# **Examining Floral Evolution Across Honeysuckles**

#### **Project Overview**

Lonicera are united by tubular flowers that vary in length and width. Some species have long and thin floral tubes while others are short and stout. Floral characteristics of species of *Lonicera* were measured to assess variation across the clade and within each species. Additionally, we examined the evolution of these traits using a phylogeny. The morphology of the flower has repeatedly evolved to have longer tubes, with greater intraspecific variation in larger flowers.



**Figure 1:** Floral diversity of *Lonicera* and floral traits examined in this study. (A) Lonicera ruprechetiana with petal lobe arrangement of 4+1 and exserted stamens. (B) *Lonicera involucrata* with 2+2+1 petal arrangement and inserted stamens. (C) Lonicera japonica showing measurements of (i) corolla tube length, the (ii) top, (iii) middle and (iv) bottom corolla tube widths. (D-I) shows a variety of traits across the diversity of *Lonicera* including corolla tube length and width, orientation of petal lobes, and inserted or exerted stamens. Species are as follows: (D) L. diocia, (E) L. rupicola, (F) L. fragrantissima, (G) L. ciliosa, (H) L. canadensis, (I) L. *flava*. Blue and black stars indicate the ventral lobe.

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Methods

- Collected data from seven virtual herbaria for 58 species of *Lonicera* for a total of 140 herbarium specimens
- Measured corolla tube length, three corolla tube widths, ventral lobe length and ovary length and width
- Examined relationships between these traits using scatterplots and a PCA using R and Rstudio statistical software
- Performed an ancestral state reconstruction of the corolla tube length in Mesquite (3.61).

## Results

- intraspecific variation



#### Discussion

- longer corolla tubes perhaps indicating a shift to a different pollinator.



- Long corolla tubes were ancestral in the *Periclymenum* clade, evolved longer tubes twice and shorter tubes twice
- Short corolla tubes were ancestral in the Chamaecerasus clade, one clade (L. bournei-L. *japonica*) evolved longer corolla tubes



**Figure 5:** The ancestorial character state reconstruction of corolla tube length.

- Inserted stamens were associated with short ventral petal lobes
- Species are not easily distinguished by corolla tube measurements



**Figure 6:** (A) Relationships between inserted or exserted stamens and ventral lobe length. (B) A PCA of 18 species of *Lonicera* resulting from the analysis of nine floral traits

• Lonicera flowers can be broadly categorized as long thin with more difficult to access nectar rewards for pollinators or short stouter tubes with more easily accessible nectar rewards for pollinators. Many species retain ancestral corolla tube lengths except for a few clades that independently gained

