



# Can clutch size save a selfing species?

Redrawn from Igic et al. 2013

## Exploring life-history strategies and evolutionary dead ends (*Master's Thesis in Biology*)

### Background:

Self-fertilization (selfing) has evolved multiple times across plants and animals. It offers short-term benefits, such as reproductive assurance, but may reduce genetic diversity and increase extinction risk over time. Evolutionary biologists have hypothesized that selfing lineages are evolutionary dead ends.

But is that the whole story? Life-history traits, such as clutch size, may buffer against the downsides of selfing. For example, producing more offspring could help maintain genetic variation and reduce extinction risk. Can selfing species avoid their presumed evolutionary fate by larger clutch sizes?

### Key question:

If self-fertilization is an evolutionary dead end, why is it so common? and can clutch size help explain this paradox?

### Project description:

This project has two parts:

1. Literature review: Survey studies on selfing, clutch size, and evolutionary outcomes.
2. Simulations: Use individual-based models to test how clutch size interacts with selfing and inbreeding, thereby shaping genetic diversity and extinction risk.

Depending on your interests, you can also explore empirical data from natural populations or focus more on modeling and theory.

### What you'll do:

- Review key literature on selfing and life-history evolution
- Design and run simulations to test evolutionary outcomes using *SLiM* and *shadie*
- Analyze how clutch size affects: Selection efficacy, effective recombination, extinction risk
- Optional: Extend to real-world data or additional life-history traits

### Skills you'll use or learn:

- Evolutionary modeling and simulations
- Literature synthesis and critical analysis
- Data visualization and interpretation

### Key readings:

Igic, Boris, and Jeremiah W. Busch. "Is self-fertilization an evolutionary dead end?." *New Phytologist* 198, no. 2 (2013): 386-397.

Sorojsrisom, Elissa S., Benjamin C. Haller, Barbara A. Ambrose, and Deren AR Eaton. "Selection on the gametophyte: Modeling alternation of generations in plants." *Applications in Plant Sciences* 10, no. 2 (2022): e11472.

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