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FOCUS

PROJECT

Multi-Locus Evolution from Genes to Communities

Our understanding of evolutionary change is largely built on the traditional genetic framework wherein the genes of individuals are responsible for differences in the traits they express. However, there is a growing appreciation of the fact that the traits of individuals are often influenced by the genes possessed by others. While there have been several models that have considered how these types of "indirect" genetic influences impact evolutionary processes, there are still important gaps in our understanding. To help close these gaps, we will work towards a general framework for understanding how various phenomena contribute to the relationship between genetic and phenotypic variation and how this, in turn, influences evolutionary processes. We aim to incorporate as wide an array of influences as possible, including "epigenetic" processes, interactions between genes at different scales, social interactions and interspecific interactions. To achieve this goal, we will develop a flexible analytical (mathematical) framework that unifies the influences of different phenomena by identifying fundamental modes through which they impact the relationship between genotype and phenotype. To maximize the link to the topic of the focus group, we will emphasize the evolution of positive interactions (cooperative or mutualistic) and negative interactions (conflict and competition). Our overarching goal will be to identify general processes and concepts that unify the contributions of different types of effects to evolutionary change.

Recommended Reading

Wolf, J. B., E. D. Brodie, III., J. M. Cheverud, A. J. Moore and M. J. Wade (1998). "Evolutionary consequences of indirect genetic effects." Trends in Ecology and Evolution 13: 64-69.
Wolf, J. B. and R. Hager (2006). "A maternal-offspring coadaptation theory for the evolution of genomic imprinting." PLoS Biology 4, 12: e380. doi: 10.1371/journal.pbio.004038.
Madgwick, P. G., B. Stewart, L. J. Belcher, C. R. L. Thompson and J. B. Wolf (2018). "Strategic investment explains patterns of cooperation and cheating in a microbe." Proceedings of the National Academy of Sciences, USA. doi.org/10.1073/pnas.1716087115.

PUBLICATIONS FROM THE FELLOWS' LIBRARY

Wolf, Jason B. (London,2019)

Conditional expression explains molecular evolution of social genes in a microbe

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=176393084X

Wolf, Jason B. (Washington, DC,2018)

Strategic investment explains patterns of cooperation and cheating in a microbe

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1027278558

Wolf, Jason B. (2017)

The coadaptation theory for genomic imprinting

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1027274773

Wolf, Jason B. (2013)

Evolution of genomic imprinting as a coordinator of coadapted gene expression

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1027277640

Wolf, Jason B. (London,2013)

Genomic imprinting and parent-of-origin effects on complex traits

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1027274226

Wolf, Jason B. (2007)

Indirect genetic effects from ecological interactions in Arabidopsis thaliana

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1027281222

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A maternal–offspring coadaptation theory for the evolution of genomic imprinting

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1027273084

Wolf, Jason B. (Amsterdam [u.a.],1998)

Evolutionary consequences of indirect genetic effects

https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=1027280064