January 2008 (CJH); one at Rabil lagoon, 17 March 2008 (TC), and one there, 14 April 2009 (RE). MAIO: one at the salt pans near Porto Inglês, 17 November 2007 (PLS); one at Ribeira de Dom João, 2 October 2008 (IRT, YBe).
It cannot be ruled out that some of the above in fact concerned *Gallinago delicata* (see below) and records are here accepted as *Gallinago gallinago* (*sensu lato*). Snipe has been recorded (October-March) from Santiago (6), São Vicente (8), Sal (2), Boavista (5), and Maio (2). With 23 records (involving many more individuals) since 1996, it is clear that the taxon is a regular winter visitor in small numbers. This is the last report in which *G. gallinago* is included, but observers are asked to remain alert for the possibility of *G. delicata*.

***Gallinago delicata** (Ord, 1825)

(0, 1) SANTIAGO: one at Barragem de Poilão, 26-30 March 2007 (PW). This is the first record of Wilson's Snipe, a vagrant from the Nearctic, for the Cape Verde Islands. There appear to be as yet no records from West Africa (cf. Borrow & Demey 2001). See also *G. gallinago* above.

Limosa limosa (Linnaeus, 1758)

(2, 6) SÃO VICENTE: three at the sewage ponds, 3 December 2006 (MC). BOAVISTA: c. 10 at Ribeira do Rabil, 13 December 2003 (LLJ). MAIO: one at Ribeira de Dom João, 30 September 2008 (IRT, YBe). Black-tailed Godwit has been recorded (August-October, December-January) from São Vicente (2), Sal (1), Boavista (3), and Maio (2).



Fig. 24. *Gallinago delicata*, Barragem de Poilão, Santiago, 26 March 2007 (René Pop)

Tringa erythropus (Pallas, 1764)

(0, 11) SÃO VICENTE: two at the sewage ponds, 3 December 2006 (MC). SAL: one at the Pedra de Lume saltpans, 4 March 2003 (RP). MAIO: one south of Ribeira Dom João, 31 December 2004 (CGr).

Spotted Redshank has been recorded (September, November-March) from Santiago (1), São Vicente (5), Sal (1), Boavista (3), and Maio (1).

Tringa totanus (Linnaeus, 1758)

(1, >20) BOAVISTA: one at Rabil lagoon, 28 March 2007, and again one there, 17 March 2008 (TC).

Although there was only one old record, Redshank has been regularly reported from São Vicente and Sal since 1980, but the above were only the fifth and sixth record for

Boavista, others being from Santiago (1) and Maio (1). Regularly present at the Pedra de Lume saltpans on Sal and the sewage ponds on São Vicente, from late August to late April. Away from these two locations records are few.

Tringa stagnatilis (Bechstein, 1803)

(0, 2) SÃO VICENTE: one at the sewage ponds, 30 November 2006 (MC). The only previous record of Marsh Sandpiper, a

vagrant from the Palearctic, was of one on Sal, 23 November 1989.

Tringa melanoleuca (Gmelin, 1789)

(0, 3) SANTIAGO: one at the sewage ponds south of Tarrafal, 19 October 2003 (EKR). SÃO VICENTE: one at the sewage ponds, 30 November 2006 (MC). The only previous record of Greater Yellowlegs, a Nearctic

vagrant, was of one near Tarrafal, Santiago, 16-17 October 2001, a remarkable concurrence in temporal and spatial occurrence (see also *Calidris melanotos* above).

Tringa flavipes (Gmelin, 1789)

(0, 13) SANTIAGO: one at the sewage ponds south of Tarrafal, 19 October 2003 (EKR); one at Cidade Velha, 29 December 2003 (JA); 1-2 at Barragem de Poilão, 16 December 2007-19 March 2008 (CGr, FV, FW, GM, HK, SG, TC). SÃO VICENTE: one at the sewage ponds, 26 December 2003 (JA), one there, 3 December 2006-1 February 2007 (DF, HH, MC), and again one there, 18 December 2007-2 January 2008 (CGr). SAL: two at the Pedra de Lume saltpans, 6 January-20 April 2003 (CGr, PD), 1-4 there, 24 October 2003-20 February 2004 (AS, EKR, JA), and one there, 24 February-15 March 2008 (HK, GM, TC).

Lesser Yellowlegs, a Nearctic migrant, has been recorded (September-April) from Santiago (3), São Vicente (3), Sal (5), and Boavista (2). All records are since 1999.

Tringa ochropus Linnaeus, 1758

(2, 14) SANTIAGO: 1-3 at Barragem de Poilão, 3-30 March 2007 (CBe, PW, TC), 1-3 there, 15 December 2007-19 March 2008 (CGr, HK, SG, TC), and 1-3 there, 21 March-7 April 2009 (JL, RE). SÃO VICENTE: two at the sewage ponds, 10 February 2005 (AS), and one there, 2 November 2005 (RC). SÃO NICOLAU: one at the Ribeira Brava river mouth, 29 November 2009 (SD). BOAVISTA: one at Sal Rei, 21 December 2003 (JA); one at Ribeira do Rabil (interior part), 9 January 2008 (CJH). MAIO: one at Lagoa, 3 October 2008 (IRT, YBe). Green Sandpiper has been recorded (October-April) from Santiago (8), São Vicente (3), São Nicolau (1), Boavista (3), and Maio (1).

Tringa solitaria A. Wilson, 1813

(0, 2) SÃO VICENTE: one at the sewage ponds, 13 January 2005 (DF). The only previous record of Solitary Sandpiper, a vagrant from the Nearctic, was of one on Boavista, 12 March 1997.

Actitis macularia (Linnaeus, 1766)

(0, 8) SANTIAGO: one first winter bird at Praia, 31 October 2005 (RC). SANTO ANTÃO: one at Ponta da Sol, 21 November 2003 (AS), and again one (possibly the same bird) there, 24-25 February 2004 (AS). SÃO VICENTE: two at the sewage ponds, 26 December 2003 (JA), one first winter bird, 2-3 November 2005 (RC), and again one there, 1-2 January 2007 (HH). A migrant from the Nearctic, Spotted Sandpiper has been recorded (October-March) from Santiago (1), Santo Antão (2), and São Vicente (5).

Phalaropus lobatus (Linnaeus, 1758)

(0, 2) MAIO: one at the Porto Inglês saltpans, 20 October 2009 (AT, TS). This is the second record of Red-necked Phalarope, the only other being of one at the Pedra de Lume saltpans, Sal, 17 January-4 February 1995.

Phalaropus fulicaria (Linnaeus, 1758)

(--, 13) SÃO VICENTE: one at the sewage ponds, 30 November 2006 (MC). CAPE VERDE SEAS: two flying north past Raso, 20 March 2007 (PW). Grey Phalarope has been recorded (October-May) from São Vicente (1), Sal (1), and at sea (11). Presumably more common at sea than the few records indicate.



Fig. 25. *Tringa flavipes*, sewage ponds, São Vicente, 1 February 2007 (Dick Forsman)



Fig. 26. *Tringa solitaria*, sewage ponds, São Vicente, 13 January 2005 (Dick Forsman)

Stercorarius skua (Brünnich, 1764)

(3, 12) CAPE VERDE SEAS: two between Branco and São Nicolau, 22 October 2003, and two off Barril, São Nicolau, the next day, were presumed to be the same birds (EKR); one between Raso and São Nicolau, 17 December 2004 (MB), and one there, 24 March 2007 (TC); one flying north past Raso, 22 March 2007 (PW); three off Barril, São Nicolau, 23 March 2009 (JL); two between São Nicolau and Raso, 11 April 2009 (RE).

As in previous years, all records of Great Skua were from the Branco-Raso area. The three pre-1980 records are of one west of Santo Antão and of ringing recoveries on São Vicente and Sal.

***Stercorarius* indet.**

CAPE VERDE SEAS: a 'great skua' between Branco and São Nicolau, 15 April 2003 (CGe), was presumably *S. skua*, but the possibility of *S. maccormicki* could not be ruled out.

Larus sabini J. Sabine, 1819

(2, 1) BOAVISTA: a juvenile at Sal Rei, 22 December 2000 (TD). Only the first record since 1980, the two previous records of Sabine's Gull were of adults at sea in April 1976.

Larus genei Brême, 1839

(0, 2) BOAVISTA: an adult at Boca de Salina, 15 February 2007 (PLS). The only previous record of Slender-billed Gull was of an immature at Santa Maria, Sal, 16 February 1994.

****Larus audouinii*** Payraudeau, 1826

(0, 1) SÃO NICOLAU: a third winter bird flying east past Juncalinho, 5 January 2008 (CGr). This is the first record of Audouin's Gull for the Cape Verde Islands. In West Africa, this Mediterranean taxon is a rare migrant (September-May) to coastal Mauritania and Senegambia (Lamarche 1988, Borrow & Demey 2001).

Larus michahellis Naumann, 1840

(1, 27) SÃO VICENTE: two at Mindelo, 12 March 2003 (RP), two second winter birds, 10 February 2005 (AS), six (including one adult), 11 March 2006 (REK), three, 15 September 2006 (CJH), and five (including one adult) there, 1-2 January 2007 (HH). RASO: a first winter bird offshore, 25 November 2009 (SD). SÃO NICOLAU: up to 12 first winter birds at Tarrafal, 8-25 January 2003 (PD). SAL: one adult at Palmeira, 2 November 2007 (CJH). With 27 records (September-June) since 1980, involving many more individuals, it is clear that Yellow-legged Gull is a regular visitor in the Cape Verde Islands. Whether these birds belong to nominate *michahellis* or *atlantis* has still to be determined, although the majority of birds seen in Cape Verde are thought to concern the latter. In addition, there are many records of unidentified immature *L. michahellis/fuscus*. Barring unusual records, this is the last report in which Yellow-legged Gull is included.

****Larus atricilla*** Linnaeus, 1758

(0, 1) SÃO VICENTE: an adult in non-breeding plumage at Praia de Lazareto, 23 July 2009 (CJH). This is the first record of Laughing Gull for the Cape Verde Islands. In

West Africa, this Nearctic taxon has been recorded as a vagrant in Senegambia (Borrow & Demey 2001) and also in the Canary Islands (Ramos 2008).

***Gelochelidon nilotica* Gmelin, 1789**

(0, 5) MAIO: two at Calheta de Baixo, 30 December 2004-2 January 2005 (CGr); one at the salt pans near Porto Inglês, 6 October 2008 (IRT, YBe), and one there, 1 January 2008 (PLS); two first winter birds at Ribeira da Lagoa, 19 April 2009 (RK). The only previous record of Gull-billed Tern was of two on Boavista, 31 January 1995.

***Sterna caspia* Pallas, 1770**

(0, 9) BOAVISTA: one at Sal Rei, 24 December 2000 (TD). MAIO: one at Casas Velhas, 31 December 2004-1 January 2005 (CGr); one at the salt pans near Porto Inglês, 25 September 2007 (PLS, TS), one there, 15 November 2007 (PLS), and again one there, 7 January 2008 (SM), are here counted as a single record of a long-staying bird. Caspian Tern has been recorded (September, November-April) from São Vicente (1), Boavista (5), and Maio (2), and at sea (1).

***Sterna maxima* Boddaert, 1783**

(0, 3) BOAVISTA: 1-2 at Sal Rei and Rabil lagoon, 24-25 December 2000 (TD). Royal Tern has been recorded (December, February-April) from Sal (1), and Boavista (2). Possibly, the record of three long-staying birds at Rabil lagoon, Boavista, 16 March-23 April 2001 (cf. Hazevoet 2003), concerned the same party as those reported here.



Fig. 27. *Gelochelidon nilotica*, Ribeira da Lagoa, Maio, 19 April 2009 (Robert Kelsh)



Fig. 28. *Sterna caspia*, saltpans, Maio, 15 November 2007 (Pedro López Suárez)



Fig. 29. *Sterna sandvicensis*, Ribeira da Madama, Sal, 4 December 2008 (Simon Tickle)

Sterna sandvicensis Latham, 1787

(1, 18) SANTIAGO: one along the shore at Praia, 21-23 December 2006 (HH). SAL: two immatures at Santa Maria, 26 October 2003 (EKR); one at Ribeira da Madama, 4 December 2008 (ST). BOAVISTA: one at Rabil lagoon, 10 February 2008 (FV). MAIO: three at Calheta de Baixo, 30 December 2004-2 January 2005 (CGr); one at the salt pans near Porto Inglês, 12 November 2007 (PLS), and again one there, 7 January 2008 (SM). Sandwich Tern has been recorded (October-March) from Santiago (2), São Nicolau (3), Sal (2), Boavista (5), Maio (4), and at sea (3).

Sterna hirundo Linnaeus, 1758

(2, 11) SAL: an immature at Santa Maria, 26 October 2003 (EKR). CAPE VERDE SEAS: one between São Nicolau and Raso, 14 April 2003 (CGe). Common Tern has been recorded (October, December, January, April-June) from Santiago (1), Santo Antão (1), Sal (6), Boavista (3), Maio (1), and at sea (1).

Sterna albifrons Pallas, 1764

(0, 15) BOAVISTA: one at Rabil lagoon, 3 March 2005 (CBa). First recorded on Maio in 1988, all subsequent records of Little Tern have been from Rabil lagoon and the nearby shore, where a few appear to be present annually from October to April.

Oena capensis (Linnaeus, 1766)

(0, 2) BOAVISTA: a male at Ponta da Varandinha, 2 December 2006 (PLS). This is the second record of Namaqua Dove, a common resident and intra-African migrant in the Sahel zone, the previous being of one on Maio, 21 July 1995.



Fig. 30. *Oena capensis*, Ponta de Varandinha, Boavista, 2 December 2006 (Pedro López Suárez)



Fig. 31. *Streptopelia turtur*, Santa Maria, Sal, 17 September 2007 (Robin Brace)

Streptopelia turtur (Linnaeus, 1758)

(2, 10) SAL: one at Pedra de Lume, 30 September 2005 (RBT); three at Santa Maria, 17 September 2007 (RB). Turtle Dove has been recorded (August-October, February) from Santiago (2), São Vicente (3), Sal (4), Boavista (2), and Maio (1).

****Streptopelia decaocto*** (Frisvaldsky, 1838)

(0, 2) SÃO NICOLAU: one at Vila da Ribeira Brava, 12 November 2009 (SD). SAL: one at Espargos, 3 April 2006 (AX). appearance in Cape Verde still comes as a surprise. In the Canary Islands, Morocco and Western Sahara, it has become well-established since the 1990s (Bergier 2000, Bergier & Thévenot 2008, Bergier *et al.* 1999, Lorenzo & Barone 2007, Ramos 2008). These are the first records of Collared Dove for the Cape Verde Islands. Even considering the taxon's spectacular range expansion during the last century, its

Asio flammeus (Pontoppidan, 1763)

(0, 10) RASO: single birds on 13 December 2002 and 15 and 21 January 2003 presumably concerned the same individual (PD); one present, 22-24 November 2009 (SD). MAIO: one at the salt pans near Porto Inglês, 5 October 2008 (TS). Short-eared Owl has been recorded (October-March) from Raso (4), Sal (3), and Maio (1), with another two seen from ships at sea between the islands.

****Ceryle rudis*** (Linnaeus, 1758)

(0, 1) FOGO: one at Porto do Vale dos Cavaleiros (São Filipe harbour), 19 October 2004 (RW). This is the first record of Pied Kingfisher for the Cape Verde Islands. In West Africa, it is common south of 17°N, probably mainly sedentary, but seasonal changes in abundance have been reported (Borrow & Demey 2001).



Fig. 32. *Ceryle rudis*, Porto do Vale dos Cavaleiros, Fogo, 19 October 2004 (Richard White)



Fig. 33. *Merops apiaster*, João Barrosa, Boavista, 7 April 2006 (António Xeira)

Merops apiaster Linnaeus, 1758

(1, 5) SÃO VICENTE: one at the sewage ponds, 3 December 2006 (MC), and again one there, 2 January 2007 (HH), are here counted as a single record. SAL: 3-9 near Santa Maria, 20 August-4 September 2002 (SJP). BOAVISTA: one at João Barrosa, 7 April 2006 (AX). European Bee-eater has been recorded (August-September, December-May) from São Vicente (1), São Nicolau (1), Sal (2), and Boavista (2).

Clamator glandarius (Linnaeus, 1758)

The sighting of Great Spotted Cuckoo on Boavista in 1999 or 2000, previously published without further locality (cf. Hazevoet 2003), was at Ribeira da Renca near Cabeço dos Tarafes (PLS). The precise date appears to have been lost, but a poor quality photograph has been deposited in the Cape Verde Bird Archive.

Riparia riparia (Linnaeus, 1758)

(2, 16) SÃO VICENTE: three at the sewage ponds, 18 September 2006 (CJH). SAL: one near Ponta do Sinó (west of Santa Maria), 16 March 2003 (LD); one at the Santa Maria sewage works, 1 March 2008 (HK); one at Santa Maria, 16 April 2009 (RE). Sand Martin has been recorded (August-October, February-April) from Santiago (2), São Vicente (5), Raso (1), São Nicolau (2), and Sal (8).

***Ptyonoprogne rupestris** (Scopoli, 1769)

(0, 1) SAL: one at Ribeira da Fontona, 8 January 2008 (CGr). This is the first record of Crag Martin for the Cape Verde Islands. In West Africa, it is a rare Palearctic winter visitor to Mauritania and northern Sénégal and a vagrant in The Gambia (Lamarche 1988, Borrow & Demey 2001).



Fig. 34. *Ptyonoprogne rupestris*, Ribeira da Fontona, Sal, 8 January 2008 (Tim Collins)

Hirundo daurica Laxmann, 1769

(0, 15) SÃO VICENTE: 1-3 at the sewage ponds, 12 March-18 April 2003 (CGe, RP), and two there, 19 December 2007 (CGr). SÃO NICOLAU: one at Fajã valley, 7 February 2008 (FV); one at Tarrafal, 11 April 2009 (RE). SAL: three at Santa Maria, 16 April

2009 (RE). BOAVISTA: one at Curral Velho, 14 April 2009 (RE). Red-rumped Swallow has been recorded (December-April) from Santiago (2), São Vicente (4), Branco (1), São Nicolau (3), Sal (4), and Boavista (1). All records are since 1996.

Anthus campestris (Linnaeus, 1758)

(0, 2) SÃO NICOLAU: one near the airport, 28 January 2003 (PD). This is only the second record of Tawny Pipit for the Cape Verde

Islands, the previous being of one on Boavista, 12 March 1986.

Anthus trivialis (Linnaeus, 1758)

(0, 6) RASO: one on 6 November 2006 (MB). SAL: one at Santa Maria, 11-12 September 2007 (RB). Tree Pipit has been recorded

(September, November, March, April) from Raso (1), São Nicolau (1), Sal (1), Boavista (2), and Maio (1).

Anthus cervinus (Pallas, 1811)

(0, 6) SÃO VICENTE: one at the sewage ponds, 13 December 2007-2 January 2008 (CGr, YBa). SAL: two (one first winter and an adult) at the Santa Maria sewage works,

7-10 January 2008 (CGr), and again two there, 1 March 2008 (HK). Red-throated Pipit has been recorded (December-March) from São Vicente (3), and Sal (3).



Fig. 35. *Motacilla citreola*, Santa Maria, Sal, 10 January 2008 (Tim Collins)

***Motacilla citreola** Pallas, 1776

(0, 4) BOAVISTA: a male along Rabil lagoon, 11 April 2007 (PLS). SAL: one at the Santa Maria salt pans, 22 October 2007 (JO); one at the Santa Maria sewage works, 7-10 January 2008 (CGr), and a male there, 1 March 2008

(GM, HK). These are the first records of Citrine Wagtail for the Cape Verde Islands. In West Africa, this vagrant from the Palearctic has been recorded once in Sénégal (Borrow & Demey 2001).

Motacilla alba Linnaeus, 1758

(1, 18) SANTIAGO: one at Praia, 27 July 2003 (HN). SÃO VICENTE: one at the sewage ponds, 26 December 2003 (JA), one there, 11 March 2006 (REK), again one, 1-2 January 2007 (HH), and 1-2 there, 19-20 December 2007 (CGr). RASO: one on 7 November 2003 (MB). SÃO NICOLAU: one at the airport, 24 October 2003 (EKR). SAL: two at the Santa

Maria sewage works, 7-10 January 2008 (CGr).

White Wagtail has been recorded (July, October-March) from Santiago (3), São Vicente (8), Raso (2), São Nicolau (2), and Sal (4). The single pre-1980 record is of one collected in 1924, all others are since 1989.

***Erithacus rubecula** (Linnaeus, 1758)

(0, 1) SANTIAGO: one at the botanical garden, São Jorge dos Orgãos, 4 February 2007 (SA). This is the first record of European Robin for the Cape Verde Islands.

In West Africa, it has been recorded in coastal Mauritania only (Lamarche 1988, Borrow & Demey 2001).

Phoenicurus phoenicurus (Linnaeus, 1758)

(0, 3) BOAVISTA: a female at Rabil, 2 March 2006 (AQ). Common Redstart has been

recorded (October, March) from Sal (2), and Boavista (1).

Oenanthe oenanthe (Linnaeus, 1758)

(2, 30) SANTIAGO: one male at Tarrafal, 30 October 2005 (RC); one east of Praia harbour, 22 March 2009 (JL). SANTO ANTÃO: one at Ponta do Sol, 9 December 2007 (YBa). RASO: one, 21 October 2003 (EKR); one, possibly *leucorhoa*, 27 November 2009 (SD). SÃO NICOLAU: two males near the airport, 28 January 2003 (PD). SAL: one at the Pedra de Lume salt pans, 24 October 2001 (RBT); a female at Santa Maria, 29 January 2003 (PD), and one there, 5 March 2003 (RP); two at Espargos, 28 March 2007 (TC); one at Santa Maria, 7 January 2008 (CGr), and one at the Santa Maria sewage works, 1 March 2008 (HK).

BOAVISTA: 1-2 near Rabil, 5-7 March 2006 (AQ); one male at Rabil, 7 December 2006 (MC).

Northern Wheatear has been recorded (October-April) from Santiago (3), Santo Antão (1), Branco (1), Raso (3), São Nicolau (3), Sal (12), Boavista (7), and Maio (2). With 32 records, of which more than half from the eastern islands of Sal and Boavista, it is clear that Northern Wheatear is a regular migrant visitor to the Cape Verde Islands. Both 'subspecies' *oenanthe* and *leucorhoa* occur. Except for unusual records, Northern Wheatear will not be included in future reports any further.

***Oenanthe leucopyga** (C.L.Brehm, 1855)

(0, 1) SANTIAGO: a first winter bird at Cidade Velha, 16 January 2005 (DF). This is the first record of White-crowned Black Wheatear for the Cape Verde Islands. In

West Africa, this desert bird is a common resident and local migrant from Mauritania east to Chad, but rare south of 18°N (Lamarche 1988, Borrow & Demey 2001).



Fig. 36. *Oenanthe leucopyga*, Cidade Velha, Santiago, 16 January 2005 (Dick Forsman)

Turdus philomelos C.L. Brehm, 1831

(0, 3) SANTA LUZIA: one at Ribeira Penada, Song Thrush has been recorded (January-21-22 January 2003 (PD). SAL: one at February) from Santa Luzia (1) and Sal (2). Espargos, 24 February 2008 (GM, HK).

Sylvia borin (Boddaert, 1783)

(0, 2) SAL: one at Pedra de Lume, 9 March Garden Warbler was of 1-2 on Raso, 1-4 2004 (TC). The only previous record of October 2001.

Phylloscopus collybita (Vieillot, 1817)

(0, 3) RASO: one on 6 January 2003 (PD). Boavista (1), Chiffchaff remains a rare Palearctic vagrant. With only three records (September, December, January) from Raso (2) and

Phylloscopus trochilus (Linnaeus, 1758)

(0, 8) SÃO VICENTE: one at Mindelo, 3 (1), and Boavista (2). One of the records January 2007 (HH). SAL: one at Burracona, 4 from Boavista concerned >10 birds at December 2007 (YBa). Willow Warbler has different locations, 19-22 September 1988, been recorded (September, October, demonstrating that influxes may occur December, January, March) from São during the migration season. Vicente (1), Raso (1), São Nicolau (3), Sal

***Lanius senator** Linnaeus, 1758

(0, 1) SAL: one at Pedra de Lume, 9 March 2004 (TC). This is the first record of Woodchat Shrike for the Cape Verde Islands. In West Africa, it is a widespread Palearctic winter visitor from Mauritania to Liberia, east to Chad and CAR, common in the west, but rare in the east (Borrow & Demey 2001).

Sturnus vulgaris Linnaeus, 1758

(1, 2) SÃO VICENTE: one at the sewage ponds, 31 December 2007 (CGr). Common Starling has been recorded (October, December, March) from São Vicente (2) and São Nicolau (one collected 1970).

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REFERENCES

- Barlow, C., T. Wachter & T. Disley, 1997. A field guide to birds of The Gambia and Senegal. Pica Press, Nr. Robertsbridge. 400 pp.
- Bergier, P., 2000. De nouvelles informations sur les Tourterelles turque et maillée *Streptopelia decaocto* et *senegalensis* dans le Sud Marocain. Porphyrio 12: 10-15.
- Bergier, P. & M. Thévenot, 2008. Notes naturalistes au Sahara Atlantique marocain, février-mars 2008. Go-South Bulletin 5: 78-97.
- Bergier, P., J. Franchimont & M. Thévenot, 1999. Implantation et expansion géographique de deux espèces de columbidés au Maroc: la Tourterelle turque *Streptopelia decaocto* et la Tourterelle maillée *Streptopelia senegalensis*. *Alauda* 67: 23-36.
- Borrow, N. & R. Demey, 2001. Birds of Western Africa. Christopher Helm, London. 832 pp.
- Cesarini, D., A. Boughtflower & A. Furtado, 2008. A new breeding site of the Cape Verde Purple Heron *Ardea (purpurea) bournei* on Santiago, Cape Verde Islands. *Malimbus* 30: 145-155.
- Donald, P.F. & M. de L. Brooke, 2006. An unlikely survivor: the peculiar natural history of the Raso Lark. *British Birds* 99: 420-430.
- Donald, P.F., M. de Ponte, M.J. Pitta Groz & R. Taylor, 2003. Status, ecology, behaviour and conservation of Raso Lark *Alauda razae*. *Bird Conservation International* 13: 13-28.
- Donald, P.F., R. Taylor, M. de Ponte Machado, M.J. Pitta Groz, C.E. Wells, T. Marlow & S.M. Hille, 2004. Status of the Cape Verde Cane Warbler *Acrocephalus brevipennis* on São Nicolau, with notes on song, breeding behaviour and threats. *Malimbus* 26: 34-37.
- Donald, P.F., M. de L. Brooke, M.R. Bolton, R. Taylor, C.E. Wells, T. Marlow & S.M. Hille, 2005. Status of Raso Lark *Alauda razae* in 2003, with further notes on sex ratio, behaviour and conservation. *Bird Conservation International* 15: 165-172.
- Donald, P.F., S. Hille, M. de L. Brooke, R. Taylor, C.E. Wells, M. Bolton & T. Marlow, 2007. Sexual dimorphism, niche partitioning and social dominance

- in the feeding ecology of the critically endangered Raso Lark *Alauda razae*. *The Ibis* 149: 848-852.
- Dubois, P. & R. Seitre, 1997. Herald Petrel new to the Western Palearctic. *Birding World* 10: 456-459.
- Frade, F., 1976. Aves do arquipélago de Cabo Verde (Coleção do Centro de Zoologia da J.I.C.U.). *Garcia de Orta (Zoologia)* 5: 47-58.
- Hazevoet, C.J., 1995. The birds of the Cape Verde Islands. BOU Check-list 13. British Ornithologists' Union, Tring. 192 pp.
- Hazevoet, C.J., 1997. Notes on distribution, conservation, and taxonomy of birds from the Cape Verde Islands, including records of six species new to the archipelago. *Bulletin Zoölogisch Museum Universiteit van Amsterdam* 15: 89-100.
- Hazevoet, C.J., 1998. Third annual report on birds from the Cape Verde Islands, including records of seven taxa new to the archipelago. *Bulletin Zoölogisch Museum Universiteit van Amsterdam* 16: 65-72.
- Hazevoet, C.J., 1999a. Fourth report on birds from the Cape Verde Islands, including notes on conservation and records of 11 taxa new to the archipelago. *Bulletin Zoölogisch Museum Universiteit van Amsterdam* 17: 19-32.
- Hazevoet, C.J., 1999b. Notes on birds from the Cape Verde Islands in the collection of the Centro de Zoologia, Lisbon, with comments on taxonomy and distribution. *Bulletin of the British Ornithologists' Club* 119: 25-31.
- Hazevoet, C.J., 2003. Fifth report on birds from the Cape Verde Islands, including records of 15 taxa new to the archipelago. *Arquivos do Museu Bocage (Nova Série)* 3: 503-528.
- Hazevoet, C.J., S. Fischer & G. Deloison, 1996. Ornithological news from the Cape Verde Islands in 1995, including records of species new to the archipelago. *Bulletin Zoölogisch Museum Universiteit van Amsterdam* 15: 21-27.
- Hazevoet, C.J., L.R. Monteiro & N. Ratcliffe, 1999. Rediscovery of the Cape Verde Cane Warbler *Acrocephalus brevipennis* on São Nicolau in February 1998. *Bulletin of the British Ornithologists' Club* 119: 68-71.
- Hering, J., 2008. Eine Entdeckungsgeschichte: Der Kapverdenrohrsänger auf Fogo. *Der Falke* 55: 217-221.
- Hering, J. & R. Barone Tosco, 2007. Weltbestand auf einem Baum: Überlebt der Kapverden-Purpureiher? *Der Falke* 54: 146-149.
- Hering, J. & E. Fuchs, 2007. Grund zum Optimismus – Bestandssituation des Kapverdenrohrsängers *Acrocephalus brevipennis* auf Fogo (Kapverdische Inseln). *Vogelwarte* 45: 371-372.
- Hering, J. & E. Fuchs, 2009. The Cape Verde Warbler: distribution, density, habitat and breeding biology on the island of Fogo. *British Birds* 102: 17-24.
- Hering, J. & H. Hering, 2005. Discovery of Cape Verde Warbler *Acrocephalus brevipennis* on Fogo, Cape Verde Islands. *Bulletin of the African Bird Club* 12: 147-149.
- Hille, S. & J.-M. Thiollay, 2000. The imminent extinction of the kites *Milvus milvus fasciicauda* and *Milvus m. migrans* on the Cape Verde Islands. *Bird Conservation International* 10: 361-369.
- Horssen, P. van, 2007. Large numbers of Cape Verde Shearwaters *Calonectris edwardsii* off Santo Antão, Cape Verde Islands, in July 2005. *Atlantic Seabirds* 7 [for 2005]: 121-126.
- Lamarche, B., 1988. Liste commentée des oiseaux de Mauritanie. *Études Sahariennes et Ouest-Africains* 1 (4): 1-164.
- López Suárez, P., N. Varo Cruz, C.J. Hazevoet & L.F. López Jurado, 2007. Restricted nesting habitat and reproductive failure of Magnificent Frigatebirds *Fregata magnificens* in the Cape Verde Islands. *Atlantic Seabirds* 7 [for 2005]: 107-120.
- Lorenzo, J.A. & R. Barone, 2007. Tórtola turca *Streptopelia decaocto*. Pp. 279-282 in: J.A. Lorenzo (ed.), *Atlas de las aves nidificantes en el archipiélago canario (1997-2003)*. Dirección General de Conservación de la Naturaleza & Sociedad Española de Ornitología, Madrid.

- Mateo, J.A., L.F. López Jurado & M. García Márquez, 2004. Primeras evidencias de la supervivencia del escinco gigante de Cabo Verde, *Macroscoincus coctei* (Duméril & Bibron, 1839). Boletín de la Asociación Herpetológica Española 8: 8-11.
- Mateo, J.A., L.F. López Jurado & P. Geniez, 2009. Historical distribution of the Razo Lark *Alauda razae* in the Cape Verde archipelago. *Alauda* 77: 309-312.
- Nuovo, G., 2008. Una *Sula* zamperosse al largo di Capo Verde: seconda osservazione per il Palearctico occidentale! Quaderni di Birdwatching, ano X, volume 20 (available at <http://www.ebnitalia.it/QB/QB020/sula.htm>).
- Ontiveros, D., 2003. Nesting distribution, food habits, and conservation of Osprey on Boavista Island (Archipelago of Cape Verde). *Journal of Raptor Research* 37: 67-70.
- Ontiveros, D., 2005. Abundance and diet of Alexander's Kestrel (*Falco tinnunculus alexandri*) on Boavista Island (Archipelago of Cape Verde). *Journal of Raptor Research* 39: 82-85.
- Palacios, C.J., 2002. Situación actual de las rapaces en la isla de Santo Antão, archipiélago de Cabo Verde. *Revista de la Academia Canaria de Ciencias* 13 [for 2001]: 223-231.
- Palma, L., J. Ferreira, R. Cangarato & P. Vaz Pinto, 2004. Current status of the Osprey in the Cape Verde Islands. *Journal of Raptor Research* 38: 141-147.
- Patteson, J.B. & E.S. Brinkley, 2004. A Petrel Primer – The Gadflies of North Carolina. *Birding* 36: 586-596
- Ramos, J.J. (ed.), 2008. Anuario Ornitológico de las islas Canarias, 2000-2006. Fundación Global Nature, Santa Cruz de Tenerife. 304 pp.
- Sangster, G., C.J. Hazevoet, A.B. van den Berg, C.S. Roselaar & R. Sluys, 1999. Dutch avifaunal list: species concepts, taxonomic instability, and taxonomic changes in 1977-1998. *Ardea* 87: 139-165.
- Siverio, F., N. Varo & L.F. López Jurado, 2004. The Barn Owl *Tyto alba* as a breeding species on Boavista and Maio, Cape Verde Islands. *Airo* 14: 126-130.
- Siverio, F., J.A. Mateo & L.F. López Jurado, 2007. On the presence and biology of the Barn Owl *Tyto alba detorta* on Santa Luzia, Cape Verde Islands. *Alauda* 75: 91-93.

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New data on Hesperioidea and Papilionoidea (Lepidoptera) from the Cape Verde Islands, with a review of previous records

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ABSTRACT

Butterflies of the superfamilies Hesperioidea and Papilionoidea collected in the Cape Verde Islands and deposited in the Instituto de Investigação Científica Tropical, Lisbon, Portugal, were studied. Some novelties are reported at the insular level and one Palearctic species of Nymphalidae is reported for the first time in the islands. The identification of the only species of *Colias* (Pieridae) present in the Cape Verde Islands and its biogeographical affinities are discussed.

RESUMO

Este artigo apresenta resultados de um estudo de amostras de lepidópteros das superfamílias Hesperioidea e Papilionoidea, provenientes de ilhas de Cabo Verde e em depósito no Instituto de Investigação Científica Tropical, Lisboa, Portugal. Referem-se algumas novidades faunísticas a nível insular e uma espécie de Nymphalidae de distribuição paleártica é assinalada pela primeira vez no país. Corrige-se a determinação da única espécie do género *Colias* (Pieridae) conhecida de Cabo Verde e discutem-se as suas afinidades biogeográficas.

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INTRODUCTION

The butterflies of the Cape Verde Islands (an oceanic archipelago, situated off West Africa between 14°48', 17°22'N and 22°44', 25°22'W) have been the subject of a number of papers (e.g. Riley 1893, Aurivillius 1910, Berio 1941, Nyström 1958, Riley 1968, Traub & Baur 1982, Mück & Traub 1987, van Harten 1988, Mück *et al.* 1990, Báez & García 2005, Vieira 2008). Ackery *et al.* (1995) referred to Bacelar (1948) as being the

only Portuguese publication on Lepidoptera from the Cape Verde Islands. However, despite mentioning Cape Verde in the introduction, Bacelar (1948) included no information whatsoever on the butterflies of these islands, but only on other African territories. Bibliographies on Capeverdean Lepidoptera were presented by Báez (1988) and van Harten (1993).

MATERIAL AND METHODS

The present paper deals with 'rhopaloceran' butterflies (Hesperioidea and Papilionoidea) from the Cape Verde Islands present in the collections of the *Instituto de Investigação Científica Tropical / Jardim Botânico Tropical – Zoologia* (formerly *Centro de Zoologia*). The material consists of two series with independent registration numbers. One was collected during the years 1960, 1961 and 1965 by the late Alberto Coutinho Saraiva (herein abbreviated as CS), then at the *Missão de Estudos Agronómicos do Ultramar*, the other resulted from the *Missão de Estudos Zoológicos do Ultramar* and was collected by the late Lívio Paulos (herein abbreviated as CZ), technician at the Centro de Zoologia, during the years 1969, 1970 and 1972. With few exceptions, specimens were obtained by sweep netting during day-time. The CZ material of *Vanessa cardui* had already been

identified by A. Bacelar, but the data were never published.

Only Apterygota and Orthopteroidea were included in Saraiva's (1961) revision of the Cape Verde entomofauna, as his premature death prevented completion of his *Conspectus*. In the present contribution, data on 15 species of butterflies, represented by more than 380 specimens, are presented, bringing the number of 'rhopalocerans' known to occur in Cape Verde to 25 species. Some are reported as new for individual islands and one species of Nymphalidae with a Palearctic distribution, previously unknown from the country, is reported from Santiago island. The correct identification and geographical affinities of the Capeverdean 'clouded yellow butterfly' (Pieridae, genus *Colias*) were established through detailed study of specimens.

TAXONOMIC PART

Superfamily HESPERIOIDEA
Family HESPERIIDAE
Subfamily COELIADINAE

***Coeliades forestan forestan* (Stoll, 1782)**

C. f. forestan occurs throughout sub-Saharan Africa, except the Cape Province, and also in Madagascar, Mauritius, Reunion and the Seychelles. Riley (1968) suggested that its presence in Cape Verde must be due to accidental introduction by man. It was reported by Nyström (1958 sub

Rhopalocampta) from Santo Antão and São Nicolau, but no material was collected. In Cape Verde, caterpillars on *Terminalia catappa* (Combretaceae), one of the known host plants (Ackery *et al.* 1995), were assigned to this species by Mück & Traub (1987 sub *Rhopalocampta*).

Subfamily HESPERIINAE

Borbo borbonica borbonica (Boisduval, 1833)

Material examined – SANTIAGO: Posto Agrícola de São Jorge (São Jorge dos Orgãos), on shrubs and herbs, 12.12.60, 1 ♂ (CS-251). FOGO: near S. Filipe, road to Monte Vara, 02.03.61, 1 ♀ (CS-216). No locality, no date, 1 ♂ (CS-464).

B. borbonica was known from Santiago, Fogo, Brava, Santo Antão, São Vicente and São Nicolau (Aurivillius 1910, Nyström 1958, Traub & Bauer 1982, all sub *Parnara*). The

nominal subspecies occurs in sub-Saharan Africa and another in Madagascar. It has also been reported from Morocco and Algeria (Tennent 1996). Although known to be a migrant, there are as yet no records from the Canaries, Selvagens and Madeira. In Cape Verde, caterpillars were reported on Poaceae (Mück & Traub 1987 sub *Parnara*), including sugar-cane, one of the known host plants (Ackery *et al.* 1995).

Superfamily PAPILIONOIDEA

Family PAPILIONIDAE

Papilio demodocus demodocus Esper, 1798

Material examined – SANTIAGO: Posto Agrícola de São Jorge (São Jorge dos Orgãos), flying in orchard, 09.01.61, 4 ♂♂ 2 ♀♀ (CS-133); idem, over herbs, 13.05.61, 1 ♀ (CS-239); São Francisco, Matão, 14.07.61, 1 ♂ (CS-168); São Francisco, Mulher Branca, 25.07.61, 1 ♂ (CS-171); Boa Entrada, 08.09.69, 3 ♂♂ 2 ♀♀ (CZ-3582); between São Jorge and Santa Catarina, 20.09.69, 3 ♂♂ 1 ♀ (CZ-3589); Santa Catarina, Entre Picos, 22.09.69, 1 ♂ (CZ-3591); Cidade da Praia, 24.11.69, 1 ♂ (CZ-3625); Santa Catarina, Nhangar, 03.10.69, 1 ♂ (CZ-3600). FOGO: near Lomba, Mira-Mira, 8 km from Monte Vara, flying over herbs and bean fields, 28.03.61, 1 ♀ (CS-208). SANTO ANTÃO: Ponta do Sol, Chã, at night, 20.03.61, 1 ♂ 1 ♀ (CS-101); Ribeira das Patas, 20.10.72, 1 ♂

(CZ-3755). SÃO NICOLAU: Caldeira, 29.10.70, 2 ♂♂ (CZ-3675). BOAVISTA: Monte Redondo, in bean fields, 21.11.61, 4 ♂♂ 2 ♀♀ (CS-34). MAIO: Morro da Calheta, near Calheta, over herbs, 01.11.60, 1 ♀ (CS-271).

P. demodocus, known from Santiago, Fogo, Brava, Santo Antão and São Nicolau (Aurivillius 1910, Berio 1941, Nyström 1958, Traub & Bauer 1982, van Harten 1988), is here reported for the first time from Boavista and Maio. Occurs throughout sub-Saharan Africa, with another subspecies described from Socotra. The caterpillars mainly feed on Rutaceae (Ackery *et al.* 1995) and were found in Cape Verde on *Ruta chalepensis* (Mück & Traub 1987).

Family PIERIDAE

Subfamily COLIADINAE

Catopsilia florella (Fabricius, 1775)

Material examined – FOGO: near Lomba, Mira Mira, 8 km from Monte Vara, flying over herbs and bean fields, 28.03.61, 1 ♂ (CS-208). SÃO NICOLAU: Queimada, 23.10.70, 1 ♂ (CZ-3663). BOAVISTA: João Galego, flying over maize and bean fields, 24.11.61, 1 ♀ (CS-278); idem, 21.11.61, 4 ♂♂ (CS-279).

The species has been reported from Santiago, Fogo, Brava, São Nicolau, and Boavista (Aurivillius 1910, Nyström 1958, Traub & Bauer 1982). Abundant throughout

sub-Saharan Africa, extending eastwards possibly to Pakistan and the Indian state of Gujarat. Also occurs in the Canary Islands (Baéz & Martín 2004) and Madeira (Maravalhas 2003, Aguiar & Karsholt 2008). The caterpillars feed on *Cassia*, *Sesbania* (Fabaceae) and possibly *Gossypium* (Malvaceae) (Ackery *et al.* 1995) and were reported in Cape Verde on *Cassia occidentalis* (Mück & Traub 1987).

Colias croceus (Geoffroy in Fourcroy, 1785)

Material examined – SANTIAGO: Santa Catarina, Ribeira Mato Fontes, 09.09.69, 1 ♀ f. *helice* (CZ-3583). SANTO ANTÃO: Alto da Lagoa, 1000-1400 m, 27.03.61, 1 ♂ (CS-207); Ribeira Maiamba, 04.04.70, 1 ♂ (CZ-3681); Ribeira da Torre, Ribeira Grande, 28.10.72, 1 ♂ 1 ♀ (CZ-3758). SÃO NICOLAU: Ribeira João, 19.10.70, 1 ♂ (CZ-3631). MAIO: Ribeirão, flying over herbs, 16-17.11.60, 2 ♂♂ (CS-321).

Colias specimens from Santiago, Santo Antão, São Vicente, Santa Luzia and São Nicolau were assigned to *C. electo* (Linnaeus, 1763) by Nyström (1958), Traub & Bauer (1982) and Báez & García (2005). Apparently based on geographical range, Riley (1968) thought the *Colias* species occurring in the Cape Verde Islands to be Afrotropical *C. electo* and not Palearctic *C. croceus*. However, detailed study of the specimens reported herein showed them to be *C. croceus*, common in the Azores (Karsholt & Vieira 2005), Madeira (Aguilar & Karsholt 2008) and the Canary Islands (Báez & Martín 2004), the

latter being the southernmost occurrence known so far. The hind-wing ventral discoidal spots encircled by two rings of dark reddish-brown scales and, in the male genitalia, the shape of the valves and the disposition of the penial spinulets (restricted to the aedeagus apical area) unequivocally point to *C. croceus* (cf. Jarvis 1953). The nearest known population of *C. electo* is at submontane level (1,300+ m) in the Cameroon-Nigerian Mountains (T. Larsen *in litt.*, 17 August 2009).

The species' host plants in Cape Verde remain unknown. In North Africa, the caterpillars feed on Fabaceae (*Acanthylis*, *Anthyllis*, *Astragalus*, *Colutea*, *Erophaca*, *Hippocrepis*, *Lotus*, *Medicago*, *Onobrychis*, *Trifolium*, *Vicia*) (Tennent 1996). Of these, *Hippocrepis* (one species), *Lotus* (six species, of which four endemic) and *Medicago* and *Trifolium* (both introduced in Santo Antão) are known from Cape Verde (Sánchez-Pinto *et al.* 2005).

Eurema hecabe solifera (Butler, 1875)

Material examined – SANTIAGO: Santa Cruz, Pedra Badejo, 20.01.61, 1 ♂ (CS-79); Posto Agrícola de São Jorge (São Jorge dos Orgãos), 12.12.60, 3 ♂♂♂ 1 ♀ (CS-251); idem, 17.12.60, 1 ♂ (CS-91); 2 ♀♀ (CS-251); idem, over herbs, 13.05.61, 1 ♂ + 3 ♂♂♂ 3 ♀♀♀ (CS-239); Santa Catarina, Achada do Rincão, 04.06.69, 1 ♂ + 1 ♂ (CZ-3577); São Francisco, Rombada, 14.07.61, 1 ♂ 1 ♀ (CS-169). FOGO: near Lomba, Mira-Mira, 8 km from Monte da Vara, flying over herbs and bean fields, 28.03.61, 3 ♂♂ (CS-208). SANTO ANTÃO: Bardo de Ferro to Corda, 900-1,000 m, flying over herbs, 16.03.61, 1 ♀ (CS-202). SÃO NICOLAU: Ribeira João, 19.10.70, 1 ♂ 1 ♀ (CZ-3631); Ribeira Maiamba, 04.04.70, 3 ♂♂ 1 ♀ + 5 ♂♂ 1 ♀

(CZ-3681). BOAVISTA: João Galego, flying over maize and bean fields, 24.11.61, 1 ♂ (CS-278). No locality, no date, 2 ♂♂ (CS-461).

The species was previously reported from Santiago, Fogo, Brava and Maio (Nyström 1958 as *Terias brenda*, Traub & Bauer 1982) and is here reported for the first time from São Nicolau and Boavista. It is common throughout the Afrotropical Region, except the Cape Province, extending into Asia. The caterpillars, as yet unknown in Cape Verde, have been found on Fabaceae (*Aeschynomene*, *Albizia*, *Caesalpineae*, *Cassia*, *Dichrostachys*, *Entada*, *Lepedeza*, *Lotus*, *Parkia*, *Sesbania*) and Clusiaceae (*Hypericum*) (Ackery *et al.* 1995).

Eurema senegalensis (Boisduval, 1836)

E. senegalensis is a forest species known from West Africa to the Rift (Larsen 2005). It was treated as conspecific with *E. hecabe* by Riley (1968), who considered it a seasonal form. In

Cape Verde, it was reported from Santiago (Nyström 1958 sub *Terias*, cf. Traub & Bauer 1982), most likely a misidentification of *E. hecabe solifera*.

Eurema floricola (Boisduval, 1833)

We consider the only listing of *E. floricola* for Cape Verde (Aurivillius 1910) to be a misidentification of *E. hecabe solifera*, identification of which is often problematic. *E. floricola* is known to occur in Madagascar and the Indian Ocean archipelagos and from the Democratic Republic of Congo (formerly Zaire) to West Africa northwards to Sierra Leone (D'Abrera 1980, Ackery *et al.* 1995, Larsen 2005). Aurivillius (1910) reported one male and two females of *E. floricola* var.

ceres Butler (now considered a synonym of *E. floricola*, cf. Ackery *et al.* 1995) collected in April and May at Orgãos Grandes, Santiago, which was accepted without comment by Traub & Bauer (1982). However, 'var. *ceres*' is exclusive to Mauritius and Reunion. Larsen (2005) reported it to be rare in savannah and more common in the transition zone between savannah and forest, habitat gradients which do not exist in Cape Verde.

Subfamily PIERINAE

Colotis amata calais (Cramer, 1775)

The occurrence of *C. a. calais* in Cape Verde is based on a single and badly preserved female from São Vicente (Riley 1893: 570 sub *Teracolus*); it has not been reported since. It is known throughout sub-Saharan Africa,

especially in dry areas. The caterpillars (unknown in Cape Verde) feed on species of *Capparis* (Capparaceae) and *Salvadora* (Salvadoraceae) (Ackery *et al.* 1995).

Colotis euipe euipe (Linnaeus, 1758)

Like the previous taxon, the occurrence of *C. euipe* in Cape Verde was based on a single and badly preserved specimen (in this case a male) from São Vicente (Riley (1893: 569). Aurivillius (1910) did not identify the species and it has not been reported since. *C. euipe* occurs throughout the Afrotropical Region,

the nominal subspecies being known from The Gambia and Senegal. The caterpillars, unknown from Cape Verde, feed on species of *Cadaba*, *Capparis* and *Maerua* (Capparaceae) and *Cleome* (Cleomaceae) (Ackery *et al.* 1995).

Belenois creona creona (Cramer, 1776)

Riley (1893: 569) reported *Pieris severina* from São Vicente, based on "...fragments of *Pieris*, probably *severina*, collected at Cape Verde...". Aurivillius (1910) noted that it was "the other species" he could not identify (see *Colotis euipe* above). Báez & García (2005) based the occurrence of *B. c. severina* (Stoll, 1781) in Cape Verde on Riley (1893). *B. c. severina* is the eastern and southern African subspecies (Ackery *et al.* 1995, Larsen 2005)

and its presence in Cape Verde seems highly improbable. The nominal subspecies ranges from Senegal to Nigeria and Ethiopia and it is certainly the subspecies that, if Riley's identification were to be correct, would occur in Cape Verde. The caterpillars, unknown from Cape Verde, feed on species of *Boscia*, *Capparis*, *Maerua* and *Niebruhria* (Capparaceae) and *Cleome* (Cleomaceae) (Ackery *et al.* 1995).

Pontia daplidice Klug, 1829

Material examined – SANTO ANTÃO: Ribeira Grande, Chã de Pedra, over different crops, 19.03.61, 1 ♂ 1 ♀ (CS-90); Alto da Lagoa, 1000-1400 m, 27.03.61, 1 ♂ 2 ♀♀ (CS-207).

P. daplidice was known from Fogo, Santo

Antão, Sal and Boavista (Nyström 1958 sub *Leucochloë*, Traub & Bauer 1982). Vieira (2008) summarized earlier data, but did not collect new specimens. D'Abrera (1997) recognized only one subspecies in the Afrotropical Region (i.e. *P. d. aethiops*),

restricted to the highlands of Ethiopia. Ackery *et al.* (1995), who considered the species to be monotypic, noted that it also occurs in North Africa, inland to northern Chad and Niger. The species also occurs in southern Europe (Maravalhas 2003) and the Canary Islands (Baéz & Martín, 2004), but is absent in Madeira and the Azores. Riley (1968)

considered it the only truly Palearctic element in the Capeverdean macrolepidopterid fauna. In Europe, the caterpillars feed on Brassicaceae and Resedaceae (Ackery *et al.* 1995, Vieira 2008), but in Cape Verde they were found on *Quaelusia* sp. (Fabaceae) (Mück & Traub 1987).

Pontia glauconome Klug, 1829

Riley (1968) suggested that Nyström's (1958 sub *Leucochloë*) report of *P. glauconome* from Santo Antão and Sal (based on specimens taken in January 1954) needs confirmation, but these records were accepted by Traub & Bauer (1982). Vieira (2008) listed the species as an occasional migrant in desert or semi-desert areas and accepted its occurrence in Cape Verde. The species is said to be restricted to scrub areas in southwestern

Arabia (including Socotra), Somalia, Ethiopia, Kenya, Sudan, Chad, Mauritania and possibly Nigeria (D'Abrera 1977, Ackery *et al.* 1995). Tennent (1996) described its range as being from northern Central Africa through Saudi Arabia to Afghanistan and mentioned its occurrence in the Hoggar (Algeria) and probably also southernmost Morocco and Tunisia.

Family LYCAENIDAE
Subfamily THECLINAE

Deudorix (Virachola) dinomenes diomedes Jackson, 1966

This species was reported from Santiago by Mück & Traub (1987), who reported caterpillars feeding on *Acacia seyal*. Two subspecies have been described, with the nominal one being from eastern and southern Africa and *D. d. diomedes* ranging from West Africa to Cameroon, western Kenya and western Tanzania (Larsen 2005). Ackery *et al.* (1995) and Larsen (2005) reported *Deinbollia* sp. (Sapindaceae) as the food-plant, but Larsen (2005) believed it to be polyphagous. Although it seems well established in Santiago (where it reproduces) and occurs in neighbouring Senegal, Báez & García (2005)

thought the species likely to be introduced in Cape Verde. T. Larsen (*in litt.*, 17 August 2009) considered the presence of this forest butterfly in Cape Verde unlikely, suggesting that the specimens reported by Mück & Traub (1987) probably concerned *Deudorix livia*, a similar species of dry habitats from Senegal to eastern Africa (Egypt, Sudan, Somalia, Djibouti), Arabia and the eastern Mediterranean region, the caterpillars of which are strongly polyphagous and known to feed on Arecaceae, Alliaceae, Fabaceae, Myrtaceae, Punicaceae, Rosaceae, Rubiaceae and Solanaceae.

Subfamily POLYOMMATINAE

Lampides boeticus (Linnaeus, 1767)

Material examined – SANTIAGO: Posto Agrícola de São Jorge (São Jorge dos Orgãos), 17.12.60, 1 ♂ (CS-91); idem, on herbs, 13.05.61, 1 ♂ (CS-239); idem, 14.12.60, 1 ♂ (CS-246); São Francisco, Matão, 19.07.61, 1 ♂ 1 ♀ (CS-164); São Francisco, Mulher Branca and Matão, 19.07.61, 5 ♂♂ 2 ♀♀ (CS-174); São Francisco, Matão to Mulher Branca, 07.07.61,

1 ♂ (CS-186); Santa Catarina, c. 700 m, flying over field of beans, 05.01.61, 4 ♂♂ 2 ♀♀ (CS-234); Santa Cruz, Pedra Badejo, mainly on *Ricinus* and banana-trees, 06.01.61, 4 ♂♂ (CS-245). FOGO: near Lomba, Mira-Mira, 8 km from Monte Vara, 28.02.61, 1 ♂ (CS-210). SANTO ANTÃO: Ponta do Sol, Chã, farm, 17.03.61, 2 ♂♂ 1 ♀ (CS-85); Ribeira Grande, Chã de Pedra, over cultivated

plants, 19.03.61, 1 ♂ 1 ♀ (CS-90); near Ribeira das Patas, hillside with dry grasses, 26.03.61, 1 ♂ (CS-96); Bardo de Ferro to Corda, 900-1,000 m, flying over herbs, 16.03.61, 3 ♂♂ 1 ♀ (CS-202); Ribeira da Torre, Chô-Chô, 13.03.61, 2 ♂♂ (CS-205). MAIO: beach of Calheta, close to the sea, 19.10.60, 2 ♂♂ (CS-41); Ribeirão, 14.11.60, 2 ♂♂ (CS-106); idem, flying over grasses, 16-17.11.60, 1 ♂ 2 ♀♀ (CS-321). No locality, no date, 1 ♂ 1 ♀ (CS-194).

The species has been reported from Santiago, Fogo, Brava, Santo Antão, São Vicente, São Nicolau, Sal, Boavista and Maio (Aurivillius 1910 sub *Cupido*, Nyström 1958, Traub & Bauer 1982, Vieira 2008). Considered monotypical, it occurs in the Palearctic, Afrotropical, Oriental and Australian Regions. In Cape Verde, the polyphagous caterpillars (known to feed on Leguminosae) were seen on *Crotalaria* sp. (Fabaceae) (Mück & Traub 1987).

Leptotes pirithous (Linnaeus, 1767)

L. pirithous was reported from Santiago by Aurivillius (1910, as *Cupido telicanus* var. *plinius*) and from Santiago, Fogo, Brava, Santo Antão and São Vicente by Nyström (1958, as *Cupido telicanus*, cf. Traub & Bauer 1987). It is widely distributed in Africa and Madagascar, much of Asia and reaches south-western Europe. The polyphagous caterpillars

are known from several genera of Fabaceae and also from Ericaceae, Fagaceae, Lythraceae, Plumbaginaceae, Rosaceae and Verbenaceae (Ackery *et al.* 1995, Tennent, 1996). In Cape Verde, they were reported to feed on *Medicago* cf. *sativa* (Fabaceae) (Mück & Traub 1987).

Euchrysops osiris (Hoppfer, 1855)

This species was reported from Brava and Santo Antão (Nyström 1958, cf. Traub & Bauer 1982). It is known from open habitats in sub-Saharan Africa and Madagascar. In Cape Verde, the caterpillars are unknown, but

elsewhere they feed on species of *Rynchosia*, *Vigna* (Fabaceae) and possibly *Becium* (Lamiaceae) (Ackery *et al.* 1995, Larsen 2005).

Azanus jesous (Guérin, 1847)

A. jesous is known from Santiago (Aurivillius 1910, Nyström 1958, both sub *Cupido*) and Fogo (Traub & Bauer 1982). According to D'Abrera (1979) and Larsen (2005), the species lives in arid *Acacia* woodland throughout Africa and is common in West

Africa. In Cape Verde, the caterpillars were reported on *Desmanthus vulgaris* (Fabaceae) (Mück & Traub 1987), while Ackery *et al.* (1995) and Larsen (2005) reported feeding on other genera of the same family (*Acacia*, *Dichrostachys*, *Entada*, *Medicago*).

Azanus mirza (Plötz, 1880)

Common in open habitats (mainly savannah) throughout sub-Saharan Africa, this species was reported from Santiago, Fogo, São Vicente, Boavista and Maio (Nyström 1958 sub *Cupido*, cf. Traub & Bauer 1982). The

caterpillars, unknown in Cape Verde, feed on *Acacia* spp. and *Dichrostachys* spp. (Fabaceae) and in forests on *Allophylus* spp. (Sapindaceae) (Ackery *et al.* 1995)

Azanus moriqua (Wallengren, 1857)

In Cape Verde, *A. moriqua* is only known from Santiago (Aurivillius 1910 sub *Cupido*, cf. Traub & Bauer 1982). It occurs in open habitats throughout Africa and southern

Arabia. The caterpillars, unknown in Cape Verde, feed on *Acacia* spp. (Fabaceae) (Ackery *et al.* 1995, Larsen 2005).

Zizeeria knysna (Trimen, 1862)

Material examined – SANTIAGO: Posto Agrícola de São Jorge (São Jorge dos Orgãos), c. 300 m, 07.10.65, 1 ♂ (CS-23); idem, 14.12.60, 2 ♂♂ (CS-246); idem, 20.12.60, 1 ♂ (CS-312); Santa Catarina, c. 700 m, flying over field of beans, 05.01.61, 1 ♂ (CS-234); Santa Cruz, Pedra Badejo, mainly on *Ricinus* and banana-trees, 06.01.61, 1 ♂ (CS-245). SANTO ANTÃO: Ribeira Grande, Boca da Coruja, 19.03.61, 1 ♂ (CS-36); Ponta do Sol, Chã, farm, 17.03.61, 3 ♂♂ 1 ♀ (CS-85); Ribeira da Torre, Chô-Chô, 13.03.61, 1 ♂ (CS-205). SÃO VICENTE: Ribeira Julião and Seixal, 14.03.61, 2 ♂♂ 1 ♀ (CS-281). No locality, no date, 1 without abdomen (CS-406); 1 ♂ (CS-464).

Previously, the species was reported from Santiago, Fogo, Brava, Santo Antão, São

Vicente, São Nicolau and Sal (Aurivillius 1910 as *Cupido lysimon*, Nyström 1958 as *Zizera lysimon*, Traub & Bauer 1982, Vieira 2008). Occurs throughout tropical Africa and southern Arabia, extending into tropical Asia and Australia. It has also been reported from Palearctic north-western Africa (Tennent 1996), the Iberian Peninsula (Maravalhas 2003) and the Canary Islands (Baéz & Martín 2004), but it is unknown in the Selvagens and Madeira. The caterpillars, in Cape Verde reported on *Amaranthus* (Amaranthaceae) and *Tribulus* (Zygophyllaceae) (Mück & Traub 1987), are polyphagous, feeding mainly on Fabaceae, but also on Amaranthaceae, Chenopodiaceae, Euphorbiaceae, Oxalidaceae and Zygophyllaceae (Ackery *et al.* 1995, Larsen 2005).

Family NYMPHALIDAE

Subfamily DANAINAE

Danaus chrysippus chrysippus (Linnaeus, 1758)

Material examined – SANTIAGO: Santa Cruz, Pedra Badejo, 20.01.61, 1 ♂ (CS-79); Posto Agrícola de São Jorge (São Jorge dos Orgãos), 17.12.60, 1 ♂ (CS-91); idem, over herbs, 13.05.61, 1 ♂ 1 ♀ (CS-239); São Francisco, Vale Cachopo, among sugar-cane, 06.07.61, 3 ♂♂ 2 ♀♀ (CS-151); São Francisco, Mundo Novo, 21.07.61, 2 ♂♂ (CS-165); São Francisco, Matão, 14.07.61, 1 ♂ 1 ♀ (CS-168); São Francisco, Rombada, 14.07.61, 2 ♂♂ 1 ♀ (CS-169); São Francisco, São Tomé, 20.07.61, 1 ♂ (CS-177); São Francisco, Mulher Branca, 21.07.61, 1 ♂ (CS-288); Santa Catarina, Achada do Rincão, 04.09.69, 1 ♂ (CZ-3577); Santa Catarina, Achada Galega, 26.09.69, 3 ♂♂ (CZ-3592). BRAVA: Ribeira do Forno, 10.10.69, 3 ♂♂ (CZ-3604); Vinagre, 14.10.69, 1 ♂ (CZ-3609); Ribeira Fajã de Água, 16.10.69, 6 ♂♂ 2 ♀♀ (CZ-3612). SANTO ANTÃO: Ribeira do Paul, 23.03.61, 1 ♂ 1 ♀ (CS-93); idem, 24.03.61, 2 ♂♂ 1 ♀ (CS-203); Bardo de Ferro to Corda, 900-1,000 m, flying over herbs, 16.03.61, 3 ♂♂ (CS-202); Ribeira da Torre, Chô-Chô, 13.03.61, 1 ♀ (CS-205); Ribeira do Cachugo, 20.10.72, 1 ♂ 1 ♀ (CZ-3574); Ribeira das Patas, 20.10.72, 2 ♂♂ (CZ-3755); Paul, 15.11.72, 1 ♂ 1 ♀ (CZ-3771). SÃO VICENTE: Ribeira Julião to Seixal, 14.03.61,

3 ♂♂ (CS-281). SÃO NICOLAU: Ribeira João, 19.10.70, 2 ♂♂ (CZ-3631); Cachaço, 21.10.70, 2 ♂♂ 1 ♀ (CZ-3633); Ribeira Brava, 21.10.70, 2 ♂♂ 1 ♀ (CZ-3655); Caldeira, 29.10.70, 3 ♂♂ 1 ♀ (CZ-3675); Prainha, 04.11.70, 1 ♂ (CZ-3680); Ribeira Maiamba, 04.04.70, 2 ♂♂ (CZ-3681). BOAVISTA: João Galego, flying over maize and bean fields, 24.11.61, 1 ♂ 2 ♀♀ (CS-279). MAIO: Morro and Calheta, over herbs, 01.11.60, 2 ♂♂ 1 ♀ (CS-271); Barreiro, at night on tall grasses, 22.11.60, 5 ♂♂ 1 ♀ (CS-275); Chico Vaz, Vale de Figueira, 20.11.60, 1 ♂ 1 ♀ (CS-320); Lagoa, 13.08.69, 2 ♂♂ 2 ♀♀ (CZ-3561); Mourinho, 15.08.69, 7 ♂♂ 1 ♀ (CZ-3565); Figueira da Horta, 18.08.69, 2 ♂♂ (CZ-3566); Pilão Cão, 19.08.69, 1 ♂ (CZ-3568); no locality, 28.11.60, 1 ♂ (CS-259). No locality, no date, 1 ♂ 1 ♀ (CS-407).

Danaus chrysippus is known from almost all of the Cape Verde Islands (Aurivillius 1910 as var. *alcippus*, Nyström 1958 sub *Danais*, Traub & Bauer 1982, Vieira 2008) and is here reported from Brava for the first time. It is a migrant species known from the Palearctic, Afrotropical, Oriental and Australian Regions. *D. c. chrysippus* is considered the only subspecies present in Africa (Larsen 2005), although *Danaus*

chrysippus aegyptius (Schreber, 1759) has been recognized by some authors (e.g. Ackery *et al.* 1995, D'Abrera 1997). The caterpillars mainly feed on Asclepiadaceae and in Cape

Verde their presence has been reported on two species of the family, i.e. *Calotropis procera* and *Asclepias curassavica* (Mück & Traub 1987 sub *Danais*).

Subfamily SATYRINAE

Melanitis leda (Linnaeus, 1758)

Material examined – SANTIAGO: Santa Cruz, Pedra Badejo, 20.01.61, 1 ♀ (CS-79); idem, especially over *Ricinus* and banana-trees, 06.01.61, 3 ♂♂ 5 ♀♀ (CS-245); São Francisco, Benfica to Mato Baixo, 07.07.61, 1 ♂ 1 ♀ (CS-188); Posto Agrícola de São Jorge (São Jorge dos Orgãos), 18.01.61, 2 ♂♂ 2 ♀♀ (CS-241); idem, Ribeira da Longueira, 31.12.60, 1 ♂ (CS-349). BRAVA: Vinagre, 14.10.69, 3 ♀♀ (CZ-3609). SANTO ANTÃO: Ribeira Grande, Boca da Coruja, 19.03.61, 3 ♂♂ 2 ♀♀ (CS-36); Ponta do Sol, Chã, farm, 17.03.61, 1 ♂ (CS-85); Ribeira do Paul, 24.03.61, 1 ♂ 2 ♀♀ (CS-203); Ribeira da Torre, Chô-Chô, 13.03.61, 3 ♂♂ 3 ♀♀ (CS-205). SÃO NICOLAU: Cachaço, 21.10.70, 1 ♂ (CZ-3633); Caldeira, 29.10.70, 4 ♂♂ (CZ-

3675); Ribeira Maiamba, 04.04.70, 2 ♂♂ (CZ-3681). No locality, no date, 1 ♀ (CS-469).

This is the first record of *M. leda* for Brava. Previously, it had been reported from Santiago, Santo Antão and São Nicolau (Aurivillius 1910, Nyström 1958, Traub & Bauer 1982). The species is widespread in the Afrotropical, Oriental and Australian Regions. Larsen (2005) considered it to be monotypical, with African *M. l. helena* (Westwood, 1851) no longer being recognized. The caterpillars feed on a diversity of Poaceae (Ackery *et al.* 1995, Larsen 2005), but so far they have not been found in Cape Verde.

Subfamily NYMPHALINAE

Vanessa cardui Linnaeus, 1758

Material examined – SANTIAGO: Santa Catarina, Achada do Rincão, 04.09.69, 1 ♀ (CZ-3577); Boa Entrada, 08.09.69, 1 ♀ (CZ-3582); Santa Catarina, Entre Picos, 22.09.69, 1 ♂ 1 ♀ (CZ-3591); Santa Catarina, Nhangar, 03.10.69, 2 ♂♂ (CZ-3600). BRAVA: Vila Nova Sintra, 13.10.69, 1 ♂ (CZ-3607). FOGO: São Filipe, 02.03.61, 1 ♂ (CS-348). SANTO ANTÃO: Ribeira da Torre, Ribeira Grande, 28.10.72, 1 ♀ (CZ-3758). SÃO VICENTE: Ribeira Julião and Seixal, 14.03.61, 1 ♂ (CS-281). SÃO NICOLAU: Ribeira Maiamba, 04.04.70, 1 ♂ (CZ-3681). MAIO: Morro and Calheta, over herbs, 01.11.60, 2 ♂♂ (CS-271); slope of Monte Batalha, over herbs, 19.10.60, 1 ♂ 1 ♀ (CS-

273); Chico Vaz, Vale de Figueira, strong wind, 20.11.60, 1 ♂ (CS-320).

This is the first record for Maio and the species is now known from all of the Cape Verde Islands (cf. Aurivillius 1910 and Nyström 1958 sub *Pyrameis*, Traub & Bauer 1982, Vieira, 2008). *V. cardui* is a cosmopolitan and migratory species, ranging from New Zealand to Iceland, but not occurring in South America. The caterpillars feed on a variety of host plants. In Cape Verde, they were reported on Malvaceae and *Trichodesma africanum* (Boraginaceae) and a pupa was collected on *Nicotiana glauca* (Solanaceae) (Mück & Traub 1987).

Nymphalis polychloros polychloros Linnaeus, 1758

Material examined – SANTIAGO: Santa Cruz, Pedra Badejo, sugar-cane field, 25.01.61, 1 ♀ (CS-142).

This is the first record of *N. polychloros* for the Cape Verde Islands and represents a

Palaearctic element in the islands' macrolepidopteran fauna. The specimen was obtained along the north-eastern coast of Santiago (app. 15° 09'N, 23° 31'W), almost at sea level. The species is considered to include

two subspecies (D'Abreu 1992, Tennent 1996), the nominal one ranging from southern Europe to the Himalayas and *N. p. erythromelas* Austaut, 1885, a North African endemic, known from Morocco to Tunisia where it occurs at *c.* 1,500-2,000 m altitude. Devoid of any rufous or reddish tint, the

specimen is identical to material from Portugal and other European countries, thus allowing it to be assigned to the nominate subspecies. The caterpillars, unknown in Cape Verde, are gregarious and occur on Salicaceae, Ulmaceae and Rosaceae (Ackery *et al.* 1995, Tennent 1996).

Hypolimnas misippus (Linnaeus, 1764)

Material examined – SANTIAGO: Santa Cruz, Pedra Badejo, sugar-cane field, 25.01.61, 1 ♀ (CS-142); São Francisco, Rombada, 14.07.61, 2 ♀♀ (CS-169); São Francisco, Benfica to Mato Baixo, 07.07.61, 1 ♀ (CS-188); Posto Agrícola de São Jorge (São Jorge dos Orgãos), over herbs, 13.05.61, 1 ♀ (CS-239); idem, 16.01.61, 1 ♀ (CS-241); Santa Catarina, Achada do Rincão, 04.09.69, 1 ♂ 1 ♀ (CZ-3577); Boa Entrada, 08.09.69, 1 ♀ (CZ-3582); Santa Catarina, Ribeira do Mato Fontes, 09.09.69, 1 ♀ (CZ-3583); São Jorge to Santa Catarina, 20.09.69, 1 ♂ 1 ♀ (CZ-3589); Santa Catarina, Entre Picos, 22.09.69, 3 ♂♂ (CZ-3591); Santa Catarina, Achada Galega, 26.09.69, 1 ♀ (CZ-3592); Santa Catarina, 30.09.69, 1 ♂ 2 ♀♀ (CZ-3597); Santa Catarina, Nhangar, 03.10.69, 1 ♀ (CZ-3600); Cidade da Praia, 24.11.69, 1 ♂ 1 ♀ (CZ-3625). FOGO: near Lomba, Mira-Mira, 8 km from Monte Vara, flying over herbs and bean fields, 28.03.61, 1 ♂ (CS-208); Nossa Senhora do Socorro, 04.11.69, 2 ♂♂ 2 ♀♀ (CZ-3619). SANTO ANTÃO: Ribeira do Cachugo, 20.10.72, 3 ♂♂ (CZ-3754); Ribeira das Patas, 20.10.72, 2 ♂♂ (CZ-3755); Paul, 15.11.72, 2 ♂♂ 1 ♀ (CZ-3771). SÃO NICOLAU: Ribeira Brava, 21.10.70, 3 ♂♂ 1 ♀ (CZ-3655); Ribeira João, 19.10.70, 1 ♀ (CZ-3631); Ribeira Maiamba, 04.04.70, 2 ♀♀ (CZ-3681). BOAVISTA:

João Galego, flying over maize and bean fields, 24.11.61, 1 ♂ (CS-278). MAIO: Vila do Maio, 10.11.60, 1 ♂ (CS-260); Calheta, over herbs, 15.10.60, 1 ♂ (CS-268); slope of Monte Batalha, on herbs, 19.10.60, 2 ♂♂ 1 ♀ (CS-273); Chico Vaz, Vale de Figueira, strong wind, 20.11.60, 1 ♀ (CS-320); Mourinho, 15.08.69, 4 ♀♀ (CZ-3565). No locality, no date, 1 ♂ (CS-407); 1 ♂ (CZ- without number).

H. misippus has been reported from all islands, except Santa Luzia and Sal (Riley 1893, Aurivillius 1910, Nyström 1958, Traub & Bauer 1982). The species is widely distributed in the tropical regions of the world. It is common in the Canary Islands (Baéz & García 2005) and has also been collected in Madeira and the Desertas (Maravalhas 2003, Aguiar & Karsholt 2008) and in São Miguel island in the Azores (Karsholt & Vieira 2005), although it appears to be absent in continental north-western Africa (Tennent 1996). The caterpillars are polyphagous and feed on a variety of host plants, i.e. Acanthaceae, Amaranthaceae, Arecaceae, Convolvulaceae, Malvaceae, Portulacaceae and possibly Moraceae (Ackery *et al.* 1995). In Cape Verde, caterpillars were collected on *Portulaca oleracea* (Portulacaceae) (Mück & Traub 1987).

Subfamily BIBLIDINAE

Byblia ilithya (Drury, 1773)

Material examined – SANTIAGO: Santa Cruz, Pedra Badejo, 20.01.1961, 3 ♂♂ 1 ♀ (CS-79); Posto Agrícola de São Jorge (São Jorge dos Orgãos), at night attracted by light, 19.12.1960, 1 ♀ (CS-243). SANTO ANTÃO: Ribeira Grande, Boca da Coruja, 19.03.1961, 1 ♀ (CS-36); Ribeira do Paul, 23.03.1961, 1 ♂ 3 ♀♀ (CS-93); near Ribeira das Patas, hillside with dry grasses, 26.03.1961, 1 ♀

(CS-96). BOAVISTA: João Galego, flying over maize and bean fields, 24.11.1961, 1 ♀ (CS-278). MAIO: Chico Vaz, Vale de Figueira, no date, 1 ♂ (CS-263).

Previously reported from Santiago, Fogo, Santo Antão and São Nicolau (Nyström 1958, Traub & Bauer 1982), the above are the first records for Boavista and Maio. *B. ilithya* is widely distributed in sub-Saharan Africa,

extending into southern Arabia. The caterpillars, unknown in Cape Verde, feed on

species of *Delechampia* and *Tragia* (Euphorbiaceae) (Ackery *et al.* 1995).

DISCUSSION

The present study of Cape Verde butterflies in the collection of the *Instituto de Investigação Científica Tropical* and a review of data obtained by previous authors who published on Cape Verde Lepidoptera, leads us to the following conclusions (see also Appendix 1).

One species of Nymphalidae *sensu stricto*, i.e. *Nymphalis p. polychloros* (Linnaeus, 1758), is reported for the first time from Cape Verde. A total of 25 species of ‘rhopalocerans’ is now known from the archipelago (but see note on *Eurema floricola* and *E. senegalensis* below).

Despite the geographical position of the archipelago, the ‘clouded yellow’ occurring in Cape Verde is Palearctic *Colias croceus* and not, as previously suggested, Afrotropical *C. electo*. It is one of the few Palearctic macrolepidopterids in Cape Verde.

The known distribution within the archipelago of several species could be extended, with one record being new for Santiago and Santo Antão, two for Brava, Fogo and São Nicolau, three for Boavista and four for Maio.

Old records of *Eurema floricola* and *E. senegalensis* (both reported once from Santiago) are now thought to concern *E. hecabe solifera*. Identifying *Eurema* spp. remains problematical, even taking into account the tinge of the yellow ground-color of the dorsal surface of the wings, the morphology of the forewing outer margin or even the morphology of the male genitalia (cf. Larsen 1996, 2005).

Riley (1968) suggested that the records of *Pontia glauconome* from Sal and Santo Antão (Nyström 1958) need confirmation. However, even though the specimens are in poor condition (as noted by Nyström 1958), the morphology of the male genitalia confirms the presence of *P. glauconome* in Santo Antão and Sal and *P. daplidice* in Santo Antão and Boavista.

The highest species diversity of ‘rhopalocerans’ in Cape Verde is found in Santiago, where 18 species have now been recorded, i.e. 72% of the number of species known from the archipelago (assuming that

Pontia glauconome does indeed occur and *Eurema floricola* and *E. senegalensis* were misidentified). Macrolepidopterid diversity is also high in Santo Antão (16 species, i.e. 64% of species known in Cape Verde), Fogo (14 species, 56%), Brava (13 species, 52%), São Vicente (12 species, 48%), São Nicolau (13 species, 52%) and Boavista (10 species, 40%). Islands with the lowest butterfly diversity are Sal with five species (20%) and Santa Luzia with two species (8%).

Palearctic elements – *Pontia daplidice*, *P. glauconome* (if correctly identified), *Nymphalis polychloros* and *Colias croceus*, i.e. 12% – are less common in the archipelago than taxa of African origin (64%). Cosmopolitan species and those that are known from at least two zoogeographical regions (six species) make up the remaining 24%.

One only species, *Vanessa cardui*, is known from all islands. Further research will probably demonstrate that the same applies to cosmopolitan *Lampides boeticus* and *Danaus chrysippus*, not yet reported from Santa Luzia, and *Hypolimnas misippus*, as yet unknown from Santa Luzia and Sal.

Azanus moriqua has been collected in Santiago only and *Colotis amata*, *C. euippe* and *Belenois creona* only in São Vicente. These four taxa are only known from single and poorly preserved imagines, possibly suggesting accidental occurrences without established local populations. The same may eventually be shown to apply to the newly reported *Nymphalis p. polychloros*.

Deudorix dinomenes – or *D. livia* if T. Larsen (*in litt.*) is correct – is only known from Santiago and was suggested to have been introduced to the island. The presence of caterpillars indicates the existence of a local population, possibly imported from Senegal, where the species is known to occur.

Most species occur in both the Leeward (Maio, Santiago, Fogo, Brava) and Windward (Santo Antão, São Vicente, Santa Luzia, São Nicolau, Sal, Boavista) island groups and none is exclusive to Sal and/or Boavista (sometimes considered to constitute a third

island group). At present, four species (*Coeliades forestan*, *Colotis amata*, *Colotis euipe*, *Belenois creona*) are exclusively known from the Windward islands and

another four (*Deudorix dinomenes*, *Azanus jesous*, *A. moriqua*, *Nymphalis polychloros*) are only known from the Leeward islands.

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REFERENCES

- Ackery, P.R., C.R. Smith & R.I. Vane-Wright (eds.), 1995. Carcasson's African Butterflies: An Annotated Catalogue of the Papilionoidea and Hesperioidea of the Afrotropical Region. CSIRO, Australia. i-ix + 1-803.
- Aguiar, A.M.F. & O. Karsholt, 2008. Lepidoptera. Pp. 339-345 in: P.A.V. Borges, C. Abreu, A.M.F. Aguiar, P. Carvalho, R. Jardim, I. Melo, P. Oliveira, C. Sérgio, A.R.M. Serrano & P. Vieira (eds.), Listagem dos Fungos, Flora e Fauna Terrestres dos Arquipélagos da Madeira e Selvagens. Direcção Regional do Ambiente da Madeira e Universidade dos Açores, Funchal e Angra do Heroísmo.
- Aurivillius, C., 1910. Schmetterlinge gesammelt in Westafrika von Leonardo Fea in den Jahren 1897-1902. Annali del Museo civico di Storia naturale di Genova (3) 4: 492-501.
- Bacelar, A., 1948. Lepidópteros de África, principalmente das colónias portuguesas. Arquivos do Museu Bocage 19: 167-207.
- Báez, M., 1988. Preliminary catalogue of the entomological bibliography of the Cape Verde Islands. Courier Forschungsinstitut Senckenberg 105: 211-220
- Báez, M. & A. García, 2005. Lepidoptera. Pp. 87-90 in: M. Arechavaleta, N. Zurita, M.C. Marrero & J.L. Martín (eds.), Lista Preliminar de Especies Silvestres de Cabo Verde (Hongos, Plantas y Animales Terrestres). Consejería de Medio Ambiente y Ordenación Territorial. Gobierno de Canarias.
- Báez, M. & E. Martín, 2004. Lepidoptera. Pp. 247-260 in: I. Izquierdo, J.L. Martín, N. Zurita & M. Arechavaleta, 2004. Lista de Especies Silvestres de Canarias (Hongos, Plantas y Animales Terrestres). Consejería de Medio Ambiente y Ordenación Territorial. Gobierno de Canarias.
- Berio, E., 1941. Osservazioni sulla variazione de *Papilio demodocus* Esp. e descrizione di tre nuove forme. Bolletino della Società entomologica italiana 73: 90-92.
- D'Abrera, B., 1979. Butterflies of the Afrotropical Region. Landsdowe, Melbourne. i-xx + 1-593.
- D'Abrera, B., 1992. Butterflies of the Holarctic Region. Part II. Satyridae (concl.), Nymphalidae (partim). Hill House, Melbourne. i-xv + 186-334.
- D'Abrera, B., 1997. Butterflies of the Afrotropical Region. Part I. Papilionidae, Pieridae, Acraeidae, Danaidae, Satyridae. 2nd edition. Hill House, Melbourne & London. i-xxi + 1-263.
- Jarvis, F.V.L., 1953. The relationships of *Colias croceus* (Fourcroy) and *Colias electo* (Linn.). Transactions of the Royal Entomological Society of London, 104 (14): 521-541.
- Karsholt, O. & V. Vieira, 2005. Lepidoptera. Pp. 207-210 in: P.A.V. Borges, R. Cunha, R. Gabriel, A.F. Martins, L. Silva & V. Vieira (eds), Listagem da Fauna e Flora (Mollusca e Arthropoda) (Bryophyta, Pteridophyta e Spermatophyta) Terrestres dos Açores. Direcção Regional do Ambiente e Universidade dos Açores, Horta, Angra do Heroísmo e Ponta Delgada.
- Larsen, T.B., 1996. The Butterflies of Kenya and their Natural History. Oxford University Press. i-xxii + 1-500.

- Larsen, T.B., 2005. Butterflies of West Africa. Text volume. Apollo Books, Stenstrup. 1-595.
- Maravalhas, E., 2003. As Borboletas de Portugal. Published by the author. 1-455.
- Mück, O. & B. Traub, 1987. Ergänzungen zur Macrolepidopteren-Fauna der Kapverdischen Inseln. Courier Forschungsinstitut Senckenberg 95: 91-97.
- Mück, O., J.P. Carvalho, A. van Harten & B. Traub, 1990. Los Lepidopteros nocivos em Cabo Verde. Courier Forschungsinstitut Senckenberg 120: 1-30.
- Nyström, V., 1958. Macrolepidoptera of the Cape Verde Islands. Societas Scientiarum Fennica Commentationes Biologicae 17: 1-36.
- Riley, C.V., 1893. Scientific results of the U.S. Eclipse expedition to West Africa 1899-90. Report upon the Insecta, Arachnida and Myriapoda. Proceedings of the United States National Museum 16: 565-587.
- Riley, N.D., 1968. Notes on the butterflies of the Cape Verde Islands. Pp. 62-65 in: D.A. Bannerman & W.M. Bannerman, History of the Birds of the Cape Verde Islands. Birds of the Atlantic Islands, Vol. 4. Oliver & Boyd, Edinburgh.
- Sánchez-Pinto, L., M.L. Rodríguez, S. Rodríguez, K. Martín, A. Cabrera & M.C. Marrero, 2005. Pteridophyta, Spermatophyta. Pp. 38-57 in: M. Arechavaleta, N. Zurita, M.C. Marrero & J.L. Martín, 2005. Lista Preliminar de Especies Silvestres de Cabo Verde (Hongos, Plantas y Animales Terrestres). Consejería de Medio Ambiente y Ordenación Territorial. Gobierno de Canarias.
- Saraiva, A.C., 1961. "Conspectus" da entomofauna cabo-verdiana. Estudos, Ensaios e Documentos 83: 1-189.
- Tennent, J., 1996. The Butterflies of Morocco, Algeria and Tunisia. Gem Publ. Comp., Oxfordshire. i-xxxvi + 1-217.
- Traub, B. & E. Bauer, 1982. Zur Macrolepidopteren-Fauna der Kapverdischen Inseln. Courier Forschungsinstitut Senckenberg 52: 225-229.
- van Harten, A., 1988. Sobre a identificação de insectos, a formação de uma colecção e a inventariação da entomofauna de Cabo Verde. Investigação Agrária (São Jorge dos Orgãos) 2: 9-24.
- van Harten, A., 1993. Terrestrial arthropods of the Cape Verde Islands. A check-list. Courier Forschungsinstitut Senckenberg 159: 235-300.
- Vieira, V., 2008. Lepidopteran fauna from the Sal Island, Cape Verde (Insecta: Lepidoptera). SHILAP, Revista de Lepidopterologia 36: 243-252.

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APPENDIX 1. Distribution of 'rhopalocerans' (Lepidoptera: Hesperioidea and Papilionoidea) in the Cape Verde Islands. A – Santo Antão; V – São Vicente; L – Santa Luzia; N – São Nicolau; S – Sal; Bv – Boavista; M – Maio; T – Santiago; F – Fogo; Br – Brava; O – previous authors; X – new records (this study); * – not reported for more than 100 years and almost certainly not occurring in the archipelago today. # – possibly introduced and a naturalized population may not exist.

	A	V	N	L	S	Bv	M	T	F	Br
Hesperiidae										
<i>Coeliades f. forestan</i>	o	-	o	-	-	-	-	-	-	-
<i>Borbo b. borbonica</i>	o	o	o	-	-	-	-	OX	OX	o
Papilionidae										
<i>Papilio d. demodocus</i>	OX	-	OX	-	-	X	X	OX	OX	o
Pieridae										
<i>Catopsilia florella</i>	-	-	OX	-	-	OX	-	o	OX	o
<i>Colias croceus</i>	OX	o	OX	o	-	-	X	OX	-	-
<i>Eurema hecabe solifera</i>	X	-	X	-	-	X	o	OX	OX	o
<i>Colotis amata calais</i> *	-	o	-	-	-	-	-	-	-	-
<i>Colotis e. euippe</i> *	-	o	-	-	-	-	-	-	-	-
<i>Belenois c. creona</i> *	-	o	-	-	-	-	-	-	-	-
<i>Pontia daplidice</i>	OX	-	-	-	-	o	-	-	o	o
<i>Pontia glauconome</i>	o	-	-	-	o	-	-	-	-	-
Lycaenidae										
<i>Deudorix dinomenes diogenes</i>	-	-	-	-	-	-	-	o	-	-
<i>Lampides boeticus</i>	OX	o	o	-	o	o	OX	OX	OX	o
<i>Leptotes pirthous</i>	o	o	-	-	-	-	-	o	o	o
<i>Euchrysops osiris</i>	o	-	-	-	-	-	-	-	-	o
<i>Azanus jesous</i>	-	-	-	-	-	-	-	o	o	-
<i>Azanus mirza</i>	-	o	-	-	-	o	o	o	o	-
<i>Azanus moriqua</i>	-	-	-	-	-	-	-	o	-	-
<i>Zizeeria knysna</i>	OX	OX	o	-	o	-	-	OX	o	o
Nymphalidae (Danainae)										
<i>Danaus c. chrysippus</i>	OX	OX	OX	-	o	OX	OX	OX	o	X
Nymphalidae (Satyrinae)										
<i>Melanitis leda</i>	OX	-	OX	-	-	-	-	OX	-	X
Nymphalidae s.s.										
<i>Vanessa cardui</i>	OX	OX	OX	o	o	o	X	OX	OX	OX
<i>Nymphalis p. polychloros</i> #	-	-	-	-	-	-	-	X	-	-
<i>Hypolimnas misippus</i>	OX	o	OX	-	-	OX	OX	OX	X	o
<i>Byblia ilithyia</i>	OX	-	o	-	-	X	X	OX	o	-
Total number of species per island	16	12	13	2	5	10	9	18	14	13

Recent data on marine bivalves (Mollusca, Bivalvia) of the Cape Verde Islands, with records of six species new to the archipelago

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Keywords: Bivalvia, Cape Verde Islands, taxonomy, distribution

ABSTRACT

Based on newly collected samples and data from the literature, an updated list of the marine bivalves of the Cape Verde Islands is presented. From 2004 to 2006, collections were made at 22 sampling points in the islands of Santiago, São Vicente, Santa Luzia, São Nicolau, Boavista and Maio. Using qualitative and direct sampling methods, 39 species of bivalves, belonging to 20 families, were identified. Families most represented were Veneridae (6 species), Cardiidae (5 species), Arcidae (4 species) and Mytilidae (4 species). Islands with the largest diversity of species were São Vicente (30 species) and Santiago (23 species), probably due to the larger number of sample points (64% of total). Six species not previously reported from the archipelago were collected, i.e. *Irus irus*, *Venus declivis*, *Timoclea ovata*, *Diplodonta rotundata*, *Plagiocardium papillosum* and *Tagelus adansoni*. *Corbicula fluminea*, supposedly a man assisted introduction, was also collected.

RESUMO

Uma nova lista de espécies de moluscos bivalves com ocorrência no arquipélago de Cabo Verde é proposta, a partir de amostras recolhidas e análise da literatura. Entre 2004 e 2006, foram recolhidos bivalves em 22 pontos de amostragem nas ilhas de Santiago, São Vicente, Santa Luzia, São Nicolau, Boavista e Maio. Com base numa amostragem qualitativa e em métodos de recolha directos, foram identificadas 39 espécies de bivalves agrupados em 20 famílias. As famílias mais representativas foram Veneridae (6 espécies), Cardiidae (5 espécies), Arcidae (4 espécies) e Mytilidae (4 espécies). As ilhas com maior número de espécies representadas foram as de São Vicente (30 espécies) e Santiago (23 espécies), o que poderá estar relacionado com o maior número de pontos de amostragem (64% do total). Foram encontradas espécies cuja ocorrência não tinha sido registada até agora para o arquipélago, nomeadamente *Irus irus*, *Venus declivis*, *Timoclea ovata*, *Diplodonta rotundata*, *Plagiocardium papillosum* e *Tagelus adansoni*. Foi também recolhida *Corbicula fluminea*, supostamente introduzida pelo homem.

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INTRODUCTION

Bivalve mollusks or clams (Mollusca, Bivalvia) are soft-bodied invertebrates that usually produce an exoskeleton (shell) by precipitation of calcium carbonate. The shell consists of two valves, united by a ligament (Ruppert *et al.* 2005). Bivalve mollusks are cosmopolitan, but their distribution is limited by several factors like mode of reproduction, water currents, water temperature, salinity, depth and sediment type (Silva & Mantalverne 1980).

The Cape Verde archipelago is located *c.* 500 km off Senegal, West Africa, between latitudes 14°50'N-17°20'N and longitudes 22°40'W-25°30'W. It is composed of 10 islands and several islets, some of latter being satellites of the main islets, while others are entities of their own. The islands are divided into two groups: the Barlavento (Windward) islands (Santo Antão, São Vicente, Santa Luzia, São Nicolau, Sal and Boavista) and the Sotavento (Leeward) islands (Maio, Santiago, Fogo and Brava). Natural resources are few and terrestrial ecosystems are fragile and sensitive to changes caused by extreme environmental imbalances.

A great diversity of marine organisms exists in Cape Verde and this also applies to bivalve mollusks. They are often collected,

together with the gastropod *Strombus latus* Gmelin, 1791, for decorative purposes, mainly *Glycymeris formosus* (Reeve, 1843), *Lyrocardium aeolicum* (Born, 1780) and *Nodipecten corallinoides* (d'Orbigny, 1834) (Almada & Lopes 1998). So far, the bivalves of Cape Verde have remained little studied. Saldanha (1997) dealt with the underwater fauna of the eastern Atlantic, while Guerreiro & Reiner (2000) listed the mollusks known from São Vicente island. The Second National Report on Biodiversity (SEPA 2001), only mentioned two families of bivalve mollusks from Cape Verde. There exists considerable discrepancy in taxonomic treatment between the publications mentioned above, especially regarding the nomenclature of species level taxa.

The study of mollusks from Cape Verde should make an important contribution to malacological systematics in general and to the conservation of local marine biodiversity in particular. The main objective of the present work was to contribute to the knowledge of marine bivalves of the Cape Verde archipelago by clarifying their taxonomy, establishing spatial distribution of taxa in the islands and to increase the number of species recorded in the archipelago.

MATERIAL AND METHODS

SAMPLING Specimens were collected from April 2004 to July 2006 at 22 sampling sites (Fig. 1) on the islands of São Vicente (Calhau, Matiota, Baía das Gatas, Salamansa, Baía do Porto Grande, São Pedro, Tupim), Santa Luzia (Palmo a Tostão), São Nicolau (Barril, Tedja, Cacimba, Urina D'Ose), Boavista (Ervatão, Cural Velho, Ponta Cosme, João Barrosa), Maio (sand extraction area in the north of the island) and Santiago (Gamboa, Prainha, Praia Baixo, São Francisco, Tarrafal).

Sites were searched qualitatively, with the minimum requirement of collecting the maximum number of species present. Specimens were collected in the intertidal zone (by direct observation at low tide), up to 6 m deep in coral areas (by snorkeling) and up to 30 m deep (by mechanical sand dredgers at 30 m of coastline in the north of Maio).

Sampling sites had different types of substrate, including sand, silt, rocks and gravel.

IDENTIFICATION Screening of the collected material was carried out with stereo microscopes to assort it into species or higher taxonomic categories. After screening, the material was stored in labeled plastic bags. Identification of the material was carried out using Fischer *et al.* (1981, 1987, 1990), Schneider (1992), Saldanha (1997), Lloris & Rucabado (1998), Guerreiro & Reiner (2000) and Leal (2002). As a base criterion (cf. Rolán 2005), the morphological characteristics of the shell (grooves, spines) were taken into account. After morphological analysis, the samples were photographed and simple frequency analyses were carried out in an MS® Office Excel sheet.

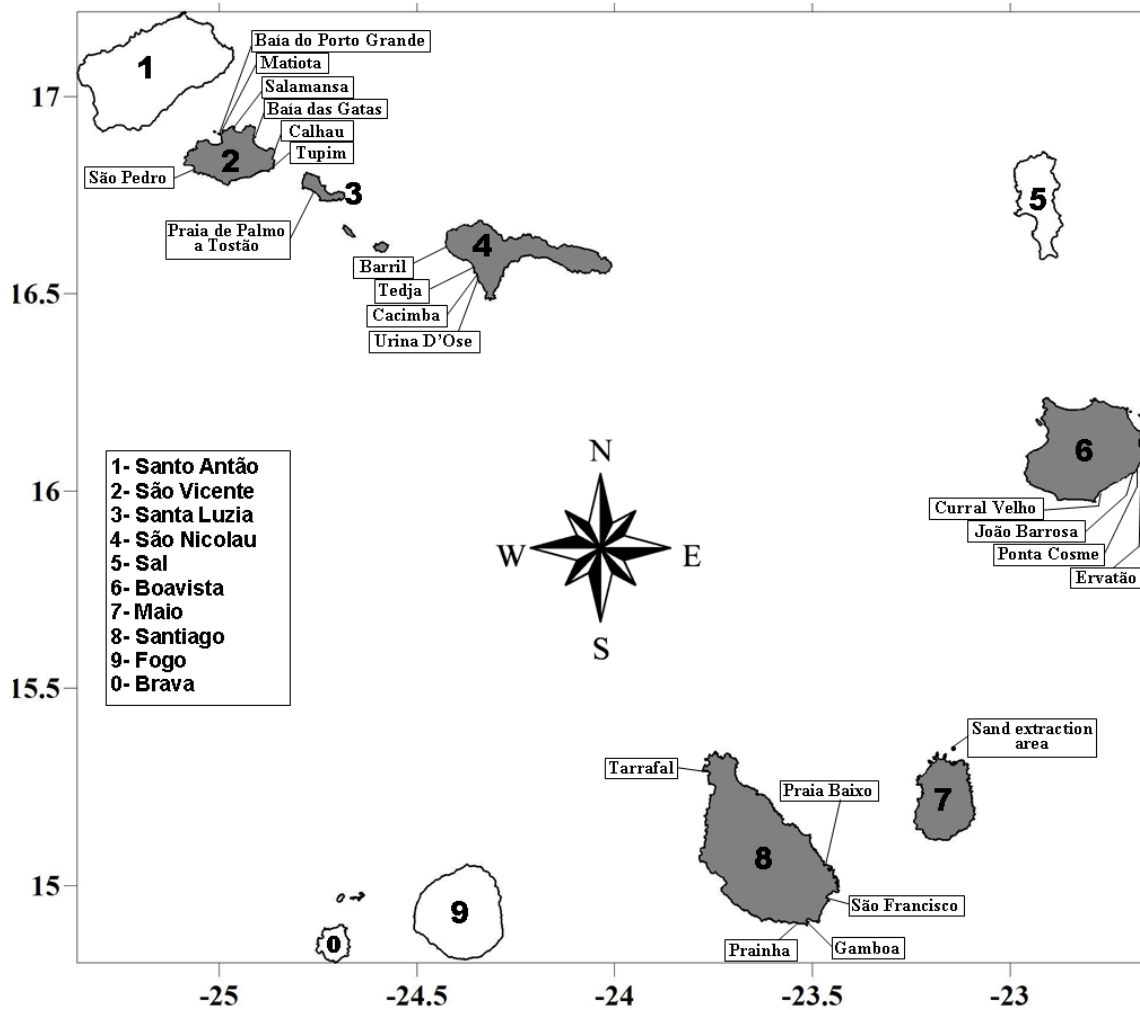


Fig. 1. Map of the Cape Verde Islands, showing sampled islands (grey) and sampling sites.

RESULTS

The material collected in this study yielded 39 species of bivalves, distributed in 20 families¹. Of these, 33 had been reported from Cape Verde before, while six species (of the families Veneridae, Ungulinidae, Cardiidae and Solecurtidae) are reported for the first time for the islands. Islands with the largest number of species were São Vicente (30) and Santiago (23), representing 77% and 54%, respectively, of the total number of species identified. In other islands, the number of species was smaller, i.e. 21 in Santa Luzia, 19 in Maio, 15 in Boavista and 13 in São Nicolau (Table 1).

¹ Specimens were deposited at the Laboratory of Cytology and Developmental Biology, Department of Engineering and Marine Science, University of Cape Verde, São Vicente, Republic of Cape Verde.

The most common families were Veneridae (6 species), Cardiidae (5), Arcidae (4), Mytilidae (4), Pectinidae (3), Lucinidae (2) and Ostreidae (2), with the remaining 13 families being represented by a single species. Apart from being the most common, species of Veneridae showed the widest distribution in the archipelago, being found in sandy and muddy sediments. Species of Arcidae, Cardiidae, Chamidae, Lucinidae and Spondilidae were also found in all islands sampled. Families most restricted were Tellinidae, Ungulinidae and Solecurtidae, being found in a single sample only. Spondilidae and Chamidae were each represented by a single species in all islands sampled, i.e. *Spondylus senegalensis* (Schreibers, 1793) and *Pseudochama radians* (Lamarck, 1819). In some cases, such as

specimens of Anomiidae and *Lithophaga* (Mytilidae), identification at the species level was not possible.

Except for the families Mytilidae, Ostreidae and Pinnidae, which were better represented in areas of hard substrate and in coral communities, most species were collected in areas of soft substrate (sand or mud) with little depth and strong hydrodynamics. In the present study, a total of 53 species level taxa (including those not specifically identified) of marine bivalves were collected in the Cape Verde archipelago (Appendix 2).

Six species not previously reported from the Cape Verde Islands were found, i.e. *Irus irus* (Linnaeus, 1758), *Venus declivis* Sowerby, 1853 and *Timoclea ovata* (Pennant, 1777) (Veneridae), *Diplodonta rotundata* (Montagu, 1803) (Ungulinidae), *Plagiocardium papillosum* (Poli, 1795) (Cardiidae) and *Tagelus adansoni* (Bosc, 1801) (Solecurtidae) (Appendix 1). The presence of *Corbicula fluminea* (O.F. Müller, 1774) (Corbiculoidae) in samples from São Vicente and Maio is also worth mentioning.

	Number of species per island					
	São Vicente	Santa Luzia	São Nicolau	Boavista	Maio	Santiago
ANOMIIDAE	1	1	0	0	0	1
ARCIDAE	3	2	2	2	4	3
CARDIIDAE	3	2	2	2	2	2
CARDITIDAE	1	1	0	0	0	1
CHAMIDAE	1	1	1	1	1	1
CORBICULOIDAE	1	0	0	0	1	0
GLYCYMERIDIDAE	1	1	0	1	1	1
ISOGNOMONIDAE	1	1	1	1	0	1
LUCINIDAE	2	1	1	2	1	2
MACTRIDAE	1	1	0	1	1	1
MYTILIDAE	3	1	1	2	0	2
NOETIIDAE	1	1	1	0	1	1
OSTREIDAE	2	1	1	0	1	2
PECTINIDAE	2	2	1	0	1	0
PINNIDAE	1	1	1	1	0	0
SOLECURTIDAE	0	0	0	0	0	1
SPONDYLIDAE	1	1	1	1	1	1
TELLINIDAE	1	0	0	0	0	0
UNGULINIDAE	0	0	0	0	0	1
VENERIDAE	4	3	0	1	4	1
Number of species	30	21	13	15	19	22
Number of sampling sites	7	1	4	4	1	5

Table 1. Number of species per island identified in this study.

DISCUSSION

Results show a larger number of species in São Vicente and Santiago, which may be due to the larger number of sampling sites in these two islands. Although fewer sites were sampled there (4.5% of total), Maio yielded a

wide variety of species (19). This island has an extensive continental shelf, with small depths, sandy bays and mudflats that support high species diversity (cf. Bravo de Laguna 1985, Almada 1993). The same applies to

Boavista (18% of the total number of sampling sites), where 15 species were identified.

On São Nicolau, a relatively low number of species (13) was obtained. This may be related to the fact that the sampled beaches in São Nicolau contained little sand or mud, without suitable habitats for a number of mollusk species (Guerreiro & Reiner 2000). Beaches on São Nicolau are heavily affected by the collecting of sand for construction, which has led to the degradation of coastal habitats. In contrast, Santa Luzia – with only a single sampling point – shows a considerable diversity of bivalves (21, i.e. 54% of the total number of species). The absence of anthropogenic factors, such as harvesting of species, marine pollution and the fact that the island is uninhabited, may be the reason for this abundance and species diversity.

The families with the largest number of species (Cardiidae and Veneridae) were collected in areas of soft substrate. This is in agreement with the lifestyle of these organisms, which are mostly burying filter-feeders that seek refuge in sand or mud bottoms (Ruppert *et al.* 2005).

The species reported here for the first time for the Cape Verde Islands are distributed throughout the North Atlantic, Mediterranean and along the West African coast (Fischer *et al.* 1981, 1987, 1990, Lloris & Rucabado 1998, Leal 2002). It can be hypothesized that the occurrence of these species in Cape Verde is a result of larval transport (meroplankton, temporary plankton) by ocean currents, especially the cool Canary current, which extends from the North Atlantic to the Cape Verde Islands.

Another species collected – *Corbicula fluminea*, known as the ‘Asian clam’ – is distributed from North America south to Brazil and in Europe and Asia (Poppe & Goto 1993, Abbott & Dance 1998). This

species is characteristic of fresh and brackish waters and estuaries and was not previously reported from West Africa. It is an expansive exotic when introduced in freshwater (Nobre 1940). It is used as an *in situ* biomarker in environmental monitoring studies regarding competition for space with other species (Mersch *et al.* 1996). Since there were several shells of this species in the samples, but none with the shellfish present dead or alive, they were probably introduced by man (Ruiz *et al.* 2000). *Corbicula fluminea* can have reached the Cape Verde Islands by way of ballast water, being discarded by Chinese sailors (who consume them) or by ocean currents, although the latter is rather unlikely because of the large distance they would have to travel. Any of these possibilities should be viewed with caution and evaluated in future studies.

Taxonomy of some species in Appendix 2 diverges from that employed by previous authors, e.g. *Arcopsis afra*, previously included in Arcidae as *Arca afra* Gmelin, 1791 by Guerreiro & Reiner (2000), but now placed in Noetiidae as *Arcopsis afra* (Gmelin, 1791). Other changes in taxonomy have occurred as a result of improved data communication between researchers and the advance of new technologies used in the description, identification and classification of species.

Because of uncertainties in species identification, the present study should be considered as preliminary. As these taxa do not reach high biomass values, cannot be exploited and collection of specimens is more casual than intentional, few studies have been carried out. The material collected in this study forms the basis of a reference collection to be used in future studies on the identification, distribution and taxonomy of bivalves in the Cape Verde Islands.

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REFERENCES

- Abbott, R.T. & S.P. Dance, 1998. Compendium of seashells. A full-color guide to more than 4200 of the world's marine shells. Odyssey, El Cajon. 411 pp.
- Almada, E.O., 1993. Caracterização oceanológica das zonas de pesca da Z.E.E. do arquipélago de Cabo Verde. Unpublished report, Instituto Nacional de Desenvolvimento das Pescas, Mindelo. 27 pp.
- Almada, E. & J.A. Lopes, 1998. A diversidade biológica de Cabo Verde. Análise e hierarquização das pressões humanas sobre a DB marinha e identificação das prioridades para a sua conservação e utilização sustentável. Unpublished report, Direcção Geral do Ambiente, Praia. 64 pp.
- Bravo de Laguna, J., 1985. Plantes-formes insulaires et zone économique exclusive à la République du Cap-Vert. Projet pour le renforcement du Secrétariat d'Etat aux Pêche du Cap-Vert, CVI/82/003/Rapport Technique 6: 1-28. PNUD/FAO, Praia.
- Fischer, W., G. Bianchi & W.B. Scott, 1981. FAO species identification sheets for fishery purposes. Eastern Central Atlantic; fishing area 34, 47 (in part), Vol. 1-7. Department of Fisheries and Oceans of Canada & Food and Agriculture Organization of the United Nations, Ottawa.
- Fischer, W., M.L. Bauchot & M. Schneider, 1987. Fiches FAO d'identification des espèces pour les besoins de la pêche (révision 1). Méditerranée et Mer noire. Zone de pêche 37, Vol. 1. Végétaux et Invertébrés (Projet GCP/INT/422/EEC). FAO, Rome. 760 pp.
- Fischer, W., I. Sousa, C.S.A. de Freitas, J.M. Poutiers, W. Schneider, T.C. Borges, J.P. Féral & A. Massinga, 1990. Fichas FAO de identificação de espécies para actividades de pesca. Guia de campo das espécies comerciais marinhas e de águas salobras de Moçambique. PNUD/FAO MOZ/86/030. FAO, Rome. 424 pp.
- Guerreiro, A.E. & F. Reiner, 2000. Moluscos marinhos da ilha de São Vicente (arquipélago de Cabo Verde). Câmara Municipal de Oeiras, Oeiras. 279 pp.
- Lloris, D. & J. Rucabado, 1998. Guide FAO d'identification des espèces pour les besoins de la pêche. Guide d'identification des Ressources Marines Vivantes du Maroc. FAO, Rome. 263 pp.
- Leal, J.H., 2002. Bivalves. Pp. 26-98 in: K.E. Carpenter (ed.), The living marine resources of the Western Central Atlantic, Vol. 1. FAO Species Identification Guide No. 5. FAO, Rome.
- Mersch, J., P. Wagner & J.C. Pihan, 1996. Copper in indigenous and transplanted Zebra Mussels in relation to changing water concentrations and body weight. *Environmental Toxicology and Chemistry* 15: 886-893.
- Nobre, A., 1940. Fauna malacológica de Portugal, Vol. 1. Moluscos marinhos e das águas salobras. Companhia Editora do Minho, Barcelos. 806 pp.
- Poppe, G.T. & Y. Goto, 1993. European seashells, Vol. 2. Scaphopoda, Bivalvia, Cephalopoda. Verlag Christa Hemmen, Wiesbaden. 221 pp.
- Rolán, E.M., 2005. Malacological fauna from the Cape Verde Archipelago, Part 1. Conchbooks, Vigo. 455 pp.
- Ruiz, G.M., T.K. Rawlings, F.C. Dobbs, L.A. Drake, T. Mullady, A. Huq & R.R. Colwell, 2000. Invasion biology: global spread of microorganisms by ships. *Nature* 408: 49-50.
- Ruppert, E.E., S. Fox & R.D. Barnes, 2005. *Zoologia dos Invertebrados*. 7th edition. Editora Roca, São Paulo. 1145 pp.
- Saldanha, L., 1997. Fauna Submarina Atlântica. 3rd edition. Publicações Europa-América, Sintra. 364 pp.
- Schneider, W., 1992. FAO species identification sheets for fishery purposes. Field guide to the commercial marine resources of the Gulf of Guinea. FAO, Rome. 268 pp.
- SEPA, 2001. Segundo relatório nacional sobre a biodiversidade em Cabo Verde. Unpublished report, Ministério da Agricultura e Pescas, Praia. 128 pp.
- Silva, J.A. & G. Mantalverne, 1980. Iniciação á colecção de conchas. Editora Presença, Lisbon. 108 pp.

APPENDIX 1. Photographs of bivalve species not reported previously from the Cape Verde Islands.



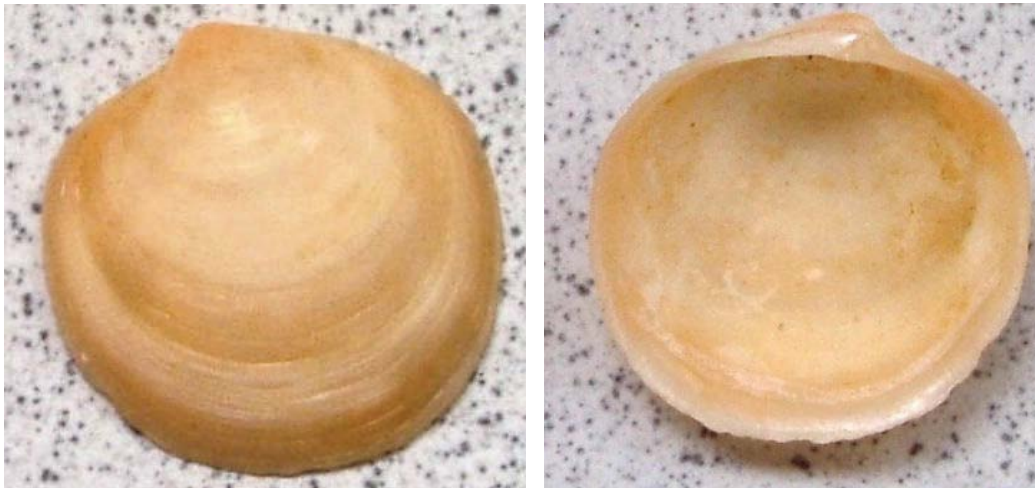
Irus irus (Linnaeus, 1758) (L - 12mm)



Venus declivis Sowerby, 1853 (L - 30mm)



Timoclea ovata (Pennant, 1777) (L - 7mm)



Diplodonta rotundata (Montagu, 1803) (L - 20mm)



Plagiocardium papillosum (Poli, 1795) (L - 5mm)



Tagelus adansoni (Bosc, 1801) (L - 60mm)

APPENDIX 2. Bivalves recorded in the Cape Verde Islands, based on this study and data in Silva & Mantalverne (1980), Saldanha (1997), Abbott & Dance (1998), Guerreiro & Reiner (2000) and Leal (2002). CS = current study; numbers indicate islands where specimens were collected (see Fig. 1).

Class BIVALVIA Linnaeus, 1758

- Subclass PROTOBRANCHIA Pelseneer, 1889
 - ⇒ Order SOLEMYOIDA Dall, 1889
 - Superfamily SOLEMYOIDEA J.E. Gray, 1857
 - * Family SOLEMYIDAE J.E. Gray, 1857
 - ◆ *Solemya togata* (Poli, 1795)
- Subclass PTEROMORPHIA Beurlen, 1944
 - ⇒ Order ARCOIDA Stoliczka, 1871
 - Superfamily ARCOIDEA, Lamarck, 1818
 - * Family ARCIDAE Lamarck, 1818
 - o Subfamily ARCINAE Lamarck, 1818
 - ◆ *Arca bouvieri* P. Fischer, 1874 (CS 2,3,4,6,7,8)
 - ◆ *Arca noae* Linnaeus, 1758 (CS 2,3,4,7,8)
 - ◆ *Anadara geissei* Dunker in Kobelt, 1891 (CS 2,7,8)
 - ◆ *Senilia senilis* (Linnaeus, 1758) (CS 6,7,8)
 - * Family NOETIIDAE Stewart, 1930
 - ◆ *Arcopsis afra* (Gmelin, 1791) (CS 2,3,4,7,8)
 - * Family GLYCYMERIDIDAE Newton, 1922
 - o Subfamily GLYCYMERIDINAE Newton, 1922
 - ◆ *Glycymeris formosus* (Reeve, 1843) (CS 2,3,6,7,8)
 - ⇒ Order MYTILOIDA Ferussac, 1922
 - Superfamily MYTILOIDEA Rafinesque, 1815
 - * Family MYTILIDAE Rafinesque, 1815
 - o Subfamily MYTILINAE Rafinesque, 1815
 - ◆ *Brachidontes puniceus* (Gmelin, 1791) (CS 2,3,4,6,8)
 - ◆ *Perna perna* (Linnaeus, 1758) (CS 2)
 - ◆ *Mytilus* cf. *galloprovincialis* Lamarck, 1819 (CS 2)
 - ◆ *Lithophaga* sp. (CS 6)
 - o Subfamily CRENELLINAE H. & A. Adams, 1857
 - ◆ *Musculus subpictus* (Cantraine, 1835)
 - o Subfamily MODIOLINAE Keen, 1958
 - ◆ *Arcuatula elegans* J.E. Gray, 1828

- ◆ *Modiolus lulat* (Dautzenberg, 1891)
- ◆ *Modiolus verdensis* Cosel, 1995
- Superfamily PINNOIDEA Leach, 1819
 - * Family PINNIDAE Leach, 1819
 - ◆ *Pinna rudis* Linnaeus 1758 (CS 2,3,4)
 - ◆ *Atrina chautardi* Nicklès, 1953
- Order PTERIOIDA Newell, 1965
 - ⇒ - Superfamily PTERIOIDEA J.E. Gray, 1847
 - Suborder PTERIINA Newell, 1965
 - * Family ISOGNOMONIDAE
 - ◆ *Isognomon dunkeri* (P. Fisher, 1881) (CS 2,3,4,6,8)
 - Superfamily PECTINOIDEA Rafinesque, 1815
 - * Family PECTINIDAE Rafinesque, 1815
 - o Subfamily PECTININAE Rafinesque, 1815
 - ◆ *Pecten keppelianus* Sowerby, 1905 (CS 2,3,7)
 - ◆ *Aequipecten commutatus* (Monterosato, 1875)
 - o Subfamily CHLAMYDINAE Korobkov, 1971
 - ◆ *Crassadoma multistriata* (Poli, 1795) (CS 4)
 - ◆ *Nodipecten corallinoides* (d'Orbigny, 1834) (CS 2,3)
 - ◆ *Manupecten pesfelis* (Linnaeus, 1758)
 - ◆ *Argopecten flabellum* (Gmelin, 1791)
 - * Family SPONDYLIDAE J.E. Gray, 1826
 - ◆ *Spondylus senegalensis* (Schreibers, 1793) (CS 2,3,4,6,7,8)
 - Superfamily ANOMIOIDEA
 - * Family ANOMIIDAE
 - ⇒ Order OSTREOIDA Ferussac, 1922
 - Suborder OSTREINA Ferussac, 1922
 - Superfamily OSTREOIDEA Rafinesque, 1815
 - * Family OSTREIDAE Rafinesque, 1815
 - o Subfamily OSTREINAE Rafinesque, 1815
 - ◆ *Ostrea bicolor* (Hanley, 1845) (CS 2,3,4,7,8)
 - ◆ *Dendrostrea folium* (Linnaeus, 1758) (CS 2,8)
- Subclass HETERODONTA Neumayr, 1884
 - ⇒ Order VENEROIDA H. & A. Adams, 1857
 - Superfamily LUCINOIDEA Fleming, 1828
 - * Family LUCINIDAE Fleming, 1828

- Subfamily LUCININAE Fleming, 1828
 - ◆ *Ctena eburnea* (Gmelin, 1791) (CS 2,3,4,6,7,8)
 - ◆ *Linga adansoni* (d'Orbigny, 1839) (CS 2,6,7)
 - * Family UNGULINIDAE Fleming, 1828
 - ◆ *Diplodonta rotundata* (Montagu, 1803) (CS 8)
- Superfamily CHAMOIDEA Blainville, 1825
 - * Family CHAMIDAE Blainville, 1825
 - ◆ *Pseudochama radians* (Lamarck, 1819) (CS 2,3,4,6,7,8)
- Superfamily CARDIOIDEA Lamarck, 1809
 - * Family CARDIIDAE Lamarck, 1809
 - Subfamily LAEVICARDIINAE Keen, 1936
 - ◆ *Laevicardium crassum* (Gmelin, 1791) (CS 2,3)
 - Subfamily PROTOCARDIINAE
 - ◆ *Lyrocardium aeolicum* (Born, 1780) (CS 2,3,4,6,7)
 - Subfamily TRACHYCARDIINAE Stewart, 1930
 - ◆ *Papyridea lata* (Born, 1778) (CS 2,4,6)
 - ◆ *Plagiocardium papillosum* (Poli, 1795) (CS 8)
 - ◆ *Acanthocardia* sp. (CS 7,8)
- Superfamily CARDITOIDEA Fleming, 1928
 - * Family CARDITIDAE Fleming, 1928
 - ◆ *Cardita calyculata* (Linnaeus, 1758) (CS 2,3,8)
- Superfamily MACTROIDEA Lamarck, 1809
 - * Family MACTRIDAE Lamarck, 1809
 - Subfamily MACTRINAE Lamarck, 1809
 - ◆ *Mactra glabrata* (Linnaeus, 1758) (CS 2,3,6,7,8)
 - Subfamily LUTRARIINAE H. & A. Adams, 1856
 - ◆ *Lutraria senegalensis* J.E. Gray, 1837
- Superfamily TELLINOIDEA Blainville, 1814
 - * Family TELLINIDAE Blainville, 1814
 - Subfamily TELLININAE Blainville, 1814
 - ◆ *Tellina planata* Linnaeus, 1758 (CS 2)
 - ◆ *Arcopagia* cf. *crassa* Pennant, 1777
 - * Family DONACIDAE Fleming, 1828
 - ◆ *Donax verdensis* Cosel, 1995
 - * Family SOLECURTIDAE d'Orbigny, 1846
 - ◆ *Tagelus adansoni* (Bosc, 1801) (CS 8)

- Superfamily VENEROIDAE Rafinesque, 1815

* Family VENERIDAE Rafinesque, 1815

o Subfamily VENERINAE Rafinesque, 1815

- ◆ *Venus declivis* Sowerby, 1853 (CS 2,7)
- ◆ *Venus punctigera* (Dautzenberg & Fischer, 1906)
- ◆ *Venus verdensis* Dautzenberg & Fischer, 1906
- ◆ *Venus cf. verrucosa* Linnaeus, 1758 (CS 2,3,6,7)
- ◆ *Circomphalus foliaceolamellosus* (Dillwyn, 1817) (CS 6)
- ◆ *Timoclea ovata* (Pennant, 1777) (CS 2)
- ◆ *Dosinia exoleta* (Linnaeus, 1758) (CS 3,7)
- ◆ *Venerupis decussata* Philippi, 1836 (CS 2)
- ◆ *Irus irus* (Linnaeus, 1758) (CS 2,3)

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Short note | Nota breve

First records of Fraser's Dolphin *Lagenodelphis hosei* for the Cape Verde Islands

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Keywords: Delphinidae, *Lagenodelphis*, Cape Verde Islands, distribution

On 31 August 2003, at 11:40 local time, *c.* 5 nm southwest of São Nicolau (16°33.1N, 024°27.7W), Cape Verde Islands, GT and PLS observed *c.* 20 Fraser's Dolphins *Lagenodelphis hosei* Fraser, 1956 (Fig.1). The sighting was made under excellent weather conditions (sea state Beaufort 2 with sun) from the 39.6 m diesel engine powered oceanographic research vessel *Taliarte* during a two week cetacean survey conducted as part of the Hydrocarpo project.

The animals were *c.* 2.5 m in length, with a short beak, robust body, small dorsal and pectoral fins and showed the characteristic longitudinal striping (cf. Jefferson *et al.* 1993, Carwardine 1995). The dolphins were travelling eastwards, but when the vessel changed direction in order to get closer to the animals, they changed course as well and accompanied the ship while bow-riding. During the *c.* 15 minutes of their presence, several juveniles were observed.

Water depth in the area of the sighting was 500 m according to the 1: 500,000 Spanish Navigation Chart No. 366. Within one mile of the Fraser's Dolphins, a pod of *c.* 15 Short-finned Pilot Whales *Globicephala macrorhynchus* Gray, 1846 was observed resting and socializing.

On 10 March 2006, at the beach near Curral

Velho on the southern coast of Boavista, PLS found the carcass of a small odontocete, 132 cm in length (Fig. 2). The specimen was identified as an immature female Fraser's Dolphin on account of the short beak, small size of the dorsal and pectoral fins and the contrast between the dark dorsal and whitish ventral.

These are the first records of Fraser's Dolphin for the Cape Verde Islands (cf. Hazevoet & Wenzel 2000). The species has a pantropical distribution (Jefferson *et al.* 1993, Perrin *et al.* 1994), but in many regions its distribution is poorly known (Jefferson & Leatherwood 1994), with most records being from the tropical Pacific and Indian Oceans (Leatherwood *et al.* 1983, Weir *et al.* 2008). In the western tropical Atlantic, there are sightings and strandings from the Caribbean region and Venezuela (Mignucci-Giannoni *et al.* 1999, Bolaños & Villarroel-Marin 2003). In West Africa, a stranding has been reported from Senegal, landings from Ghana, a tentative sighting off Nigeria and sightings off Angola (Van Waerebeek *et al.* 2000, Ofori-Danson *et al.* 2003, Weir *et al.* 2008, Weir 2010). There is also a record from the Canary Islands (Vonk & Martel 1990) and an unconfirmed sighting off Sierra Leone (Jefferson *et al.* 1997).



Fig. 1. *Lagenodelphis hosei*, 5 nm southwest of São Nicolau, 31 August 2003
(Gergely Torda)



Fig. 2. *Lagenodelphis hosei*, lateral and ventral view, Curral Velho, Boavista, 10 March 2006
(Pedro López Suárez)

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REFERENCES

- Bolaños, J. & A. Villarroel-Marín, 2003. Three new records of Cetacean species for Venezuelan waters. *Caribbean Journal of Science* 39: 230-232.
- Carwardine, M., 1995. Whales, dolphins and porpoises. Dorling Kindersley, London.
- Hazevoet, C.J. & F.W. Wenzel, 2000. Whales and dolphins (Mammalia, Cetacea) of the Cape Verde Islands, with special reference to the Humpback Whale *Megaptera novaeangliae* (Borowski, 1781). *Contributions to Zoology* 69: 197-211.
- Jefferson, T.A. & S. Leatherwood, 1994. *Lagenodelphis hosei*. *Mammalian Species* 470: 1-5.
- Jefferson, T.A., S. Leatherwood & M.A. Webber, 1993. Marine mammals of the world. *FAO Species Identification Guide*. UNEP/FAO, Rome. 320 pp.
- Jefferson, T.A., B.E. Curry, S. Leatherwood & J.A. Powell, 1997. Dolphins and porpoises of West Africa: a review of records (Cetacea: Delphinidae, Phocoenidae). *Mammalia* 61: 87-108.
- Leatherwood, S. & R.R. Reeves, 1983. *The Sierra Club Handbook of Whales and Dolphins*. Sierra Club Books, San Francisco. 302 pp.
- Mignucci-Giannoni, A.A., R.A. Montoya-Ospina, J.J. Perez-Zayas, M.A. Rodriguez-Lopez & E.H. Williams, 1999. New records of Fraser's dolphin (*Lagenodelphis hosei*) for the Caribbean. *Aquatic Mammals* 25: 15-19.
- Ofori-Danson, P.K., K. Van Waerebeek & S. Debrah, 2003. A survey for the conservation of dolphins in Ghanaian coastal waters. *Journal of the Ghana Science Association* 5: 45-54.
- Perrin, W.F., S. Leatherwood & A. Collet, 1994. Fraser's Dolphin *Lagenodelphis hosei* Fraser, 1956. Pp. 225-240 in: S. Ridgway & R. Harrison (eds.), *Handbook of Marine Mammals*, Vol. 5. Academic Press, San Diego.
- Van Waerebeek, K., E. Ndiaye, A. Djiba, M. Diallo, P. Murphy, A. Jallow, A. Camara, P. Ndiaye & P. Tous, 2000. A survey of the conservation status of cetaceans in Senegal, The Gambia and Guinea-Bissau. *UNEP/CMS Secretariat*, Bonn. 80 pp.
- Vonk, R. & V.M. Martel, 1990. Fraser's dolphin *Lagenodelphis hosei* Fraser, 1956: first record on the Canary Islands. *European Research on Cetaceans* 4: 70-72.
- Weir, C.R., 2010. A review of cetacean occurrence in West African waters from the Gulf of Guinea to Angola. *Mammal Review* 40: 2-39.
- Weir, C.R., J. Debrah, P.K. Ofori-Danson, C. Pierpoint & K. Van Waerebeek, 2008. Records of Fraser's dolphin *Lagenodelphis hosei* Fraser 1956 from the Gulf of Guinea and Angola. *African Journal of Marine Science* 30: 241-246.

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