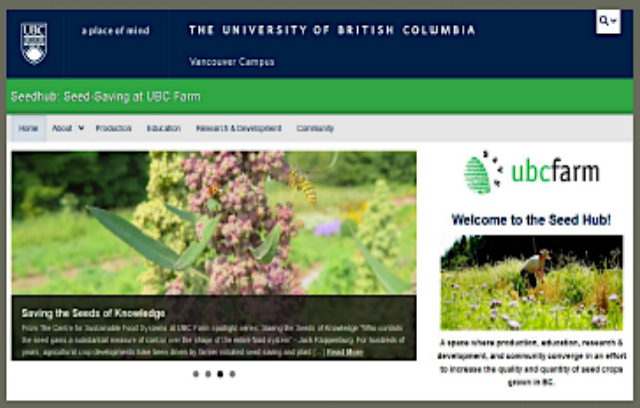
Introduction to Seed Saving

With Mel Sylvestre

sylvestre.melanie@gmail.com

UBC Farm Seed Hub



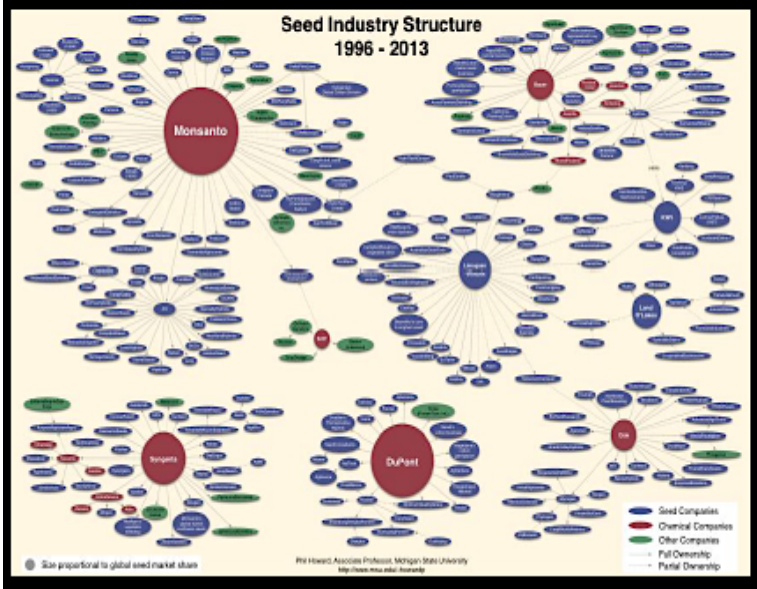
http://lfs-seedhub.sites.olt.ubc.ca

The BC Eco Seed Co-op

www.bcecoseedcoop.com

Why Save Seeds?

- Improve crops
- Adaptation
- Lower production cost
- Some cultivars become temporally unavailable
- Some cultivars disappear
- Some seeds are not available organically grown
- Increase biodiversity (bee forage)
- Cultural history
- Preserve world genetic biodiversity
- Food/seed security and sovereignty
- Express our right to save seed
- Political statement



What does it mean?

Open Pollinated (OP) Seed

- Botanical Definition: When crossers are allowed to intermate naturally
- Colloquial Definition: Any distinct variety that is not a Hybrid (or GE), and whose subsequent generations will grow true to type

Hybrid Seed (F1)

- Seed that is the result of crossing two genetically different, stable varieties
- Subsequent generations will not grow true to type

Heirloom and Heritage

- Varieties and cultivars know for a minimum of 50 years. This number of years is now being debated to be replaced by "pre-green revolution".

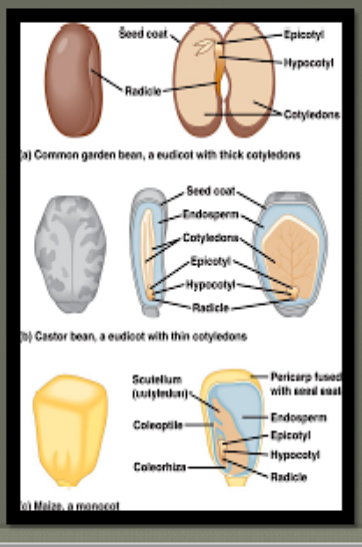
Treated vs Untreated

- Seeds are sometimes treated with fungicides or other chemical treatment snot allowed for certified organic growers

Genetically Engineered Seeds

- Genetically engineered seeds have had foreign selected genes inserted into their genetic codes.

What is a Seed?

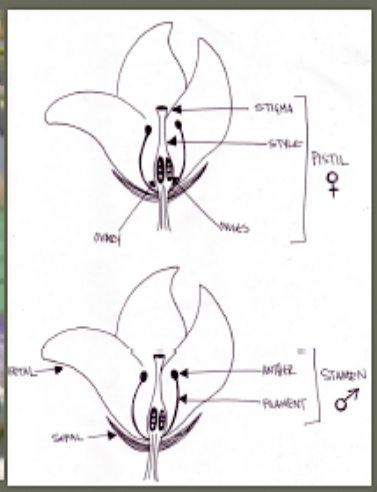


- Storage of the genetic material of the plant
- Food for the beginning of the plant's life

Lifecycles

- Annual > Produces seeds the first year of growth
- Biennial > Produces seeds the second year of growth
- Perennial > Plants survive through many seasons/years. Still reproduce annually or biannually

Flower Anatomy



Flower types

- **Perfect flowers:** All flowers can be an eventual seed location
- **Imperfect flowers:** Only female flowers will have seeds

MONECIOUS (One house)
Separate male and female flowers on the same plant
ex. Squash, corn

DIECIOUS (Two houses)
Separate male and female flowers on separate plants
ex. Kiwi, spinach

Self Pollinators (Selfers)

- Plants that pollinate and fertilize themselves
- Pollen transfer may be within the same flower, or between two flowers on the same plant
- Very minimal crossing (usually below 5%)

- Examples
  - Fabaceae Family (Peas, Beans)
  - Asteraceae Family (Lettuce, Artichoke, Shungiku)
  - Solanaceae Family (Tomatoes, Peppers, Eggplant)

Cross Pollinators (Out-breeders)

- Require pollination from another plant
- Cross within species
- Require isolation distance
- Can involve self-incompatible gametes

- Examples
  - Brassicaceae Family (Broccoli, Cauliflower, Kale (most), Cabbage, Collards, Brussels Sprouts, Radishes)
  - Cucurbitaceae Family (Squash, Melons, Cucumbers)
  - Chenopodiaceae Family (Beets, Chard)
  - Poaceae Family (Corn, Sorghum)

Biological Classification

- Kingdom
- Phylum
- Class
- Order
- Family
- Genus
- **Species**

Family: Brassicaceae
Genus: *Brassica*
Species: *Oleracea*

Outbreeder or Inbreeder??

Often one can tell just by looking at a flower whether it cross-pollinates or self-pollinates

Trait	OUTBREEDER	INBREEDER
Incompatibility	self-incompatible	self-compatible
Flower #	many flowers	few flowers
Flower size	large flowers	small flowers
Flower color	bright colors	mono-colored
Nectories	nectaries present	nectaries absent
Scent	scented flowers	unscented flowers
Nector guides	nectar guides present	nectar guides absent
Anther position	anthers far from stigma	anthers close to stigma
Pollen #	many pollen grains	fewer pollen grains
Style position	style exserted from flower	style included in flower
Stigma	stigmatic area well-defined	stigmatic area poorly-defined

Seed Crops

Growing the crops

- Start with good seeds
- Know your region and possibilities
- Use OP seeds for true-to-type results
- Know the reproduction strategies of the plant
- Know the isolation distance and population size required
- Select: plant lots, thin to the best
- Observe regularly
- Save seeds only from the best

Isolation Distances

How to know how far the crossing plants needs to be?

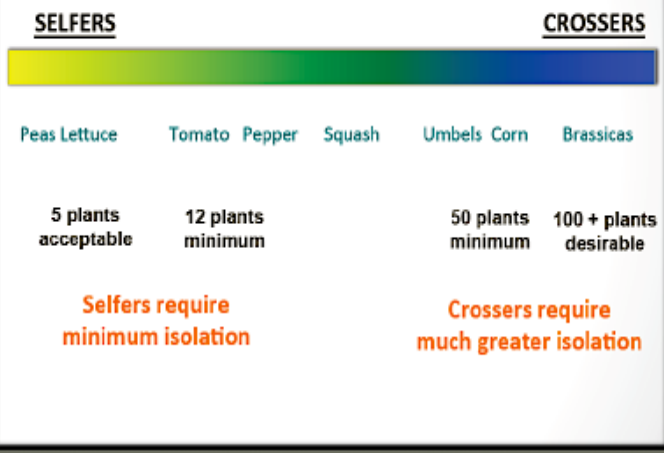
- What carries the pollen?
  - Insects
  - Wind
  - Animals
- Are there any natural or human-made barriers present?

Population Size

Why should I save from one than more plant?

- Maintaining varietal purity and genetic diversity
- Avoiding inbreeding depression in cross-pollinators and increasing vigor

Self & Cross-Pollinating Species Spectrum



Selection Criteria

Some options:

- Germination implications
- Maturity: early/late/range
- Seed size
- Color, shape, taste
- Disease resistance
- Structure
- Unintended consequences & invisible links
- Prioritize traits
- Preservation vs. preference
- Shattering
- Taste

Genetics vs. Environment

Phenotype = Genotype + Environment

Consider the environmental effects on plants.
Don't judge too fast!

Seeds in an urban context

- Know your neighbors
- Be aware of the physical separation that can reduce the isolation required
- Use isolation methods: distance, time, physical
- The best you can is often good enough

Steps

- Growing the crop (preparing site, seeding, maintenance)
- Observation and selection
- Harvesting
- Drying/fermenting
- Processing
  - Threshing
  - Winnowing
  - Size separation
- Storing
- Testing

Wet Seeded vs. Dry Seeded Crops

Dry Seeded Crops

- Harvest like grains
- Need seasonal drying
- Lower humidity environments are best
- Susceptible to disease at maturity

Wet Seeded Crops

- Harvested as fruits
- Can be extracted with water
- Higher humidity is tolerated and sometimes desirable
- Easier to avoid direct contact with diseases

Harvesting

- Mechanical harvest
- By hand
- All at once
- As it matures
- Windrow method

Processing

- Threshing:
  - Hands and feet
  - Sticks
  - Bags
  - Rollers
- Separating/Winnowing
  - Wind
  - Fan
  - Screens

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Aftercare

- Germination testing
- Seed storage
- Labeling
- Seed collection organizing

Storage

- Keep your seeds dry, cold and in the dark
- Ideally between 10 C and 15 C
- Ideally below 50% humidity
- If the temperature in Fahrenheit plus the humidity are less than100, all should be good as long as the temperature doesn't go below zero (ex: 55F + 40% humidity = 95= good).
- Freezing seeds can be done but be sure to never freeze seeds not appropriately dried. They will crack.

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Thank you!