

Assessing Abundance Of Spinner Dolphins Off A Remote Oceanic Island (Reunion Island, South West Indian Ocean) Using Mark-recapture Method

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Background

This study represents the first abundance estimation of the spinner dolphin (*Stenella longirostris*) population occurring around Reunion island (southwest Indian Ocean). This species, known to use the coastal waters of the island in the morning, is consistently targeted by the dolphin watching activities. In this context, assessing the population abundance is essential to provide the baseline information required to guide mitigation measures and future management.

Method

Dedicated boat-based surveys were conducted all year-round over a 8 year period (2012-2019) to collect photo-identification data on individual dorsal fin. Mark recapture methods following the Robust Design were applied to estimate abundance, demographic parameters and temporary emigration rates. Closure tests indicated that the sample population was closed to additions and deletions across secondary periods (i.e., June-October), while open between primary periods (i.e., years).

Results

48,141 km of effective effort were carried out from 2012 to 2019, allowing the observation of 416 groups of spinner dolphins. The species was present year-round, and the mean group size was 57.3 individuals. A total of 8,356 dorsal fin photographs were taken from which 150 individuals were identified and included in the photo-identification catalogue.

The best fitting model yielded constant temporary emigration parameters ($\gamma'' = 0,12 \pm 0,05$ and $\gamma' = 0,74 \pm 0,17$) and constant apparent survival rate of $0,83 \pm 0,04$. Abundance estimates varied across years, ranging from 97 individuals (95% CI=48-198) in 2017 to 211 individuals (95% CI=113-393) in 2012.

Conclusion

This study represents the first abundance estimate of the spinner dolphin population around Reunion island. Population estimates indicated that between 97 to 211 individual spinner dolphins are using the coastal waters of Reunion annually. Annual variations in abundance might be attributed to differences in survey effort, leading to a less precise estimates in some years (larger 95% CI), rather than actual changes in population size.

The constant and relatively high apparent survival rate suggested no permanent emigration. However, temporary migration was detected and indicated that a high

proportion of individuals stayed out of the survey area for consecutive sampling periods ($\gamma' = 0,74 \pm 0,17$), suggesting long range movements over more than one year. Comparison with the photo-identification catalogue from Mauritius showed 8 individuals' matches between the two islands, demonstrating exchanges between the two local populations. Hence, future abundance estimations should take the Mascarene islands as a whole.

In the light of growing dolphin-watching and swimming with dolphins' activities, the development of responsible practices through public awareness, sustainable management and law enforcement is strongly recommended. Results provided in this study will serve as baseline information to support and substantiate these actions.