

Waders and other wetland birds on Byet Dwarka Island, Gulf of Kutch, western India

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Byet Dwarka, a 25 km² island in the Gulf of Kutch, India, regularly supports a wintering population of over 30 wader species as well as a wide variety of herons and egrets and other wildlife. A short series of observations of Eurasian Oystercatchers suggest that their intake rates are rather low compared with those recorded in NW Europe; possibly a reflection of lower energy requirements in this site with high winter temperatures. Though the island is unspoilt at present, there is the threat of major pollution, both from nearby industry and oil spills.

INTRODUCTION

The State of Gujarat in western India is important for resident, wintering and passage migrant waders. As several studies have shown, there is both a high species-diversity as well as a great abundance of waders in this region (AWC Report 1997). This can be attributed partly to the presence of several freshwater and coastal wetland habitats and partly to the fact that the region lies along the major migration-route into the Indian subcontinent to the west of the Himalayas (Khacher 1996). Despite the importance of the region, this avifaunal diversity has not been adequately documented, especially in the numerous and isolated islands off the coast. This is unfortunate because many wader habitats in Gujarat are under threat from a variety of human-related factors.

Although the nominate race of the Eurasian Oystercatcher *Haematopus ostralegus ostralegus* has been extensively studied in Western Europe (Goss-Custard 1996), very little information is available about the race that winters on the coasts of the Indian Ocean, *H. o. longipes*. Given that the oystercatcher is widely recognised as a model study species for addressing key questions about wader ecology and habitat use, any information about it from this part of the world should be a useful addition to knowledge.

During the five years 1996–2000, I lived in Gujarat and made frequent observations on the waders of Byet Dwarka, a small island in the Gulf of Kutch. I also saw Oystercatchers on this island on a number of occasions and during two visits, in February and November 2000, I made observations on their behaviour.

STUDY AREA AND METHODS

Byet Dwarka is a horseshoe-shaped island of about 25 km², a few km offshore from Okha port (22°27'N, 69°13'E) in the Gulf of Kutch. It is 85 km west of Pirotan Island in the Marine National Park, close to Jamnagar port (Fig. 1). Much of the island is barren, except for a small area close to the Okha port, which is inhabited by a fishing community.

It is also famous for the temple of *Raani Vaas*, which is frequented by hundreds of pilgrims every day. The other significant activity on the island is nature education camps that are organised to educate school and college students about the marine environment. These take place on a stretch of beach known as Dumni Point and, during the study period, were coordinated by the author on behalf of Sundarvan Nature Discovery Center, Ahmedabad.

The climate of Byet Dwarka and Okha is benign. January is the coolest month of the year, but even then the minimum and maximum temperature range is only 19°C to 25°C (Fig. 2). The dominant vegetation is *Prosopis* sp., *Acacia* sp. and *Euphorbia* sp. with a few other tree species such as *Neem*, *Azadirachta indica* and *Ficus* sp. scattered about. The inter-tidal zone supports a wide variety of sponges, jellyfish, sea pens, sea anemones, bristled worms, molluscs, barnacles, crabs, sea cucumbers and fish (including mudskippers *Boleophthalmus* sp.). The main inter-tidal habitats are sandy beaches, rocky shores (some with barnacle- and oyster-encrusted rocks) with a few small patches of coral. The sea around the island is rich in other life forms including sea snakes, dolphins and at least three species of marine turtle.

During 1996–2000, Byet Dwarka was visited twice a year, generally in February and November. Each time, records were kept on the waders and other wildlife present and a comprehensive count of waders was made in February 2000. Observations were chiefly made at two sites, at each end of the horseshoe-shaped island. One site, Dumni-point, included about 8 km of shore. There, observations were made on the shore facing the open sea as well as on the opposite shore that looks across a sheltered bay between the two ends of the island. The other site, at the opposite end of the island, comprised 4 km of shoreline overlooking the bay, close to Sundarvan office (Fig. 1).

Observations on the foraging behaviour of Oystercatchers were all made from the shores around Dumni-point with 8 × 32 binoculars, usually from about 60 metres. Whenever possible, individual birds were observed for continuous 5-minute periods during which behaviour was recorded, par-



ticularly the number of probes in the mud and the number and size of prey items. Reactive distances of Oystercatchers and Crab Plovers were estimated as the distance in metres at which an individual bird flew away at the approach of the observer. The total time spent observing Oystercatchers at Byet Dwarka during February and November 2000 was about 6 hours but records of only seven 5-minute periods of continuous feeding activity were obtained.

RESULTS

Observations on waders and other wildlife

Byet Dwarka is rich in birdlife: during my studies, 103 species were recorded including, in the inter-tidal zone, 30 Charadrii, 14 large wading species (herons, egrets, etc.) and five raptors (Urfi *et al.* 1997, Table 1 (which also gives scientific names of the study species)). In addition, Common Snipe *Gallinago gallinago*, Terek Sandpiper *Xenus cinereus* and Indian Courser *Cursorius coromandelicus* have been recorded by other birdwatchers. The majority of waders are migrants and inhabit the inter-tidal zone where the substrate is coral, mud or sand. However, there are also two resident species, Eurasian Thick-Knee and Red-wattled Lapwing that occur in other habitats. In addition, Crab Plovers, which are common and inhabit the inter-tidal zone, are probably mainly resident, though they do move locally. During the 1984 Oxford University Expedition to the Gulf of Kutch, Crab Plovers were recorded in fairly large numbers on islands in the vicinity of Byet Dwarka. For instance, 1200 were counted on Bhaidar Island, 25–30 km away. As several of those birds were immatures, it is likely that breeding had taken place there in the sand dunes (Palmes & Briggs 1986). Crab Plovers were not recorded breeding at Byet Dwarka during this study. All of the herons, egrets, etc. listed in Table 1 are resident and confirmed breeders in other parts of Gujarat (Dharamakumarsinhji 1955). A large colony of nesting Painted Storks was discovered at Man Marodi Island, close to Byet Dwarka, during the study period (Urfi in press).

Byet Dwarka also affords nesting habitat for several species of sea turtle and we discovered female turtles using at least three of the island's beaches for this purpose. The evidence from track size, bone fragments including an intact anapsid skull suggest that these are Olive Ridley Turtles *Lepidochelys olivacea* and Green Turtles *Chelonia mydas* (Urfi *et al.* 1997). When pictures of different species of sea turtles were shown to local fishermen, they were able to confirm their occurrence and also that of the Leatherback Turtle *Dermochelys conica*. At Byet Dwarka, sea turtles are threatened through nest predation by jackals and wildboars. In addition, adults are occasionally caught in fishing nets.

Local status and feeding behaviour of Eurasian Oystercatcher

In India, Oystercatchers are winter visitors to seacoasts and offshore islands and occur more frequently on the west coast than the east (Ali & Ripley 1987). In Pakistan, they are more abundant (Table 2), especially on the Makaran coast and around Karachi where considerable numbers of non-breeding birds also over-summer (Ali & Ripley *op. cit.*, Fig. 1). Although the number of Oystercatchers reported in India has varied considerably from year to year, a substantial proportion, 25–54%, is invariably recorded in Gujarat (Table 2).

Table 1. Status of wetland birds observed at Byet Dwarka, Gulf of Kutch, India, during 1996–2000 and numbers counted in February 2000 (W = wintering, P = passage migrant, NBS = non-breeding summering, R = resident, with nesting recorded from Gujarat state, B = nesting recorded from Byet Dwarka or from areas in the immediate vicinity).

	Status	Feb. 2000 count
Scolopacidae		
Black-tailed Godwit <i>Limosa limosa</i>	W, NBS	6
Bar-tailed Godwit <i>Limosa lapponica</i>	W, NBS	60
Whimbrel <i>Numenius phaeopus</i>	W, P	6
Eurasian Curlew <i>Numenius arquata</i>	W, P	15
Spotted Redshank <i>Tringa erythropus</i>	W, P	5
Common Redshank <i>Tringa totanus</i>	W, P	18
Marsh Sandpiper <i>Tringa stagnatilis</i>	W, P	3
Common Greenshank <i>Tringa nebularia</i>	W, NBS	10
Green Sandpiper <i>Tringa ochropus</i>	W, P	15
Wood Sandpiper <i>Tringa glareola</i>	W, P	12
Common Sandpiper <i>Actitis hypoleucos</i>	W, P	20
Ruddy Turnstone <i>Arenaria interpres</i>	W, P	102
Sanderling <i>Calidris alba</i>	W, P	5
Little Stint <i>Calidris minuta</i>	W, NBS	40
Temminck's Stint <i>Calidris temminckii</i>	W, NBS	10
Dunlin <i>Calidris alpina</i>	W, NBS	60
Curlew Sandpiper <i>Calidris ferruginea</i>	W, NBS	6
Ruff <i>Philomachus pugnax</i>	W, P	150
Burhinidae		
Eurasian Thick-Knee <i>Burhinus oedicnemus</i>	R, B	8
Charadriidae		
Eurasian Oystercatcher <i>Haematopus ostralegus</i>	W, P, NBS	20
Black-winged Stilt <i>Himantopus himantopus</i>	R	125
Pied Avocet <i>Recurvirostra avosetta</i>	R, W	70
European Golden Plover <i>Pluvialis apricaria</i>	W, P, NBS	3
Grey Plover <i>Pluvialis squatarola</i>	W, P, NBS	3
Little Ringed Plover <i>Charadrius dubius</i>	W, P	18
Kentish Plover <i>Charadrius alexandrinus</i>	W, P, R(?)	5
Lesser Sand Plover <i>Charadrius mongolus</i>	W, P, NBS	12
Greater sand Plover <i>Charadrius leschenaultii</i>	W, P, NBS	8
Yellow-wattled Lapwing <i>Vanellus malarbaricus</i>	R, W(?)	2
Red-wattled Lapwing <i>Vanellus indicus</i>	R, B	8
Glareolidae		
Crab Plover <i>Dromas ardeola</i>	W, R	22
Ardeidae		
Little Egret <i>Egretta garzetta</i>	R	18
Western Reef Egret <i>Egretta gularis</i>	R	20
Grey Heron <i>Ardea cinerea</i>	R	10
Great Egret <i>Casmerodius albus</i>	R	8
Intermediate Egret <i>Mesophoyx intermedia</i>	R	6
Cattle Egret <i>Bubulcus ibis</i>	R	8
Indian Pond Heron <i>Ardeola grayii</i>	B	4
Phoenicopteridae		
Greater Flamingo <i>Phoenicopterus ruber</i>	R	6
Lesser Flamingo <i>Phoenicopterus minor</i>	R	35
Threskiornithidae		
Glossy Ibis <i>Plegadis falcinellus</i>	R	2
Black-headed Ibis <i>Threskiornis melanocephalus</i>	R	20
Black Ibis <i>Pseudibis papillosa</i>	R	10
Eurasian Spoonbill <i>Platalea leucorodia</i>	R	15
Ciconiidae		
Painted Stork <i>Mycteria leucocephala</i>	R, B	8



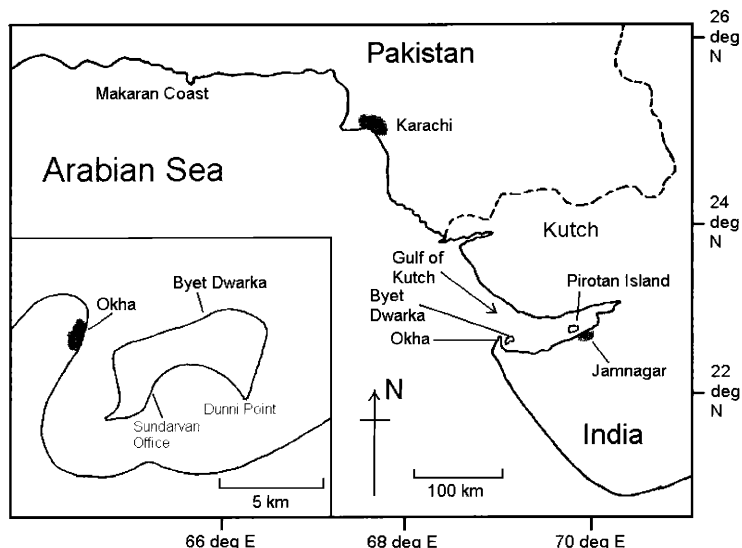


Fig. 1. Location map showing the island of Byet Dwarka and other places mentioned in the text.

This probably arises because of its proximity to the larger populations of Pakistan (Fig. 1). In Gujarat, the Oystercatcher is described as ‘an uncommon but regular passage migrant on the seacoast, arriving in August and leaving in April, though some birds in adult summer plumage were seen in June 1953 (Dharamakumarsinhji 1955). More recently, it has been described as ‘still fairly common during winter on the Kachchh (*sic*) and Saurashtra coastline with greater numbers on the oyster-encrusted rocky headlands from Okha to Pirotan Island, north of Jamnagar’ (Khacher 1996, Fig. 1).

Although the maximum number of Oystercatchers counted in any visit to Byet Dwarka was only 20, it is estimated that 60–100 could be present on the entire island. Most were seen in small feeding groups, scattered widely, rather than in a few large flocks. According to local people, Oystercatchers can be seen almost throughout the year at Byet Dwarka. Perhaps because the island is not densely populated, Oystercatchers are not habituated to people so they appear to be shy and wary. They took flight at the approach of an observer from an average distance of 64 m (Table 3). This figure is higher than the reactive distance of 25–48 m recorded for Oystercatchers on the Exe estuary in SW England (Urfi *et al.* 1996). Crab Plovers on the other hand, which are similar in size and often associate with Oystercatchers at Byet Dwarka, especially in the exposed coral areas, appear to be more tolerant of humans with a reactive

distance of 27 m (SD = 6.7, n = 5).

At low tide, Oystercatchers were observed foraging on exposed mud and in coral areas. Typically, they fed in small groups of 1–5 birds (Mean = 2.8, Table 3). At high tide, they would roost in small groups. Indeed, no large, single or mixed species roost of waders was encountered at Byet Dwarka during the study. While foraging, Oystercatchers mainly took small, unidentified prey but on a few occasions worms were seen to be taken. In no case did the size of individual prey items exceed 20% of bill length. The average feeding rate was 3.4 items per 5 minutes of foraging and the maximum recorded was 6 items in 5 minutes.

DISCUSSION

The considerable species-richness of waders at Byet Dwarka can be attributed to the fact that the island, with its valuable intertidal feeding habitat, lies along the major, western migratory flyway into the Indian subcontinent. However, Byet Dwarka may be on the periphery of the flyway because larger concentrations of waders occur further to the east, in the vicinity of Pirotan Island, off Jamnagar (Fig.1).

The Oystercatcher is widely regarded as a model study species, but little information on its ecology is available from the Indian subcontinent. Although the data reported here are sparse, they do suggest that intake rates at Byet Dwarka may

Table 2. Counts of Eurasian Oystercatchers in various parts of South Asia (data from the Asian Waterfowl Census (Lopez & Mundkur 1997)). Note that these figures derive mainly from volunteer birdwatchers and are likely to be under-estimates.

Year	South Asia	Pakistan	India	Gujarat
1994	350	279	71	18
1995	2350	2224	125	68
1996	1038	742*	292	87

* In 1996 only 15 sites were covered in Pakistan compared to 31 in 1994 and 32 in 1995, so the reduced numbers are probably a result of under-recording.

Table 3. Observations on the behaviour of Eurasian Oystercatchers at Byet Dwarka during February and November 2000. Feeding rate, searching rate and reactive distance are given for several unmarked birds.

Behaviour	Mean	SD	N
Feeding rate (prey taken/5 min.)	3.4	1.90	7*
Searching rate (probes/5 min.)	29.0	12.8	5*
Flock size	2.8	1.5	6
Reactive distance (m)	64.1	14.3	8

* 5-minute intervals



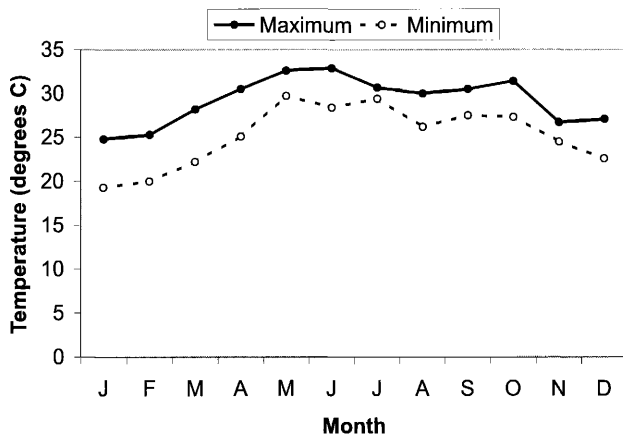


Fig. 2. Mean monthly maximum and minimum temperatures recorded at Okha port, Gulf of Kutch, India during 2000. (Source: Meteorological Department, Ahmedabad)

be rather low compared with those recorded in NW Europe. If this proves to be correct, it may be that it arises because food requirements are low because there is a lesser need for energy for thermoregulation in view of the benign winter climate (Fig. 2). As several authors, such as Ellis (1984), Hails (1983) and Klaassen *et al.* (1990), have argued, birds wintering in tropical areas use considerably less energy for their basal metabolic rate compared to birds from colder regions.

Byet Dwarka is a site that is full of opportunities for wader study and conservation action. At present, the island is unspoilt and, besides fishing and pilgrimage, there are few human activities. Just a few kilometres across the water on the mainland, however, there are several salt manufacturing units and industries. Very soon, it is likely that these will expand and begin to exert a negative influence on the ecology of Byet Dwarka. Indeed, local conservationists consider that the cement industries and salt production units around Okha are already having an effect. However, the main threat to the ecology of the inter-tidal areas of Byet Dwarka is probably from oil spills, especially from tankers plying the Gulf of Kutch. In November 1999, for example, a leak occurred in an oil pipeline in the waters of the Gulf (Arthur 2000). Also, towards the end of 2000, there was a major spill from a large oil tanker in the Gulf of Kutch and during my visit to Byet Dwarka in November of that year several oil slicks had been deposited on the beaches (including Dumni Point and the coral areas nearby). Undoubtedly, if the frequency and

scale of such events increases, it will be disastrous not only for the waders, but also for many other forms of wildlife.

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