

BANK CORMORANTS *PHALACROCORAX NEGLECTUS* TAKING  
CAPE ROCK LOBSTER *JASUS LALANDII*

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INTRODUCTION

The Bank Cormorant *Phalacrocorax neglectus* is a strictly marine species endemic to the west and southwestern coasts of southern Africa between Walvis Bay and Cape Agulhas. The population totals approximately 18 000 adult birds (Cooper 1981). It feeds close inshore, primarily among kelp beds, on a wide range of fish, cephalopods and crustaceans (Rand 1960, Williams & Burger 1978). Although Rand (1960) reported that Cape Rock Lobster *Jasus lalandii* formed a small part of the diet Siegfried *et al.* (1976), while not presenting data, suggested that Cape Rock Lobsters may have formed an important element in the diet.

This paper describes observations on Bank Cormorants foraging on Cape Rock Lobsters at one locality in the southwestern Cape and discusses this predation in relation to foraging success and kleptoparasitism by Kelp Gulls *Larus dominicanus*.

METHODS

During visits to the Duncan Docks, Cape Town, southwestern Cape, South Africa between July and September 1978, Bank Cormorants were regularly observed to surface with live Cape Rock Lobsters in their bills. Records, made between 13h00-14h00, of 14 diving sequences by different individuals were kept. Diving sequences were timed from the start of observations to the departure of the bird. This provides an estimate of the foraging period observed rather than the duration of each dive which was not recorded. Time spent on the surface, swallowing, resting between some dives and before departure and dealing with rock lobsters is included.

RESULTS

Thirtyseven dives out of 132 observed (28 %) resulted in a Bank Cormorant surfacing with a Cape Rock Lobster in its bill (Table 1). Although rapid movement and the lobster's tendency to flap and curl its tail made estimates difficult, by using bill length as a gauge it is estimated that individuals brought to the surface ranged between approximately 120-160 mm in total length. It was not possible to get a clear view for positive identification in one case. Birds surfaced without visible prey but were seen to be swallowing heavily after another 19 dives. On surfacing with a rock lobster, the procedure adopted was to shake the head vigorously from side to side and up and

TABLE 1

OBSERVATIONS ON BANK CORMORANTS *PHALACROCORAX NEGLECTUS* TAKING CAPE ROCK LOBSTERS *JASUS LALANDII*  
 AT DUNCAN DOCKS, CAPE TOWN

No. of dives per individual	Time (mins)	No. of Cape Rock Lobsters	Other prey	Observed swallowing	Attempted piracy	Successful piracy
6	?	6	0	0	3	2
13*	6	5	0	0	0	0
18*	14	7	0	1	7	4
2	?	0	0	0	0	0
17	30	5	0	3	3	1
6*	10	2	0	1	0	0
12	10	2	0	4	0	0
6	8	0	0	2	0	0
19	22	3	1	5	2	0
5	12	1	0	0	0	0
5	11	4	0	0	2	1
3*	3	0	0	0	0	0
4	5	2	0	1	1	0
16	?	0	0	2	0	0
132	-	37	1	19	18	8

\*Total dives for one foraging bout since arrival and departure were observed

down, sometimes shifting the grip and swimming strongly in short bursts while ducking and shaking the head and neck just beneath the surface or even submerging briefly ("surface diving"). Dropped animals were retrieved rapidly. During this activity swallowing sometimes took place underwater. Close observation revealed that rock lobsters were brought to the surface with most legs and antennae intact. During the shaking and surface diving these appendages became detached and the limbless prey were then swallowed head first. Swallowing of larger individuals appeared to present some difficulty even at this stage.

On 18 of the 38 occasions (47 %) when prey was brought to the surface adult or immature Kelp Gulls attempted kleptoparasitism ("piracy"). A Hartlaub's Gull *L. hartlaubii* unsuccessfully attempted piracy on one occasion. Attempted piracy took place as the bird surfaced. The cormorant's response to this surprise attack was to dive immediately, not always completely. If it did not succeed in swallowing the prey during this surface dive the gull was presented with another opportunity. Kelp Gulls appeared able to watch the movements of submerged cormorants and to predict very closely the point of emergence. Bank Cormorants appeared to be extremely "nervous" and watchful whenever surfacing with prey. The gulls were successful on eight out of 18 attempts (44 %) thereby depriving the Bank Cormorants of 22 % of all prey items observed to be brought to the surface in the bill.

It was possible on four occasions to record all dives between arrival and departure. These foraging sequences ranged between three and 18 dives and took between three and 14 minutes. On completion of a series of dives Bank Cormorants sometimes rested for a while and defaecated. Immediately before taking off they often stretched and shook themselves while flapping vigorously.

#### DISCUSSION

If only prey items brought to the surface are considered Bank Cormorants observed achieved a mean success rate per diving bout of 29 %, a minimum of 97 % of the prey taken being Cape Rock Lobster. If, however, as seems reasonable, heavy swallowing on surfacing is taken as representing a successful dive the estimate rises to a minimum of 43 %. Assuming that the Bank Cormorants are able to swallow all but the larger-sized prey while submerged this percentage is most likely an underestimate. Elucidation of this problem could only be possible if the bird was to be captured immediately after feeding. As many as seven individual rock lobsters were brought to the surface in a single foraging bout (Table 1).

Surfacing with relatively large prey items that cannot be easily swallowed underwater presumably results in an increased food intake per dive. This "advantage" may, however, be outweighed by successful piracy by aerial scavengers. While the practice of surfacing with large and difficult to swallow prey was clearly advantageous to gulls who obtained food otherwise inaccessible to them (Duffy 1982), it was not necessarily so to Bank Cormorants who after expending energy both in preparing the prey for ingestion and in evasive manoeuvres lost 22 % of prey items

brought to the surface. The primary adaptation whereby prey is ingested by Bank Cormorants while submerged can be seen as a safeguard against loss to aerial pirates. Although kleptoparasitism does not always occur, evasive tactics in the form of surface diving in response to kleptoparasitism is considered to be a secondary adaptation.

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