

ROCKHOPPER PENGUIN EGGS AND THE LIPID INTAKE OF
TRISTAN DA CUNHA ISLANDERS

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Received 25 February 1982, accepted 16 May 1982

The human population of Tristan da Cunha (c. 37 S, 12 W), 292 souls in 1973, has an anomalous sex-age distribution of serum triglyceride and cholesterol levels and it has been suggested that a contributory factor to this situation is the fact that a considerable proportion of the islanders' lipid intake is derived from saturated fats contained in eggs of Rockhopper Penguins *Eudyptes chrysocome* which the islanders eat in large quantities (Richardson *et al.* 1975). The purpose of this note is to comment on the way in which Richardson *et al.* (1975) calculated the quantity of lipid which the islanders obtain from penguin eggs.

Richardson *et al.* (1975) made no direct measurements of egg mass or of egg content. They assumed an average egg weighs 100 g (presumably they mean whole egg mass, that is including the egg-shell). Based on data from terns *Sterna* spp., they assumed that lipids form 33 % of the yolk and that lipids therefore constitute 12 % of the whole egg mass. If lipids form 33 % of the yolk and 12 % of the 100 g whole egg mass, then the yolk should weigh a little over 36 g.

Subsequent to Richardson *et al.*'s (1975) study, the composition and mass of Rockhopper Penguin eggs at Marion Island (c. 46 S, 37 E) has been investigated. Rockhopper Penguins lay a single clutch of two eggs a year (Williams 1981) and in each clutch the first laid (A) egg is markedly smaller and lighter than the second laid (B) egg (Gwynn 1953). At Marion Island A- and B-eggs respectively had: an average mass of 76,0 and 109,0 g (Williams 1980); an average wet mass of yolk of 19,3 and 23,7 g (Williams *et al.* 1982, Appendix 1); and a lipid content of 5,0 and 6,4 g dry mass (Williams *et al.* 1982, Appendix 6). The eggs of Rockhopper Penguins at Tristan da Cunha are slightly larger than those at Marion Island although the mass of fresh eggs from the Tristan group is not known (Williams & Stone 1981).

Tristan islanders collected about 25 000 and 41 000 eggs of Rockhopper Penguins in 1973 and 1974 respectively, most of the eggs being taken from nearby, uninhabited, Nightingale Island (Richardson *et al.* 1975). Using their assumptions Richardson *et al.* (1975) calculated that the individual annual intake of lipids from penguin eggs was 2 000 g (presumably based on the 1974 harvest although this is not stated). Based on our knowledge of Rockhopper Penguin egg composition at Marion Island, this calculation is too high. There are a number of reasons why this is so.

The amount of lipid in the 41 000 eggs harvested in 1974 would

depend on the proportion of A- and B-eggs collected. Richardson *et al.* (1975) give no indication that they are aware that the eggs of this species are dimorphic but the average egg mass which they cite, 100 g, indicates that most of the eggs collected are probably B-eggs. Their assumed proportion of lipid in relation to whole egg mass is considerably higher than that established at Marion Island, 12 % as opposed to 5,9 % for Marion B-eggs, as is the mass of yolk which they use, 36 g as opposed to 23,7 g for Marion B-eggs. At Marion Island dry lipid material formed 27 % of the entire yolk mass. If this proportion is applied to Richardson *et al.*'s (1975) assumed yolk mass then each B-egg would contain 9,7 g of dry lipid and if all 41 000 eggs were B-eggs then the total amount of dry lipid in the eggs would be 397 700 g. Using only Marion Island data the total dry lipid content would be 262 400 g if all eggs were B-eggs. For the 292 souls at Tristan da Cunha who consumed the 41 000 eggs the individual annual lipid intake would be 1 363 g (dry mass) using Richardson *et al.*'s (1975) inflated yolk size and 899 g (dry mass) based on Marion Island data.

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