

TREMATODE ANKLETS ON PROCELLARIFORM SEABIRDS FROM SOUTHERN  
AFRICA AND THE ADJACENT SOUTHERN OCEAN

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INTRODUCTION

Claugher (1976) and Imber (1984) reported the incidence of anklets around the tarsi of seabirds at the Chatham Islands (44S, 176W). The anklets were comprised of the larvae of a trematode *Copiatestes filiferus* (Gibson & Bray 1977) which presumably became tangled around the legs of the seabirds as the birds fed on the euphausiid host of the trematode (Imber 1984). Trematode anklets caused considerable Whitefaced Stormpetrel *Pelagodroma marina* mortality at the Chatham Islands during 1970, when anklets linking the tarsi become tangled in terrestrial vegetation (Claugher 1976, Imber 1984). During this event, anklets were found on six seabird species (Claugher 1976), but at other times they only have been reported from Whitefaced Stormpetrels, Leach's Stormpetrels *Oceanodroma leucorhoa* and Fairy Prions *Pachyptila turtur* (Imber 1984).

Anklets have been reported from Whitefaced Stormpetrels at Gough Island (40 21S, 9 53W), but no instances of death from entanglement have been recorded (Clancey 1981, Furness 1984). This study reports the incidence of trematode anklets on 26 species of procellariiform seabirds found off southern Africa and in the adjacent region of the Southern Ocean.

METHODS

During 1984 and 1985 procellariiform seabirds, excluding albatrosses and giant petrels, were examined for the presence of trematode anklets. Birds were examined at four major localities: the continental waters of South Africa, Gough Island, the Prince Edward Islands (46 45S, 37 50E), and at sea off Antarctica (south of 65S). Some of the birds from Antarctic seas were collected prior to 1984, but were kept frozen from the time of collection. Birds examined from South Africa included birds collected at sea and birds found dead on beaches. The occurrence of entanglement by objects other than trematodes was also recorded.

## RESULTS

More than 700 seabirds of 26 procellariiform species smaller than albatrosses were examined for trematode anklets (Table 1). The majority of birds came from South Africa or Gough Island; few birds from the Prince Edward Islands or Antarctic waters were examined. Trematode anklets were found on the tarsi of five seabird species (Table 2). All seabirds found to have anklets came from either South Africa or Gough Island. Anklets were most frequent on Whitefaced Stormpetrels, but were also frequent on Thinbilled Prions *Pachyptila belcheri*. The frequency of occurrence of anklets was less than 5 % in the other three species found to have anklets (Table 2). Anklets were frequently found on both tarsi of a bird, but none was linked between the tarsi. All anklets were loose and were able to move freely up and down on the tarsus.

No seabird examined was entangled by objects other than trematode anklets. The anklet of an Antarctic Prion *Pachyptila desolata* contained a single polypropylene fibre 13 mm long.

## DISCUSSION

Trematode anklets were found only on the small species of procellariiform seabirds which feed primarily on crustaceans (Harper *et al.* 1985). This agrees with Imber's (1984) hypothesis that anklets form around birds' legs while the birds forage over swarms of the trematode's euphausiid host. The high frequency of occurrence of anklets on Thinbilled Prions suggests this species also eats euphausiids (cf. Harper *et al.* 1985). The absence of trematode anklets from seabirds at the Prince Edward Islands and off Antarctica may be related to the distribution of the trematode's hosts, or could be an artefact of smaller sample sizes at these localities.

These are the first records of trematode anklets from Thinbilled Prions and Antarctic Prions, and are the first for Broadbilled Prions *Pachyptila vittata* and Common Divingpetrels *Pelecanoides urinatrix* other than during the 1970 event at the Chatham Islands (Claugher 1976). The presence of anklets on a divingpetrel is unexpected because it uses its wings for underwater propulsion; all other species reported with anklets (apart from those during the 1970 event, Claugher 1976) feed by hydroplaning, dipping or pattering (Harper *et al.* 1985). The absence of anklets from four of the five species of stormpetrels is probably due to diet or to small sample sizes. M.J. Imber (*in litt.*) found no anklets on more than 300 Greybacked Stormpetrels *Garrodia nereis* which feed primarily on the barnacle *Lepas australis* (Imber 1981).

There is no evidence to suggest that seabirds are impaired by trematode anklets, other than when an intertarsal ligament becomes tangled in terrestrial vegetation (Furness 1984, Imber 1984). Entanglement by artificial objects, particularly plastic refuse, is frequently fatal to seabirds (e.g. Tull *et al.* 1972, Hartwig *et al.* 1985). Such entanglement has not been reported for procellariiform seabirds off southern Africa and in the adjacent Southern Ocean, although it is not infrequent among

TABLE 1

NUMBERS OF SEABIRDS EXAMINED FOR TREMATODE ANKLETS AT FOUR LOCALITIES  
DURING 1984 AND 1985

Species	South Africa	Gough Island	Prince Edward Islands	Antarctic seas	Total
Antarctic Fulmar <i>Fulmarus glacialisoides</i>				1	1
Snow Petrel <i>Pagodroma nivea</i>				22	22
Antarctic Petrel <i>Thalassoica antarctica</i>	1			29	30
Pintado Petrel <i>Daption capense</i>	6				6
Broadbilled Prion <i>Pachyptila vittata</i>	3	104			107
Salvin's Prion <i>P. salvini</i>	3		3		6
Antarctic Prion <i>P. desolata</i>	78				78
Thinbilled Prion <i>P. belcheri</i>	33				33
Fairy Prion <i>P. turtur</i>			1		1
Blue Petrel <i>Halobaena caerulea</i>	23		37		60
Greatwinged Petrel <i>Pterodroma macroptera</i>	2		2		4
Atlantic Petrel <i>P. incerta</i>		7			7
Kerguelen Petrel <i>P. brevirostris</i>	8		12		20
Softplumaged Petrel <i>P. mollis</i>	3	12	1		16
Whitechinned Petrel <i>Procellaria aequinoctialis</i>	149		5		154
Cory's Shearwater <i>Calonectris diomedea</i>	7				7
Great Shearwater <i>Puffinus gravis</i>	6	30			36
Sooty Shearwater <i>P. griseus</i>	48				48
Little Shearwater <i>P. assimilis</i>		12			12
Wilson's Stormpetrel <i>Oceanites oceanicus</i>	6				6
British Stormpetrel <i>Hydrobates pelagicus</i>	1				1
Blackbellied Stormpetrel <i>Eregetta tropica</i>			1		1
Whitefaced Stormpetrel <i>Pelagodroma marina</i>		6			6
Greybacked Stormpetrel <i>Garrodia nereis</i>		7			7
Common Divingpetrel <i>Pelecanoides urinatrix</i>		48	18		66
Georgian Divingpetrel <i>P. georgicus</i>			2		2
<b>Total</b>	<b>377</b>	<b>223</b>	<b>82</b>	<b>52</b>	<b>734</b>

TABLE 2  
 THE FREQUENCY OF OCCURRENCE OF TREMATODE ANKLETS ON THE 26  
 SPECIES OF SEABIRDS EXAMINED (TABLE 1)

Species	Number	Frequency of occurrence (%)	Locality
Broadbilled Prion	2	1,9	South Africa, Gough Island
Antarctic Prion	2	2,6	South Africa
Thinbilled Prion	5	15,2	South Africa
Whitefaced Stormpetrel	5	82,3	Gough Island
Common Divingpetrel	1	1,5	Gough Island

some penguins, gannets, cormorants, gulls and terns found in continental southern Africa (J. Cooper *in litt.*, pers. obs.).

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