# Lab in focus: Barbosa lab

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Dr. Flavia Barbosa is an Associate Professor of Biology at Lake Forest College. She specializes in behavioral ecology, evolution, sexual selection, mate choice, and animal communication. Barbosa has always been interested in evolution and animal behavior. She also has a love for insects. She obtained a Bachelors in Science in 2005 at the Universidade Federal de Minas Gerais in Brazil where she majored in Biology and Zoology. She then earned a PhD in Biological Sciences at the University of Missouri in 2011. During Grad school, Barbosa focused her research interests on sexual selection. She specifically researched mate choice and courtship behavior in a tropical species of soldier fly. This has contributed to her current research of sexually-selected behaviors such as the analysis of male courtship behaviors. Barbosa is excited to work on a diverse group of study organisms and wishes to further her future research by including more study organisms.

Barbosa started working at Lake Forest College in Fall 2017. Barbosa Lab is a working ecology lab at LFC that started research during Summer 2018. Barbosa has worked on numerous insects throughout her academic and working career including flies, treehoppers, katydids, moths, and beetles. At Lake Forest, she first started out researching the cost and benefits of waxmoth male courtship calls and the benefits waxmoth females gain from having mating preference. The students involved in waxmoth research were Chris Edomwande ‘19, Hannah Gurholt ’20, and Dari Gomez ‘22. Her current research is focused on ecological studies of moths and bean beetles. Barbosa Lab was awarded an NSF Grant to focus and expand research on beetles. Thus, life history traits in Bean Beetles (Callosobruchus Maculatus) became the main focus of Barbosa Lab. After the completion of this research, Barbosa hopes to continue her past research on moth communication as well as add more organisms of study to the lab. Past and present students involved in Barbosa Lab’s beetle research are as follows: Aaron O’Neill ‘21, Elise Grossman ‘20, Ellie Bacon ‘19, Jeannine McDonald ‘19, Sam Gascoigne ‘20, Desire Uwera Nalukwago ‘22, Frances Rice ‘21, Beth DeFoe ‘23, Iman Shepard ‘23, Katina Lucas ‘25, Raneem Samman ‘24, Lia Romanotto ’25, and Isabella Wojewski ‘24.

The NSF Grant awarded to Barbosa Lab has the overall goal of understanding life history trade-offs and how they affect energy allocation to dispersal, reproduction, and mating behavior. Four main proposal aims came from the grant. First, research has been conducted measuring the role of male antennation behavior on male fitness and its potential function as courtship. Antennation is a process done by males before copulation where their antennae rapidly tap the back of the female. A second aim is to investigate if sex differences in resource allocation to immunity exist. This is hypothesized to explain the lower resource allocation plasticity observed in females. Trade-offs in biology are defined as the over development of one trait at the expense of another to increase fitness. Since energy is limited in a developing organism, not all traits can be developed to their full potential, so more energy is put into more advantageous traits over others.

Two of the proposal aims are actively being researched by current members Katina Lucas ‘25, Raneem Samman ‘24, Lia Romanotto ’25, and Isabella Wojewski ‘24. Samman and Wojewski are exploring the role of Juvenile Hormones (JH) in the developmental mechanisms that contribute to trade-offs in bean beetles. JH is a main component in insect physiological development. Since physiological trade-offs are observed in the beetles, the specific mechanism that drives these differences is hypothesized to be JH. Lucas and Romanotto are determining how different female’s - under different larval densities - oviposition strategies affect lifetime female fitness. Bean Beetles lay their eggs on beans. Larval density is measured as having a high number of eggs (13+) on a bean versus a low number of eggs (1-3).

The research conducted in Barbosa Lab is important in furthering understanding of how behavior evolves and how it is affected by life history trade-offs. The life history traits and topics researched can be applied to a multitude of other species allowing us to not only further our knowledge of other species, but also further our knowledge on ourselves.