Red-sepaled evening-primrose (*Oenothera glazioviana Micheli*): an increasing threat to native genotypes and natural and restored habitats

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Local Genotypes in Restoration

- Trends
  - Watershed-based
  - Infraspecific taxa
  - Ecotypes
  - Populations
  - Conservation of local genetic diversity and unique genotypes
- Concerns
  - Introduction of non-local genotypes
  - Genetic pollution
  - Deleterious impacts to local forms
  - Impacts to restoration goals

Red-sepaled Evening-primrose

- Onagraceae
- Rosetted biennial or short-lived perennial
- Multi-stemmed
- Indeterminate inflorescence

Red-sepaled Evening-primrose

- Stem 0.5 to 2 m
- Crinkled leaves
- Also known as
  "Large-flowered
  Evening- primrose"

Red-sepaled Evening-primrose

- 50% sterile pollen and seed
- Cross-pollinated
- Hybrid between two N.A. species
- Permanent translocation heterozygote

Red-sepaled Evening-primrose

- Commonly cultivated
- Naturalized, often in disturbed places
- Uplands and wetlands
- < 500 m, NW, CW, SW California & ± worldwide

Red-sepaled Evening-primrose

Observed in southern California

- Goleta
- UCSB
- Santa Barbara
- Montecito
- Carpinteria
- Santa Cruz Island
- McGrath S. B.
- Oxnard
- San Pedro

Opportunistic species = Invasive species

- Many dehiscent fruits producing many small seeds
- Multiple indeterminate stems
- Frequently misidentified as one of the native taxa
- Not fully recognized as invasive

- Passive & active dispersal ➔ ± Worldwide
  - Humans: horticulture & gardening, seed packets, landscaping and restoration, contaminated soil
  - Birds: wild source of food; excrement

- Disturbed/ruderal habitats ➔ Native habitats
  - Garden, ruderal, upland, wetland, and restored habitats

Red-sepaled Evening-primrose

Suburban Goleta, CA

- Median planter under utility lines
- Likely bird dispersed
- In proximity to two creeks with native populations

Oenothera elata

Hooker's Evening-primrose

- subsp. *hookeri*

  Coastal CW and SW California

- subsp. *hirsutissima*

  California, w. US, nw. Mexico

Red-sepaled Evening-primrose

Hybridization = Genetic Pollution

- 50% seed viability ➔
  - Parents are likely two US native species
  - Thought to be reintroduced from Europe
  - Out-crosses rather than self-pollinating
  - Hybrids with *Oenothera elata* are likely

- Potential hybridization with native species ➔
  - Dispersal of non-local genes
  - Introgression of endemic taxa by a non-native
  - Potential deleterious effects to native genotypes

Problem with Non-native Genotypes?

- Disruption of natural patterns of geographic variation in genotype frequencies.
- Introduction of genes that are poorly adapted to local conditions.
- Disruption of local patterns of gene interaction.

Problem with Non-native Genotypes?

- Potentially affects the local population's future ability to respond to environmental change.
- Inadvertent introduction of a new entity into the local biotic community.
- Potential cascading effects through the community.

Examples of Genetic Pollution

- *Camissoniopsis* (Onagraceae)
- *Ceanothus* (Rhamnaceae)
- *Encelia* (Asteraceae)
- *Eriogonum* (Polygonaceae)
- *Mimulus* (Phrymaceae)
- Platanus (Platanaceae)

- *Oenothera* (Onagraceae)

Recommendations

- Add to *Oenothera glazioviana* to Cal-IPC list of invasive species.
- Inform land managers of occurrences.
- Caution use of field collected and commercial seed unless ID of source known.
- Eradicate from public lands, mitigation sites, and vector corridors.
- Study impacts to native wild populations of *Oenothera elata* in CA.
- Monitor, monitor, monitor.