

**JOANA AUGUSTO**

**BSc (Environmental Biology, Marine Area), University of Lisbon, 2006**

**MSc (Marine Ecology), University of Lisbon, 2008**

**DEPARTMENT OF BIOLOGY**

**TITLE OF THESIS:** SOCIAL STRUCTURE OF THE PILOT WHALES (*GLOBICEPHALA MELAS*) OFF CAPE BRETON, NOVA SCOTIA, CANADA

**TIME/DATE:** 1:00 pm, Friday, April 21, 2017

**PLACE:** Room 3107, The Mona Campbell Building, 1459 Lemarchant Street

**EXAMINING COMMITTEE:**

Dr. Richard Connor, Department of Biology, University of Massachusetts (External Examiner)

Dr. Timothy Fraser, Department of Biology, Saint Mary's University (Reader)

Dr. Daniel Ruzzante, Department of Biology, Dalhousie University (Reader)

Dr. Hal Whitehead, Department of Biology, Dalhousie University (Supervisor)

**DEPARTMENTAL REPRESENTATIVE:** Dr. Jonathan Wright, Department of Biology, Dalhousie University

**CHAIR:** Dr. Valerie Chappe, PhD Defence Panel, Faculty of Graduate Studies

**ABSTRACT**

The long-finned pilot whale (*Globicephala melas*) is an intensely social species. I describe the social structure of the population off Cape Breton, Nova Scotia, using 12 years of individual association and behavioural data, adding molecular analyses and investigating alloparental care. Previous studies on the social structure of the species point to pilot whales being organized into social units that associate in labile groups. Units were thought to be matrilineal and comprised of both males and females, with individuals showing bisexual phylopatriy. So, social structure for this species was thought to be similar to that of 'resident' killer whales (*Orcinus orca*) in the northwest Pacific. The results of my research suggest a somewhat different structure.

I confirmed that pilot whales live in social units comprised of both sexes. I found 21 units in this population, with an average size of 7 individuals. One of the units, the K complex, became very large and started breaking apart over the duration of the study. I found that, over and above membership of the same unit, behavioural state influences how individuals associate with each other.

Genetic analysis of microsatellites found no greater relatedness of individuals within the same unit rather than in different units. It seems that unit membership is more fluid than previously thought. I could not assess matrilineality using analysis of mitochondrial DNA due to low haplotype diversity, with only 3 haplotypes identified.

I tried to create a model to sex individuals based on dorsal fin shape and photo identification characteristics, but found no correlation between any of those identifiers and individuals' gender.

Alloparental care is common in this population, with more than half the calves being cared for by non-parents. Both sexes care for calves, and carers and calves can be from different social units. There were no cases of reciprocal care, although it is possible reciprocity is occurring outside of the studied 3-year time frame.

In conclusion, this population showed some features of social structure that were expected, including the existence of social units, their size and the prevalence of alloparental care. The study also highlighted aspects that were not expected, such as dispersal between units shown by the microsatellite data and a broad distribution of potential alloparental carers for a calf.