

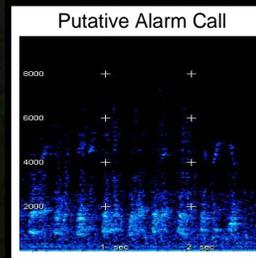
CIRCADIAN RHYTHMICITY IN INTRASPECIFIC AGGRESSION IN CAPTIVE KILLER WHALES

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Introduction

A more complete understanding of intraspecific aggression in killer whales would improve both our understanding of the social dynamics in that species and our ability to effectively manage them when they are held in captivity.



Method

We recorded the time of occurrence of each of 31 distinguishable sounds produced by five killer whales (*Orcinus orca*, of Icelandic stock) at Marineland of Canada over 42 separate 24 hour periods spaced out evenly over a one year period. Three of these distinct "syllables" were so strongly associated with bouts of aggression observable during daylight hours (r 's=0.3-0.8, $p < .001$), they constituted an unambiguous acoustic signature of agonistic interactions among our subjects. These included what we are tentatively calling an "Alarm Call", and the ripping sound of cavitation in the wake of tail strikes.

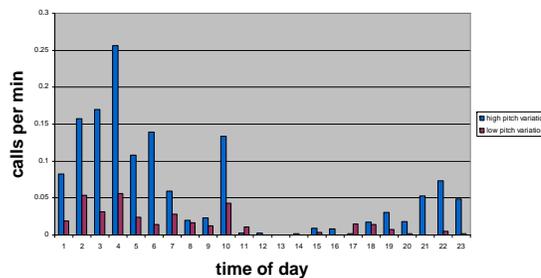


Results and Discussion

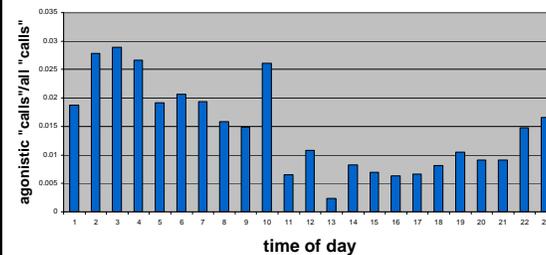
When analyzed by time of day, the clustering of these three sounds showed a clear circadian pattern in which a peak of production occurred between 2 and 4 am. When expressed as a proportion of all sounds, the rate of occurrence of the agonistic acoustic signature was six times greater at its peak at night (when darkness prevented the visual confirmation of aggression) than it was 12 hours later at mid-day ($\text{ChiSq}(1)=23.4$, $p < .001$).

The question now arises whether the circadian pattern shown by our subjects reflects a natural tendency in this species, or if it is secondary to the circumstances of captivity.

Alarm Call Rate, by time of day



Agonistic Sounds as Proportion of all Sounds, by time of day



Acknowledgements

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