Session 3: Population Dynamics

Keynote

Date: Tuesday 31 October, 2017
Time: 15:45 – 16:30
Room: Seminar Room

Age-specific contributions to the dynamics of hole-nesting birds

Author: **Marlène Gamelon**

Affiliation: Centre for Biodiversity Dynamics, Department of Biology, Norwegian University of Science and Technology, Trondheim, Norway

Classical approaches for the analyses of density dependence assume that all the individuals in a population equally respond and equally contribute to density dependence. However, in age-structured populations, individuals of different ages may differ in their responses to changes in population size and how they contribute to density dependence affecting the growth rate of the whole population. Here, we apply the concept of critical age classes, i.e. a specific scalar function that describes how one or a combination of several age classes affect the demographic rates negatively, in order to examine how total density dependence acting on the population growth rate depends on the age-specific population sizes. In a 38-year dataset of an age-structured great tit (*Parus major*) population, we find that the age classes including the youngest breeding females were the critical age classes for density regulation. These age classes correspond to new breeders that attempt to take a territory and that have the strongest competitive effect on other breeding females. They strongly affected population growth rate and reduced recruitment and survival rates of all breeding females. We also show that depending on their age class, females may differently respond to varying density. In particular, the negative effect of the number of breeding females was stronger on recruitment rate of the youngest breeding females. These findings question the classical assumptions that all the individuals of a population can be treated as having an equal contribution to density regulation and that the effect of the number of individuals is age independent. Our results improve our understanding of density regulation in natural populations.