

FOOD OF THE CAPE PIGEON (*Daption capense*) FROM PRINCESS ELIZABETH LAND, EAST ANTARCTICA

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ABSTRACT

Regurgitated food was collected from 73 Cape Pigeons nesting on coastal islands of Princess Elizabeth Land, Antarctica. Fish and euphausiids were the main food items, totalling more than 99% of the food by weight. The main euphausiid was *Euphausia superba*.

INTRODUCTION

One of the least studied aspects of the ecology of Antarctic seabirds is their diet. Of the previous sources of dietary information for Cape Pigeons (*Daption capense*), only three consisted of more than 10 samples (Table 1). Beck (1969) collected regurgitated stomach contents from nine breeding adults and 85 chicks on Signy Island (60°54'S, 45°56'W). Bierman & Voous (1950) analysed the stomach contents of 17 adults collected at sea, and Mougin (1968) examined 11 stomach contents from Terre Adelie. Other reports of the diet of Cape Pigeons are concerned with at most three samples of regurgitated stomach contents with identifiable remains (Table 1).

In the present study I examined the diet of Cape Pigeons from coastal islands of Princess Elizabeth Land during part of the nesting season of 1983-84.

METHODS

At first, I used water offloading (Wilson 1984) to try and get stomach contents. I inserted a 3 mm tube about 150 mm into the oesophagus and introduced warm fresh water from a 100 ml syringe. However, defensive regurgitation throughout the operation made water offloading difficult.

I then tried to collect food samples in a funnel 350 mm in diameter but failed. Finally I just collected samples from my clothing and the ground. I stored the samples in plastic jars in 70% ethanol and later removed the identifiable pieces, blotted them on filter paper, and weighed them.

Collections were made on Filla Island (Rauer Islands Group) and Bluff Island (Vestfold Hills).

RESULTS

Ten samples were collected from adult Cape Pigeons at Filla Island on 26 January 1984 and 63 samples at Bluff Island between 30 January and 20 February 1984. Most birds were brooding or attending small chicks at this time. Table 2 gives the pooled results of these collections.

Of the 56 samples containing Euphausiaceae, *Euphausia superba* was identified in 34 (60.7%) and *E. crystallorophias* in four (7.1%). The most *E.*

TABLE 1 — Summary of foods reported for Cape Pigeon

Reference	N	Crust- acean	Cepha- lopod	Other Molluscs	Tuni- cate	Fish	Bird	Oil	Carrion	Vomit of Giant Petrel
Clarke 1906	*	+0								
Gain 1914	1	+0								
Ardley 1936	*	+0								
Murphy 1936	3	+0	+			+	+		+	
Falla 1937	2		+						+	
Bierman & Voous 1950	17	+	+	+		+			+	
Hagen 1952	*								+	
Paulian 1953	3	+								
Ealey 1954		+	+						+	
Holgersen 1957	1		+				?			
Downes <i>et al.</i> 1959	*	+?							+	+
Mougin 1968	11	+0	+			+				
Beck 1969	94	+0		+		+	+			
Humphrey <i>et al.</i> 1970	2	+								
Mougin 1975	1	+?								
Sagar 1979	3	+0								
This study 1985	73	+0				+		+	+	

* General observations
+0 Crustacean includes euphausiids

TABLE 2 — Composition of regurgitated stomach contents obtained in this study (n = 73)

Contents	Frequency of occurrence (%)	Weight (g)			% contribution to total weight
		min.	mean	max.	
Euphausiids	76.7	0	3.43	15.9	75.9
Unidentified crustaceans	5.5	0	0.5	1.9	0.7
Fish	38.4	0	2.12	9.3	23.4
Nematodes	1.4				<0.1
Unidentified	9.6				<0.1

superba identified in a sample were 34 and the most *E. crystallophias* were 11. Of the 28 occurrences of fish (38.4%), one was identified as *Trematomus* sp. and two as *Pagothenia borchgrevinki*. The fish were estimated from incomplete specimens to have been 70-100 mm long.

Intact carapaces of euphausiids were in 23 samples (31.5%). I measured from the tip of the rostrum to the posterior dorsal median margin to calculate body size. For 93 carapaces of *E. superba*, the mean was 13.7 mm (SD 1.8, range 7.2-17.5 mm). Three carapaces of *E. crystallophias* measured 8.7, 7.0 and 8.5 mm (mean 8.07, SD 0.93 mm). The formula $y = 0.35x - 0.919$ (Murano *et al.* 1979), where x is the body length and y the carapace length, was applied to the *E. superba* data. Derived body length averaged 41.7 mm (SD 5.4, range 23.2-52.6 mm).

On a few occasions I saw Cape Pigeons feeding on oil and particulate matter dispersing from Adélie Penguins (*Pygoscelis adeliae*) killed by leopard seals (*Hydrurga leptonyx*) and from the floating carcasses of seals.

DISCUSSION

The food of the Cape Pigeons collected in this study consisted almost entirely of euphausiids and fish. This was shown by both their frequency of occurrence (76.7% and 38.4% respectively) and their contribution to the total weight of the food sample (75.9% and 23.4% respectively).

Although Beck (1969) collected 85 of his 94 food samples from chicks at Signy Island, South Orkney Islands, a long way from my study area, the two major components in both studies were the same. Beck found that euphausiids were more frequent (97.9% cf. my 76.7%) and fish less frequent (15.9% cf. my 38.4%). Bierman & Voous (1950) reported frequencies of occurrence of 47.1% for euphausiids and 23.5% for fish.

Bierman & Voous found cephalopod material in 15 of their 17 samples (88%). However, no cephalopod material was found in the 94 samples studied by Beck or in my 73 samples. Beaks may have been retained in the stomach and not regurgitated, or the local availability of cephalopods may have differed. Samples I collected near the Vestfold Hills from Adélie Penguins, Emperor Penguins (*Aptenodytes forsteri*) (Green, in press), Southern Giant Petrels (*Macronectes giganteus*) (Green 1986) and Weddell seals (*Leptonychotes weddelli*) also had fewer cephalopod remains than reported elsewhere, indicating a low availability of cephalopods.

Beck (1969) found only *E. superba*, whereas in this study *E. crystallophias* was a minor component. It is of interest that, in the same period at Magnetic Island, I found that the euphausiid component of the food of the Adélie Penguin was also primarily *E. superba*, whereas in the previous season it had been primarily *E. crystallophias* (Puddicombe & Johnstone, in press). The body length of *E. superba* taken by Cape Pigeons (mean 41.7, SD 5.4, range 23.2-52.6 mm) was similar to that taken by Adélies that I sampled at Magnetic Island (mean 40.7, SD 4.7, range 25.5-51.1 mm).

Both this study and that of Beck have shown that fish and euphausiids are important to breeding birds. Bierman & Voous considered crustaceans and fish to be "less favoured" components of the diet and stated that the normal food of Cape Pigeons was mainly cephalopods. Their samples, however, were

collected at sea up to 1860 km from land, from birds that included failed breeders (Beck 1969). General statements on the food of Cape Pigeons therefore cannot be made until sampling is conducted over a wider range and in all seasons.

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