NECTAR IN *NICOTIANA*: POLLINATOR ASSOCIATIONS, SOURCES OF VARIATION, AND EVOLUTIONARY CONSEQUENCES

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ABSTRACT

Nectar is the primary floral reward offered by plants to attract pollinators. Pollinators often exhibit a preference for certain types of nectars over others. If pollinator preferences for certain nectar traits are strong enough, pollinator-mediated selection may cause ethological isolation. Nectar traits in *Nicotiana* could be placed under selective pressure if they exhibit variation, the variation includes a heritable component, and the variation can affect the fitness of individuals.

I determined that nectar traits exhibited a high degree of variability in the controlled environment of the greenhouse, both within and among *Nicotiana* species, and many traits varied in association with the pollination system. This variation was also demonstrated in plants growing in natural populations. Although nectar traits often differed between the greenhouse and natural population environments, associations between nectar traits and pollination system did not differ much between the two environments.

A significant heritable component was detected for nectar volume and energy, as well as corolla tube length, in an experimental population of *Nicotiana alata*. Although phenotypic correlations were significant for all measured traits, only two correlations had

a genetic basis. However, some differences in trait means and genotype by environment interactions were detected between the novel environment in which the experiment was conducted (Missouri), and the ancestral habitat of this species (Brazil). Therefore, heritability and correlation estimates may not fully represent that which would be found in natural populations. These estimates could also change within a population over time.

I conducted an experiment in the native habitat to investigate whether increased nectar quantity can affect fitness components in *Nicotiana alata*. With the methods used, results suggest that nectar augmentation did not affect seed production in this experimental population. However, had methods, location, or time been different, results may have been different.

Although significant variation and heritability in nectar traits suggest that nectar traits have the potential to respond to selection, plant fitness was not affected by increased nectar quantities with the methods used. Further studies are necessary to conclusively support or refute the possibility of pollinators' exerting selective pressure on nectar traits in *Nicotiana*.