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Experimental and Theoretical Approaches  
to Plant Reproductive Diversity

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Plant reproductive diversity



- Plant reproduction:
  - Sexual reproduction (seeds)
  - Asexual reproduction (apomixis, clonality)

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### Combining sex and clonality

- Most perennial plants combine sex and asexual reproduction
- Diversity of reproductive strategies



- Measuring life-time fitness in perennial, clonal organisms is complicated

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### Fitness in hermaphrodites

- Even "simple" life histories such as annuals, pose challenges in estimating fitness
- Most plants are hermaphrodites
- Fitness accrued via **male** and **female** functions
- **Female fitness.** Contribution via female gametes: seed production
- **Male fitness.** Contribution via male gametes (pollen): seed paternity
- Male fitness is difficult to estimate, particularly in field conditions



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### Aims of the Course

- To provide an introduction to the experimental and theoretical approaches available to study some of the less-known aspects of plant reproductive diversity

#### Main Topics

1. Experimental approaches to study buzz-pollination
2. What is fitness in clonal plants and how can we measure it?
3. How can we study male components of fitness?

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### Course Road Map

- **Day 1. Buzz pollination**

- Introduction to buzz pollination
- Methods to study vibrations

- Collect buzzing data on campus
- Analysis of bee vibrations

- **Day 2. Plant clonality**

- Plant clonality
- Fitness in clonal organisms

- Genetic estimates of clonality
- Demographic approaches to measure fitness

- **Day 3. Male fitness**

- Fitness contribution via male function

- Paternity analysis

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### Paper discussion

- Day 1.

Morgan T, PR Whitehorn, GC Lye and M Vallejo-Marín (2016) Floral sonication is an innate behaviour in bumblebees that can be fine-tuned with experience in manipulating flowers. *Journal of Insect Behavior*. 29: 233-241. doi: 10.1007/s10905-016-9553-5

- Day 2.

Pan JJ, & Price JS (2001). Fitness and evolution in clonal plants: the impact of clonal growth. *Evolutionary Ecology*, 15(4-6), 583-600.

- Day 3.

Jones, AG, Small C M, Paczolt KA, & Ratterman NL (2010). A practical guide to methods of parentage analysis. *Molecular Ecology Resources*, 10(1), 6-30.

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- PDF copies of the handouts available at:



<https://github.com/mvallejo6/unicamp-course>

- Buzz pollination sound recordings available at:

<http://www.plant-evolution.org/campinas/>

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