

ZOOLOGIA CABOVERDIANA

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Zoologia Caboverdiana é uma revista científica com arbitragem científica (*peer-review*) e de acesso livre. Nela são publicados artigos de investigação original, artigos de síntese e notas breves sobre Zoologia, Paleontologia, Biogeografia, Etnozoologia e Conservação nas ilhas de Cabo Verde. Também publicamos artigos originais ou de revisão de uma área geográfica mais ampla desde que debruçados sobre espécies que ocorrem no arquipélago de Cabo Verde.

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Nota editorial

Às aranhas

Reparar no que é evidente é fácil. Mais difícil é ver e dar valor ao que é pequeno e discreto, ao que está longe ou isolado. Por isso descuramos muitas vezes os pequenos organismos e os ilhéus distantes. E a verdade é que há muito que a revista não publicava algo sobre invertebrados terrestres, que constituem provavelmente o grupo mais discreto e diverso nas ilhas de Cabo Verde. É igualmente verdadeiro que ainda não existiam publicações sobre os ilhéus do Rombo, que são uma importante Reserva Integral. Nem sobre a Brava ou Fogo, este último designado Reserva da Biosfera. Andamos assim perdidos na teia sobre que papel ecológico os invertebrados terrestres possam ter no arquipélago e sem informação suficiente para começar a delinear acções de conservação nas áreas protegidas com estatuto de protecção mais elevado.

Para humildemente contribuímos para colmatar essa falha, este número inclui duas publicações dedicadas às aranhas e um a áreas inacessíveis, num total de três publicações: um artigo e duas notas breves. A primeira publicação, intitulada “*Distribuição e uso do habitat de aves do ilhéu de Cima (ilhéus do Rombo, Cabo Verde) no Inverno*”, mostra que o pequeno ilhéu de Cima é uma importante área protegida não só para as aves marinhas, mas também das aves terrestres, limícolas, costeiras e de rapina. As aves não-marinhas têm sido negligenciadas até agora devido à dificuldade de acesso a este ilhéu, mas este estudo vem agora providenciar não só uma lista das mesmas, mas também mapas de distribuição de cada uma delas no Inverno. Adicionalmente, este estudo providencia um mapa detalhado dos principais habitats do ilhéu. Apresenta ainda informação sobre o

impacto das marés no comportamento das aves limícolas e costeiras. No entanto, muitas questões levantadas, relativamente ao impacto da predação de algumas destas espécies nas aves marinhas e à presença e distribuição destas espécies noutras épocas do ano, ficam por responder.

A segunda publicação é intitulada “*Um novo registo da aranha orbe Argiope sector (Araneidae) para a ilha de Santa Luzia, Cabo Verde*”. Esta nota breve mostra, mais uma vez, como é necessário reforçar a monitorização da biodiversidade nas ilhas mais remotas, como as ilhas Desertas, em particular de grupos pouco amostrados. Este trabalho é resultado da terceira edição das bolsas do Fundo SCVZ Desertas criado com o resultado das vendas do livro incidindo sobre a História Natural das mesmas.

A terceira e última publicação é uma nota breve que descreve a presença de outra aranha no país, desta vez no Maio. A nota “*Presença de uma espécie invasora de aranhas caçadoras Heteropoda venatoria no Porto Inglês, ilha do Maio, arquipélago de Cabo Verde*” relata o primeiro registo com uma localização precisa da aranha-caranguejo, da família das aranhas caçadoras (Sparassidae), nesta ilha do Sotavento. Tal localização, perto de um porto, leva a presumir que a entrada da espécie no país possa ser devida a acção humana, aquando da reconstrução do porto ou do transporte de carga por via marítima.

Desejo de que estas festas nos ajudem a apreciar os pequenos detalhes isolados de beleza e generosidade no meio de dias difíceis que nos deixaram às aranhas.

Doutora Raquel Vasconcelos
Editora-chefe da *Zoologia Caboverdiana*

Editorial note

At sixes and sevens

Noticing the obvious is easy. More difficult is to see and value what is small and discreet, what is far away or isolated. That is why we often neglect the small organisms and distant islets. And the truth is that it has been a long time since this journal published something about terrestrial invertebrates, which are probably the most discreet and diverse group on the islands of Cabo Verde. It is equally true that there were still no publications about the Rombo Islets, which are an important Integral Reserve. Nor about Brava or Fogo, the latter designated a Biosphere reserve. So we are at sixes and sevens about the ecological role that terrestrial invertebrates might play in the archipelago, and without sufficient information to start planning conservation actions in the protected areas with higher protection status.

To humbly contribute to filling this gap, this issue includes two publications dedicated to spiders and one to inaccessible areas, in a total of three publications: an original article and two short notes. The first publication, entitled “*Distribution and habitat use of the birds of Cima Islet (Rombo Islets, Cabo Verde) in winter*”, shows that the small Cima Islet is an important protected area not only for seabirds, but also for terrestrial and wading birds, shorebirds, and birds of prey. The non-marine birds have been neglected so far due to the difficulty of accessing this islet, but this study now provides not only their checklist, but also distribution maps in winter for each one of them. Additionally, this study provides a detailed map of the main habitats of the islet. It also presents information on the impact of tides on the behaviour of wading and shorebirds. However, many questions raised regarding the predation impact of some

of these species on seabirds, and the occurrence and distribution of these species in other seasons along the year, remain to be answered.

The second publication is entitled “*A new record of the orb spider Argiope sector (Araneidae) for the island of Santa Luzia, Cabo Verde*”. This short note shows, once again, how it is necessary to reinforce the biodiversity monitoring on the most remote islands, such as the Desertas Islands, in particular of poorly sampled groups. This work is the result of the third edition of the SCVZ Desertas Fund grants created with the result of book sales focusing on their Natural History.

The third and last publication is a short note that describes the presence of another spider in the country, this time on Maio. The note “*Presence of an invasive species of huntsman spider species Heteropoda venatoria in Porto Inglês, Maio Island, Cabo Verde Archipelago*” reports the first record with a precise location of the crab spider, from the hunting spider’s family (Sparassidae), on this Leeward island. Such location, close to a port, leads to the assumption that the entry of the species in the country may be due to human action, when reconstructing the port or transporting cargo by sea.

I hope these holidays will help us notice the small secluded details of beauty and generosity in the midst of a spider’s web of difficult days.

Raquel Vasconcelos, PhD
Editor-in-chief of *Zoologia Caboverdiana*



Artigo original | Original article

Distribution and habitat use of the birds of Cima Islet (Rombo Islets, Cabo Verde) in winter

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RESUMO

O ilhéu de Cima é considerado um importante *hotspot* de biodiversidade em Cabo Verde para espécies de aves marinhas. Contudo, a riqueza, distribuição e utilização do habitat de aves terrestres, costeiras, limícolas e de rapina têm sido largamente negligenciadas até agora. Realizámos o primeiro levantamento detalhado da avifauna não marinha do ilhéu de Cima para orientar a conservação e gestão desta Reserva Integral. Efectuámos 24 transectos em Janeiro e Fevereiro de 2021. No total, detectámos 22 espécies, 12 das quais eram novos registos para o ilhéu. As espécies mais comuns foram pardais-de-Cabo-Verde, maçaricos brancos, rolas-do-mar, borrelhos-grandes-de-coleira e corvos. As espécies apresentavam-se largamente distribuídas de acordo com a disponibilidade dos principais recursos alimentares dos mesmos. As limícolas e costeiras concentraram-se principalmente em locais costeiros ou interiores durante a maré alta e espalharam-se para forragear em zonas intermareais durante a maré baixa, particularmente na costa norte. O relativamente elevado número de corvos (até 18) e o casal reprodutor de corujas-de-Cabo-Verde estão provavelmente a preda várias aves marinhas reprodutoras, o que pode ser preocupante para a conservação. Os nossos resultados enfatizam que o ilhéu de Cima é um santuário não só para aves marinhas, mas também para outras espécies migradoras e residentes.

Palavras-chave: abundância; forrageamento intermareal; levantamento por transectos; predação a aves marinhas

ABSTRACT

Cima Islet is considered a key biodiversity hotspot in Cabo Verde for seabird species. However, the richness, distribution and habitat use of terrestrial birds, shorebirds, wading birds and birds of prey have been largely neglected so far. We performed the first detailed survey of the non-marine avifauna of Cima Islet to guide the conservation and management of this Integral Reserve. We carried out 24 transects in January and February 2021. Overall, we detected 22 species, 12 of which were new records for the islet. The most common species were Iago sparrows, sanderlings, ruddy turnstones, ringed plovers and brown-necked ravens. Species were largely distributed according to the availability of their main food resources. Wading and shorebirds mostly concentrated on coastal or inland sites during high tide and spread for foraging on intertidal areas during the low tide, particularly on the northern coast. The relatively high numbers of brown-necked ravens (up to 18) and the breeding pair of Cabo Verde barn owls are probably preying upon several breeding seabirds, what may be of conservation concern. Our results emphasize that Cima Islet is a sanctuary not only for seabirds, but also for other migrating and resident bird species.

Keywords: abundance; intertidal foraging; seabird predation; transect surveys

INTRODUCTION

Assessing the distribution and abundance of birds is crucial for their, effective conservation planning (Abie *et al.* 2019). However, this basic information is often lacking for many regions such as Cabo Verde. These islands in the middle of a major Atlantic flyway between the northern and the southern hemispheres are regularly visited by more than one hundred migratory bird species (Hazevoet, 2003).

Cima is one of the Cabo Verde islets commonly visited by migratory birds. It is uninhabited and target of several studies regarding its marine and terrestrial diversity, chiefly seabirds (Cruz-Flores *et al.* 2018, Semedo *et al.* 2020, Torres *et al.* 2021). Cima is considered a key reproduction site for five seabird species: the Cabo Verde storm petrel *Hydrobates jabejabe*, the white-faced storm petrel *Pelagodroma marina*, the Bulwer's petrel *Bulweria bulwerii*, the Boyd's shearwater *Puffinus boydi* and the red-billed tropicbird *Phaethon aethereus* (Semedo *et al.* 2020). However, information on terrestrial birds, shorebirds, wading birds and birds of prey is much scarcer. Among them, the peregrine falcon *Falco peregrinus madens*,

with 15–20 breeding pairs in the 1960s, stood out (Hazevoet 1995). A few whimbrels *Numenius phaeopus*, greenshanks *Tringa nebularia* and turnstones *Arenaria interpres* were also recorded, but no study was performed in the winter so far (Hazevoet 1992). Recently, a review by Garcia-del-Rey (2016) indicated the occurrence of 18 terrestrial bird species.

Cima was included within the Important Bird Areas network by BirdLife International (Hazevoet *et al.* 1995) and later declared an Integral Reserve by the Cabo Verde government (Anonymous 2003). Since then, the islet is inaccessible for tourists, which may explain the information gap on its terrestrial avifauna. However, it has been suffering anthropogenic impacts, such as illegal visits, predation from introduced mammals (i.e. mice and ants) and habitat destruction (i.e. stepping on nests) Rocha & Neves (2007). No management plans have yet been developed for bird species and surveillance of the reserve is poor (Vasconcelos *et al.* 2012).

To understand the importance of Cima as a wintering site for migratory and resident terrestrial birds we conducted transect. This

allowed us to: (1) provide a preliminary checklist of their occurrence; (2) infer their abundance; (3) assess their spatial distribution and habitat use in winter; and (4) understand

the changes in distribution, and feeding/resting behaviour of wading and shorebirds with tides.

MATERIAL AND METHODS

Cima Islet, located 8 km Northeast of Brava, where this study was performed, belongs to Rombo Islets group (Fig. 1A), composed by Grande (2.5 km²), Luis Carneiro, Rei and Sapado islets which are smaller (<0.25 km²). Cima is a rocky flat islet with 1.5 km² and a

small hill (~77 m high). Data were collected in January–February 2021 by walking along the islet, most times following the coastline, but sometimes inland to include terrestrial habitats (Fig. 1B).

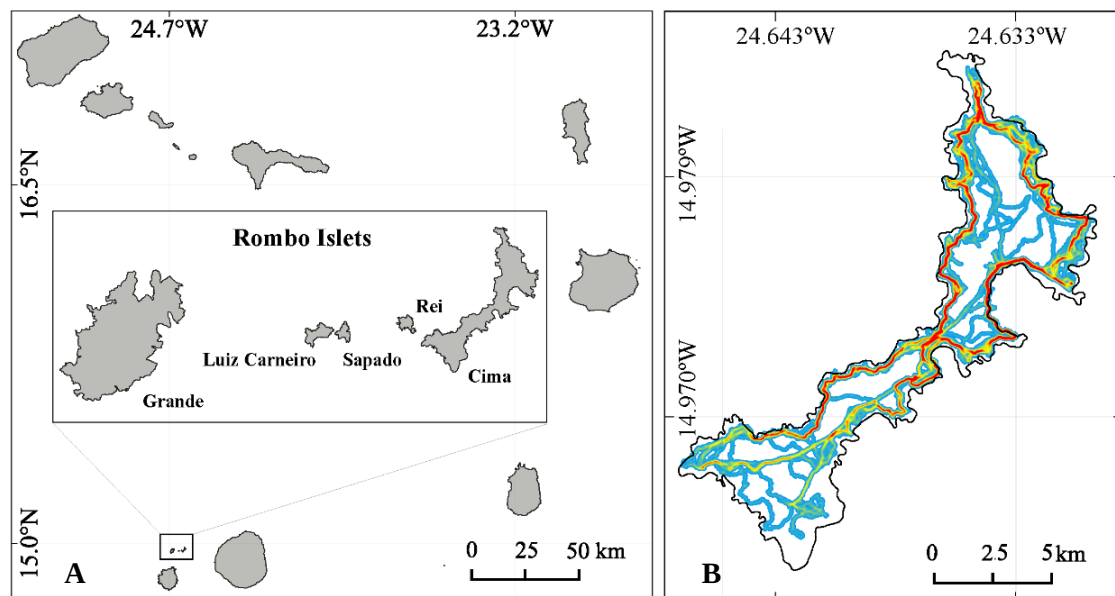


Fig. 1. Study area. **A)** Geographic location of Cima Islet (Rombo Islets, Cabo Verde) and **B)** of the 22 transects performed in January and February 2021. The colours depict the transect effort in three levels: high (red), average (yellow) and low (blue).

We classified the habitats in seven categories and clumped them into four main habitats – beach (white sand), inland, intertidal (flat coastal rocks), rocks (hilly coastal rocks) – and other (habitats not included in the behavioural analyses: black sand, hill top and slopes). We used Opticron 10x42 binoculars and a Canon 2000D camera with 70–300 mm lens to confirm species identifications based on literature (Clarke 2006; Svensson *et al.* 2009). A total of 24 transects were performed within a minimum 3h-interval, during the high tide (N=10), low tide (N=11), and in medium

tide (N=3), with an average duration and standard deviation of $2.06 \text{ h} \pm 0.68$ (range= 0.23–3.17 h) and average length of $6.17 \text{ km} \pm 1.90$ (range= 1.10–8.79 km).

To record the sampling effort per area (classified as high, average or low) as well as the GPS position of each sighting, we used Wikiloc version 3.20.9 (www.wikiloc.com). For each sighting we recorded the species, type of plumage (winter or prenuptial), sex (only possible for Iago sparrows *Passer iagoensis* due to technical limitation), age (only possible for turnstones, sanderling

Calidris alba and ringed plover *Charadrius hiaticula* because of technical limitation to distinguish the plumage on other species), the behaviour of the birds (flying, foraging, or resting), and habitat type (beach, inland, intertidal or coastal rocky areas). Regarding the Iago sparrow juveniles were identified by

the movement of the wings when asking for food. We also took pictures of each sighting, whenever possible. Distribution and abundance maps were produced with QGIS version 3.10.5. Individual maps and graphs were produced only for the species with more than 15 sightings.

RESULTS

Sampling effort was mainly concentrated on the coast and was higher in the northern than in the southern part of the islet (Fig. 1B). Overall, we identified 22 non-marine bird species, 12 of those new for Cima Islet (Table 1, Fig. 2). The greatest bird concentrations were along the northern coast, mainly

composed of wader species, such as ruddy turnstone, sanderling, ringed plover or whimbrel (Fig. 2). The most abundant species was the Iago sparrow with a maximum of 139 individuals sighted in one day (Table 1, Fig. 2A). Most species were seen in low numbers, usually 1 to 2 individuals (Table 1, Fig 2B).

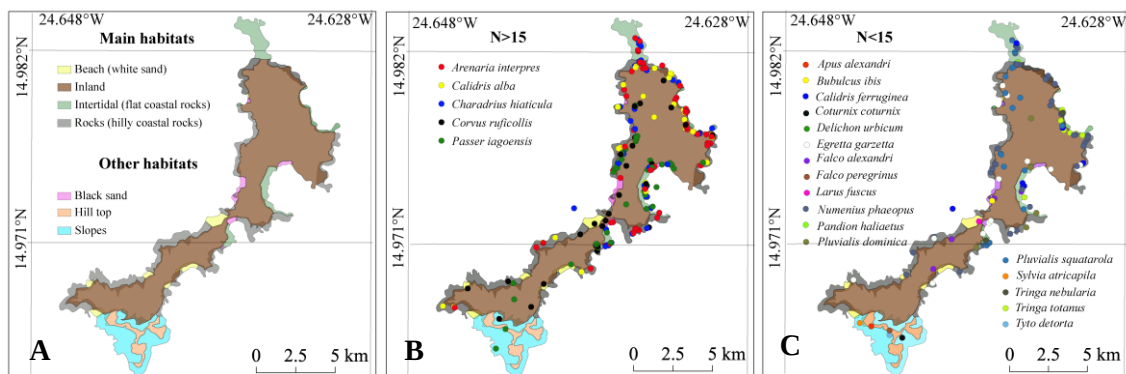


Fig. 2. Distribution of the habitats and non-marine bird sightings on Cima Islet (Rombo Islets, Cabo Verde). **A)** Distribution of main and other habitats. **B)** Distribution of species with more than 15 individuals (N>15) and **C)** of species with less than 15 individuals (N<15).

The ruddy turnstone used almost all habitats. In low tide, turnstones were mostly foraging, regardless of the habitat. In low tide, birds dispersed over the flat intertidal central and northern areas. During high tide, most individuals were resting concentrated in specific resting points mainly inland and in flat intertidal areas (Fig. 3A and 3B). However, when they were in coastal rocky areas in high tide, approximately half of the sighted birds were foraging and the other half was resting. Only a small percentage of individuals were flying.

Sanderlings mostly foraged during the low tide, both in the flat intertidal or coastal rocky

areas. During low tide, they dispersed more than during high tide, but still concentrated on flat intertidal areas. During high tide they used coastal rocky areas to rest, while they used flat intertidal areas for foraging or resting and were found mostly in the north (Fig. 3C and 3D).

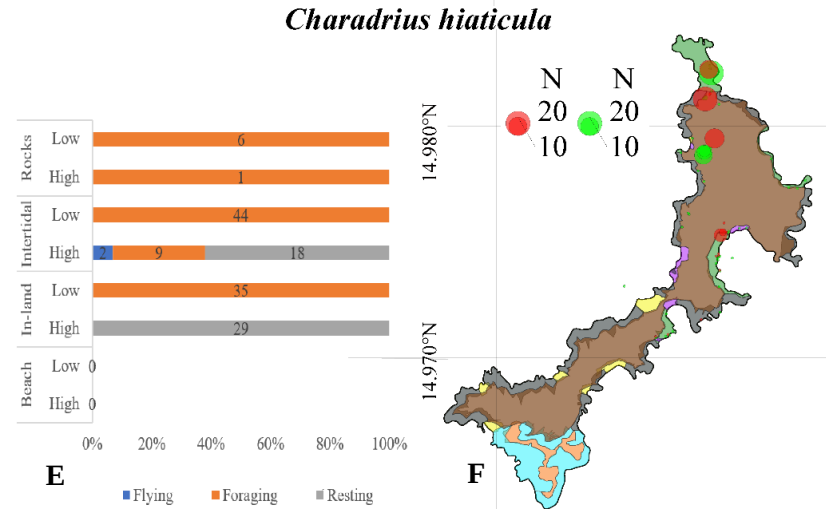
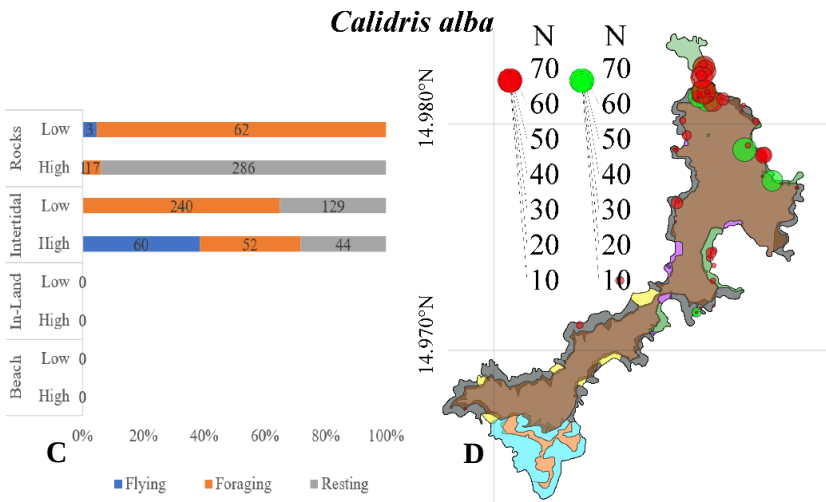
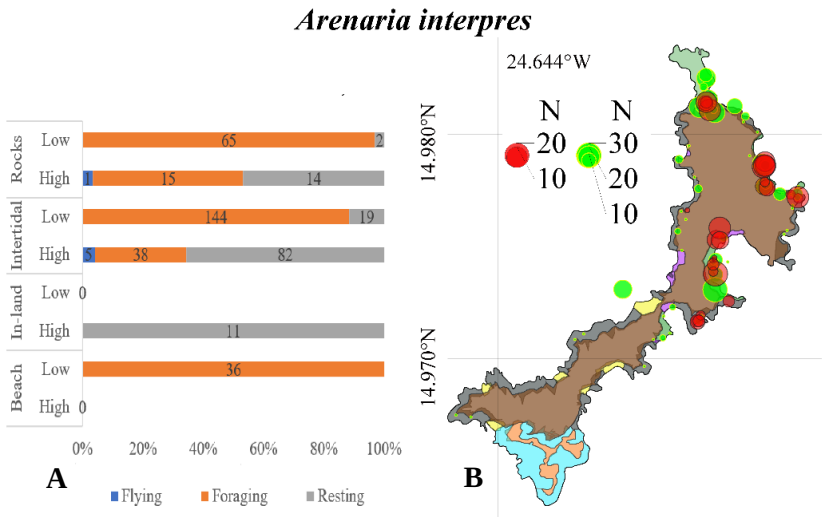
Ringed plovers used a wide range of habitats, but only in the north. In coastal rocky areas birds were always foraging regardless the tide. During low tide birds widely dispersed in flat intertidal areas for foraging, but also to inland areas, and in high tide they mostly rested in flat intertidal areas reducing their distribution (Fig. 3E and 3F).

Table 1. Details on the species recorded on Cima Islet (Rombos, Cabo Verde) in January and February 2021. The taxonomy, life history (resident, migrant, wintering, or vagrant), global distribution (endemic, pantropical, Nearctic, Neotropical, Afrotropic, or Palearctic), maximum number of records per species per day (N), and cumulative age composition (A, adult; J, juvenile) of each species is shown. Their conservation status, considering the global IUCN status (Global) and national (Local) Red Lists (LC, Least Concern; NT, Near Threat; EN, Endangered; NE, Not Evaluated), and their population trends following the IUCN (Pop: +, increasing; -, decreasing; 0, stable; ?, unknown) are also given. New records for Cima Islet are marked with an asterisk (*).

Taxonomy			Life	Distribution	N	Age	Conservation status		
Family	Common name	Scientific name	history			composition	Global	Local	Pop
Apodidae	Cabo Verde swift	<i>Apus alexandri</i>	Resident	Endemic	1		LC	NE	+
Ardenidae	cattle egret	<i>Bubulcus ibis</i> *	Migrant	Pantropical	1		LC	NE	+
	little egret	<i>Egretta garzetta</i>	Wintering	Pantropical	1		LC	NE	+
Charadriidae	ringed plover	<i>Charadrius hiaticula</i> *	Wintering	Pantropical	19	35A+31J	LC	NE	-
	American golden plover	<i>Pluvialis dominica</i> *	Vagrant	Nearctic/Neotropic	1		LC	NE	-
	grey plover	<i>Pluvialis squatarola</i> *	Wintering	Pantropical	2		LC	NE	-
Corvidae	brown-necked raven	<i>Corvus ruficollis</i> *	Resident	Afrotropic	18		LC	NE	+
Falconidae	common kestrel	<i>Falco alexandri</i>	Resident	Endemic	1		LC	NE	-
	peregrine falcon	<i>Falco peregrinus</i>	Migrant	Pantropical	1		LC	NE	0
Hirundinidae	house martin	<i>Delichon urbicum</i>	Migrant	Pantropical	1		LC	NE	-
Laridae	lesser black-backed gull	<i>Larus fuscus</i> *	Migrant	Pantropical	1		LC	NE	+
Pandionidae	osprey	<i>Pandion haliaetus</i> *	Resident	Pantropical	1		LC	EN	+
Passeriniidae	Iago sparrow	<i>Passer iagoensis</i>	Resident	Endemic	139		LC	NE	0
Phasianidae	common quail	<i>Coturnix coturnix</i> *	Resident	Palearctic/Afrotropic	1		LC	NE	-
Scolopacidae	ruddy turn-stones	<i>Arenaria interpres</i>	Wintering	Pantropical	70	415A+165J	LC	NE	-
	sanderling	<i>Calidris alba</i>	Wintering	Pantropical	107	309A+131J	LC	NE	?
	curlew sandpiper	<i>Calidris ferruginea</i> *	Wintering	Pantropical	1		NT	NE	-
	whimbrel	<i>Numenius phaeopus</i>	Wintering	Pantropical	2		LC	NE	-
	green shank	<i>Tringa nebularia</i> *	Wintering	Pantropical	1		LC	NE	0
	red shank	<i>Tringa totanus</i> *	Wintering	Pantropical	1		LC	NE	?
Sylviidae	blackcap	<i>Sylvia atricapilla</i> *	Vagrant	Palearctic/Afrotropic			LC	NE	+
Tytonidae	Cabo Verde barn owl	<i>Tyto alba detorta</i>	Resident	Endemic	2		NE	NE	?

Whimbrels were distributed widely during low tide where they were found mostly foraging on the flat intertidal areas foraging. During high tide, birds were mostly resting,

even though some were flying. In high tide they congregated at specific points in the East, but were also observed sporadically inland (Fig. 3G and 3H).



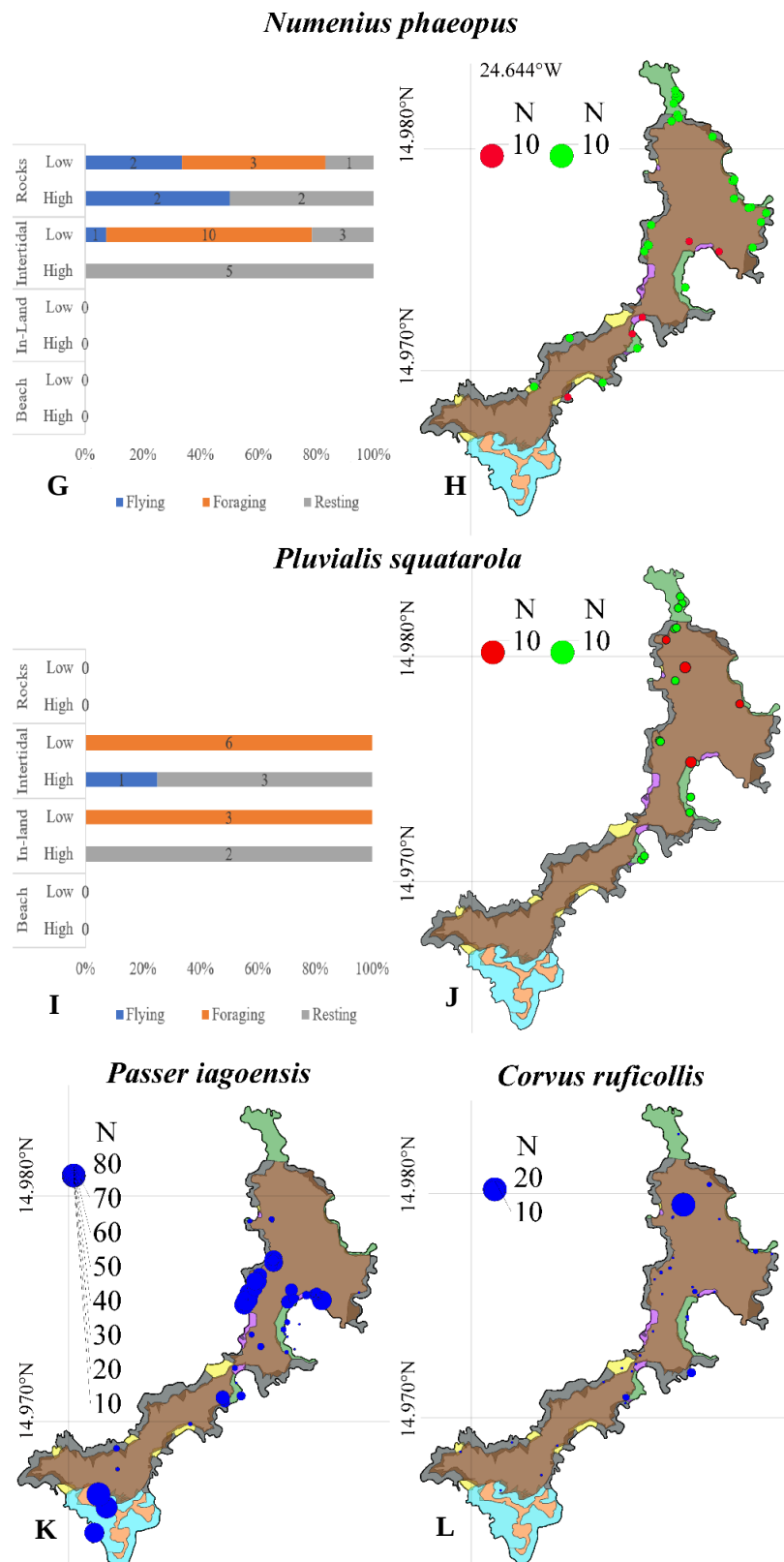


Fig. 3. Habitat use, distribution and behaviour in relation to the tide (low or high) of non-marine bird species with more than 15 sightings on Cima (Rombos, Cabo Verde) in January and February 2021. Data for **A**) & **B**) the ruddy turnstone *Arenaria interpres*, **C**) & **D**) the sanderling *Calidris alba*, **E**) & **F**) the ringed plover *Charadrius hiaticula*, **G**) & **H**) the whimbrel *Numenius phaeopus*, **I**) & **J**) the grey plover *Pluvialis squatarola*, **K**) the Iago sparrow *Passer iagoensis*, and **L**) the brown-necked raven *Corvus ruficollis*. The number of birds (N) seen at high tide (red) and low tide (green) is proportional to the size of the dots. Foraging in orange, flying in blue and resting in grey (all measured in percentage, %). Habitat characterization polygons as in Fig. 2.

Grey plovers *Pluvialis squatarola* were only seen in the north and showed a well-defined behaviour regarding tides. During low tide they were mostly foraging widely dispersed across flat intertidal rocky areas. During high tide, there was a clear reduction in sightings, with individuals seen further inland mostly resting (Fig. 3I and 3J).

The distribution of Iago sparrows was almost uniform, but with three concentration foci in the midwest, mideast and southern tip

(Fig. 3K). Similarly, brown-necked ravens *Corvus ruficollis* showed a uniform distribution across the islet with a slight preference for the north (Fig. 3L).

Regarding age classes, ruddy turnstones and sanderlings were mostly composed by adults (>60% of the sightings), whereas ringed plovers were more balanced, with 53% adults and 47% juveniles. Iago sparrow females were more frequent than males (3:1 in 916 sightings).

DISCUSSION

This is the first detailed non-marine bird survey for Cima Islet in winter, including details on their distribution and abundance during high and low tide, habitat use and behaviour. It is also the first detailed characterization of the islet habitats. Cima offers a diverse habitat combination for wintering, passing and resident birds, highlighting its value and the need for its effective protection as a sanctuary not only for seabirds, but also for other migrating and resident bird species.

Most records were of wintering waders. Due to the location of the flat intertidal areas, where waders were more abundant, the observation effort was greater in the north than in the south of the islet and in coastal areas. Nevertheless, given all areas were visited a minimum of five times, our results still provide a representative assessment of birds across the islet.

Previously, 18 non-marine bird species were described for Cima, including two not currently occurring in Cabo Verde, black kites *Milvus milvus* and red kites *Milvus migrans* (Garcia-del-Rey 2016). In this study, restricted to the wintering period, we recorded 22 species (seven residents, 15 European breeders and one American breeder), 12 of which were new records for the islet. Some corresponded to rare sightings in Cabo Verde, such as the American golden plover *Pluvialis dominica* (Garcia-del-Rey 2016). Regarding their IUCN conservation status, most are

classified as Least Concern, although more than half show decreasing population sizes or present unknown trends. Additionally, the curlew sandpiper *Calidris ferruginea* is classified as Near Threatened, and the osprey *Pandion haliaetus* is considered locally Endangered (Hazevoet 1996), highlighting the interest to closely monitor these species. Moreover, three taxa are Cabo Verde endemics, thus highlighting the value and the need for an increase of an effective protection of this islet as a sanctuary not only for seabirds, but also for other migrating and resident bird species.

Regarding habitat use and behaviour, shorebirds typically dispersed and foraged during low tides in flat intertidal areas and concentrated for resting in a several coastal or inland locations. These changes in distribution and behaviour with tides are commonly found in waders, given they mainly feed on intertidal invertebrates, which are unavailable during high tide (Burger *et al.* 1977, Fonseca *et al.* 2017).

In winter, species distribution is mainly influenced by prey availability (Gauthreaux 1982), and the same was observed in some non-marine birds on Cima Islet. Iago sparrow is an example of this. Although widely distributed, two of the three foci, in the central east and southernmost of the islet, are in the fishermen and visitors camp sites where sparrows profit from food remains. Other factor explaining those foci is the presence of

natural and artificial seabird nests that sparrows use for nesting. Similarly, the brown-necked ravens were widely dispersed in the islet, but showed a preference for the north coast, probably because it holds a huge breeding colony of white-faced storm-petrel (Grant *et al.* 2000). In December, these petrels visit their burrows and start laying in March (Campos 1999). They breed in sandy burrows that often collapse or are easily breached by brown-necked ravens to prey upon them (both on adults and juveniles, pers. obser.). The number of brown-necked ravens detected in the area and the apparent level of predation may be of conservation concern for storm-petrels, Bulwer's petrel and even for red-billed tropicbirds and warrants further scrutiny. Cabo Verde barn owls *Tyto detorta* are only present in the southern tip of the islet,

where they strongly predate on Cabo Verde and white-faced storm petrels, as both were found in great numbers in their regurgitations and nests (70% of prey's remains on the nest; pers. obser.). We argue that the level of predation on breeding bird species and their impacts should be closely monitored.

The present survey was restricted to January and February, and therefore it would be very convenient to extend it along the year to fully understand the role of the islet as a stopover and feeding site, specifically during migration peaks between Europe and Africa (particularly during September–October and April). Likewise, it is advisable to increase sampling effort in the inland to confirm the presence of desertic birds, which have been only occasionally detected (pers. obser.), but not confirmed in this study.

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Nota breve | Short note

A new record of the orb spider *Argiope sector* (Araneidae) for the island of Santa Luzia, Cabo Verde

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Argiope Audouin, 1826 is a genus of rather large spiders, with pronounced sexual dimorphism and often coloured opisthosoma containing 89 species (Wang *et al.* 2021, World Spider Catalog 2021) and worldwide distribution (Levi 1983, Jäger 2012). *Argiope sector* (Forsskål, 1776) occurs in Cabo Verde, Senegal, North Africa and the Middle East (Bjørn 1997). In Cabo Verde, it has been reported as probably native for Santo Antão, São Vicente, São Nicolau, Sal, Boavista, Santiago, Fogo, and Maio (Fig. 1A; Capello 1866, García *et al.* 2005, Jäger 2012).

The collection of *Argiope sector* spiders was opportunistic while carrying invertebrate inventories on Santa Luzia between the 13th–20th November 2021 by two observers. The fieldwork consisted on two days and two

nights in the northern region and the same duration in the centre and in the south regions (Fig.1A). Species identification was based on the epigynum shape and presence of a median knob (Bjørn 1997).

All individuals were found on their orb webs. One was found in a dry river canal between *Sporobolus virginicus* grass in the north (16°46,58 N, 24°46,31 W; Fig.1B); none in the centre; and nine others were found in the south, on *Suaeda mollis* shrubs. Of those nine, one spider was found at the southernmost locality (16°44,16 N, 24°42,15 W), four near dunes (16°44,51 N, 24°42,35 W), and four others (two adults and two juveniles) close together (16°44,23 N, 24°42,29 W, Fig. 1A). Only two individuals were seen predating, a grasshopper and a fly, respectively (Fig. 1C).

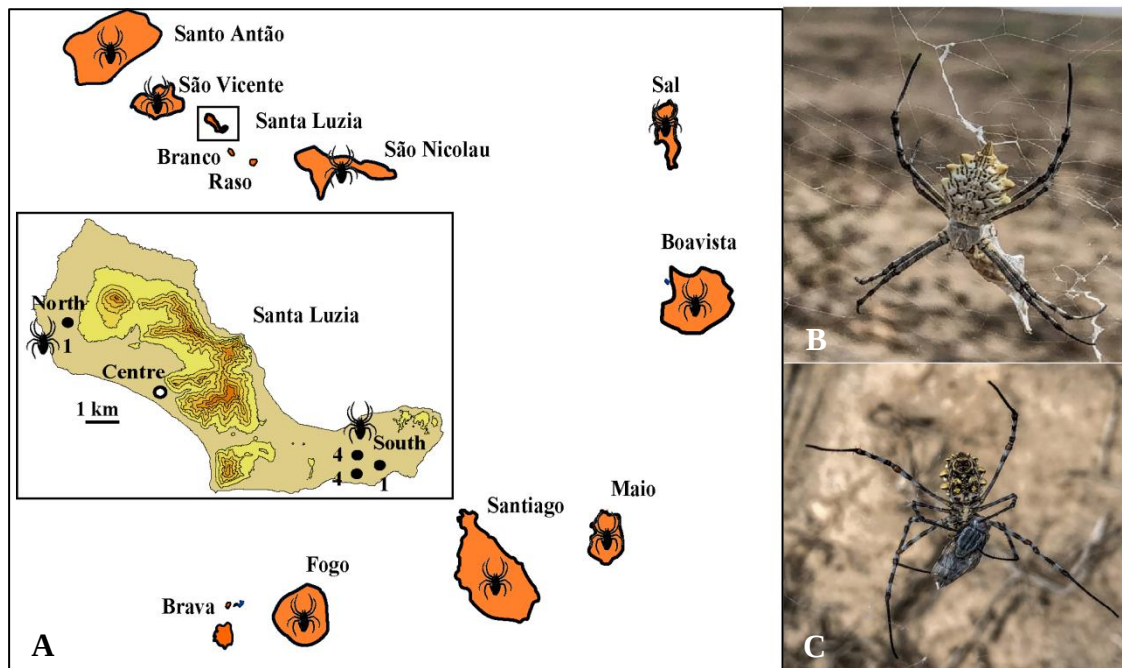


Fig. 1. Location of the study area and depictions of the study species (photos by S. Caut). **A)** Distribution of *Argiope sector* in the Cabo Verde Islands according to the literature, and on Santa Luzia Island (spider symbol). The insert map shows Santa Luzia elevation range and the study sites in detail (new presence records in black with number of individuals and absence records in white) Note: Jager (2012) cites *A. australis* on Fogo. **B)** The individual found at the northern site. **C)** An individual predating on a fly in the southern site.

The lack of spiders in the centre of Santa Luzia is likely an artefact of reduced sampling effort. Breitling *et al.* (2011) based on a spider collection obtained in 2009, and an extensive literature review from Maio Island, described 10 new species of arachnids to Cabo Verde. Further surveys are likely to reveal new records to the archipelago or for some of the islands (e.g., Fortes in press). It is plausible that *A. sector* has not been recorded in the uninhabited Desertas Islands (Santa Luzia, Branco, Raso) by the lack of specialized surveys.

Spiders can disperse by ballooning through

the air by releasing gossamer threads to catch the wind currents and electric fields (Morley & Robert 2018). The presence of the species in Senegal and in other Cabo Verde islands, could suggest colonization from the nearby mainland, as well as possible gene flow among islands. Genetic identification of several mainland and island haplotypes may determine the direction of colonization. The shortage of systematic studies from the Desertas Islands, specifically for some groups (i.e., invertebrates), highlights the importance of conducting such studies for future conservation assessment.

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Nota breve | Short note

**Presence of an invasive huntsman spider species
Heteropoda venatoria in Porto Inglês, Maio Island,
Cabo Verde Archipelago**

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Keywords: spider fauna, invasive species, distribution, Cabo Verde Islands

Spiders are common in all terrestrial ecosystems and are widely used as ecological indicators (Ross *et al.* 1982, Schmitz 2008). However, the spider fauna of the Cabo Verde Islands (CVI) is poorly known when compared to the other Macaronesia archipelagos (Cardoso *et al.* 2010). The current total number of spider species reported for CVI is more than 200 (García *et al.* 2005, Breitling *et al.* 2011). Maio is a semi-dry desertic eastern island with a variety of habitats. The most recent overview on the Maio spider fauna by Breitling *et al.* (2011) included 46 species from 18 families, including 16 species endemic to the CVI.

The pantropical huntsman spider *Heteropoda venatoria* (Latreille, 1802), from the family Sparassidae (Platnick & Levi 1974), is originally an Asian species, considered invasive in many countries, including Cabo Verde (García *et al.* 2005).

This spider, also known as the giant crab spider or banana spider, often feeds on cockroaches (Bhattacharya 1941), and it is often found in human habitation, possibly due to the abundance of prey (Ross *et al.* 1982). This species was reported by Breitling *et al.* (2011) on Maio; however, they did not provide location details.

We report one individual of *H. venatoria* seen on December 11, 2020, at 11:25 am, inside a house in Porto Inglês, the main city of Maio (Fig. 1). It had a leg span of ~11 cm (Fig. 1B), and a body length of ~2.5 cm (Fig. 1C). The specimen was not collected, but was putatively identified from photographs as *H. venatoria*, due to its synanthropic habitat, large size and brown colouration, flattened body structure, white clypeal band, lack of conspicuous pilosity, dorsal pattern, and legs with distinct black spots from which erectile macroseta arose.

The specimen was sexed as female due to its light colouration on the abdomen and legs and

the absence of enlarged pedipalps.

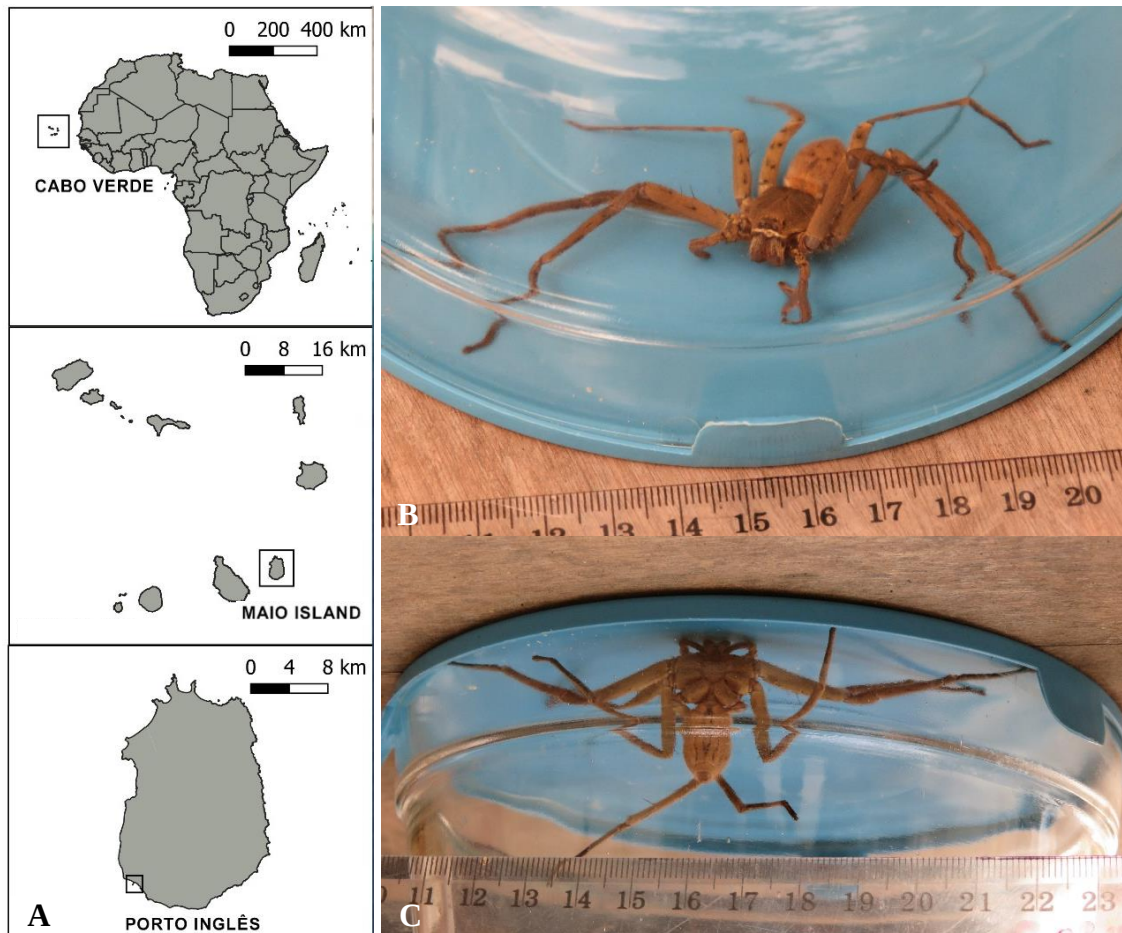


Fig. 1. Location of the site where the huntsman spider *Heteropoda venatoria* was seen and pictures of the caught individual (photos by A. Adrião and H. Silva). A) Location of the Cabo Verde Archipelago, Maio Island, and Porto Inglês, the city where the specimen was found (marked with squares) on December 11, 2020 (site location: 15.139893° N, -23.212388° W). B) Dorsal and C) ventral view of the specimen.

Breitling *et al.* (2011) stated that the actual number of spider species on Maio is probably much larger. They also found that different sampling techniques resulted in different spider species being recorded. This particular species has spread worldwide and its synanthropic occurrence is improbable to

result in conservation concerns (Ewunkem *et al.* 2016). Given the knowledge gap of the spider fauna and its status in CVI, we recommend more studies using a mix of sampling techniques to better understand their population status, distribution, and threats.

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