NUS National University of Singapore | Department of Biological Sciences Faculty of Science

BIOLOGY COLLOQUIUM

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Hosted by Professor Rudolf Meier

THE SURPRISING DIETARY ECOLOGY OF THE MAGGOT : Exploring Environmental Effects In Development and Evolution

By **Russell Bonduriansky**

Evolution & Ecology Research Centre and School of Biological, Earth and Environmental Sciences, University of New South Wales, Australia

Bio

Russell Bonduriansky completed his PhD at the University of Toronto in 2004, and is currently Associate Professor at the University of New South Wales in Sydney. His research interests span extended heredity, developmental plasticity, sexual coevolution and life history, and he is particularly interested in forging conceptual links between these areas.

Although the role of environment in shaping the expression of phenotypic traits has been recognized since the dawn of evolutionary biology, recent research suggests that environmental effects on development can be far more subtle and pervasive than previously assumed, and can influence the course and outcome of evolution. We are using endemic neriid flies (*Telostylinus* spp.) as models to understand the nature and consequences of environmental variation. We have found that variation in a key environmental factor – the nutrient composition of the larval diet – apparently contributes a large proportion of total phenotypic variation in natural populations, regulates sexual size and shape dimorphism, and mediates a trade-off between larval survival and the expression of adult male secondary sexual traits. Larval diet reaction norms also evolve and diversify in a sex-specific manner. Moreover, environmentally-generated variation in important traits is partly transmitted across generations via nongenetic maternal and paternal effects, and theoretical analysis shows that nongenetic paternal effects on offspring condition can influence the course of sexual coevolution. Our findings suggest that variation in larval nutrition represents an important source of both heritable and nonheritable variation, and that such effects can play an important role in evolution.

Artwork by Ann Nee, DBS, NUS