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FOCUS

PROJECT

The Signalling Value of Colouration: a Role for Pleiotropy

Establishing the links between phenotype and genotype is key to resolving questions about the evolution, maintenance and adaptive function of phenotypic variation. This is particularly interesting when a phenotype is positively selected in one sex but negatively in the other sex (sexually antagonistic selection). Identifying the genes responsible for variation in phenotypes selected in opposite directions in the two sexes is particularly interesting because these genes may have beneficial physiological effects in one sex but detrimental ones in the other sex. Using the cosmopolitan barn owl, I tackle the genetic basis of sexually antagonistic selection exerted on a melanin-based plumage trait. Because the melanocortin system is involved in the expression of melanin pigments and pleiotropically regulates a large number of physiological and behavioural traits, I look for polymorphisms in this system and measure the expression levels of these genes in relation to melanin-based colouration and their associated traits. This study is relevant from an evolutionary and biomedical point of view because the melanocortin system is highly conserved across vertebrates and implicated in many physiological functions and diseases.

Recommended Reading

Emaresi, G., A.-L. Ducrest, P. Bize, H. Richter, C. Simon, and A. Roulin (2013). "Pleiotropy in the melanocortin system: expression levels of this system are associated with melanogenesis and pigmentation in the tawny owl (Strix aluco)." Molecular Ecology 22: 4915-4930.
Roulin, A., R. Altwegg, H. Jensen, I. Steinsland, and M. Schaub (2010). "Sex-dependent selection on an autosomal melanic female ornament promotes the evolution of sex ratio bias." Ecology Letters 13: 616-626.
Ducrest, A.-L., L. Keller, and A. Roulin (2008). "Pleiotropy in the melanocortin system, coloration and behavioural syndromes." Trends in Ecology and Evolution 23: 502-510.

TUESDAY COLLOQUIUM, 02.06.2016

Parent-Offspring Conflict and Sibling Negotiation

Until the sixties and seventies evolutionary biologists envisioned family interactions as harmonious with parents maximising the number of surviving offspring. However, after the development of the theories of kin selection and parent-offspring conflict, it became evident that family members might have conflicting interest concerning the allocation of parental resources and such conflicts may be particularly violent between siblings. Sibling competition refers to rivalry between siblings over access to limited parental resources. The cause of sibling rivalry stems from offspring demanding more resources from their parents than they are willing to supply. The limitation of resources leads to three forms of conflict between family members: siblings compete among each other to share resources, offspring are in conflict with their parents over how much they should invest in providing resources, and in species with biparental care the mother and father are in conflict over how much effort each party should assume. The observation that even closely related individuals compete intensely for resources may seem counterintuitive at first sight. There is however a trade-off between behaving altruistically towards relatives to derive indirect genetic benefits and competing with them to obtain direct material benefits. This makes the study of sibling interactions challenging as such interactions range from cooperation to fierce competition. Here I will present a review of parent-offspring conflict and sibling competition and elaborate the concept of sibling cooperation based on data collected in the barn owl (Tyto alba).

PUBLICATIONS FROM THE FELLOWS' LIBRARY

Roulin, Alexandre (Cambridge, United Kingdom,2020)

Barn owls : evolution and ecology

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=166433517X

Roulin, Alexandre (2018)

A melanin-based trait is more strongly related to body size in the tropics than in temperate regions in the globally distributed barn owl family

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1048946452