

Beyond population regulation and limitation

Charles J. Krebs

Abstract

The study of population dynamics addresses three questions that are not always separated in discussions with empirical data. Two questions address population regulation. *What stabilises population density* is the first question, and, in spite of much theory, little progress has been made in answering this question empirically. The assumption of an equilibrium density is impossible to test and direct experimental tests to answer this question are rare. *What prevents population growth* is a second question, and is the classic question of population regulation. To answer this question requires an increasing population, and, with adequate experimental manipulations, the density dependent factors preventing increase can be identified. Surprisingly, answering this question has provided little assistance in solving practical problems in population dynamics, possibly because most populations are rarely in the state of growth and show a limited range of densities. *What limits population density in good and poor habitats* is a third question, which addresses population limitation rather than regulation, and has been the most useful question for empirical ecologists to ask. Population limitation admits of little theory and no elegant models, and highlights the gap between theory and practice in much of ecology. Defining the question clearly and adopting an experimental approach with clear alternative hypotheses will be essential to avoiding the controversies of the past while building useful generalisations for the practical problems of population management.