

# Maternal Floral Color, UV Protection, and Germination in *Ipomopsis aggregata* (Polemoniaceae)

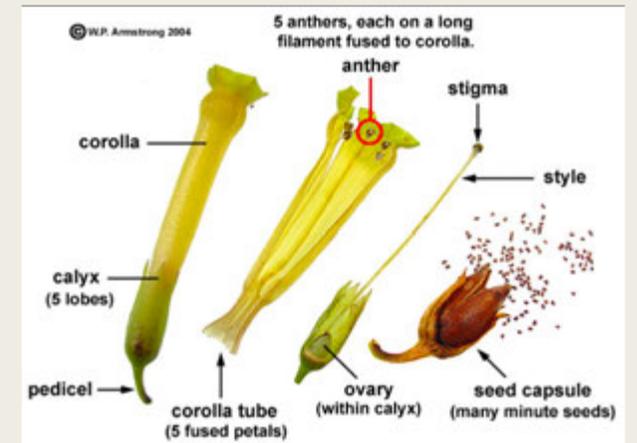
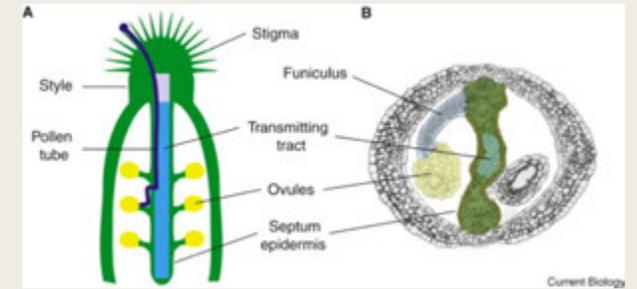
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# Maternal Effects in Plants

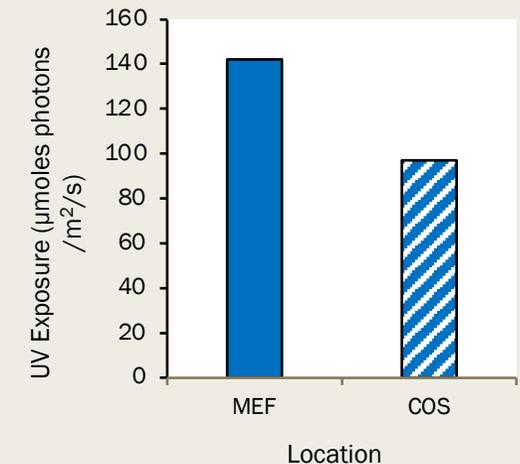
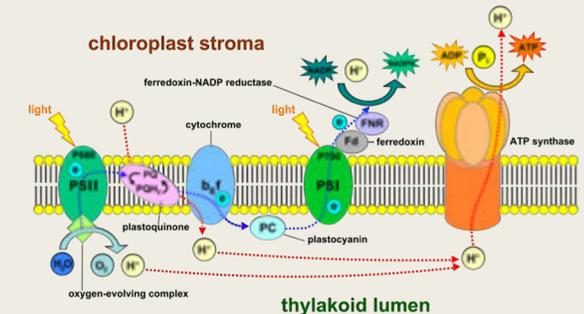
- “the contribution of the maternal parent to progeny phenotype beyond the equal chromosomal contribution of both parents” – Roach and Wulff 1987
- Physical connection between adult plant and the developing seed provides mode for chemical transfer





# UV Radiation in Manitou Experimental Forest

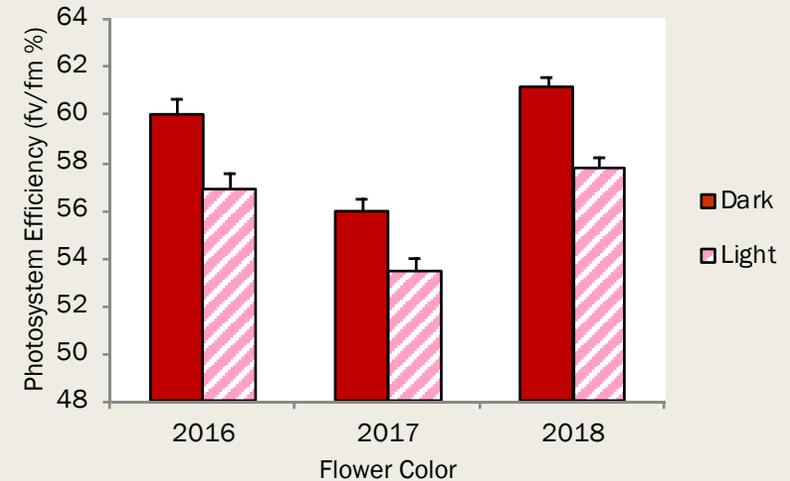
- Ultra violet radiation damage plants by hindering photosynthesis
  - Damage to ETC proteins and thylakoid membrane
- Alpine forest in foothills of Rocky Mountains
- Approximately 8000ft elevation (COS ~ 6000ft)





# *Ipomopsis aggregata* in Manitou Experimental Forest

- Perennial herb
- Native to western US
- Pollinated by hawkmoths and hummingbirds
- Blooms from light pink to deep scarlet
  - Pigmented by anthocyanin – red secondary flavonoid which absorbs UV radiation
  - Previous data shows advantages in adult plants



Effect	Photosystem Efficiency	Conductance	Anthocyanin Content	Chlorophyll Content
<b>Floral Color</b>	60.5233***	3.6852+	103.7519***	8.2232**
<b>Site</b>	2.3353+	48.8919***	0.0987	11.8391***

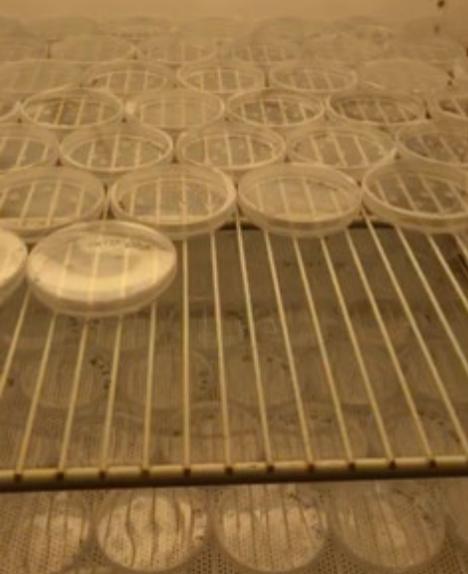
# Research Questions

Does maternal flower color affect realized fitness?

- Seed number, biomass, germination rate, germination success

What effect does maternal flower color have on the physiology of seedlings?

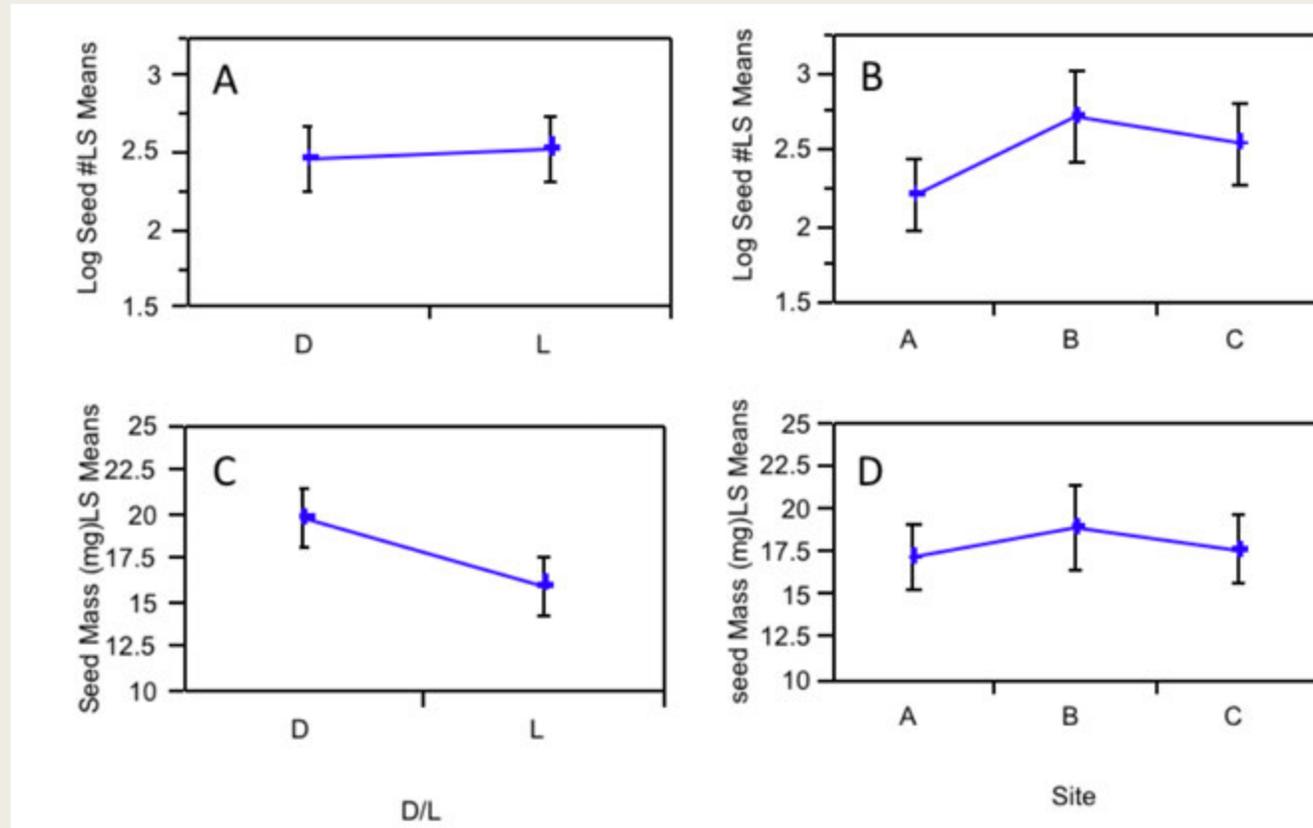
- Seedling photosynthetic potential, biomass, anthocyanin, chlorophyll content

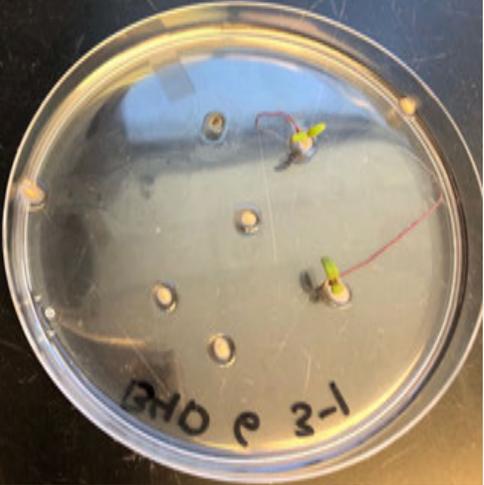


# Data Collection

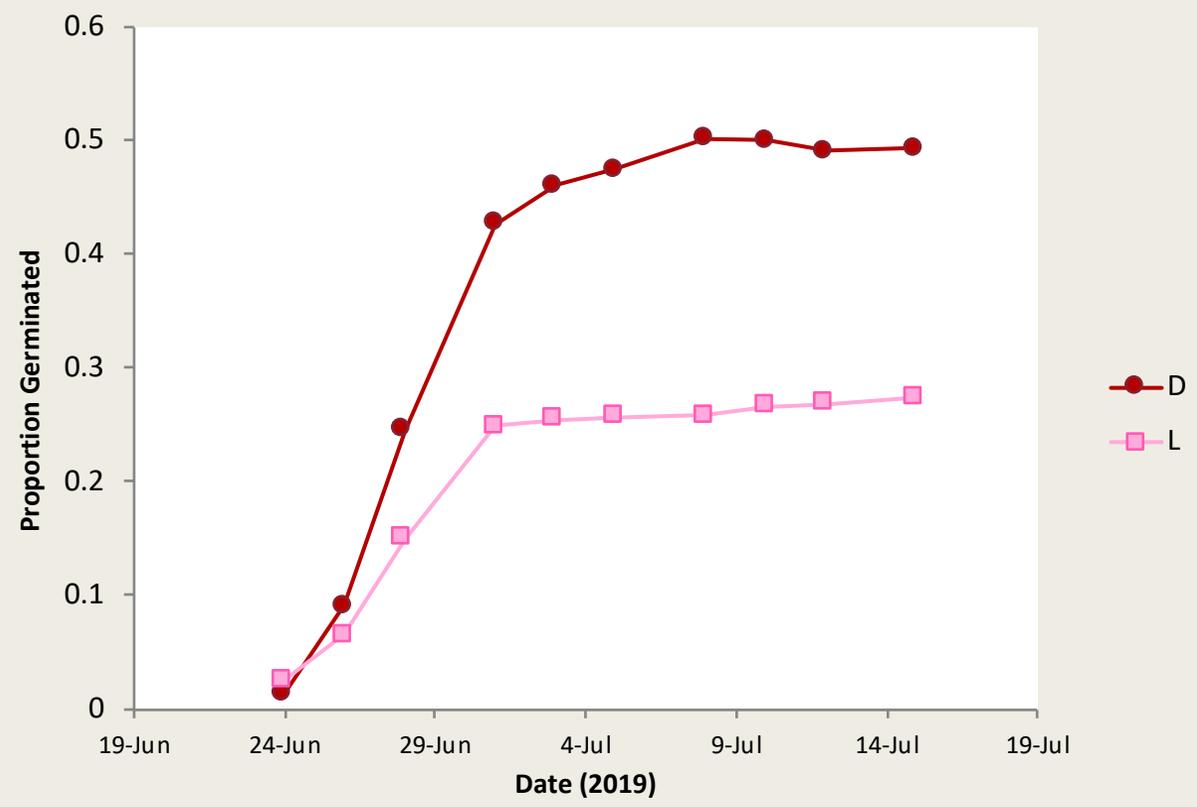
- Field Data Collection
  - Three sites along roadside at MEF separated by microenvironment
  - Plants classified as dark or light
  - Seeds collected from 12 dark colored and 12 light colored maternal plants (24 plants total)
- Germination Assay
  - Eight replicate plates per 24 maternal plants (192 total)
  - 21 days censusing every M, W, F
- Seedling Physiology Measurements
  - Six seedlings per maternal plant measured for biomass, chlorophyll and anthocyanin content indices, and photosystem efficiency after 21 days in growth chamber

# Maternal Seed Production

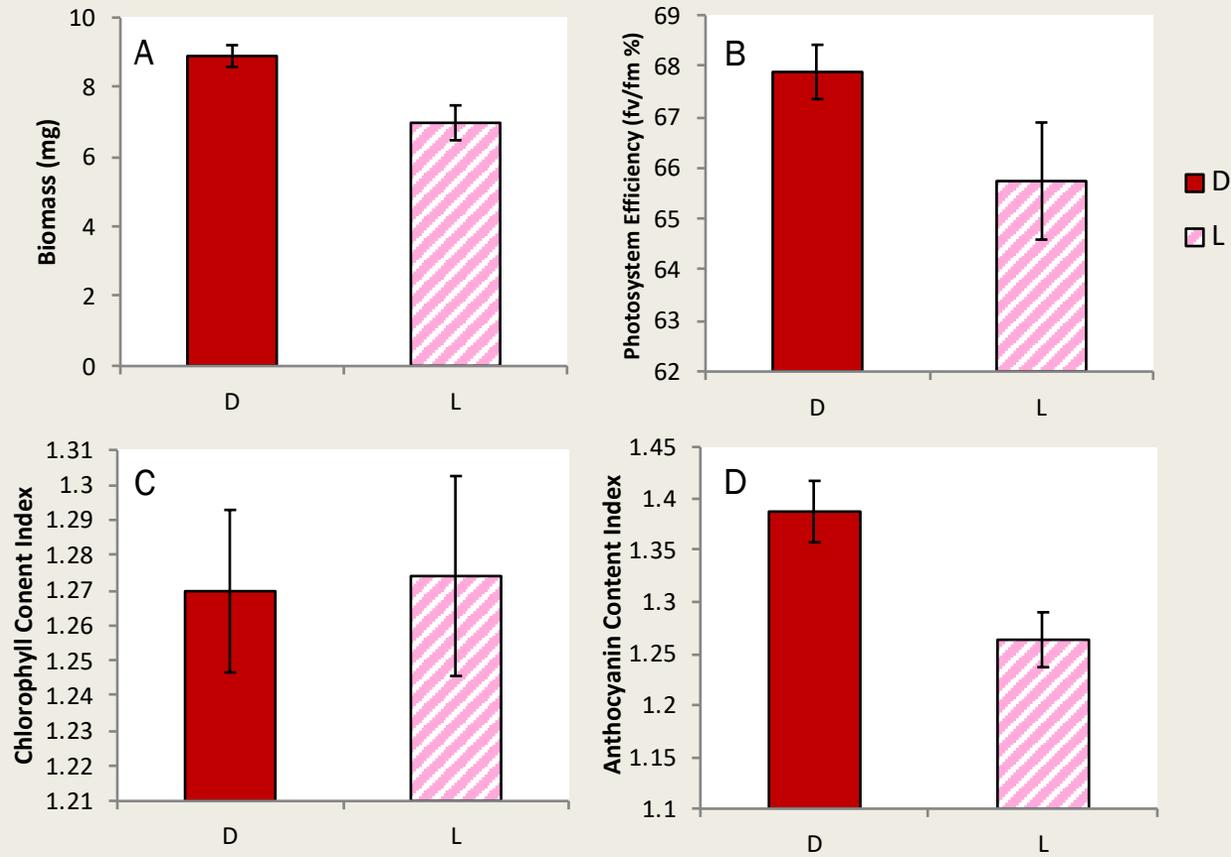




# Germination Success



# Seedling Physiology



Effect	Biomass	PE	Chlorophyll Content	Anthocyanin Content
<b>Floral Color</b>	9.7752**	2.9846+	0.0002	8.3808**
<b>Site</b>	3.337*	0.005	3.3758*	2.2742





## Does maternal flower color affect realized fitness?

Seeds from dark maternal plants have significantly higher

- Seed biomass
- Germination rate
- Germination success

## What effect does maternal flower color have on seedling functional traits?

Seedlings from dark maternal plants have significantly higher

- Biomass
- Photosystem efficiency
- Anthocyanin content



# Acknowledgements

## Thanks to:

- **Shane Heschel**
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