

Symposium 34 Optimality in bird migration — the role of stopover ecology

Introduction

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Bird migration has many components, and varies among species, populations, age classes and sex. Yet its causes, adaptive significance, and consequences are only now being explored. This has and will only become possible by taking advantage of comparative and integrated studies that combine theory, field observation and laboratory experiment, and link mechanical physics, physiology, ecology and behavior.

Stopovers to refuel are a crucial component because they largely determine the speed and success of migration. When replenishing energy stores at stopover sites, migrants have to forage in unfamiliar habitat with unknown food resources and predation risk in competition with others under unpredictable weather. Furthermore, the flight bout just completed may have affected capabilities entailing behavioral and physiological constraints; and the prospective bout may affect duration and fat accumulation at the site. Although models predict the optimal way in which migrants should fatten up under given selective pressures, there are few empirical studies of this process. So this symposium attempts an overview of current optimality models in avian migration and of recent findings in behavioral and physiological ecology during stopovers.

Anders Hedenström and Thomas Weber address modeling that integrates fuel loading with the mechanics of flight and energy use for determining optimal flight times,

distances and speeds. Volker Dierscke breaks ground by synthesizing a range of intrinsic and extrinsic (environmental) factors affecting departure decisions in small passerines from empirical studies of northern wheatears and other migrants. Nikita Chernetsov and Casimir Bolshakov report the development of small temporary home ranges in some species and individuals at stopovers, but not in others, which has implications for body condition and refueling and affects departure decisions. Michael Schaub completes the symposium by presenting a methodological framework for comparing and rating the importance of extrinsic and intrinsic factors affecting departure decisions from simple capture-recapture data. It is yet another step forward towards understanding stopover ecology and managing migrants at stopover sites. One paper by Frank Moore and colleagues, which addressed mainly the physiological aspects of stopover ecology, was given only as an oral. Its abstract is published in the Abstract volume for the Congress.

More detailed knowledge of variation in migration and its mechanisms and regulatory processes is crucial for understanding the role of migration within the complete life cycle of migrant species, for understanding how natural selection moulds migratory life-histories, and for elucidating the evolution of those life-histories.