

Lawrence Page, Biochemistry

Year in School: Freshman
Faculty Mentor: Dr. Bruce McClure, Biochemistry
Funding Sources: Honors College Discovery Fellowship Program, National Science Foundation

Variation in pollen tube growth rate in *Nicotiana* section *Alatae*

The definition of species and the boundaries that separate species are not always clear. Reproductive ability is one of many criteria that defines a species. Occasionally, plants have the ability to create hybrids with closely related taxa thus confusing the concept of species boundaries. Investigating the physiological processes that control plant reproduction could help to define and increase our understanding of species boundaries in angiosperms. In *Nicotiana* Section *Alatae*, crosses between taxa with different style lengths show a correlation between seed set and pollen donor style length. We tested whether this results from differential pollen tube growth rates. Multiple pollinations were performed on pollen donors from small to large flowers on all of the long-styled species in Section *Alatae*. Pollen tube growth was measured at various times after pollination. The results show that pollen from longer-styled species grows faster than pollen of shorter-styled species. Thus, pollen tube growth rates reinforce species boundaries in one direction; long-styled species discriminate against short-styled ones. Furthermore, we observed that individual plants demonstrated maternal and paternal effects on growth rate during the pollen tube growth phase of angiosperm reproduction. We think that longer pistils allow angiosperms to screen for pollen fitness, and that more fit pollen may tend to grow faster and come from plants that have longer styles themselves.