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Dynamics of mother-offspring
common dolphins (*Delphinus* sp.)
engaged in foraging activities in the
Hauraki Gulf, New Zealand

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Abstract

This study investigated the dynamic of mother-offspring common dolphins (*Delphinus* sp.) engaged in foraging activities in the Hauraki Gulf, New Zealand. While previous studies have demonstrated the importance of Hauraki Gulf waters for feeding and nursing common dolphins, no previous study has systematically assessed the dynamics of mother-offspring pairs engaged in foraging activities. During 228 hr of survey time, a total of 49 independent focal groups were recorded between March and July 2009. All observations were conducted from the surface using the platform of opportunity, *Dolphin Explorer*, a 20 m tour boat. Variables examined included group size, composition, offspring presence, predominant behavioural state, foraging strategies employed, associated species, mother-offspring relationship, and location of offspring within groups. This study tested the hypothesis that foraging strategies employed by mother-offspring pairs would be influenced by environmental and anthropogenic parameters, group size, and associated species. It also examined the influence of associated species and foraging strategies on the mother-offspring dynamic within focal groups.

Sighting Per Unit Effort (SPUE) and Offspring Per Unit Effort (OPUE) varied by month, with SPUE and OPUE being highest in March and July, respectively. Mother-offspring pairs predominantly engaged in cooperative foraging strategies (97%), and were less likely to engage in individual strategies. Cooperative feeding groups likely provide better protection to young and vulnerable dolphins, as well as a more prolific food supply to lactating females and their offspring. Water depth, sea surface temperature and group size had no influence on foraging strategies employed by mother-offspring pairs. Groups comprising immature dolphins typically altered their behaviour more frequently in presence of vessels, with presumed mothers keeping their offspring away from boats in 80% of encounters. However, a limited sample size likely impeded the statistical significance of this observation. Behavioural changes and potential vessel avoidance during foraging activity may occur as a response of perceived threat. Cooperative foraging strategies employed by focal groups had no significant influence on the location of the young. Offspring were observed in echelon position during 93.6% of the time dolphins foraged, and were never separated from their assumed mother during individual foraging strategies. Echelon position may enhance better predatory protection, as well as learning during foraging activities.

Mother-offspring pairs were observed in association with Australasian gannets (*Morus serrator*) and Bryde's whales (*Balaenoptera brydei*) during 68.4% and 8.4% of encounters, respectively. Prevalence of dolphin cooperative feeding is likely to attract and benefit associated species. While neither species were found to affect the foraging strategies employed by mother-offspring pairs, diving gannets did affect the position of mother-offspring pairs within feeding groups, with offspring typically located on the peripheral edge of the focal group. Conversely, no such affect was detected for associated feeding involving Bryde's whales. Since mothers permit offspring in the centre of mono-specific feeding groups, it seems plausible that the use of peripheral regions maybe associated with the presence of mixed-species feeding aggregations. This apparent shift in mother-offspring position is unexplained, although may represent perceived risk by the assumed mother. Results presented here extend our knowledge of foraging behaviour and mother-offspring common dolphin dynamics in the Hauraki Gulf, New Zealand.

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