SEEWIESEN

LECTURE SERIES

Max Planck Institute for Ornithology

FALL/WINTER/SPRING 2020/2021

MAX PLANCK GESELLSCHAFT

THURSDAY | December 3rd, 2020 | 13.00 | ONLINE

ANDREA AND MELISSA GRUNST

University of Antwerp | Host: Küpper Research Group

Interconnections between behavior, sexual selection and senescence in a dimorphic bird with a supergene

The white-throated sparrow (Zonotrichia albicollis) is an ordinary looking songbird with extraordinary genetics. Both sexes exist in either a white-striped or tan-striped morph, as determined by a >100-Mb inversion-based supergene on the second chromosome. White morph birds are almost all heterozygous for the supergene, suggesting that homozygousity is deleterious. Tan morph birds are homozygous without the supergene. The supergene is associated with a suite of coadapted traits that are expressed by both white males and females, including higher levels of aggressiveness, song and copulation, and lower levels of parental care. Due to behavioral and genetic incompatibilities within white male x white female pairs, white-throated sparrows pair dissassortively by morph. Tan males and white females share parental care relatively equally, whereas white males provide little paternal support to tan partners. We leveraged this unique system and an 18-year long-term dataset regarding reproduction and survivorship to test different evolutionary theories of aging, and elucidate how differences in actuarial and reproductive senescence might affect the balance in fitness between morphs. On one hand, some theories of aging suggest that competitive traits, such as those associated with the supergene, have high physiological costs and promote a live-fast-die-young strategy and faster senescence. On the other hand, intense investment in parental care, as in the tan morph, can also have costs. Furthermore, a more cooperative reproductive strategy, as observed in tan males x white female pairs, might lessen reproductive costs and dampen senescence rates. Our data do not support high costs of the competitive traits associated with the morph-determining supergene, but rather suggest high costs of unsupported parental care, and that cooperative reproductive strategies might dampen rates of senescence. To better understand how genetics contribute to morph differences in life-history and senescence, more work is needed regarding how specific genes within the supergene affect physiological and self-maintenance differences between the morphs. Such work will ultimately advance understanding of how supergenes promote the persistence of multiple morphs with distinct life-history strategies within a species.

WHO ARE ANDREA AND MELISSA GRUNST?

2013 – 2016 Postdoctoral Researcher, Dept. Biology/Center for Genomic Advocacy
Indiana State University, Terre Haute, IN

2016 – 2020 Postdoctoral Fellow, Dept. of Biology/Behavioural Ecology and Ecophysiology Research Group
University of Antwerp, Antwerp, Belgium

2020 – present Postdoctoral Fellow, Institute Littoral Environnement et Sociétés
La Rochelle University, La Rochelle, France

SELECTED PUBLICATIONS

• Grunst ML, Grunst AS, Gonser RA, Tuttle EM. 2018. Actuarial senescence in a dimorphic bird: effects of sexual selection versus parental care. Proc R Soc Lond B. 285: 20182053. doi: 10.1098/rspb.2018.2053.

• Grunst AS*, Grunst ML*, Formica VA, Korody M, Betuel AM, Barcelo-Serra M, Ford S, Gonser RA, Tuttle EM. 2018. Morph-specific patterns of reproductive senescence: connections to discrete reproductive strategies. Am Nat. 191:744-755. doi: 10.1086/697377. *Shared first authorship.

• Grunst AS, Grunst ML, Gonser RA, Tuttle EM. 2019. Developmental stress and telomere dynamics in a genetically polymorphic species. J Evol Biol. 32: 134-143. doi: 10.1111/jeb.13400.

LINK TO TALK

https://gwdg.zoom.us/j/88963191522?pwd=Y3lZb0x1MnYvVEJ2ZHp5YXF1WXFoZz09
Meeting-ID: 889 6319 1522 - for code please contact:

CO-ORDINATOR Nicole Fritz | nicole.fritz@orn.mpg.de | 08157 - 932 240