Desert bums and city slickers: Physiological adjustments of birds to urbanization

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Urban environments are evolutionary novel and challenging to many organisms, yet many of these organisms, including avian taxa, adjust well to these environments. At the core of these adjustments are physiological changes, including to the reproductive system activity. In particular, urban birds commonly show advanced seasonal reproductive development compared to non-urban conspecifics, a difference that may result in an overall longer breeding season and enhanced fitness. The physiological bases of advanced reproductive development in urban environments are poorly understood. Many seasonally breeding birds have evolved to reproduce when trophic resources for the offspring are most abundant. Urban areas often provide more food resources, including of anthropogenic origin, than non-urban areas. A focus of our research, therefore, has been to test whether food availability and nutritional quality contribute to the vernal advancement of reproductive phenology observed in urban birds, and to unravel the underlying mechanisms. To address this issue, our work combines field and laboratory work on birds of wild origin and belonging to several species. Our results suggest effects of food availability at several levels of the reproductive axis, in particular the endocrine hypothalamus and the gonads. Future progress hinges of studies investigating (1) how urban birds integrate the effects of additional factors, e.g., water availability, predation pressure, noise, and artificial lights into reproductive responses; (2) the mechanisms of action of these factors at all levels of the reproductive axis; and (3) the fitness consequences of reproductive adjustments to urbanization.