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Landrace Gardening

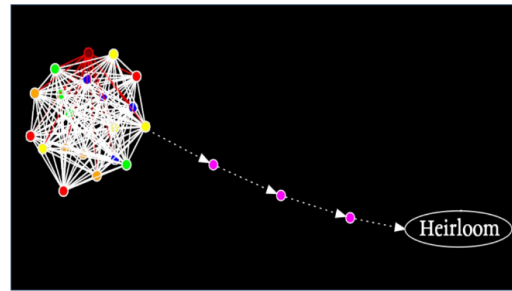


The information and graphics on this handout are drawn from the free online course titled *Landrace Gardening* by Joseph Lofthouse. It is a great resource! For more information: Sign up to the free course via the website goingtoseed.org or buy his fantastic book by the same name.

Heirloom Varieties

- An heirloom is a variety (also known as cultivar) of a species, commonly grown pre-1950, then kept true to type over the years by breeding in isolation from other varieties of the same species. The genetics of these cultivars have been developed and saved because they were delicious, hardy, or valuable in other ways. They are important vessels of genetic diversity.
- Heirlooms are Open Pollinated. The term Open Pollinated is used for populations that are usually isolated by variety, but crossing is not controlled within the population group. Thus OP seeds can be genetically diverse, or they can be inbred, depending on the parent population and the amount of isolation practised by the breeder. Varieties that are consistently isolated will lose genetic diversity.
- The problem with heirlooms is that through generations of breeding with themselves or a

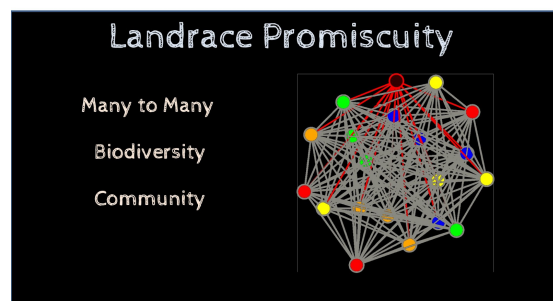
close relative, their genetic resource base has declined significantly to the extent where the plant can lack genes to function as a healthy, disease resistant plant.



Above is a representation of how initially diverse species undergo genetic bottlenecks in order to achieve the criteria that the plant breeding world deems "Distinct, uniform and stable". Initially diverse, locally-adapted landrace populations go through a process of inbreeding. Uniformity can usually be achieved after seven generations (each purple dot represents a generation).

Landrace Varieties

- **Promiscuously pollinating:** Natural, uncontrolled, cross-pollination between multiple varieties of the same species.
- **Genetically diverse:** Due to open-pollination and mixed original parentage, they have high genetic diversity.
- **Locally adapted:** Their high genetic diversity gives them the ability to evolve and adapt over time according to the farmer's selection and local conditions. Things that can be selected for are cold, heat or drought tolerance, colour, ability to thrive in nutrient poor conditions, to outcompete weeds, to set seed, earliness, lateness, and much more.



This image represents the genetic diversity in landrace crops. Each colour point is a parent plant, and after several years of promiscuous pollination, each plant contains genetics from many parents.

Why choose a landrace?

- **More resilient plants:** With a landrace, the need for large amounts of compost, fertilisers, pesticides and crop protection is reduced because seeds are selected from plants that thrive under low-input conditions. Instead of changing the environment to suit the plants, you're allowing the plants to adapt to your environment as it exists now, and then as it changes over time. With a landrace your entire crop will not succumb to a particular disease or pest pressure because they have broad genetic diversity within the population - some may die while others will survive.
- **Climate adaptability:** landrace plants will be more resilient to extreme weather events and a changing climate. Crossing multiple varieties gives rise to offspring with a more complete set of genes for each trait (multiple genes are involved in each trait), which increases the chance that they will be able to survive unexpected challenging events.
- **Overcome small space challenges:** Landrace Gardening, the typical seed saving requirements of maintaining minimum population sizes to avoid inbreeding depression do not apply. This is because you will have plants that are not closely related pollinating each other.
- **Easy and fun!** By not having to worry so much about keeping a variety true to type, landrace plant breeding is easier than conventional plant breeding. Anyone can do it!

How to create a landrace?

- At minimum: If you start with two varieties, that is completely fine, but plan to **add in a new variety every 1-2 years** to increase diversity over time. Or start with seeds from a couple of existing landraces.
- If you only have space for a few plants, plant them **closely together**, and consider techniques that increase the available surface area. Consider species that don't take up much room so that you can have a larger number of plants to select from.
- **The first year**, focus on increasing the genetic diversity within a crop species by allowing varieties to cross pollinate with each other. This will increase their health, vigor, and ability to adapt to your area.

- Plant and grow as you normally would, just with focus on increasing diversity, and expanding your seed supply.
- Plant a few varieties together and allow them to cross pollinate.
- Continue gardening using methods that bring you joy.
- Save seeds from anything that produces a fruit or seed.
- **The second year**, continue the process of allowing cross pollination and selection by the ecosystem. Select for the best tasting fruit if you have a lot to choose from.
 - Seeds planted will be the offspring of everything that produced fruit or pollen the first year.
 - Add additional varieties if you like.
 - Save seeds from the healthiest plants.
- **The third year** is the magical year in landrace gardening.
 - Start selecting for the flavors and other traits that you value.
 - Add new varieties if you like.
 - Enjoy the fruits of your labor.
- **The fourth year** and beyond
 - Enter a steady state of maintenance.
 - Keep tasting and saving seed from plants you value and please you.
 - Occasionally add new varieties when you find something you love or that interests you.

Which crops to choose?

The easiest crops to choose for your first landrace breeding project are the reliable outcrosses (outcrossing is defined as readily sharing pollen with each other): corn, squash, melons, cucumber, spinach, fava beans, runner beans, and brassicas.

What to watch out for?

- Don't introduce traits that you don't like. It takes 2-3 years to get rid of a trait you don't want!
- There still needs to be some isolation - only grow the types that you like. Make sure that you separate varieties of the same species that will not produce desirable offspring, by either space or time. Eg pop corn and sweet corn don't produce good corn!
- If you want 2 varieties to cross you need to plant them really close together. This is especially important with natural inbreeders.