



Seewiesen Colloquia

Speaker by: Research Group Hau

Thursday, 29 September 2016, 13h, House 4, Lecture Room

Coping with challenges: plasticity, repeatability and evolution of hormonal phenotypes

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Hormones mediate individual decisions on behavior and life history strategies depending on internal and external conditions. The glucocorticoid hormone corticosterone (CORT) is involved in metabolic processes and thus facilitates adjustments in behavior and life history strategies to energetic circumstances. Vertebrate populations can show substantial within- and among-individual variation in circulating CORT concentrations, raising questions on the causes of such variation and its phenotypic consequences. Furthermore, to understand evolutionary processes we need to determine whether CORT traits of individuals are repeatable and heritable, whether they are related to fitness components and which selection pressures they may underlie. To approach these questions, we assessed relationships among CORT traits, behavior, internal and environmental challenges and fitness in individual great tits (*Parus major*), combining field and captive studies. In great tits, circulating CORT concentrations were related to behavioral phenotypes including exploratory behavior, parental investment, and pair bond dynamics. Circulating baseline CORT concentrations were also related to reproductive success in wild great tits. Even though CORT concentrations showed considerable within- and among-individual variation, we found significant repeatabilities for CORT traits, especially when environmental variation was reduced in captivity. Given the high sensitivity of CORT concentrations to both internal and external cues, we have begun to test whether individuals exhibit consistent reaction norms in CORT traits, which may constitute an important component of an individual's hormonal organization. Our work aims at elucidating evolutionary patterns in hormonal phenotypes of wild avian populations.

Who is Michaela Hau?

- 1995 Ph.D. in Zoology, Ludwig-Maximilians-University Munich, Germany,
- 1995-1998 Post-doctoral researcher at University of Washington, USA
- 1998-2000 Research Specialist & Adjunct Assistant Professor, Dept. Ecology, Ethology and Evolution, University of Illinois at Urbana-Champaign, USA.
- 2000-2008 Assistant Professor, Dept. Ecological and Evolutionary Biology, Princeton University, USA.
- 2008-2013 Group leader, Max Planck Institute for Ornithology, Radolfzell.
- Since 2011 Professor, Department of Biology, University of Konstanz.
- Since 2013 Group leader, Max Planck Institute for Ornithology, Seewiesen.

Selected publications:

- Hau, M., Casagrande, S., Ouyang, J.Q. & Baugh, A.T. 2016. Glucocorticoid-mediated phenotypes: multilevel variation and evolution. *Adv. Study Behav.* 48: 41-115.
- Hau, M. & Goymann, W. 2015. Endocrine mechanisms, behavioral phenotypes and plasticity: known relationships and open questions. *Front. Zool.* 12 (Suppl): S7.
- Ouyang, J.Q., Sharp, P., Quetting, M. & Hau, M. 2013. Endocrine phenotype, reproductive fitness and survival in the great tit, *Parus major*. *J. Evol. Biol.* 26(9): 1988-1989.
- Baugh, A.T., van Oers, K., Naguib, M. & Hau, M. 2013. Initial reactivity and magnitude of the acute stress response associated with personality in wild great tits (*Parus major*). *Gen. Comp. Endocrinol.* 89: 96-104.
- Ouyang, J.Q., Sharp, P.J., Dawson, A., Quetting, M. & Hau, M. Hormone levels predict individual differences in reproductive success in a passerine bird. *Proc. R. Soc. Lond. B.* 278: 2537-2545.