TREMATODE ANKLETS ON WHITEFACED STORMPETRELS *PELAGODROMA MARINA* AND FAIRY PRIONS *PACHYPTILA TURTUR*

M.J. IMBER

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A bizarre characteristic of Whitefaced Stormpetrels *Pelagodroma marina* breeding at the Chatham Islands (44°S, 176°W) is the presence of anklets on many adult birds. These anklets are white to translucent and gelatinous when fresh, but become straw-coloured, elastic and very tough as they dry out (Figs. 1,2). Though normally present separately on one or both legs, in which state they seem of no concern to the birds, sometimes the anklets become joined by a tough ligament. This has fatal consequences, since the stormpetrels easily become entangled in any twiggy vegetation in the forest, scrub or bracken where they nest, and are unable to free themselves (pers. obs.). Tens of thousands may die in rare years when the anklet problem is at its worst (D.V. Merton pers. comm.).

Anklets were especially abundant in 1970 on petrels at South East Island in the Chatham Islands when D.V. Merton (pers. comm.) collected specimens from the multitudes of corpses. After he had experienced problems finding someone who could identify the entangling material, he sent specimens to the British Museum of Natural History. There, Claugher (1976), after surmounting the problem of reconstituting the material, identified it as desiccated entangled larvae of the marine digenean trematode *Syncoelium filiferum*. He counted 800 larvae in the anklets from one bird.

This trematode is a gill parasite on some epipelagic fish (Rohde *et al.* 1980). The 60 mm long, elastic, adhesive filaments that are appendages of the larval trematodes apparently enable them to attach themselves to the final host's gills. Some become attached instead to petrels' legs and subsequently die by desiccation.

Attachment to petrels' legs comes about because the petrels feed on the euphausiid *Nematoscelis megalops* (Imber 1981). This is the intermediate host of the trematode, from which the trematode was first described (Claugher 1976). These type specimens were obtained during the *"Challenger"* expedition in 1876 close to Tristan da Cunha (Claugher 1976). *N. megalops* is a diel vertical migrant, living at about 400 m by day and coming to the surface at night (Marshall 1954), whereas the final hosts are surface-living fish. Claugher (1976) suggested that the trematodes release themselves from the euphausiids as the latter descend at dawn, then float up to the surface (thereby avoiding entanglement with the euphausiids) where they sometimes encounter resting stormpetrels. It seems more likely that the trematodes break free in surface waters and become entangled with stormpetrels' legs while the birds are feeding on the euphausiids. Possibly the different degrees of the problem from year to year on stormpetrels at the Chatham Islands are due to

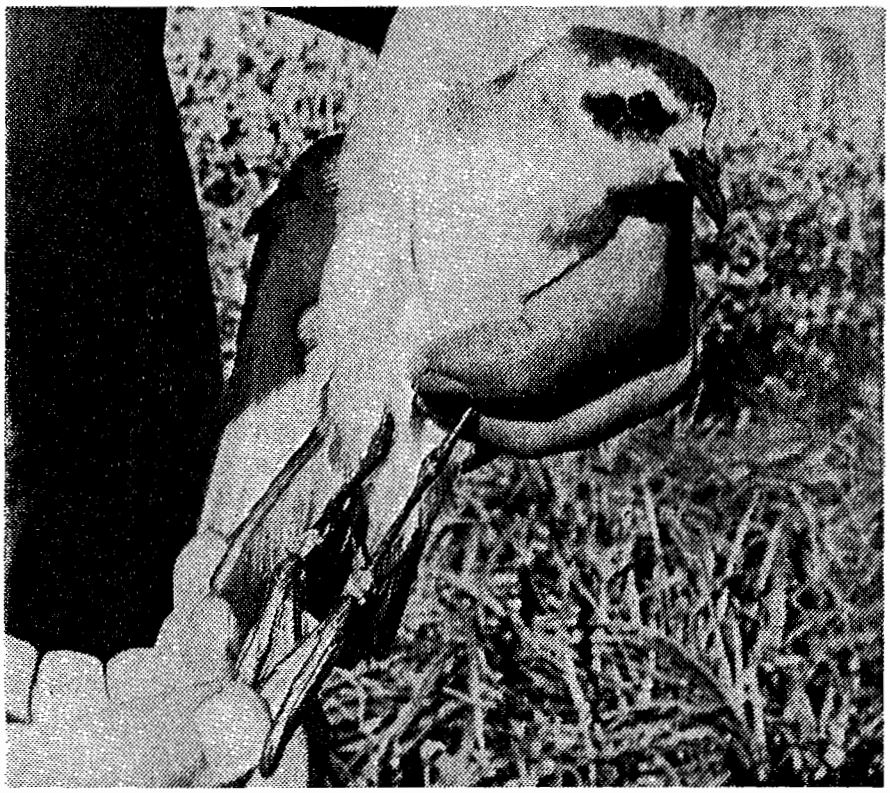

Figure 1

Whitefaced Stormpetrel *Pelagodroma marina* with trematode anklets, Rabbit Island, Chantham Islands, November 1980. Photographed by T.G. Lovegrove.

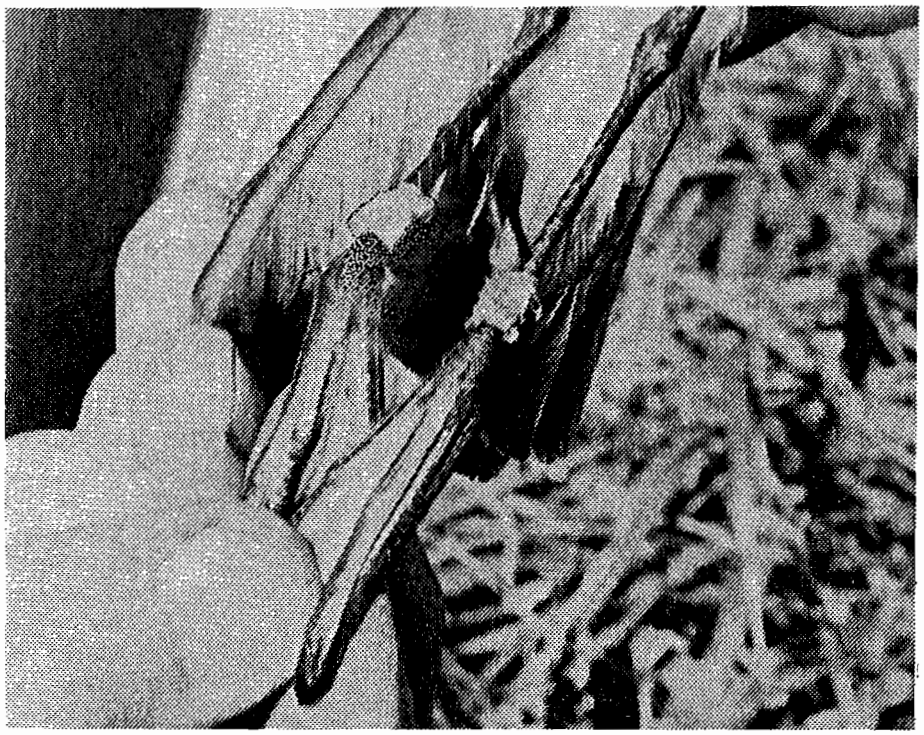

Figure 2

Close-up of trematode anklets on the same bird as in Fig. 1. Photographed by T.G. Lovegrove.

annual fluctuations in infestation of *N. megalops* by the trematode, or to annual variations in the proportion of the petrels' diet formed by this particular euphausiid.

N. megalops was found to be the most abundant euphausiid west of the Chatham Islands (Robertson *et al.* 1978). It occurs circumpolarly in the Southern Hemisphere near the Subtropical Convergence and in the North Atlantic (Mauchline & Fisher 1969).

Clancey (1981) observed that several specimens of Whitefaced Stormpetrels collected at Gough Island (40°S, 10°W) carried "dried algal anklets". Since the trematode was first reported nearby (Claugher 1976), its occurrence on these stormpetrels at Gough Island is to be expected. When visiting Gough Island in 1979 I examined only one Whitefaced Stormpetrel. It carried no anklets.

Since 1975 I have handled many petrels at the Chatham Islands, including hundreds of Whitefaced Stormpetrels, Greybacked Stormpetrels *Garrodia nereis*, Broadbilled Prions *Pachyptila vittata*, Fairy Prions *P. turtur*, Sooty Shearwaters *Puffinus griseus* and lesser numbers of Common Divingpetrels *Pelecanoides urinatrix*, Fulmar Prions *Pachyptila crassirostris*, Little Shearwaters *Puffinus assimilis*, Blackwinged Petrels Pterodroma *nigripennis*, Chatham Island Petrels *P. axillaris* and Magenta Petrels *P. magentae*. Among these I have seen trematode anklets only on Whitefaced Stormpetrels and Fairy Prions, both of which feed predominantly on euphausiids at the surface (Imber 1981). One of two Leach's Stormpetrels *Oceanodroma leucorhoa* caught at the Chatham Islands in 1980 (Imber & Lovegrove 1982) also carried minute anklets. Linton (1978) recorded *N. megalops* in the diet of Leach's Stormpetrels off eastern Canada. Thus there seems to be a strong link between feeding on these euphausiids by surface-seizing and entanglement of trematodes round the legs.

Although New Zealand Fairy Prions *Pachyptila t. turtur* feed mainly on the euphausiid *Nyctiphanes australis* (Harper 1976, Imber 1981), *Nematoscelis megalops*, which is a slightly larger species, may be important in the diet of these prions at the Chatham Islands.

Whitefaced Stormpetrels are likely to collect the trematodes and develop intertarsal ligaments because of their feeding method. They hover at the surface using both feet together to touch down briefly, then bound forward (pers. obs.). This frequent contact of both feet with the sea, in which the tarsi are kept closer together than the length of the filaments of trematodes becoming attached to each tarsus, presumably results in the formation of anklets and connecting ligaments. Fairy Prions feed with a running motion of the feet on the sea surface: I have not seen them with a trematode ligament connecting their tarsi. Whitefaced Stormpetrels at the Chatham Islands are the only petrels known to suffer mortality caused by these trematodes.

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REFERENCES

CLANCEY, P.A. 1981. On birds from Gough Island, central South Atlantic. *Durban Mus. Novit.* 12: 187-200.

CLAUGHER, D. 1976. A trematode associated with the death of the white-faced storm petrel *(Pelagodroma marina)* on the Chatham Islands. *J. Nat. Hist.* 10: 633-641.

HARPER, P.C. 1976. Breeding biology of the fairy prion *(Pachyptila turtur)* at the Poor Knights Island, New Zealand. *N.Z. J. Zool.* 3: 351-371.

IMBER, M.J. 1981. Diets of stormpetrels *Pelagodroma* and *Garrodia* and of prions *Pachyptila* (Procellariiformes). In: COOPER, J. (ED.). Proceedings of the Symposium on Birds of the Sea and Shore, 1979. Cape Town: African Seabird Group. pp 63-88.

IMBER, M.J. & LOVEGROVE, T.G. 1982. Leach's Storm Petrels *(Oceanodroma l. leucorhoa)* prospecting for nest sites on the Chatham Islands. *Notornis* 29: 101-108.

LINTON, A. 1978. The food and feeding habitats of Leach's Storm-Petrel *(Oceanodroma leucorhoa)* at Pearl Island, Nova Scotia and Middle Lawn Island, Newfoundland. M.Sc. thesis: Dalhousie University, Canada.

MARSHALL, N.B. 1954. Aspects of deep sea biology. London: Hutchinson.

MAUCHLINE, J. & FISHER, L.R. 1969. The biology of euphausiids. *Adv. Mar. Biol.* 7: 1-454.

ROBERTSON, D.A., ROBERTS, P.E. & WILSON, J.B. 1978. Mesopelagic faunal transition across the Subtropical Convergence east of New Zealand. *N.Z. Mar. Freshwat. Res.* 12: 295-312.

ROHDE, K., ROUBAL, F. & HEWITT, G.C. 1980. Ectoparasitic Monogenea, Digenea, and Copepoda from the gills of some marine fishes of New Caledonia and New Zealand. *N.Z. J. Mar. Freshwat. Res.* 14: 1-13.

M.J. Imber, Wildlife Service, Department of Internal Affairs, Private Bag, Wellington, New Zealand.