Interspecific Pollen Transfer, Gene Flow, and Speciation in Bat-Pollinated *Burmeistera* H. Karst. & Triana (Campanulaceae: Lobelioidae)

Date: April 21, 2022  
Time: 1:00 p.m. to 3:00 p.m.  
Place: 103 Benton Hall

Abstract
The evolutionary success of angiosperms has been largely influenced by their interactions with animal pollinators, which provide pollen and gene transport between individuals, populations, and young diverging species. Here, I examine the interplay between interspecific pollen transfer (IPT) by shared pollinators, gene flow, and the evolution of reproductive isolation in the young rapid radiation of Neotropical bat-pollinated bellflowers in the genus *Burmeistera* (Campanulaceae: Lobelioidae). In Chapter 1, I conducted an extensive review of the pollination and plant speciation literature to highlight the evolutionary consequences of IPT in angiosperms and showed that it has profound consequences for the evolution of floral traits, reproductive isolation barriers, and patterns of gene flow during speciation. In Chapter 2, I studied how heterospecific pollen deposition affects fruit and seed production in two sympatric *Burmeistera* species pairs that experience asymmetric pollen transfer among them in nature. Species that were frequent recipients of heterospecific pollen did not show negative effects on reproduction, whereas those that rarely received pollen from relatives produced significantly fewer seeds when more heterospecific pollen was applied to flowers. In Chapter 3, I studied patterns of IPT and introgression in three *Burmeistera* communities to examine a possible relationship between pollen and gene flow between them. Despite extensive IPT among the study species, I did not detect a significant signal of historic introgression between them suggesting that post-pollination reproductive isolation has been sufficient to prevent historic gene flow. Lastly, in Chapter 4 I quantified pre- and post-pollination isolation for 11 *Burmeistera* species pairs along a continuum of evolutionary divergence. Average post-pollination isolation was stronger than pre-pollination isolation, yet both stages had similar relative contributions to total isolation among pairs. Lastly, using a dated *Burmeistera* phylogeny I uncovered a linear positive relationship between post-pollination isolation and time since divergence among pairs, while no such relationship was found for pre-pollination isolation. Post-pollination isolation has thus contributed to speciation during the evolution of *Burmeistera* while pre-pollination isolation has apparently only evolved later in secondary contact. This dissertation shows how the extraordinary radiation of *Burmeistera* has proceeded while faithfully upholding their close partnership with their furry nectar-seeking bat friends.

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