

PLANT CONSERVANCY TOUR

OBJECTIVES:

- 1) Understand the position of "family" in the hierarchy of biological taxonomy.
- 2) Learn the criteria used to group angiosperms into families.
- 3) Compare the morphological divergence of leaves and flowers within a plant family.
- 4) Observe convergence of desert species from different families.

BACKGROUND:

Earlier this semester we constructed a phylogeny of five plant species from the tomato family (Solanaceae). Today, you can put your observations from that exercise into the broader framework of all flowering plants.

First, you should know where "family" fits into the hierarchy of the Linnaean system of classification. The important levels of classification in descending order are: Kingdom, Division, Class, Order, Family, Genus, Species. Plants constitute one of the five Kingdoms, the Plantae. Flowering plants, the angiosperms, are one of twelve divisions within the kingdom. There are roughly 235,000 species of angiosperms, but only 30,000 species in all the other divisions combined! Within the angiosperm division, there are two classes, the dicots and the monocots. What you will see today are mostly dicots. Worldwide, there are approximately 40 orders and 300 families of dicots, including the tomato family.

The Linnaean system predates evolutionary biology, so it is not (yet anyway) entirely reflective of the evolutionary lineages of plants. However, the plant families you will see today are likely to be monophyletic groups.

One common generalization of plant evolution is that flower and fruit evolve more slowly than other aspects of the plants such as leaf morphology. It isn't clear why this is true. One common explanation is that flowers are under stabilizing selection by pollinators. Of course this explanation only works for animal pollinated plants.

IN-CLASS EXERCISE:

Divide your time among the following two activities:

- 1) Explore the greenhouse and look at all the varieties of plants present.
- 2) Document leaf and flower variation within TWO of the four assigned plant families (Gesneriaceae, Piperaceae, Begoniaceae, and Commelinaceae).
-see page 2 of this handout-

ASSIGNMENT (due Nov. 30)

- 1) In a short paragraph (1/4 page - single spaced) discuss the variation you observed in morphology within and between the two families you chose. Were flowers less variable than leaves within the families? What aspects of leaves / flowers were most / least variable? Use drawings to support your points.
- 2) Turn in your drawings. Make sure to label them clearly.