

USING SPECIES-SPECIFIC FORAGING RANGES CAN DETERMINE HOW INTRINSIC AND EXTRINSIC FACTORS SHAPE COLONY DYNAMICS

Grecian William James¹, Matthew J. Witt², Stuart Bearhop², Brendan J. Godley², Martin J. Attrill¹ and Stephen C. Votier¹

¹ Marine Biology and Ecology Research Centre, University of Plymouth, Plymouth, Devon, PL4 8AA, United Kingdom
E-mail: james.grecian@plymouth.ac.uk

² Centre of Ecology and Conservation, University of Exeter, Cornwall Campus, Penryn, Cornwall, TR10 9EZ, United Kingdom

Despite over forty years of research since David Lack first investigated factors regulating colonial nesting seabirds, the topic remains hotly debated. Lack originally proposed that seabird colonies were regulated in a density dependent fashion and recent evidence supports this view, indicating that seabird colonies may be regulated by intra- as well as inter-specific competition for food. Nevertheless, no study has integrated both intra- and inter-specific competition simultaneously and more importantly has not corrected for the availability of resources. Previous studies have grouped foraging ability across species and projected foraging ranges using generic radii. Instead we estimate species-specific foraging ranges, and integrate them with data on the position and size of colonies around the coasts of the United Kingdom and Ireland. We use the resulting models of potential foraging effort to measure intra- and inter-specific comparisons of colony position, colony size and foraging range overlap. These models allow us to determine the degree to which both intra- and inter-specific competition may influence colony size and also highlight areas of high foraging effort. The results will be compared with data on remotely sensed marine characteristics, such as sea surface temperature, chlorophyll-a distribution and fisheries pressure, to elucidate the drivers of cross-species colony dynamics. These findings have implications for understanding the demography and conservation of colonial nesting seabirds.