Calf survivability and female reproductive success in a North Sea coastal bottlenose community

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Poster LH5

Introduction: Wild bottlenose dolphins (*Tursiops truncatus*) live in a complex hierarchal society in which lower ranking animals are often, even forcefully, reminded of their place. In the Moray Firth in NE Scotland, violent sexual interactions and infanticidal behaviour are remarkably common in the species (Ross & Wilson, 1996; Patterson et al., 1998), and here the maternal rank and experience of females may be crucial to the survival of offspring. Infancy is undoubtedly the most vulnerable period in a mammal's life, and bottlenose dolphins are no exception in this respect. Using data from a 10-year photo-identification study, the following paper provides a first examination of the reproductive success (RS) of female bottlenoses frequenting the southern coastline of the outer Moray Firth region. The influence of factors thought to affect calf survivability in this location are subsequently explored and discussed.

Methods: Between May and October 1997 to 2006 inclusive, a total of 210 encounters were recorded with bottlenose dolphins along an 83km length of coastline comprising the southern outer Moray Firth region (**Figure 1**). The extensive photo-identification material collated over this period (www.crru.org.uk) was used to select 21 "marked" females with established sightings histories. Unmarked females and those with unknown calving histories were excluded from the analysis. Female RS was classified as 0, 1, 2 or 3 with respect to the number of calves seen to survive to the age of 3 across this period. Survivorship of calves subsequently involved classifying 33 calves according to whether or not they died before this minimum weaning age.

Results

- 84.8% of all groups recorded in the study area contained calves, with annual births peaking between Jul and Sep.
- From a total of 14 females with complete life histories, 1 was successful in raising three calves, 4 successfully raised two, 6 successfully raised one calf and 3 were unsuccessful in raising any calves (Figure 2).
- First born calves appeared to be more vulnerable than older calves to mortality.
- A high mean inter-calving interval of 4.09 years was determined from the 16 inter-calf periods for this bottlenose community.

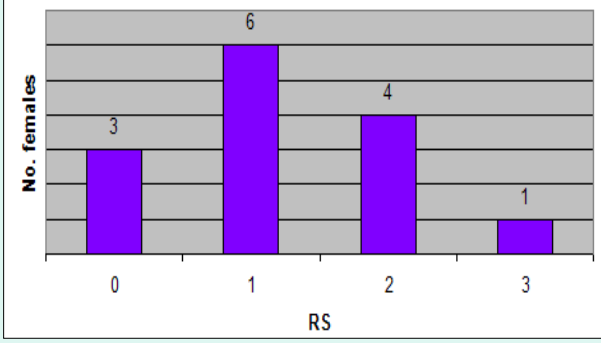

Fig. 2. Showing the reproductive success of female North sea bottlenoses. 3 were un-successful in raising any calves (RS0), 6 success-fully raised one calf (RS1), 4 successfully raised two (RS2), and a single female successfully raised three calves RS3).

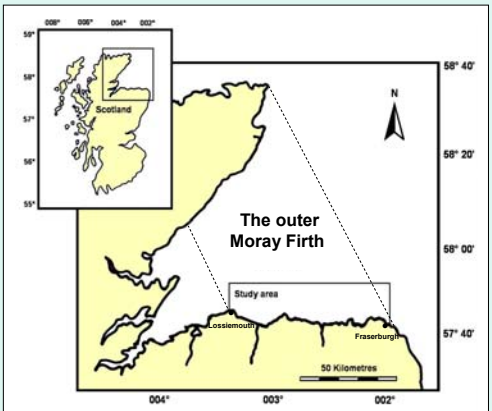

Fig. 1. Map of the Moray Firth in northeast Scotland showing the position of the study area between Lossiemouth and Fraserburgh, along the southern coastline of the outer firth region.

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Fig. 3. Female bottlenose dolphin (centre) with newborn calf (behind) close to her side, in typical echelon position. The larger calf to the right of the picture (also travelling in close proximity to the adult) is the former, 4-year old offspring belonging to the same female.

Discussion: Previous studies by Eisfeld & Robinson (2004) and Culloch & Robinson (2008) have intimated the significance of the southern coastline of the outer Moray Firth as a calving / nursery area for the Moray Firth bottlenose community. In addition to anthropogenic impacts, factors such as food availability, maternal experience and even mate choice and group size, however, are all thought to affect the RS of bottlenose dolphins in this location. Nevertheless, an accurate picture of RS could not really be provided in this study owing to the number of calves that were unable to be tracked to weaning. This was largely due to the extensive range and movements of this coastal dolphin population, which resulted in discontinuous sightings and substitution of many of the study animals in the outer firth across the 10-year study period. Accordingly, the low figures obtained for calf survivability did not correlate with the large inter-calving interval of 4.09 years determined, and therefore a broader evaluation with more complete sightings data is needed to provide a better assessment of calf mortality rates in this case. Consequently, we propose an integrated effort involving all research institutions currently working with this Moray Firth dolphin colony to address this concern and the concerns of Grellier *et al.* (2003) for the viability of these North Sea bottlenose dolphins. We hope to commence this work in May 2008 in collaboration with the University of Aberdeen.

References

Eisfeld, S.M., & K.P. Robinson (2004). The sociality of bottlenose dolphins in the outer southern Moray Firth, NE Scotland: Implications for current management proposals? *European Research on Cetaceans* **18**.

Culloch, R.M. & K.P. Robinson (2008). Bottlenose dolphins using coastal regions adjacent to a Special Area of Conservation (SAC) in NE Scotland. *Journal of the Marine Biological Association of the UK* **88** (in press).

Grellier, K., P.S. Hammond, B. Wilson, C.A. Sanders-Reed & P.M. Thompson (2003). Use of photo-identification data to quantify mother-calf association patterns in bottlenose dolphins. *Canadian Journal of Zoology*, **81**, 1421-1427.

Patterson, I.A.P., R.J. Reid, B. Wilson, K. Grellier, H.M. Ross & P.M. Thompson (1998). Evidence for infanticide in bottlenose dolphins: an explanation for violent interactions with harbour porpoises? *Proceedings of the Royal Society of London B.*, **265**, 1167-1170.

Ross, H.M. & B. Wilson (1996). Violent interactions between bottlenose dolphins and harbour porpoise. *Proceedings of the Royal Society of London* B, **263**, 283-286.

22nd Annual Conference of the European Cetacean Society, Egmond aan Zee, Netherlands, 10–12 March 2008