

Determination of feather testosterone and corticosterone in barn swallow (*Hirundo rustica*)

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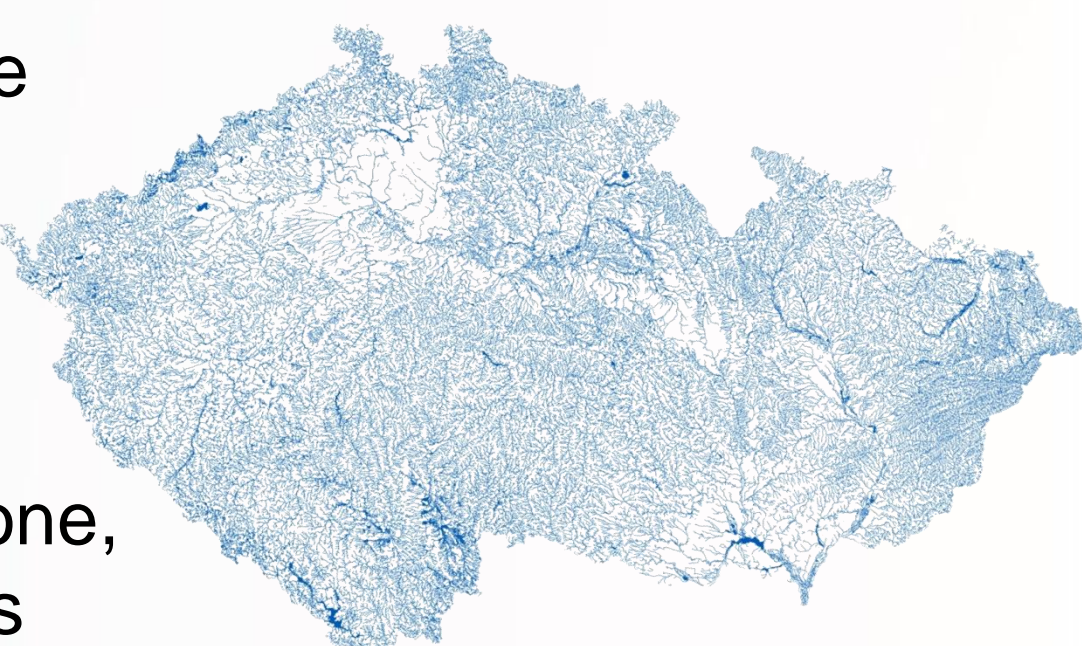
Introduction

Stress and sex hormones can be potential mediators of individual fitness. They regulate reproduction and survival-related traits according to environmental conditions and individual physiological state. Feathers gradually accumulate hormones during their growth. Analysis of hormone concentration in feathers is suitable method for studies of carry-over effects linking periods of wintering and breeding in long-distance migrants such as barn swallow (*Hirundo rustica*).

What have we tested?

✓ relationships between corticosterone, testosterone concentrations and feather growth rate as a signal of condition

✓ differences in corticosterone, testosterone concentrations and feather growth rate between sexes



Benefits of using feathers

- resistant to cold and heat
- stable (analysis of older feathers)
- feather growth in one period
- long-time hormonal levels at time of feather growth



Conclusion

The study was focused on method optimization for determination of testosterone and corticosterone in bird feathers. Barn swallow was used as model species.

One of the results suggests an involvement of stress hormones in feather growth of barn swallow which may help to understand the mechanisms ensuring honesty of body condition signaling. Relationship between feather growth rate and corticosterone level in feather was confirmed. Higher growth rate is connected with lower corticosterone level. No effect of testosterone was founded. This relationship asserted separately in both sexes too.

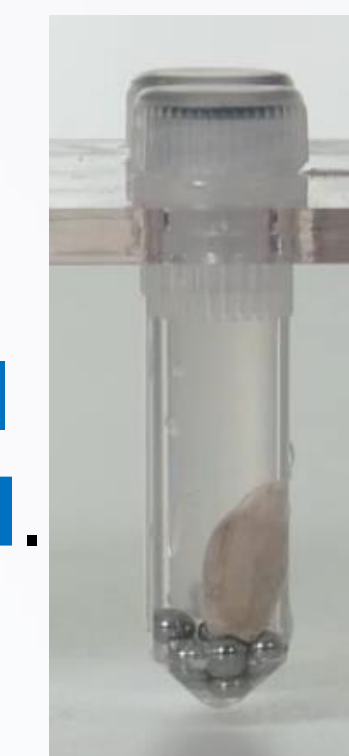
This work will continue the comparative study of feather steroids analysis among other bird species.



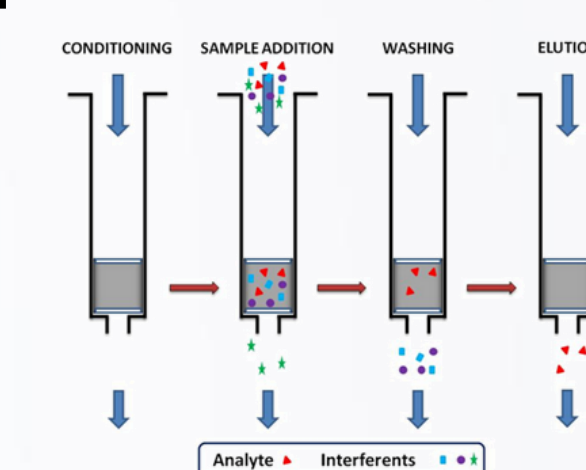
1. Downy feathers were collected for the analysis of steroids.



2. The feathers were pulverized by ball mill and extracted with MeOH.

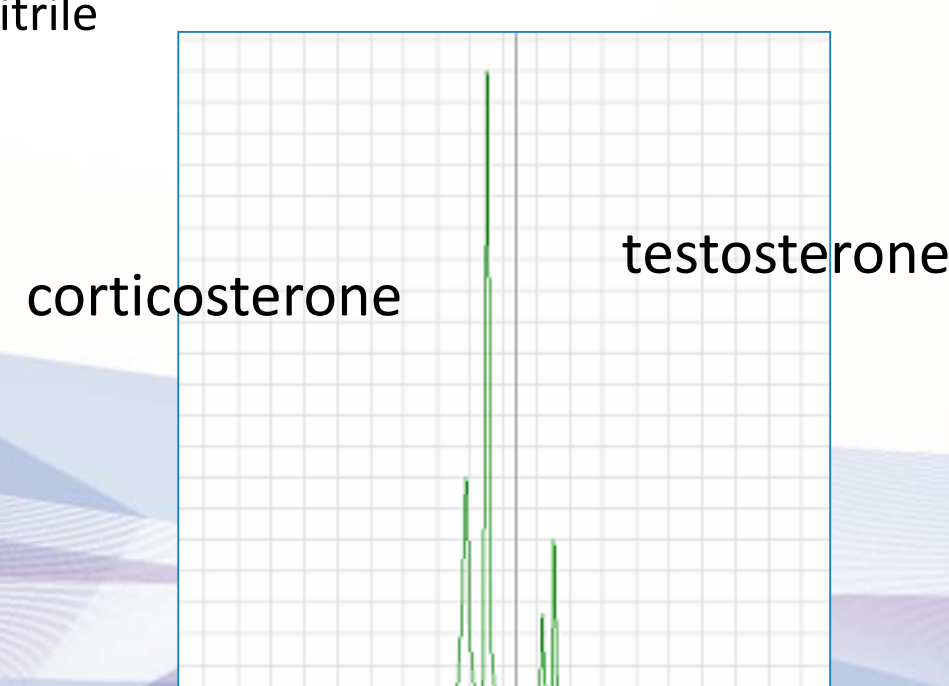


3. The extract was purified by SPE (solid phase extraction). Purified extract was transferred to micro-vial and evaporated to dryness.

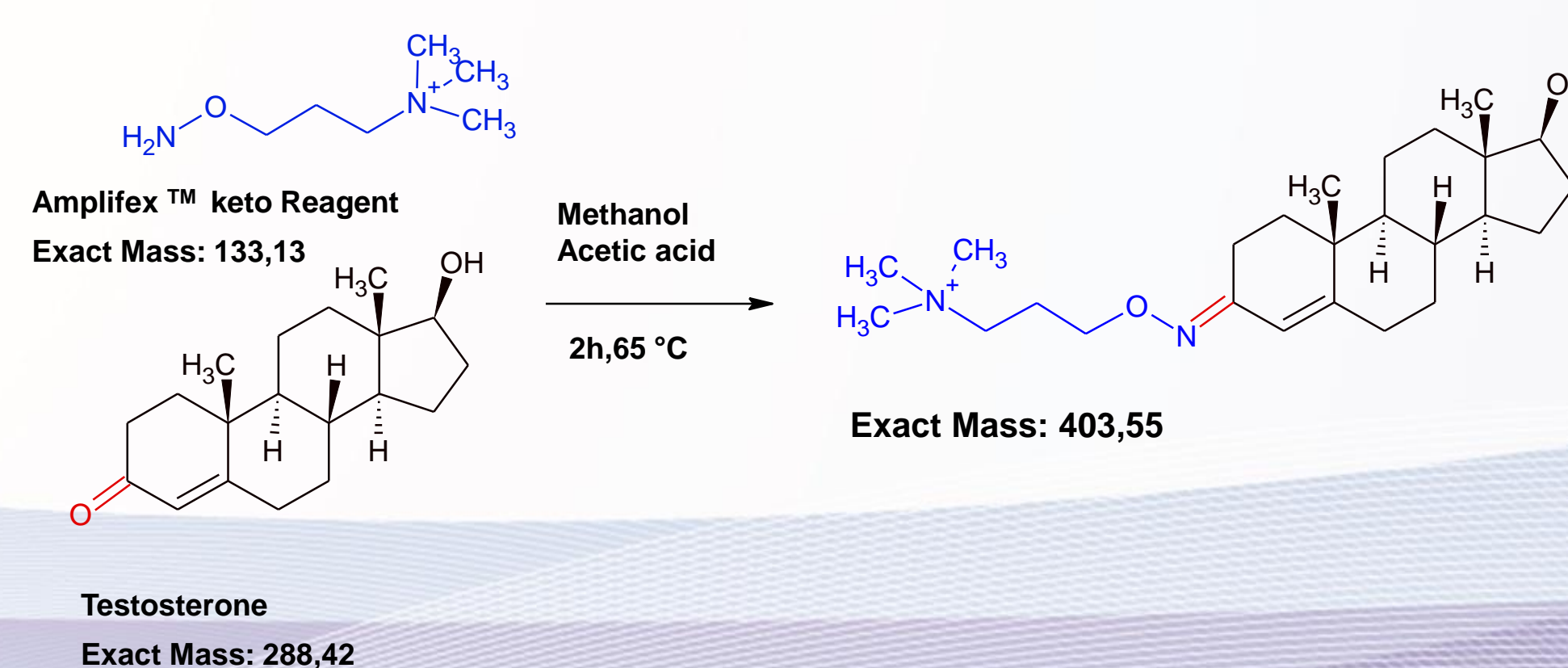


5. LC/ESI/MS/MS analyses

- MP: 0,1% FA Water/ Acetonitrile
- SP: C18

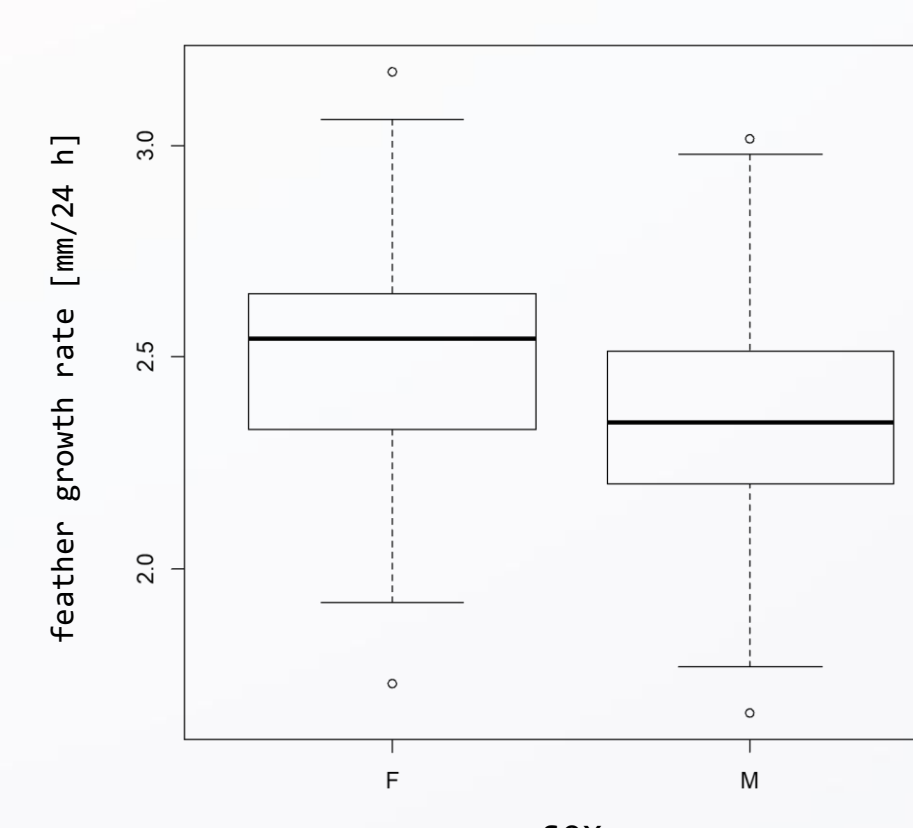
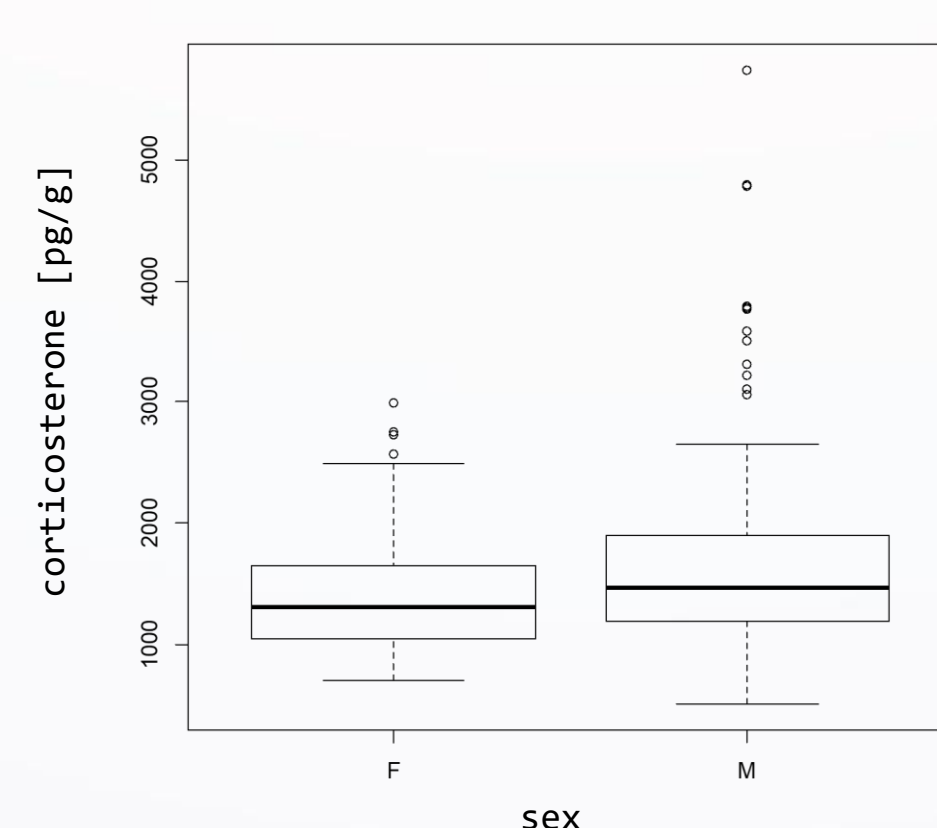


4. The Amplifex™ keto Reagent was used for hormones derivatisation.

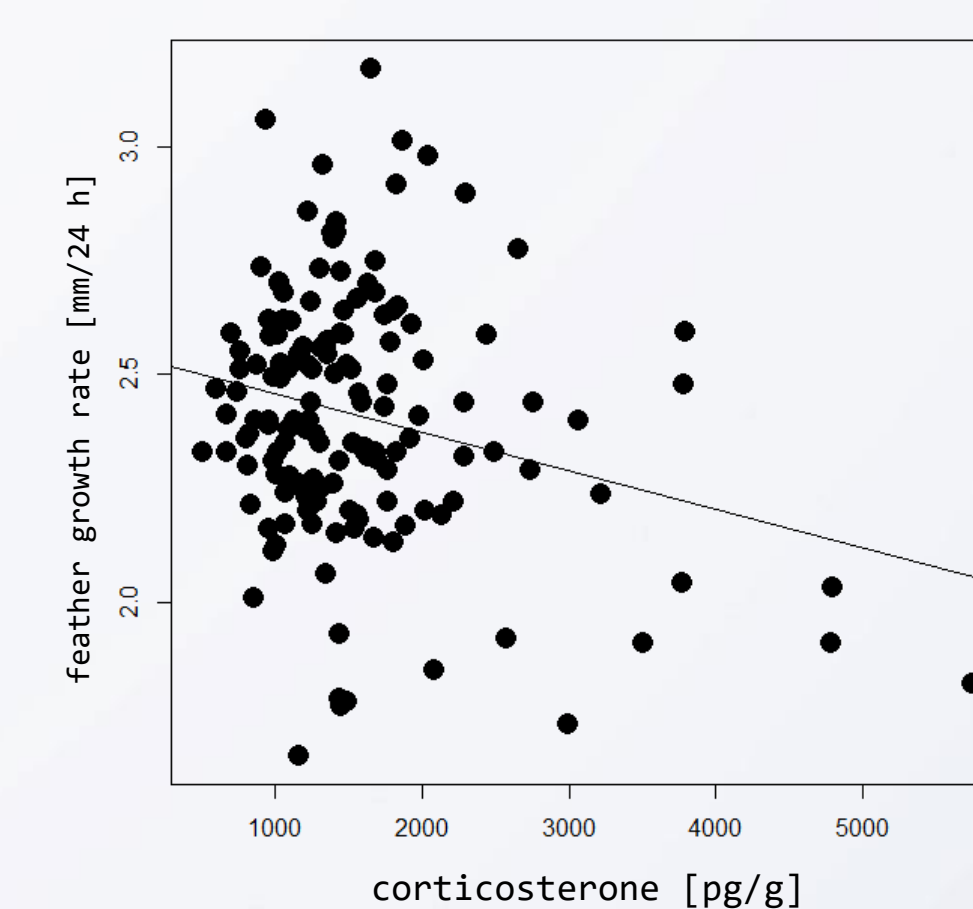


Corticosterone differences between sexes and feather growth rate

- corticosterone levels between sexes: $t_{162} = 2,197$; $p = 0,029$
- feather growth rate between sexes: $t_{142} = -3,11$; $p = 0,002$



- corticosterone levels and feather growth $t_{142} = -3,031$; $p = 0,003$



- males have higher corticosterone levels than females
- males have lower growth rate of feathers than females
- birds with higher growth rate have lower corticosterone levels

Acknowledgement

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