

Abstract:

Avian life histories range along the axis from slow to fast, with slow life histories being characterized by greater investments in future reproduction, and fast by greater investments in current reproduction. The concept of pace-of-life syndromes refers to the coevolution of life strategies and related physiological, immunological and behavioral traits. Avian species from tropical areas are characterised by slower life histories (longer parental care, later maturation, smaller clutches, reduced metabolic rate) when compared to temperate zone species. Within this latitudinal gradient, investments in the total amount (weight) of body feathers have also been shown to be reduced in tropical birds. It remains unclear, however, whether feather growth itself follows this latitudinal pattern, and is slower in tropical species. Tropical birds have lower basal levels of corticosterone and testosterone, however available studies are based mainly on analyzes of hormone concentrations from plasma. The first aim of this diploma thesis was to evaluate differences between tropical (Cameroon) and temperate zone (the Czech Republic) passerine species in investments in tail feather growth by using methods of comparative ptilochronology. The second aim of the diploma thesis was to analyze concentrations of steroid hormones from feathers in selected temperate zone (Czech) passerine species by using approaches based on the HPLC/MS method. When controlled for feather length and body weight, feathers showed slower growth rates for Cameroonian species. At the same time, sub-Saharan migrants exhibited the same growth rates as temperate residents and short distance migrants. These results suggest that the tail feather growth rate increases along the latitudinal gradient, from the equator towards the temperate zone, and feathers of the same length grow longer in tropical passerines than in their temperate zone counterparts. The HPLC/MS analysis detected steroid hormones, namely corticosterone and testosterone, in all analysed feathers. Hormone concentrations analysis of selected species of temperate zone passerines showed high repeatability values despite relatively low sample sizes and relatively high variability in hormone concentrations between left and right feathers. Concentrations of feather steroid hormones differed at interspecific comparison, however, the relationship between the concentrations and the ptilochronological parameters of the feather was not revealed, probably because of a limited sample size. To conclude, our finding that tropical birds grow tail feathers slower can deepen existing knowledge of changes in bird life histories along the global latitudinal climatic gradient. The combination of ptilochronology and new methods of hormone analysis from feathers could provide an effective tool for studying investments in feather growth in the context of latitude associated pace-of-life syndromes.

Key words: comparative analysis, corticosterone, feather growth bar, HPLC, life history traits, ptilochronology, pace-of-life syndrome