DISPERSAL SYNDROMES IN A FIRE ADAPTED PLANT

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WHAT ARE DISPERSAL SYNDROMES?

1. Dispersal is an emergent property of population interactions adaptive for escaping negative density-dependent mortality and exploiting resources in space and time
2. Many plants have coevolved with animals to disperse their seeds
3. Different guilds of animals putatively have differential fitness effects on plants
4. Dispersal syndromes are phenotypic correlations diaspore traits matched to the behavior, physiology, and morphology of different types of dispersers
5. **The aim of the study is to identify and delimit seed dispersal syndromes within a clade of fire-adapted plants**

WHAT IS THE TAXON OF INTEREST?

Manzanita (*Arctostaphylos* sp. Adans.)

Ecologically relevant characteristics:

1. Most taxonomically diverse woody plant genus in the California Floristic Province
2. Diverse in (i) life history characteristics, (ii) growth habits, (iii) fruit morphology, (iv) geographic range, and (v) edaphic specialization
3. Ostensibly, and hypothesized to be dispersed by many different agents, including birds, small mammals, and medium-to-large mammals

WHY IS IT OF INTEREST?

We are trying to understand dispersal dynamics in (i) manzanitas and (ii) plants in disturbance-prone areas

DO DISPERSAL SYNDROMES EXIST AMONG TAXA?

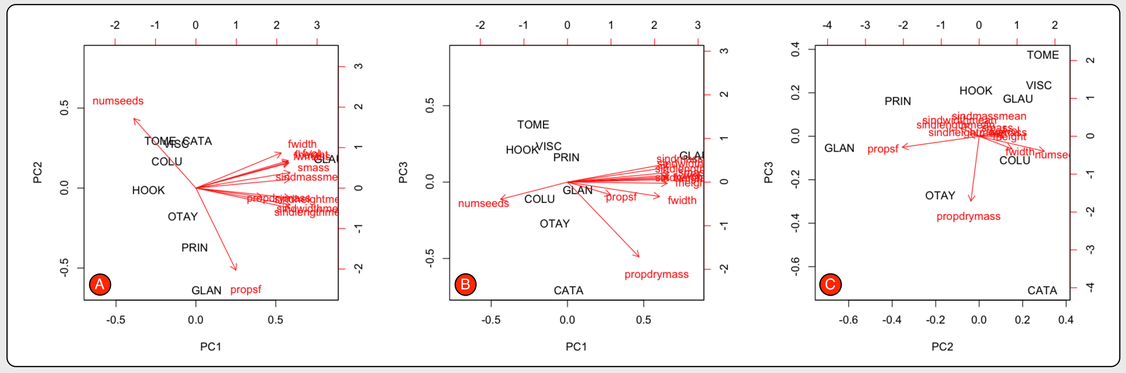
MEASURED CHARACTERS

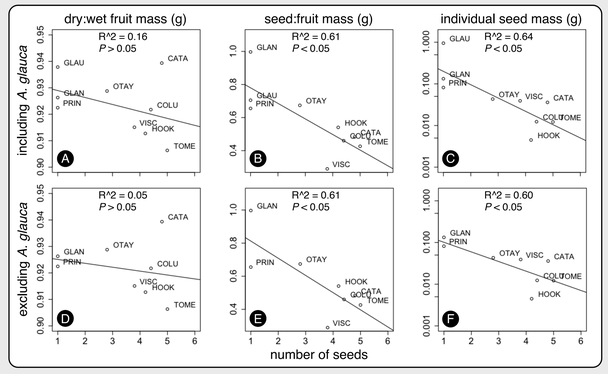
(1) fruit polar diameter (mm), (2) fruit equatorial diameter (mm), (4) fruit wet mass (g), (5) fruit dry mass (g), (7) number of seeds per fruit, (9) individual seed mass (g), (10) individual seed height (mm), (11) individual seed width (mm),(12) individual seed length (mm)

DERIVED CHARACTERS

(3) fruit volume (mm^3),

(6) dry:wet mass (g, (8) total seed mass (g), (13) seed:fruit mass (g)





PCA PLOTS

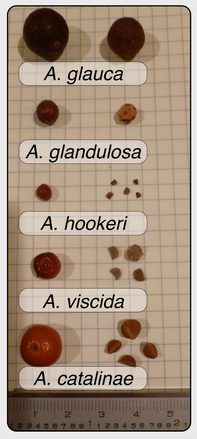
Biplots of the first three principle components for nine taxa with all characters included. PC1, PC2, and PC3 respectively cumulatively explain 77, 91, and 97 percent of the variance.

SCATTERPLOTS

Most important variables in from PCA plotted against the number of seeds. Because *A. glauca* is very different that the other fruits, the second row excludes it from the analysis

TAXON SYMBOLS: **CATA**: *Arctostaphylos catalinae,* **COLU**: *Arctostaphylos columbiana,* **GLAN**: *Arctostaphylos gladiolas gladiolas,* **GLAU**: *Arctostaphylos glauca,* **HOOK**: *Arctostaphylos hookeri hookeri,* **NEVA**: *Arctostaphylos nevadensis nevadensis,* **OTAY**: *Arctostaphylos otayensis,* **PARR**: *Arctostaphylos parryiana,* **PATU**: *Arctostaphylos patula,* **PRIN**: *Arctostaphylos princely drupacea,* **PUNG**: *Arctostaphylos pungens,* **TOME**: *Arctostaphylos tomentosa tomentosa,***VISC**: *Arctostaphylos viscida mariposa*

SOME MANZANITA FRUITS AND SEEDS



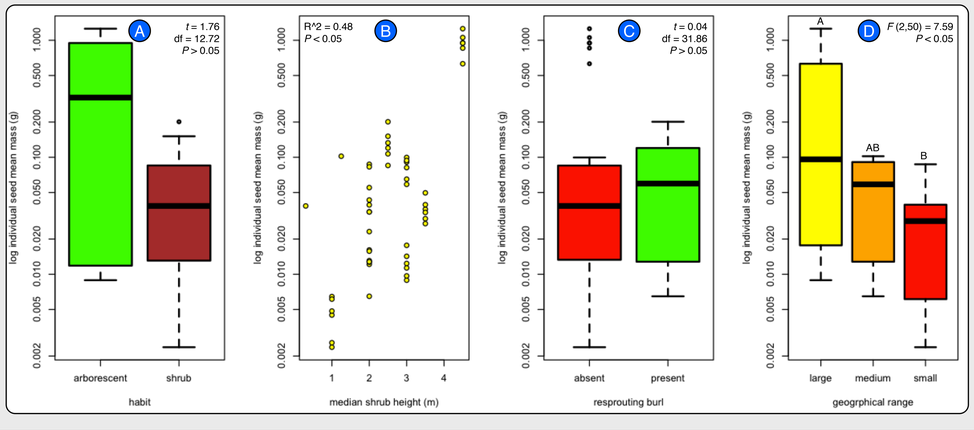
DISPERSAL SYNDROMES IN MANZANITA

There are two distinct distinct morphological groups among manzanitas--*A. glauca* and the rest.

Within manzanitas, there seems to be a gradient between fleshier, more mealy, lighter in colour, distinct fruits towards drier, less mealy, darker, fused seeds that are more nut-like. The most curious of which is *A. catalinae*, as it has a large fruit and seeds but low seed:fruit mass.

The respective ends of this continuum adhere somewhat more to syndromes, but there is a large, grey area that needs to be studied in greater detail. Given that two-phased seed dispersal occurs in this system, ambiguous boundaries are to be expected.

WHAT WAS LEARNED FROM THIS STUDY?



LIFE HISTORY CORRELATES

The center figure in this panel presents the next direction this investigation will follow. Preliminary patterns among several fruit and seed traits suggest relationships with other life history traits, including growth habit, shrub height, sprouting or seeding response to fire, edaphic specialization, and geographical range. The example figure shows the individual seed mass as a function of growth habit (A), plant height, (B) sprouting or seeding in response to fire (C), and geographical range (D). Many seeds traits show patterns in relation to life history traits even though statistical significance has not yet been demonstrated.

NEXT STEPS

-Include more species
-Include other characters putatively indicative of dispersal syndromes (e.g., size of fruit cluster [presentation to disperser], colour)
-Examine endosperm reward suggestive of a seed-caching dispersal syndromes