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Room: Seminar Room

## Eco-evolutionary dynamics of a sexually selected trait in a Mediterranean population of pied flycatchers

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To understand the evolutionary dynamics of phenotypic traits and the potential of populations to adapt to changing environmental conditions, it is essential to identify the factors that best explain variation in selection. This is particularly relevant for sexually selected traits since they are directly associated to reproductive success, and environmental change can modify their frequency distribution over time by influencing such association. The effects of climate change on eco-evolutionary dynamics have often been investigated, but whether climate is a proximate cause of evolutionary change or its effect is related to other agents of selection has been little explored. Thus, there is a need for a systematic approach dedicated to finding the best abiotic or biotic factors driving selection on the expression of secondary sexual traits in wild populations. We use long-term data gathered from a population of pied flycatchers in which the sexually-selected male white forehead patch has steadily increased in mean size over 30 years. We first show that climate has no direct effect on the expression of patch size but is instead mediated by population density. Secondly, we find that viability and fecundity selection on male patch size can be driven by climate or population density, respectively. Specifically, we find opposing trends of viability and fecundity selection in relation to population density. This suggests that individuals with larger patches face a different life-history trade-off as a function of population density. A behavioural interpretation of this is that the ornament cost is density-dependent, so males with a larger patch may switch their investment from reproduction to survival as population density increases. We suggest that evolutionary dynamics of this sexual trait in our population is driven more by intrinsic (intra-sexual) than extrinsic (climatic) factors although a potential indirect effect of climate on population demography cannot be ruled out.