

Short Note

Observations on the Food of the South Polar Skua, *Catharacta maccormicki* near Davis, Antarctica

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Summary. Regurgitated boluses of undigested material were examined from six sites in East Antarctica. Skuas nesting near Adelie penguin, southern fulmar and Antarctic petrel colonies showed greater site fidelity in their feeding than did skuas nesting close to cape petrels or a Weddell seal pupping site.

Introduction

Previous studies on the food of the south polar skua *Catharacta maccormicki* have been conducted in the vicinity of the Ross and Weddell Seas and the Scotia Arc, either near colonies of penguins or remote from any bird colony (Young 1963).

In the present study area south polar skuas had access to colonies of southern fulmars *Fulmarus glacialisoides*, Antarctic petrels *Thalassoica antarctica*, cape petrels *Daption capense* and Adelie penguins *Pygoscelis adeliae*. The aim of this study was to examine the food of skuas nesting at a number of these sites to investigate the relationship between diet and nesting locality.

Methods

Regurgitated boluses of undigested material were collected from the ground around skua nests and high points commonly frequented by skuas. The sites chosen were adjacent to two fulmar/Antarctic petrel colonies, two cape petrel colonies, one Adelie penguin colony and a major Weddell seal pupping site. Boluses were collected from the ground, and were sorted wet. Avian components were identified by comparison with skeletal material from known birds.

Results

A total 466 boluses was collected in the summer of 1983/84. Penguin material was the most frequent item at

two sites, fulmar and Antarctic petrel material at three and Wilson's storm petrel at one (Table 1). Fish bones were uncommon except in boluses from near the Weddell seal pupping site.

Discussion

Examination of boluses has an inherent bias towards larger prey with indigestible remains. Johnstone (1977)

Table 1. Frequency of occurrence (%) of food items in skua boluses

Adjacent colony type Colony size (pairs)	None	Adelie	Cape petrel		Fulmar/Antarctic petrel	
			200	100	4700 ^b	3300 ^c
Prey	<i>n</i> = 34	<i>n</i> = 64	<i>n</i> = 78	<i>n</i> = 11	<i>n</i> = 115	<i>n</i> = 164
Weddell seal	17.6	0	1.3	0	0.9	0
Elephant seal	5.9	0	0	0	0	0
Adelie penguin	29.4	96.9	42.3	27.3	6.1	8.5
Southern fulmar	0	0	0	18.2	46.1	38.4
Antarctic petrel	0	0	0	0	2.6	9.1
Cape petrel	0	0	12.8	0	1.7	3.7
Snow petrel	2.9	0	19.2	9.1	15.7	14.0
Wilson's storm petrel	70.6	0	7.7	0	1.7	1.2
Unidentified procellariid ^d	5.9	0	0	36.4	21.7	27.4
Skua	0	0	0	9.1	3.5	0
Egg	0	39.1	9.0	36.4	19.1	28.0
Fish	23.5	1.6	0	0	0.9	0
Cephalopod	0	0	0	0	3.5	0
Stones	32.4	71.9	35.9	27.3	43.5	31.1
Plastic	0	0	1.3	0	0	0.6

^a G. W. Johnstone, pers. comm.

^b Comprising 4000 southern fulmars and 700 Antarctic petrels

^c Comprising 2400 southern fulmars and 900 Antarctic petrels

^d These were in most cases probably southern fulmars or Antarctic petrels

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reported that fish, cephalopods and crustaceans had lower frequencies of occurrence in boluses than in regurgitations for both chicks and adults of the southern giant petrel *Macronectes giganteus*. Because of this, the importance of marine prey cannot be assessed.

Of 62 occurrences of Adelie material in boluses from near the Adelie colony, 51.6% contained remains of chicks. However, of 67 occurrences of Adelie material in boluses from other colonies, chick remains occurred in only 16.4%. If skuas nesting away from Adelie colonies obtained Adelies as food only from within Adelie colonies then there would be no reason to expect fewer chick remains in boluses. The lack of chick remains therefore indicates that much of this Adelie material came from areas devoid of chicks, that is, away from any colony. It is possible that these skuas were deterred from feeding in colonies by other skuas defending the Adelie colonies as feeding territories (see Young 1963). If the figures here are representative then as little as one third of the Adelie remains (16.4/51.6) were taken from colonies, with the remainder coming from Adelies that died or were killed elsewhere. One source of this material could have been leopard seal faeces, at which skuas were observed to feed frequently.

The results presented here for skuas at Adelie penguin and southern fulmar/Antarctic petrel colonies show that the avian component of their diet was derived from the nearest colony with little opportunistic feeding in other bird colonies (Table 1). These data reinforce the statement by Müller-Schwarze and Müller-Schwarze (1977) that at Cape Crozier, skuas defending territories in colonies appeared to derive much of their food from that source. However, for skuas nesting beside cape petrel colonies the occurrence of cape petrel material in boluses was low. The two cape petrel colonies were probably too small to provide an adequate food supply during the breeding season. As well, cape petrels nest in sheltered sites giving them a degree of protection from skuas and increasing the pressure on skuas to feed elsewhere. The occurrence of Adelie remains was higher in boluses from cape petrel colonies than from the southern fulmar/Antarctic petrel colonies despite the closer proximity of the latter colonies to Adelie colonies.

The occurrence of Adelie penguin remains in boluses from near the Weddell seal pupping site was also high. The highest frequency of occurrence of Wilson's storm petrel remains (70.6%) was also in boluses from this site.

Fish remains also occurred with a higher frequency at the Weddell seal pupping site than elsewhere. Young (1963) found that skuas in a colony only hunted for fish as a last resort. These results suggest that in the absence of other nearby avian prey, skuas foraged more widely and preyed more actively on smaller birds and fish. The relatively high frequency of remains of Weddell seals was expected from this main pupping site, but the occurrence of elephant seal hair indicates that these skuas were foraging at least 7 km to near Davis Station where the nearest wallow occurs.

The frequency of occurrence of southern fulmar remains in boluses from southern fulmar/Antarctic petrel colonies is 17.7 and 4.2 times higher than that of Antarctic petrels. This is in contrast to the ratio of the two species at these two sites of four to one and two to one, respectively. Green and Johnstone (in press) found no significant difference between nesting densities of the two species in counting areas within colonies. However, Antarctic petrel colonies tended to exist as discrete blocks compared with the stragglings nature of southern fulmar colonies. The easier access to southern fulmar nests may explain the disproportionately higher incidence of southern fulmar remains.

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