

Abstract

Sexual selection theory tries to explain evolution of apparently useless traits which mainly developed in males of numerous species. One such trait is also rich and vibrant coloration, typical for many of the bird species. These traits are difficult to be falsified, and therefore they honestly signal quality of the individual. Carotenoid coloration reflects the health condition and melanin coloration the social status, even though this traditional division might not be as strict according to the latest studies. Apart from these ways of maintaining honesty, recent studies are focusing more also on the effect of hormones, mainly two steroids: male sexual hormone – testosterone –, and the “stress” hormone – corticosterone. Both hormones could positively influence male’s sexual traits such as ornamental coloration. On the other hand, elevated levels of these hormones possess risk to the organism (higher energetic expenditure, chronic stress), therefore also might potentially become costly.

Using photographs of birds in standardized conditions as well as spectrophotometry I analyzed the plumage coloration of males of the Yellowhammer (*Emberiza citrinella*). Concentrations of testosterone and corticosterone deposited in feathers were analyzed using the LC-MS/MS. Also, for males in breeding season 2015, their territoriality status and overwinter survival was assessed. I have found that to analyze feather coloration with spectrophotometer, one should measure at least ten feathers to obtain representative results. Then I showed that young and old males differed in hue and blue chroma of their carotenoid coloration. Hue also seems to be positively correlated with feather corticosterone, though this trend was only marginally significant. A significant negative correlation was found between brightness of melanin rump and feather testosterone. My models also suggested a trend that males with brighter and more extensive carotenoid plumage and higher feather corticosterone have higher overwinter survival. Findings of this thesis are unique, as not like other studies, I used a novel method of feather testosterone assessment, and as probably the first one I found potential relationship between melanin and deposited testosterone.