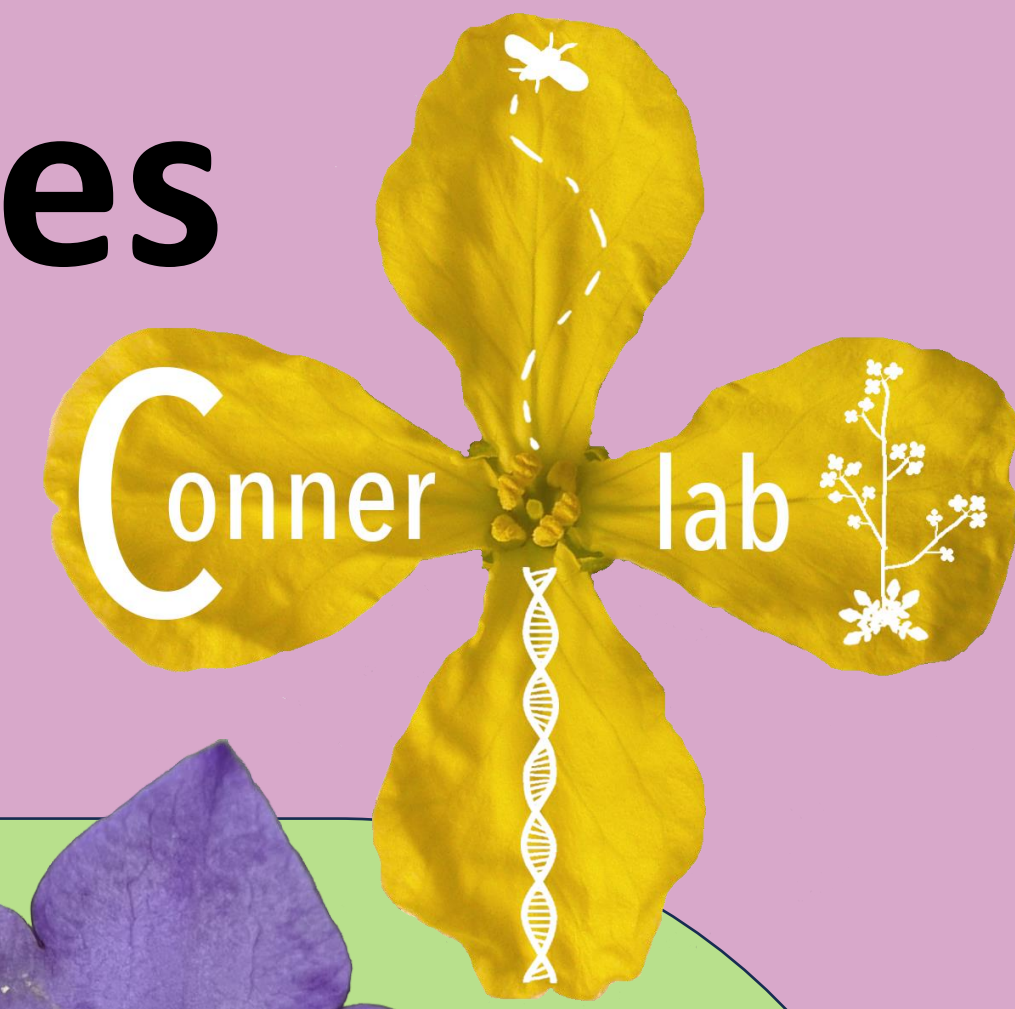


# Patterns of phenotypic integration and variation in 4 wildflower species

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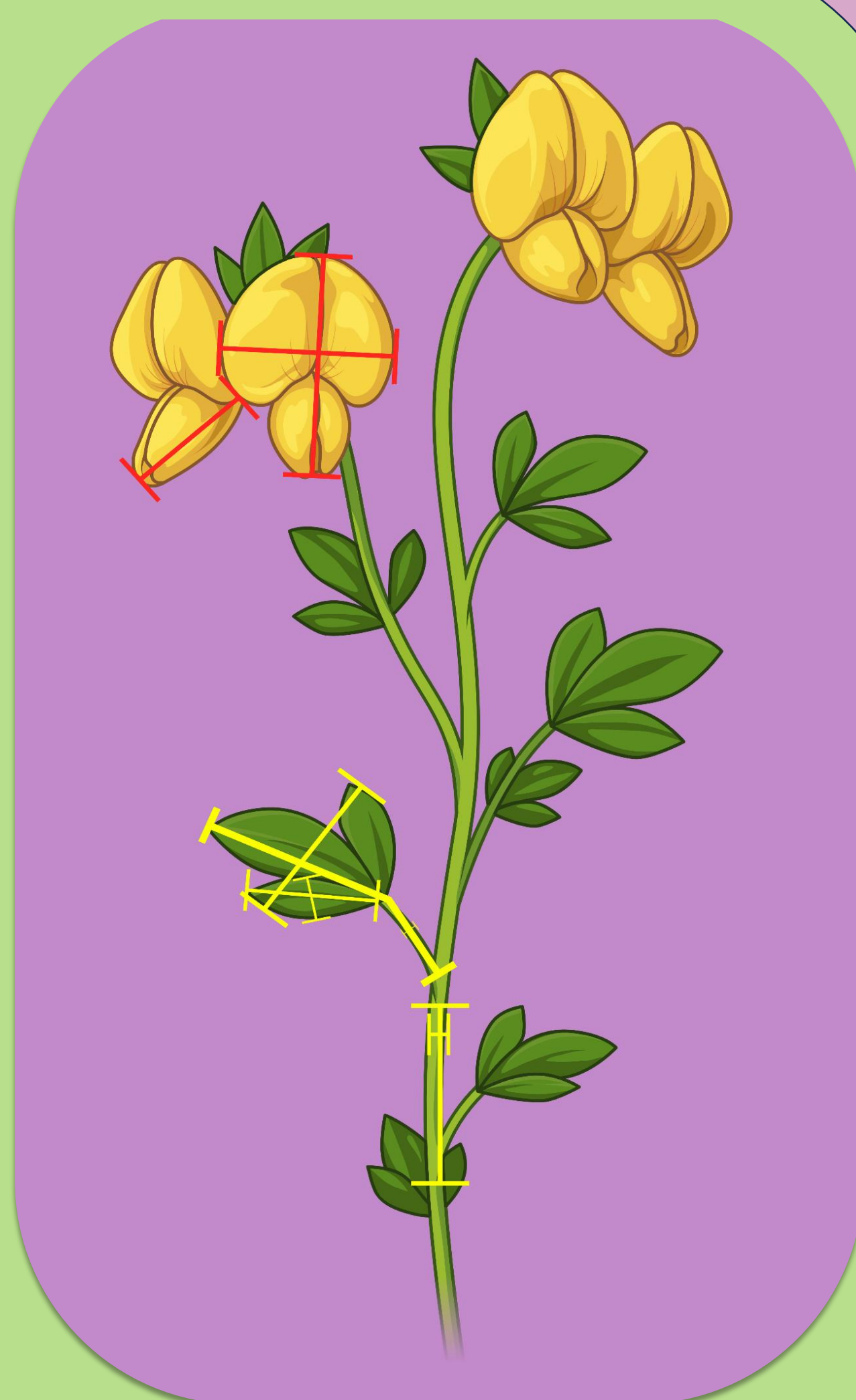
## Introduction

- Plants with specialized pollination are thought to exhibit **correlational modularity** between floral and vegetative traits (1,3)
- Specialized pollination may also be associated with **less variation in floral traits** compared to vegetative traits (2)
- We hope to test these hypotheses and answer the question:

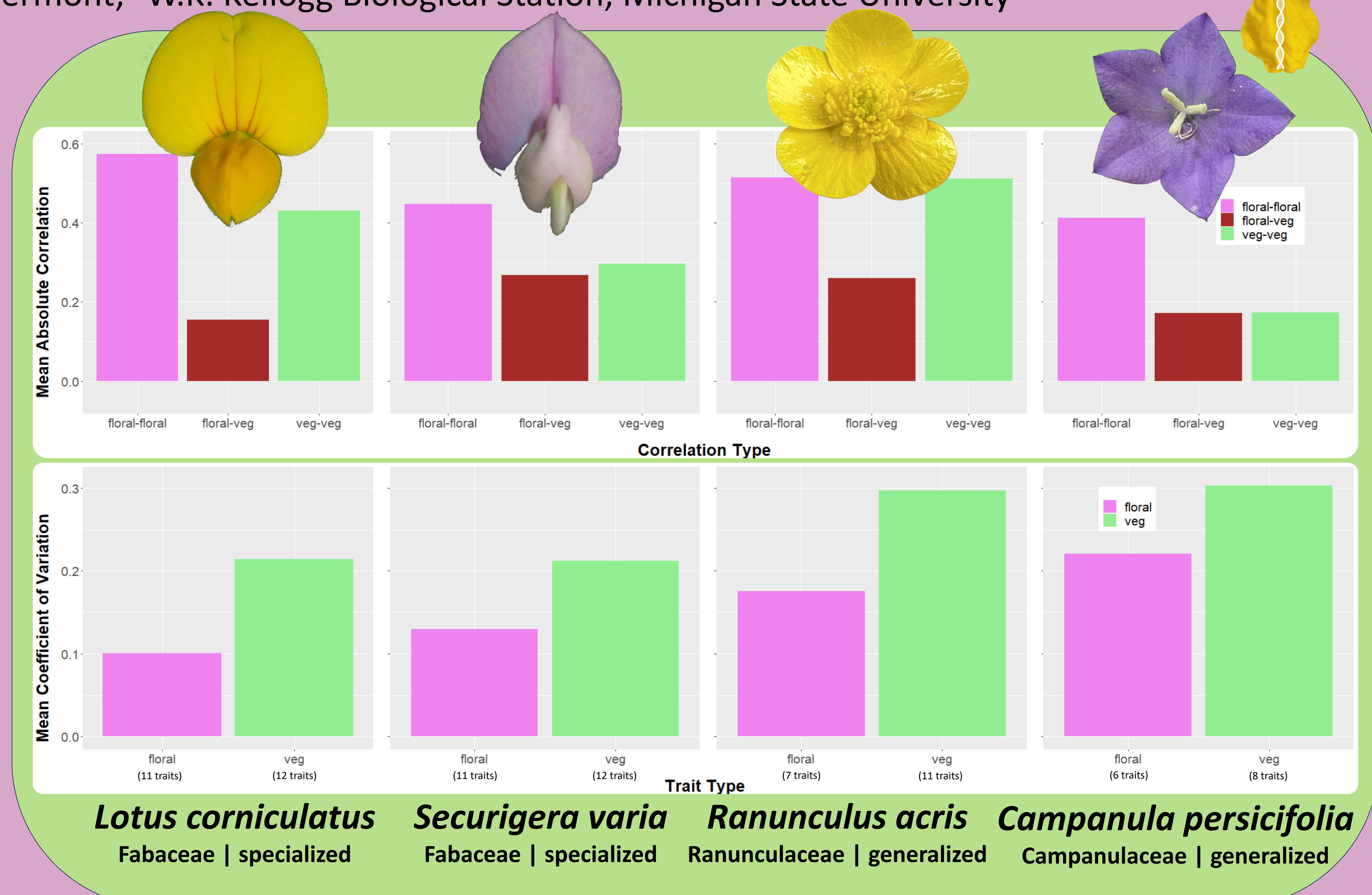
Is a specialized pollination strategy associated with **floral-vegetative modularity** and less **floral variation**?

## Methods

- Species were selected to reflect a variety of pollination strategies and ecological niches
- 7 species have been collected and measured, though only 4 have been fully analyzed at time of printing
- For each species, twenty plants were sampled from a single population
- A number of (primarily linear) floral and vegetative measurements (14-27, depending on species) were taken with rulers, calipers, and ImageJ

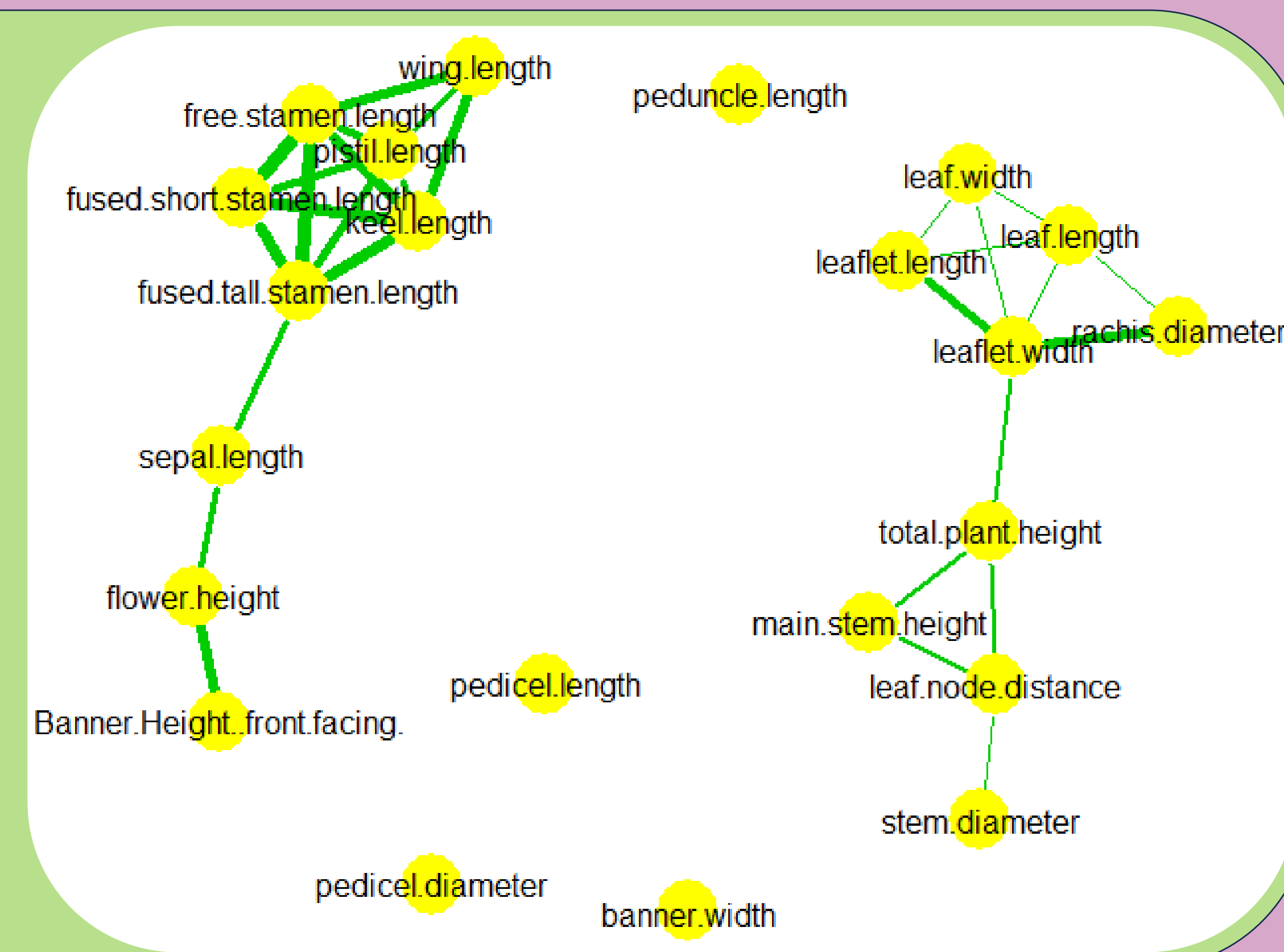


Example of **floral** and **vegetative** measurements. Created with BioRender



***Lotus corniculatus*** Fabaceae | specialized    ***Securigera varia*** Fabaceae | specialized    ***Ranunculus acris*** Ranunculaceae | generalized    ***Campanula persicifolia*** Campanulaceae | generalized

Example network diagram of trait correlations for *L. corniculatus*. Nodes are linked if correlation < .65, and link width indicates relative strength of correlation



## Results and Future Directions

- In **contrast** to Berg's hypothesis (3), modularity does **not** appear to be related to pollination strategy in these species
- All species also had **lower variation in floral traits** compared to vegetative traits
- We intend to collect more species to properly make **inter-species comparisons**



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## References

- Conner, J. K., & Lande, R. (2014, August 19). Raissa L. Berg's contributions to the study of phenotypic integration, with a professional biographical sketch. *Philos. Trans. Royal Soc. B: Biol. Sci.*, 369(1649), 20130250.
- Armbruster, W. S., & Wege, J. A. (2018, October 31). Detecting canalization and intra-floral modularity in triggerplant (*Stylidium*) flowers: correlations are only part of the story. *An. Bot.*, 123(2), 355-372.
- Berg, R. L. (1960, June). The Ecological Significance of Correlation Pleiades. *Evolution*, 14(2), 171.