

THE BREEDING FREQUENCY OF JACKASS PENGUINS ON THE WEST COAST OF SOUTH AFRICA

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Abstract.—Of 308 clutches of the Jackass Penguin at Marcus Island, 12.3% involved replacement clutches and 5.8% involved second clutches. Such rebreeding increases productivity and could change proposed population models and life tables significantly.

FRECUENCIA REPRODUCTIVA DE *SPHENISCUS DEMERSUS* EN LA COSTA OESTE DE AFRICA DEL SUR

Resumen.—De un total de 308 camadas de *Spheniscus demersus* estudiadas en la Isla Marcus, 12.3% resultaron ser camadas de remplazo y 5.8% segundas camadas. Estos segundos esfuerzos reproductivos de los pingüinos, aumentan la productividad y pueden cambiar los modelos poblacionales propuestos, como también los de sobrevivencia.

Jackass Penguins (*Spheniscus demersus*) are decreasing in numbers on the west coast of South Africa, the area where most of the species' population breeds (Shelton et al. 1984). Models of these populations (Furness and Cooper 1982, Jackson et al. 1976) have assumed that individuals nest only once a year. However, Randall (1983) reported 29% of pairs laying second clutches at St. Croix Island (33°48'S, 25°46'E) on the east coast of South Africa. This paper reports on the incidence of second-clutch nesting attempts among Jackass Penguins at Marcus Island (33°03'S, 17°55'E) on the west coast of South Africa.

A 3500 m² area was established in 1977 for a long-term study of Jackass Penguins at Marcus Island (La Cock et al. 1987). A total of 145 nest sites were checked monthly from 1979 to 1985. The laying of eggs constituted a breeding attempt, and the attempt was successful if chicks fledged. Chicks were considered fledged if they reached the stage at which they lost their down and were then not seen on subsequent visits (La Cock et al. 1987). A second-clutch attempt was defined as the laying of eggs after chicks were fledged from the first clutch in the same breeding season. A replacement clutch was defined as one laid if the first was unsuccessful.

From 1979 to 1985, we observed 308 clutches, of which 12.3% ($n = 38$) were replacement clutches and 5.8% ($n = 18$) were second clutches. Among the 18 second clutches, six (33.3%) were successful.

One of the pairs which laid a second clutch did so at a site different from where the first breeding attempt took place. Another case involved a bird which changed partners for the second clutch. Second clutches (17 out of 18; 94.4%) were laid at the site where the first chicks were raised

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significantly more (17 out of 18; 94.4%) than replacement clutches (23 out of 38; 60.5%) ($\chi^2 = 6.89$, $df = 1$, $P < 0.01$). A similar trend was observed in Little Penguins (*Eudyptula minor*) (Reilly and Cullen 1981).

When rebreeding was taken into account at Marcus Island, the number of fledglings produced per breeding pair increased from an average of 0.49 to 0.63 per year, an increase of 28.6%. This increase in productivity could change proposed population models and life tables significantly, an important consideration when the decrease of Jackass Penguin numbers on the west coast of South Africa is considered.

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