



**20**  
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## SÉMINAIRE

# Non-random inbreeding with respect to phenotype biases estimates of inbreeding depression

**Philipp Becker**

Université de Zürich

Animals often show substantial variation in dispersal behaviour and resident individuals are more likely to inbreed. At least part of the variation in dispersal behaviour may be phenotype-dependent, potentially leading to non-random inbreeding with respect to a particular phenotype. Here we show that non-random inbreeding in structured populations can have important implications for estimates of the effect of inbreeding (inbreeding depression). We do this using a long-term individual-based data set for a population of Eurasian dippers (*Cinclus cinclus*), a bird species living exclusively along streams and rivers. Extensive pedigree data show that close inbreeding is relatively common in this species. However, inbreeding birds are not a random subsample of the population but are smaller on average. Given the significant heritability of body size, inbred individuals are smaller due to both additive genetic and inbreeding effects. Importantly, the effects of inbreeding are overestimated if additive genetic effects are not accounted for. We show how estimating the effects of inbreeding within an animal model framework removes this bias, highlighting the importance of integrating quantitative genetics and animal behaviour when measuring the effects of inbreeding in the wild.