

Best Talk – Pre-doctoral student: Emily Humble

Measuring inbreeding in a declining population of Antarctic fur seals

Authors:

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Abstract:

Inbreeding depression has been a major focus in ecology, evolution and conservation for decades. In an age where climate change and habitat destruction threaten to reduce the size of many natural populations, quantifying the extent and impact of inbreeding depression in the wild is of critical importance and yet has been hampered by the difficulty of precisely measuring individual inbreeding coefficients. Antarctic fur seals (*Arctocephalus gazella*) provide an ideal opportunity to investigate the impacts of inbreeding in the wild. During the 1800s, fur seals were pushed to the edge of extinction due to years of persistent hunting for their pelts and consequently experienced a severe bottleneck. Despite this, when hunting ended, the species quickly recovered to reach numbers in the millions. However, environmental change has led to increased sea surface temperatures and reduced sea ice around the western Antarctic Peninsula. As a result, the quantity and quality of Antarctic krill, the seal's primary food supply, has declined. Over the last three decades, this has led to a reduction in pup birth weights, increased mortality of inbred pups, and consequently, the population is experiencing a severe decline yet again. For the first time in a marine mammal we used tens of thousands of genomic markers to precisely measure individual inbreeding through estimating runs of homozygosity. We combined this with data collected in the field to explore the impact of inbreeding on juvenile growth, which is a reliable predictor of survival and closely associated with food availability. I present evidence for inbreeding depression, and consider both the implications of these findings on the capacity for fur seals to respond to a changing environment, and the applications of my methods to other vulnerable species.