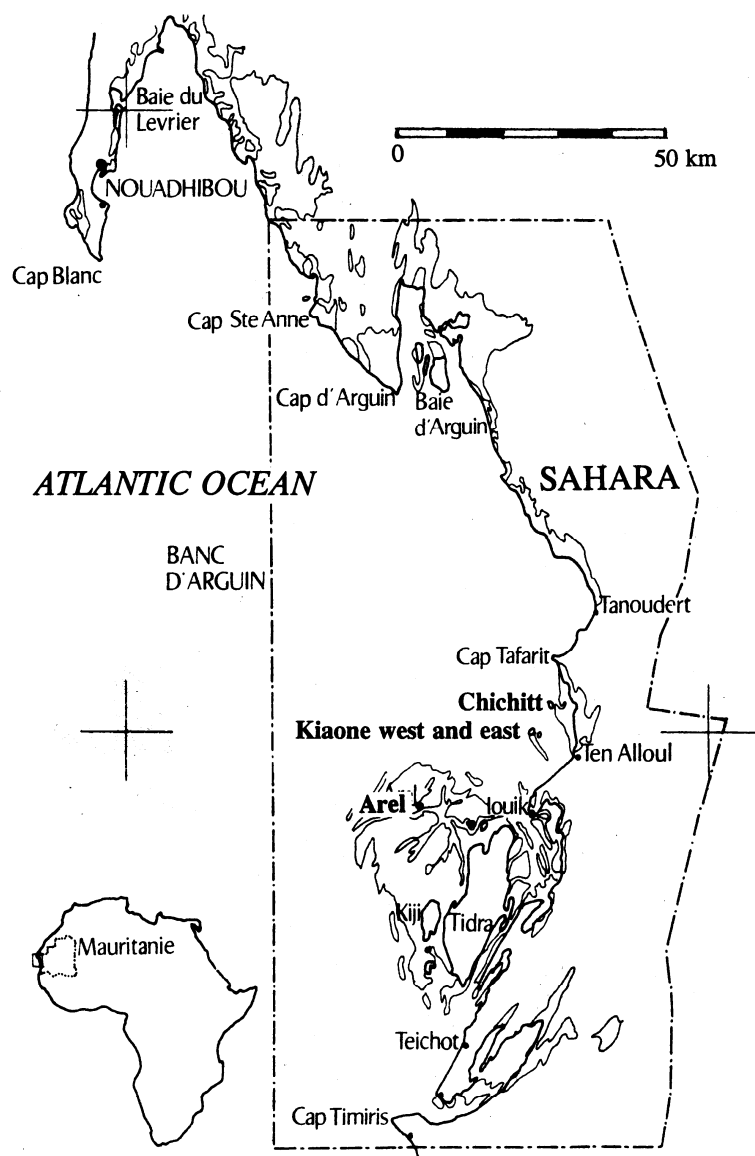


GREAT CORMORANTS *Phalacrocorax carbo lucidus* AND OTHER PISCIVOROUS WATERBIRDS ON THE BANC D'ARGUIN, MAURITANIA IN JANUARY-FEBRUARY 1997

Ronnie Veldkamp

*De Rikking 46, NL-8332 CG Steenwijk, The Netherlands
e-mail: veldkamp16@zonnet.nl*



Introduction

The Banc d'Arguin is situated on the Atlantic coast of Mauritania between about 19E20' and 20E 30' N. It consists of a large area of tidal mudflats and shallow waters bordering the Sahara desert. Four small isles in the area (Chichitt, Kiaone east and west and Arel) are rocky (fig. 1).

In winter about two million waders, more than a quarter of all waders wintering along the entire European, and are concentrated in the National Park Banc d'Arguin (c. 12.000 km²). Besides for waders, the Banc d'Arguin is of great importance for piscivorous waterfowl.

The Banc d'Arguin is the most shallow part of an extensive upwelling zone off the Mauritanian coast (Wolff & Smit 1990, Wolff *et al.* 1993). This upwelling zone nowadays attracts an international fleet of many (huge) fishing vessels. Local fisherman (Imraguen) on the Banc d'Arguin use small sailing boats (lanches) to catch fish, mainly mullet but also shark and ray. They complain about sharply reduced catches and a size reduction of the fish caught. The latter might indicate overfishing.

Figure 1. Map of the Banc d'Arguin (changed from Altenburg *et al.* 1982).

Counting method

During the wader count held in January and February 1997 in the National Park Banc d'Arguin also other waterfowl were censused. The counts were made in the same way as in 1980 (Altenburg *et al.* 1982). The methods are described and discussed in Zwarts *et al.* (1998).

Like real waders, herons and spoonbill have a quite strict tidal rhythm. The counting of high tide roosts probably gives a good estimate of numbers present of those birds. Though cormorants have a high tide migration pattern, they also have a more or less diurnal rhythm. Besides cormorants can forage during high tide. So the counting of high tide roosts is probably not the best method of estimating cormorant numbers. During the 1997 expedition only one of the rocky isles (Arel) was counted. Being free of common jackal *Canis aureus*, especially the rocky isles are used as breeding places and roosts. Like Arel the Kiaone isles are known as breeding places of the great cormorants (Gowthorpe & Larmarche 1996). From the mainland coast was observed that the isle Kiaone east actually was used as a roost. Due to the distance, it was impossible to make an estimate of great cormorant numbers on this isle. In 1980 Chickchitt was also a cormorant roost (Altenburg *et al.* 1982).

So with only one rocky island counted, it is possible that substantial numbers of great cormorants were missed. To get a good estimate of the total number of great cormorants wintering in the Banc d'Arguin the rocky isles should be counted around sunset by preference when the tide is high. Since cormorant numbers in 1997 were estimated in the same way as in 1980, numbers are comparable.

Numbers of piscivorous waterbirds

In table 1 numbers of piscivorous waterbirds counted in 1980 and 1997 are compared.

Table 1. Total numbers of piscivorous birds counted on the Banc d'Arguin, Mauritania, in January-March 1980 (Altenburg *et al.* 1982) and January-February 1997 (Zwarts *et al.* 1998). Change ' in- or decrease in %.

<u>Species</u>	<u>1980</u>	<u>1997</u>	<u>change</u>
Great Cormorant <i>Phalacrocorax carbo</i>	9395	25362	+170
Long-tailed Cormorant <i>Phalacrocorax africanus</i>	7787	6616	-15
White Pelican <i>Pelecanus onocrotalus</i>	611	1624	+166
Western Reef Heron/ Little Egret <i>Egretta gularis/garzetta</i>	5610	6106	+9
Grey Heron <i>Ardea cinerea</i>	3076	3369	+10
Spoonbill <i>Platalea leucorodia</i>	8991	7254	- 19
Gull-billed Tern <i>Gelochelidon nilotica</i>	110	180	+ 64
Caspian Tern <i>Sterna caspia</i>	2434	5069	+ 108
Royal Tern <i>Sterna maxima</i>	3339	3340	0
Sandwich Tern <i>Sterna sandvicensis</i>	250	664	+ 166
Little Tern <i>Sterna albifrons</i>	371	186	- 50
Lesser Crested Tern <i>Sterna bengalensis</i>	0	6	+4

Total	41.974	59.776	+ 42
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Table 1 reveals that most species fish eating waterbirds increased between 1980 and 1997 whilst local fisherman complain about reduced catches probably due to overfishing. Overfishing leads to a reduction of greater length classes fish and an increase of small fish. Piscivorous birds may have profited by this phenomenon.

Great cormorant, white pelican *Pelecanus onocrotalus* and caspian tern *Sterna caspia* show marked increases. In spite of the fact that the West European population is thriving, the number of spoonbills *Platalea leucorodia* was in 1997 somewhat lower than in 1980. Probably due to an increased jackal predation, the local breeding population of spoonbills *P. l. balsaci* has decreased. During the 1997 expedition for the first time lesser crested terns *Sterna bengalensis* were identified on the Banc d'Arguin. In winter 1986-87, an important wintering area was discovered along the coast of Guinea Bissau: 400 birds were counted and at least 1.000 were estimated to be present (Altenburg *et al.* 1992). In 1993 two colonies (40 and 1.700 pairs) of lesser crested terns were rediscovered on the Libyan coast (Meininger *et al.* 1994). Because the Banc d'Arguin lies between the most western breeding places and an important wintering area, many lesser crested terns must pass through the area during spring and autumn migration.

Great Cormorant *Phalacrocorax carbo*

In West Africa, the great cormorant is a resident and winter visitor. Three subspecies occur along the Atlantic coast: *P. c. sinensis* is a winter visitor from Western Europe.. *P. c. lucidus* breeds along the coasts from Mauritania to Guinea-Bissau. *P. c. maroccanus* is a resident in coastal north-western Africa from Morocco south to Mauritania.

P. c. sinensis

West European breeders of the continental race *P. c. sinensis* migrate chiefly south to southwest. Those ringed in The Netherlands are found abroad mainly in France, Iberia, Corsica and Sardinia. They also occur on the southern fringe of the Mediterranean (Munsterman & Van Eerden 1991). Birds were recovered from Algeria and many from Tunisia. There are also recoveries and observations from the Atlantic coast of Morocco (Speek & Speek 1984, Groen & Zomerdijk 1994). There are no observations of adult *P. c. sinensis* in Mauritania thusfar. This is quite remarkable. It was calculated that the 1995-96 midwinter population of the European great cormorants *P. c. sinensis* and *P. c. carbo* was at least c. 720.000 birds (Veldkamp 1997a,b). The wintering places of some 300.000 great cormorants in Europe are known. Part of the population winters along the shores of the Mediterranean. Substantial numbers are reported from Tunisia, Egypt and Israel (totalling at least 50.000 birds). This means that the wintering places of at least 370.000 birds are still unknown. It is likely that many routes in the Mediterranean have never been counted. The flyway along the Northwestern coasts of Africa seems to be of little meaning for the highly migratory continental subspecies of the great cormorant since only small numbers have been reported from Morocco (Kersten *et al.* 1983, Groen & Zomerdijk 1994). In January and February 1997 no adult *sinensis*-like birds were observed on the Banc d'Arguin. Since it is hard to distinguish between juvenile birds of the races *sinensis* and *lucidus*, one cannot be sure whether there were juvenile hidden birds in the large groups of great cormorants at the Banc d'Arguin. Because there were no birds observed with colour rings, it seems not likely that the Banc d'Arguin/Mauritania is an important winter area for West-European continental great cormorants.

West-European great cormorants probably don't go further south than Morocco, some immature *sinensis* birds born in Ukraine have proven to be long distance migrators, since one bird ringed on the Lebiashy islets (Karkinitsky Bay, on the western Crimean coast) was recovered in Nigeria and another in Senegal (distance more than 5500 km) (Koshelev *et al.* 1997).

P. c. maroccanus

Very little is known about of *P. c. maroccanus*, an intermediate between *P. c. sinensis* and *P. c. lucidus*. Cramp & Simmons (1977) give measurements of only one bird. In 1981 single individuals were seen regularly, flying over the Sidi Moussa area, Morocco but counts yielded no great cormorants at all. Six single birds were seen at sea between Sidi Moussa and El Jadida. The birds were white necked and probably belonged to the subspecies *P. c. maroccanus* (Kersten *et al.* 1983). During a survey of waders and waterbirds along part of the Atlantic Coast of Morocco during autumn 1991 and spring 1992 only few great cormorants were seen. In seven out of twelve wetlands visited, a maximum number of 114 birds were counted. A few birds in adult plumage which could closely studied in the lagoon at Oualidia on 19 December belonged to the subspecies *sinensis*. On 21 December an adult of the subspecies *maroccanus* (or perhaps *lucidus*) was observed at Sidi Moussa (Groen & Zomerdijk 1994). On the Banc d'Arguin all adult great cormorants seemed to be white-breasted, suggesting that *P. c. maroccanus* does not winter in the National Park.

P. c. lucidus

Great cormorants wintering on the Banc d'Arguin probably all belong to the subspecies *P. c. lucidus* (Gowthorpe & Larmarche 1996). As table 1 reveals in 1997 a total number of 25.362 great cormorants were counted in the Banc d'Arguin. This was more than ever before. Late December 1971 3.000 were counted (Pététin & Trogtignon 1972) and in January-March 1980 9.395 birds were counted (Altenburg *et al.* 1982). Arel with 7.550 birds was the main roost. In 1997 17.000 birds used Arel as a roost.

Like on the Banc d'Arguin, there was also an increase of *P. c. lucidus* reported from southern Africa (Wilson & Van Zegeren 1996).

mass feeding

P. c. lucidus usually feeds solitary but in the Ethiopian Rift Valley often in large groups, sometimes mixed with other species occur (Brown *et al.* 1982). On Lake Malaëi great cormorants normally fish in large flocks of many thousands of birds.

Mass fishing of great cormorants in the Banc d'Arguin has not been documented yet. While travelling and sailing through the National Park from 24 January till 9 February observations seemed to confirm the rule that great cormorants feed solitary in clear water because only solitarily fishing birds were seen. However, on 9 February several thousands great cormorants were observed fishing in a large group together with more than 200 white pelicans 19E49' 0.6 N, 16E27' 44 W, 15 km east of the isle Arel. On a roost on mudflats nearby more than 10.000 great cormorants were resting.

Social fishing by great cormorants is directed towards the catch of relatively small, pelagically dwelling fish. Mass fishing by great cormorants *Phalacrocorax carbo sinensis* on

Lake IJsselmeer, The Netherlands, was regarded as a adaption to a turbid environment (Van Eerden & Voslamber 1995). Since the water on the Banc d'Arguin is clear, mass fishing which is facilitated by the large number of birds, here certainly is not an adaption to turbidity of the water.

pellets with fiddler crab remains

A quick examination of some great cormorant pellets on the isle Arel revealed that they contained pincers of fiddler crabs *Uca tangeri*. Probably crabs are caught when great cormorants rest on mudflats. Being extremely abundant it is possible that the fiddler crab is eaten in considerable numbers.

long-tailed cormorant *Phalacrocorax africanus*

The long-tailed cormorant, a typical African cormorant is widely distributed mainly south of about 18°N from Mauritania and Senegal to Sudan and Ethiopia south to the Cape (Brown *et al.* 1982). It is almost exclusively associated with fresh-water habitats. Only in some areas where the crowned cormorant *Phalacrocorax coronatus* is absent like the Mauretanian coast, long-tailed cormorants extends to coastal islands (Johnsgard 1993).

Though highly gregarious at the roosting sites, the long-tailed cormorant feeds individually. Communal feeding was not observed during the 1997 Banc d'Arguin expedition.

The Banc d'Arguin is the only proved breeding area of the species in the west Palearctic. In 1973 there were 2.585 breeding pairs (Cramp & Simmons 1977). Afterwards the number of breeding pairs sharply declined. In 1993-94 there were only 365 breeding pairs in the Mangrove northwest of Tidra and on isle Ardent (Gowthorpe & Lamarche 1996). During the high tide count of the isle Zira near Iouik prove was found that long-tailed cormorants bred on this isle in 1996. Nests were build inside and outside of an observation tower. The isle of Zira proved to be an important roost for long-tailed cormorants. Early in the morning of 3 February c. 1.600 ex. took of from the isle flying in a direction northwest. During the highwater count of Zira only 980 long-tailed cormorants were seen.

Numbers counted on high tide roosts in 1997 proved to be somewhat lower than in 1980 (table 1). Having the Zira-count in mind, it is not clear whether the lower numbers really reflect a decline of the species at the Banc d'Arguin.

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Ronnie Veldkamp, De Rikking 46, NL-8332 CG Steenwijk, The Netherlands
e-mail: veldkamp16@zonnet.nl