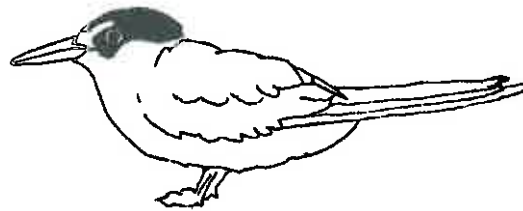


Behavioural ecology of the endangered New Zealand Fairy Tern (Tara-iti) *Sterna nereis davisae*: implications for management



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Abstract

The roles of the sexes in the New Zealand Fairy Tern (*Sterna nereis davisiae*) during reproduction were investigated over the 1997/1998 and 1998/1999 seasons at Mangawhai and Waipu, Northland, North Island New Zealand. Factors which may affect the behaviour of the birds were investigated including time of season, time of day, weather conditions and the state of the tide. As in other terns, the contributions of the male and the female Fairy Tern to reproduction were relatively equal. Courtship feeding, however, appears to be a male-specific behaviour, and the male feeds the chick more than the female when there is a single chick. The level of care of eggs and chicks at night by the female, and of the fledged young by the male, is unclear, but could alter the overall contribution to breeding by the two sexes. In the first season, wind speed caused less absence from young, while time of day and time of season (week) affected incubation, and parental activities. Egg manipulation for management purposes at Mangawhai altered the birds' behaviour, the female being less attentive during the day and it increased the amount of time birds sat on the nest. The state of the tide affected the feeding of young, with increased feeding three hours after low tide. This may be site-dependent because the Mangawhai Fairy Terns also foraged at high tides. Fairy Terns were highly aggressive towards Harriers, Black-backed Gulls and people, particularly when they had young. Fairy Terns also responded aggressively within 75 m, the birds at Waipu responding more often because a number of other birds nested in, and passed over, the area. The Fairy Terns preferred highly elevated nest sites, with low vegetation cover, and a high percentage of shell cover. These features characterise nest sites of a number of terns. DNA analysis suggests that copulation behaviour, but not morphology, is adequate evidence for sexing adult Fairy Terns. The sex ratio of nine juveniles was five males: four females. The number of adults caught was too small to calculate an adult sex ratio.

This study has implications for future management of Fairy Terns. Eggs at the same development stage should be placed under foster parents, fences should be placed 180m from the nest or chicks, and sparsely vegetated and shell covered areas should be protected and maintained. Weather conditions, the time of day, and observed absences should be considered before removing eggs from the field. More blood samples are needed for parental and taxonomic studies.

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2. The roles of sexes in courtship feeding. This appears to be a male-specific behaviour but more information from the early stages of Fairy Tern reproduction ie during courtship, egg laying and early incubation would confirm this.
3. Post-breeding care of the young. Occasional sightings of adults with juveniles immediately after the breeding season suggest that only the male may feed the juveniles after fledging, and teach them to fend for themselves. The role of adults in post-fledging care should be examined by following the juveniles for an extended period after fledging to establish parental involvement, and the length of time any care persists. This also may provide some insights into the juvenile or adult mortality.
4. Population dynamics of Fairy Terns. DNA work suggests that the recruitment of juveniles into the population is not sex-biased. Further blood sampling is required to establish the sex of juveniles, and adults, to monitor the sex ratio, and to provide information on the parents of young previously unbanded and taxonomy.

6.4 Conclusion

For New Zealand Fairy Terns the parental investment by male and females appears to be relatively equal, but better measures of nocturnal activity during incubation and brooding, and post-fledging care of young, could alter our understanding of the contributions of the sexes. In general, Fairy Terns behave similarly to other terns, however, Fairy Terns breed in single pairs not in colonies, so there is potential for individual behaviour. Differences between breeding sites may further complicate nesting behaviour, such as the feeding frequency in relation to the state of the tide. The fact that Fairy Terns breed in single pairs and comprise a tiny population provides a unique opportunity to study their ecology in detail, and can contribute to the future management of the species.