
(range 62.9%-82.4%), with that of males larger (64.9%-83.0%, average 78.2%) than females (57.2%-86.3%, average 67.5%). Most nesting birds (over 60.0%) are of local origin, males considerably predominate over females (among individuals of one to seven years in age - by 1.6 times). The number of immigrating females is much greater than that of males. The reproductive nucleus comprises birds of two to five years in age. When a colony is declining, the role of birds of local origin increases, while with an expanding population, this role decreases.

In different years, the number of hatched nestlings in the local colony was more stable (the maximum difference was 28.5%) than numbers of nesting birds (the maximum difference was 32.5%). The number of fledging birds is still more stable; the nestling mortality varying from 36.3% to 69.6%, on average 52.1%. Overall average productivity fluctuates in different

seasons from 1.6 to 2.6, on average 2.0 of the hatched, and on average 1.1 (0.9-1.2) of fledged birds per nesting pair.

CONCLUSIONS

Large local colonies of Redshanks in the south of the Ukraine are, in this way, essentially autonomous. They are characterized by mechanisms regulating their numbers and colony structures both at the level of nestlings and at an older age. The mechanisms which regulate population size are productivity, adult and nestling survival, and the degree of natal philopatry shown by nesting birds. Males represent a more conservative group in such colonies, which is mainly responsible for the isolation of colonies, and, most likely, for their genetic and phenotypical peculiarity. The less philopatric females promote stabilization of characters within wider territorial limits.

Migrant and resident waders in the Cape Verde Islands

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INTRODUCTION

During 1986-90, I visited the Cape Verde Islands (officially the República de Cabo Verde) in connection with the National Parks and Protected Areas Program, developed under the auspices of the International Council for Bird Preservation (Netherlands Section) and the Instituto Nacional de Investigação Agrária (Cabo Verde). Prior to three prolonged stays in 1988-90, I was in the islands on two fortnight visits as a tour-leader for groups of naturalists in 1986-88. Altogether, I spent eight months in the islands, covering all months except July and most of August. As part of a general collection of ornithological data throughout the archipelago during all visits, counts of waders were made at a few selected sites.

Little has been published on migrant waders in the Cape Verde Islands. Bannerman & Bannerman (1968) summarized

observations up to the mid-1960s, and were first to comment on fluctuations of wader numbers as observed during their stay on São Vicente between January-March 1966. Frade (1976) reported on birds collected by Jaime Vieira dos Santos in 1969, 1970 and 1972, while annotated lists of species observed during short visits were published by Lambert (1980), Nørrevang & Hartog (1984), Summers-Smith (1984) and Hartog (1990). Furthermore, much unpublished data from various observers who have visited the islands during the last decade were collected while preparing a forthcoming *Checklist of the Birds of the Cape Verde Islands* (Hazevoet *in prep.*). I here report on my observations of waders during 1986-90.

THE ENVIRONMENT

The Cape Verde Islands are situated in the eastern Atlantic, 500-600 km west of S n gal. There are nine inhabited main



Table 1. Waders counted at the Pedra Lume salt-pans, Sal.

	30 Aug 1988	30 Oct 1988	23 Dec 1987	28 Apr 1990
Black-winged Stilt <i>H. himantopus</i>	75	75	75	75
Ringed Plover <i>C. hiaticula</i>	1	2	5	10
Kentish Plover <i>C. alexandrinus</i>	25	25	50	25
Grey Plover <i>P. squatarola</i>	1	3	3	-
Lapwing <i>V. vanellus</i>	-	-	2	-
Sanderling <i>C. alba</i>	40	40	150	50
Little Stint <i>C. minuta</i>	5	2	10	10
Curlew Sandpiper <i>C. ferruginea</i>	12	16	100	25
Ruff <i>P. pugnax</i>	-	2	-	-
Black-tailed Godwit <i>L. limosa</i>	2	2	-	-
Bar-tailed Godwit <i>L. lapponica</i>	-	2	-	-
Whimbrel <i>N. phaeopus</i>	-	-	2	-
Redshank <i>T. totanus</i>	2	2	4	1
Greenshank <i>T. nebularia</i>	4	4	6	1
Common Sandpiper <i>A. hypoleucos</i>	-	-	1	-
Turnstone <i>A. interpres</i>	100	100	75	20

islands and several smaller uninhabited islands and islets (Figure 1).

The three easternmost islands - Sal, Boavista and Maio - are rather flat and have considerable stretches of sandy beach as well as salt-pans and lagoons. The island of Santiago is mountainous and has mainly rocky shores but there are some sandy beaches and a large lagoon. São Vicente has mainly rocky shores but there are sandy beaches, reefs and a lagoon, and also a sewage-farm where waders can be found in numbers. The uninhabited island of Santa Luzia has rocky shores with some sandy beaches, but was visited by me only once for a few hours when few waders were observed.

The islands of Fogo, Brava, Santo Antão and São Nicolau are highly mountainous and generally have steep rocky coasts without lagoons and only small stretches of sandy beach, and therefore support only few waders. The uninhabited islets of Rombos, Branco and Raso are rocky, with small sandy beaches on Cima (Rombos) and Branco, and few waders were found here.

BREEDING RESIDENTS

Three wader species breed in the Cape Verde Islands: Cream-coloured Courser *Cursorius cursor*, Black-winged Stilt *Himantopus himantopus*, and Kentish Plover *Charadrius alexandrinus*.

The desert-dwelling Cream-coloured Courser is a widespread and rather common resident on Sal, Boavista, Maio, Santiago and Sao Vicente, which has also been recorded (but not proved breeding) on Santo Antao, Santa Luzia, Raso and Sao Nicolau (Hazevoet *in prep.*). It is not further considered here.

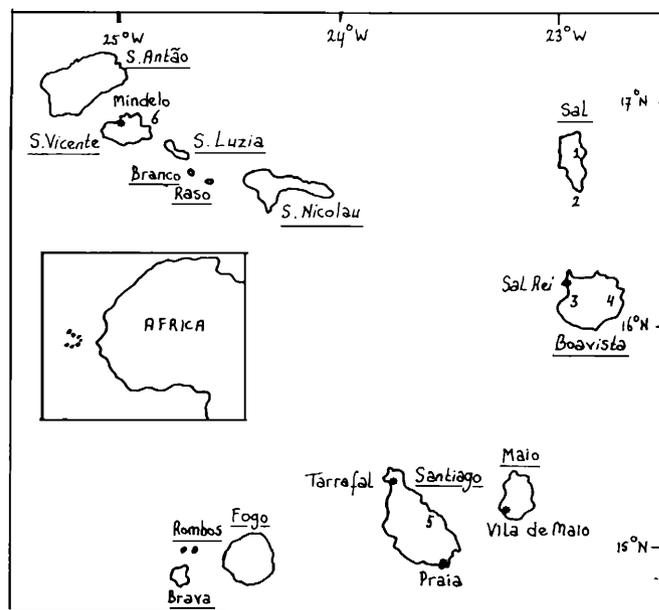


Figure 1. Map of the Cape Verde Islands. 1. Pedra Lume salt-pans; 2. Santa Maria salt-pans; 3. Rabil Lagoon; 4. Porto Ferreira Lagoon; 5. Pedra Badejo Lagoon; 6. Baia des Gatas.

Table 2. Waders counted at the Mindelo sewage-farm, São Vicente.

	27 Mar 1990	14 Jun 1989
Ringed Plover <i>C. hiaticula</i>	10	-
Kentish Plover <i>C. alexandrinus</i>	15	50
Little Stint <i>C. minuta</i>	1	-
Sanderling <i>C. alba</i>	30	-
Greenshank <i>T. nebularia</i>	25	4
Wood Sandpiper <i>T. glareola</i>	3	-
Common Sandpiper <i>A. hypoleucos</i>	3	-
Whimbrel <i>N. phaeopus</i>	3	8
Turnstone <i>A. interpres</i>	50	3

Table 3. Waders counted at Baia das Gatas, São Vicente.

	6 Oct 1988	26 Mar 1990
Ringed Plover <i>C. hiaticula</i>	2	1
Kentish Plover <i>C. alexandrinus</i>	2	2
Grey Plover <i>P. squatarola</i>	3	1
Whimbrel <i>N. phaeopus</i>	2	1
Greenshank <i>T. nebularia</i>	1	-
Turnstone <i>A. interpres</i>	10	8

The Black-winged Stilt only breeds in the salt-pans at Pedra Lume on the island of Sal. The breeding population is c. 30 pairs. Naurois & Bonnaffoux (1969) suggested that these are regularly augmented by migrants from abroad. However, numbers counted in four different months (Table 1), suggest that the birds are resident and there is no indication of migrants visiting the island. Occasionally, a few (1-5) stilts are seen at lagoons on Boavista, Maio and Santiago, as well as in



Table 4. Waders counted at Rabil Lagoon, Boavista.

	18 Sep 1988	14 Nov 1988	19 Mar 1990	22 May 1989
Black-winged Stilt <i>H. himantopus</i>	-	-	-	3
Ringed Plover <i>C. hiaticula</i>	5	10	10	3
Kentish Plover <i>C. alexandrinus</i>	20	25	25	25
Grey Plover <i>P. squatarola</i>	1	-	10	1
Sanderling <i>C. alba</i>	14	15	50	20
Little Stint <i>C. minuta</i>	-	1	-	-
Curlew Sandpiper <i>C. ferruginea</i>	8	12	-	-
Bar-tailed Godwit <i>L. lapponica</i>	-	2	2	-
Whimbrel <i>N. phaeopus</i>	24	-	4	4
Redshank <i>T. totanus</i>	-	2	-	-
Greenshank <i>T. nebularia</i>	3	1	-	-
Common Sandpiper <i>A. hypoleucos</i>	2	1	-	-
Turnstone <i>A. interpres</i>	55	+	60	30

the salt-pans at Santa Maria on Sal, but these are likely to be wanderers from the Pedra Lume colony.

The Kentish Plover is widespread and common on Sal, Boavista and Maio, and locally common on Santiago and Sao Vicente. It occurs along the shores and at salt-pans and lagoons, as well as on dry coastal plains. Because of lack of suitable habitat, it is only found in small numbers on the remaining islands, and so far breeding has not been established there. The local population appears to be resident. Bannerman & Bannerman (1968) thought that groups of migrants were passing through Sao Vicente in February-March 1966. However, no significant numbers of migrants are thought to visit the Cape Verde Islands. The only observations possibly indicating migration were of a loose party of c.100 birds at the lagoon and salt-pans north of Vila do Maio, Maio, on 26 May 1989 (which seems to be rather late for passage migrants), and a group of 18 on the dry coastal plain south of Tarrafal, Santiago, on 12 April 1990. The fluctuations

Table 5. Waders counted at Pedra Badejo Lagoon, Santiago.

	21 Oct 1988	9 Nov 1988	2 Mar 1990	10 Apr 1990	14 May 1989
Black-winged Stilt <i>H. himantopus</i>	-	5	-	-	2
Little Ringed Plover <i>C. dubius</i>	1	3	2	-	1
Ringed Plover <i>C. hiaticula</i>	6	1	0	13	14
Kentish Plover <i>C. alexandrinus</i>	15	+	16	16	+
Grey Plover <i>P. squatarola</i>	2	2	-	-	-
Sanderling <i>C. alba</i>	6	+	3	10	5
Little Stint <i>C. minuta</i>	-	2	-	-	-
Curlew Sandpiper <i>C. ferruginea</i>	17	25	-	-	-
Knot <i>C. canutus</i>	-	1	1	-	-
Ruff <i>P. pugnax</i>	-	6	-	-	4
Whimbrel <i>N. phaeopus</i>	1	-	-	-	1
Spotted Redshank <i>T. erythropus</i>	-	1	-	-	-
Redshank <i>T. totanus</i>	-	3	-	-	-
Greenshank <i>T. nebularia</i>	2	6	1	3	5
Wood Sandpiper <i>T. glareola</i>	-	1	3	4	10
Common Sandpiper <i>A. hypoleucos</i>	2	12	1	3	1
Turnstone <i>A. interpres</i>	10	15	12	25	13

in numbers as shown in Tables 1 and 2 were probably due to local movements of roosting birds.

NON-BREEDING VISITORS

In contrast to the situation along the coasts of the West African mainland, numbers of wintering waders in the Cape Verde Islands are small.

The three eastern islands (Sal, Boavista, Maio) support the highest numbers of migrant waders to be found in the archipelago, as they have the most suitable habitats, and perhaps also because they are nearest to the African mainland. Here, and on Santiago, São Vicente and probably also Santa Luzia, Ringed Plover *Charadrius hiaticula*, Grey Plover *Pluvialis squatarola*, Sanderling *Calidris alba*, Whimbrel *Numenius phaeopus* and Greenshank *Tringa nebularia* are widespread in small numbers, while Turnstones *Arenaria interpres* frequent the rocky parts of the shore, as well as salt-pans, lagoons and waste dumps near coastal villages.

On Fogo, Brava, Santo Antão and São Vicente, Ringed Plover, Grey Plover, Whimbrel, Greenshank and Common Sandpiper *Actitis hypoleucos* are encountered occasionally, but mostly singles, rarely more than two individuals of a species at a time. Sanderling and Turnstone are more often met with - the former on the few beaches (of black volcanic rock), the latter along the rocky shores and near coastal villages - but even these seldom number more than 10 birds in a group.

The only waders encountered on the uninhabited islets of Rombos, Branco and Raso, were single Whimbrels and Greenshanks and small parties of Turnstones.

Results of wader counts at five sites on four islands are presented in Tables 1-5. In general, numbers at the various sites appear to remain rather stable from late August until April. Numbers decrease in May, and the count at the Mindelo sewage-farm in June (Table 2) shows that only few birds remain that late in the season. Judging from my own sightings and both published and unpublished data, small numbers of waders seem to overwinter. There are June and August records of nearly all waders that occur regularly in the Cape Verde Islands (Hazevoet *in prep.*). July records are rare, probably reflecting a lack of observers during that month rather than a genuine absence of birds. Very few observers appear to have visited the islands in July.

The peak, both in numbers and in species, at Pedra Badejo Lagoon on 9 November (Table 5), occurred after heavy rains



which filled the lagoon with water and deposited plenty of mud and plant material in it, offering ideal feeding opportunities for waders. This was attractive to species which apparently are present in the islands in small numbers but usually remain undetected. The high numbers of Curlew Sandpiper *C. ferruginea* and Sanderling at the Pedra Lume salt-pans on 23 December (Table 1) are noteworthy, probably not being due to roosting movements only, and possibly representing a distinct influx.

Apart from the locations included in Tables 1-5, only few sites were found where more than a few waders occurred together. These were the salt-pans at Santa Maria on Sal (25 November 1988: Black-winged Stilt 4, Ringed Plover 2, Kentish Plover 20, Little Stint *C. minuta* 1, Curlew Sandpiper 2, Dunlin *C. alpina* 1, Bar-tailed Godwit *Limosa lapponica* 1, Turnstone 10); the lagoon north of Porto Ferreira on Boavista (20 May 1989: Kentish Plover 2, Sanderling 30, Greenshank 1, Turnstone 10); and the reefs south of Mindelo, São Vicente (26 March 1990: Ringed Plover 25, Kentish Plover 10, Ruff *Philomachus pugnax* 1, Whimbrel 5, Turnstone 15). The Dunlin at Santa Maria was the only one seen in the islands during 1986-90. In the Cape Verde Islands the species is a rare migrant of which there are only c. 10 records (Hazevoet *in prep.*). The Bar-tailed Godwit, first recorded only in 1969 (Frade 1976) and formerly considered a vagrant, has now been shown to be a regular winter visitor in small numbers, with records from October to February (Hazevoet 1990). The party of 25 Ringed Plovers near Mindelo was unusual and constitutes the largest flock observed.

Turnstones, by far the most common wader in the Cape Verde Islands, were often found around coastal villages foraging at rubbish dumps and on fish offal. For instance, around Sal Rei, the main village on Boavista, c. 100 Turnstones were present on various dates from September to May.

Details of the rarer species included here have already been published elsewhere (Hazevoet 1988, 1990). These are Lapwing *Vanellus vanellus* (first record), Spotted Redshank *T. erythropus* (first record), and Knot *C. canutus* (second record). Another Knot (third record), on 2 March 1990 (Table 5), was inadvertently omitted from the earlier publication.

The only other species observed and not mentioned above or listed in Tables 1-5, was a Collared Pratincole *Glareola pratincola* at Calheta, Maio, on 27 May 1989: the third record for the Cape Verde Islands (Hazevoet 1990).

DISCUSSION

Due to the scarcity of suitable habitat, only limited numbers of migrant waders winter in the Cape Verde Islands. The extreme rarity of Knot and Dunlin, among the most numerous wintering waders along the West African shores, is remarkable. Most probably, the absence of mudflats is the limiting factor for these species. On the West African mainland, Dunlins are abundant on the Banc d'Arguin, Mauritania, but much scarcer further south (Smit & Piersma 1989). Whimbrel and Greenshank occur in low densities along coasts throughout the archipelago, both on rocky and sandy shores. Small parties of Sanderlings can be found wherever there are sandy beaches, which also support the occasional Ringed Plover and Grey Plover, although these two are found on reefs as well. Species exclusively observed at salt-pans, lagoons or at the sewage farm included, Little Stint, Curlew Sandpiper, Redshank and Wood Sandpiper. In view of the many rocky shores in the Cape Verde Islands, it is not surprising that the Turnstone should be the commonest wintering wader. Also, the species is a scavenger around coastal human settlements, a niche not exploited by the other waders.

Notwithstanding the small numbers, nearly all wader species that commonly winter in West Africa have now been shown to reach - at least occasionally - the Cape Verde Islands. One notable exception is the Curlew *N. arquata*, the only record of which is an unsubstantiated claim by Alexander (1898). The only exclusively Nearctic wader recorded is the Lesser Golden Plover *P. dominica* (cf. Appendix 1), but it is likely that more will be found as field work continues.

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APPENDIX 1. Wader species recorded in the Cape Verde Islands but not observed by the present author. Data from Hazevoet (in prep.).

Oystercatcher *Haematopus ostralegus* (6 records)

Avocet *Recurvirostra avosetta* (2 records)

Lesser Golden Plover *Pluvialis dominica* (3 records)

Jack Snipe *Lymnocyptes minimus* (one record)

Marsh Sandpiper *Tringa stagnatilis* (2 records)

Green Sandpiper *Tringa ochropus* (3 records)

Grey Phalarope *Phalaropus fulicarius* (uncommon migrant in Cape Verde Seas, c. 10 records)

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A visit to the Cape Verde Islands between January - April 1991 resulted in the third island record for Avocet, the first record of Curlew *Numenius arquata*, the second Spotted Redshank and the first Nearctic Whimbrel *N.p. hudsonicus*.

