

Determining Paternal Influence in *Clarkia breweri*

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Introduction

- *Clarkia breweri* is rare California endemic species in the evening primrose family (Onagraceae).
- This species is self-compatible which allows selfing/inbreeding as a means of pollination. In an event where primary pollinators (hawkmoths) are absent, the movement of pollen is limited, which leads to an influx of self-pollination, and a reduction of fitness (1). Paternity analysis allowed us to measure the number of different paternal plants and the occurrence of paternal pollinators via outcrossing.
- Studying the influences of plant paternity and the genetic flow between *Clarkia breweri* populations provides the blueprint to explore and evaluate the effects of inbreeding.
- These factors are why monitoring plant reproductive diversity is important to conservation efforts and understanding how these components impact *Clarkia breweri*.

Questions

1. What are the outcrossing and inbreeding rates of the collected *Clarkia breweri*?
2. How do populations levels of “relatedness (*r*)” compare to individual maternal line mating events?



Clarkia breweri



Clarkia breweri

Results

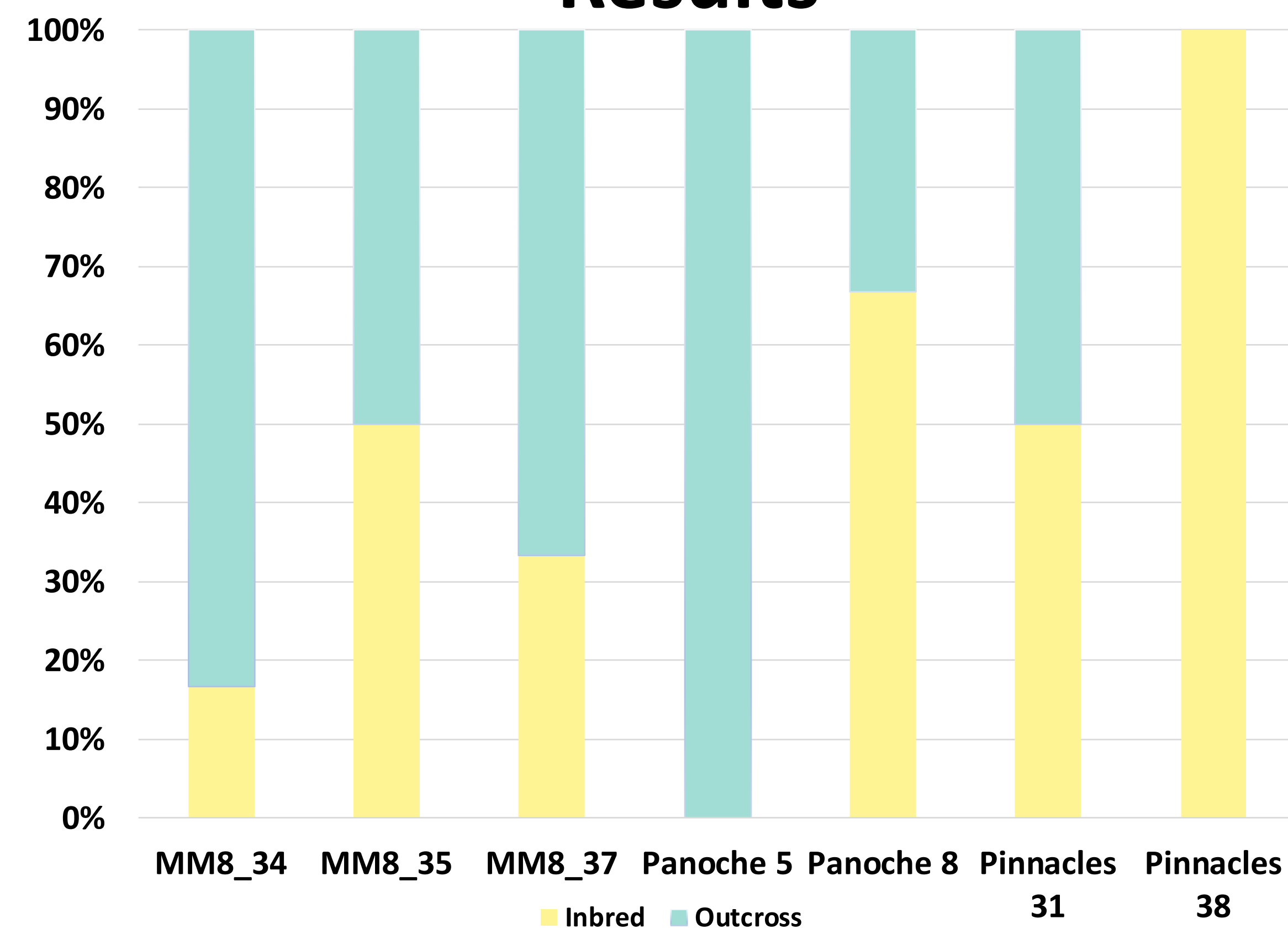


Figure 1. Proportions of inbreeding and outcrossing mating events for each maternal line. Panoche exhibits the highest outcrossing rate.

Mean Within Population Pairwise Values

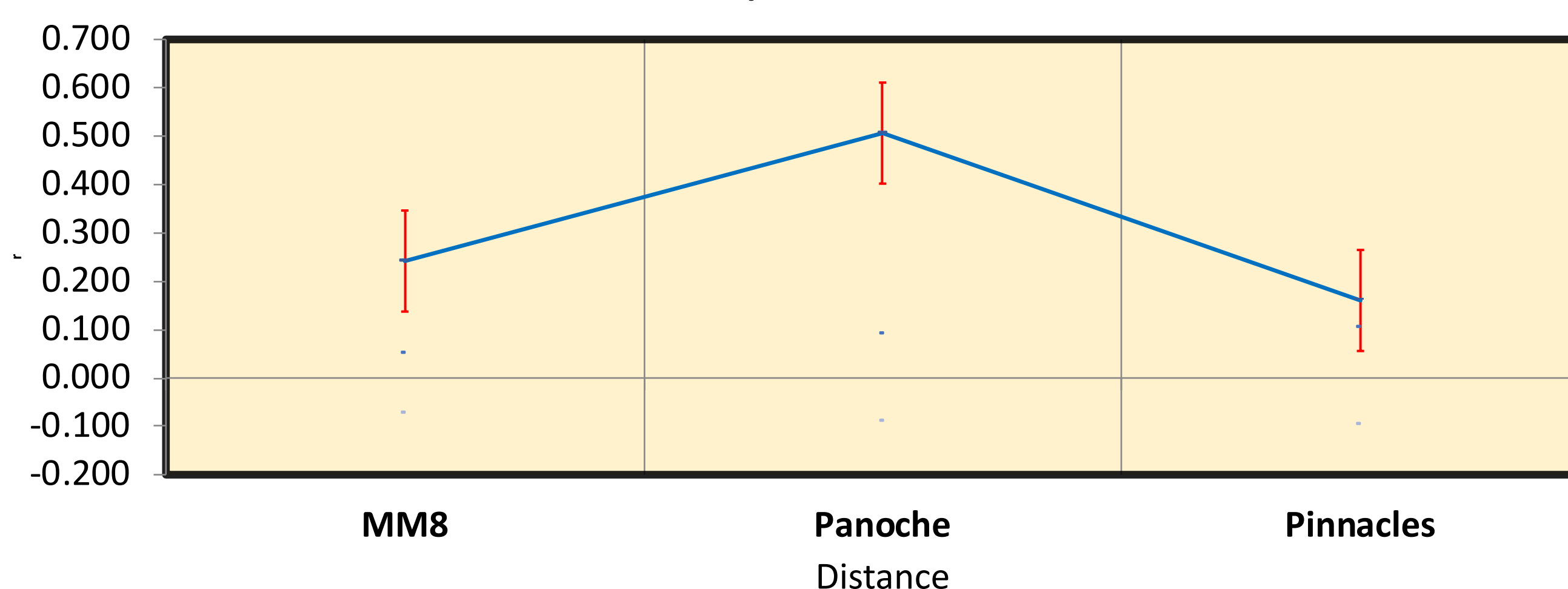
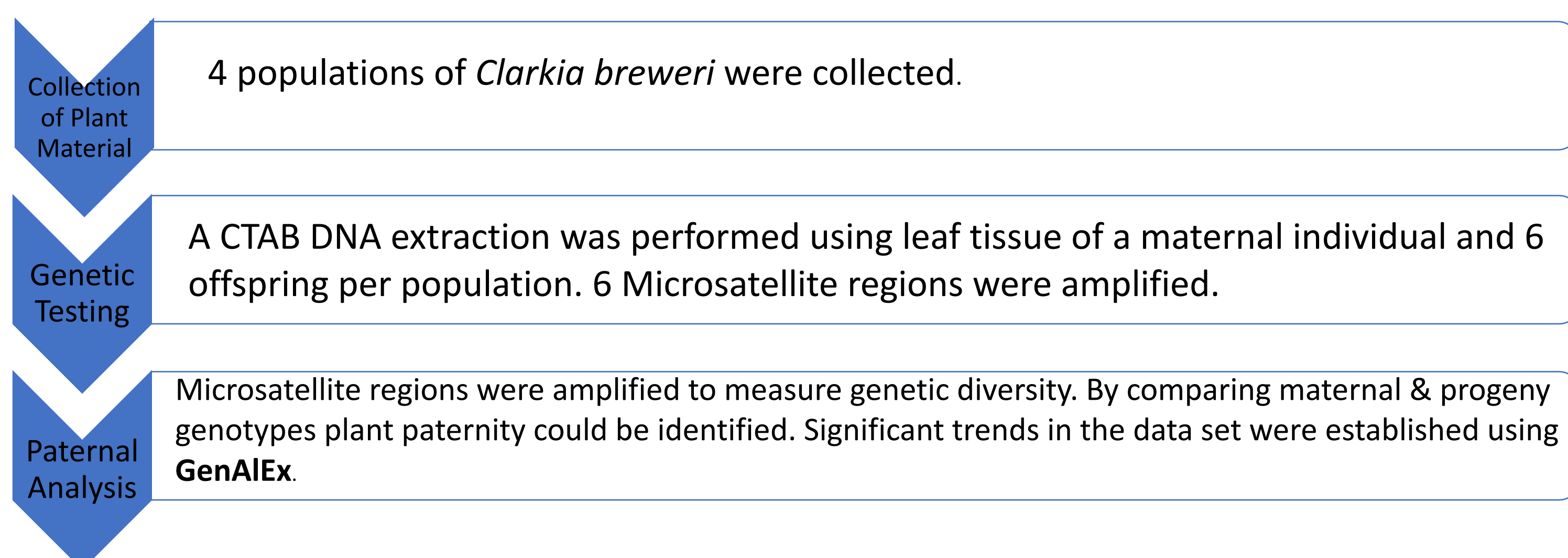


Figure 2. Mean values suggest that Panoche displays the highest level of relatedness, thus the greatest inbreeding rate of *Clarkia breweri* populations.

Methods



Discussion

- By measuring individual maternal line mating events and the level of relatedness at the population level, we better able to understand how rates of selfing and outcrossing in *Clarkia breweri* populations impact their genetic structure.
- We found contrasting stories when we compared outcrossing rates (Fig. 1) and levels of relatedness, sourced from low genetic diversity in a population, rather than low pollinator diversity.
- Pinnacles exhibits a greater level of inbreeding than the other *Clarkia breweri* populations (Fig. 1), but lower relatedness (Fig 2).
- This leads us to suggest that the despite higher inbreeding the levels, Pinnacles population is still more genetically diverse and therefore maybe overall more resilient than MM8 and Panoche populations.
- By contrast Panoche shows a high level of relatedness (fig 2) but high outcrossing (fig 1). Therefore despite high outcrossing rates, the high relatedness might indicate a bottleneck has occurred in this population.
- *Clarkia* and Conservation:
 - Inbreeding (*f_{is}* and “*r*”) are used to obtain historical inbreeding and outcrossing rates in populations. This allows us to see the big picture of the status of each population in order to allocate species management and conservation efforts.

References

- 1) Hedrick, P. (2000) Inbreeding Depression in Conservation Biology Annual Review of Ecology and Systematics Vol. 31:139-162

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