Landrace Gardening
Excerpts and Resources

How to grow food when you can't buy seeds, fertilizers, or pesticides

By Joseph Lofthouse

Copyright © 2021 by Joseph Lofthouse
All rights reserved. This booklet may be copied for personal, non- commercial use in settings involving education,permaculture, homesteading, or seed-saving.

If you love this booklet, the full length edition is available as *Landrace Gardening: Food SecurityThrough Biodiversity and Promiscuous Pollination*.

Author Page, Mailing List, and Autographed books: https://Lofthouse.com
Amazon: https://www.amazon.com/dp/0578245655/
GoodReads: https://www.goodreads.com/author/show/21773933.Joseph_Lofthouse
BookBub: https://www.bookbub.com/authors/joseph-lofthouse?follow=true

A video course, active online community, and Landrace Seed Swap based on Landrace Gardening are available at: **http://GoingToSeed.org**

Dedicated to the millions of freelance seed-keepers who spent tens of thousands of years domesticating the species that I now grow.

Landrace Definition

A locally-adapted, genetically-diverse, promiscuously-pollinating food crop that undergoes survival of the fittest selection to provide food security under local ever-changing conditions. Landraces are intimately connected to the land, ecosystem, farmer, and community.

The Grand Secret to plant Breeding:

Plants make seeds, which can be collected and replanted.

Offspring resemble their parents and grandparents.

With that foundation of knowledge, illiterate plant breeders domesticated the food species that we now grow.

Natural Selection

Landrace gardening is the traditional method of growing food. It is based on survival of the fittest. Landrace varieties are locally adapted, genetically variable, and promiscuously-pollinating. This booklet focuses on the intimate connection of landrace varieties with local gardeners and communities.
Landraces adapt to changing conditions. The plants most likely to thrive are the offspring of plants that previously thrived.

Heirlooms

An heirloom is a variety that has been isolated for decades, and is maintained by continual inbreeding. It may have been the perfect variety for one family or tribe, that lived a very long time ago, in a place far away. Because heirlooms are from a different place and time, they often lack the genetic toolkit to deal with modern conditions. They also suffer from 'inbreeding depression' making them more susceptible to disease, pest attacks, and lack of vigor.

Open Pollinated

The benefit to "open pollinated" varieties is that you can save the seeds from them, and they will look the same next year as they did last year. However, the problem is that open pollinated varieties persist through inbreeding and closed populations. The common sense meaning of the phrase is that there might be some crossing going on, leading to genetic diversity. However, in practice, the plants are isolated to prevent crossing from occurring. Varieties that are consistently isolated lose genetic diversity, and thus also suffer from inbreeding depression. It doesn't matter how many plants are in the population if a population is isolated.

F1 Hybrids

Hybrids occur whenever two plants cross with each other that are not closely related. The seed industry is fond of taking two highly inbred parents and crossing them together. This results in offspring with highly uniform traits, which are approximately a blending of the traits of the parents, and sometimes with a particular trait of one parent being dominant.
In the next generation, the genes rearrange, and the traits of the grandparents get randomly distributed between the offspring.

Heritage Landraces

A genetically-diverse, promiscuously-pollinating landrace combines the best of all worlds, creating new hybrids between locally adapted parents, while maintaining local adaptation and the emotional satisfaction of growing inter-pollinating crops. Over multiple generations, they are selected by the local environmental conditions, as well as by the farmer for what the community prefers.

Creating Landraces

Modern landraces arise either by making an initial mass cross between many varieties, or by a slow and gradual process of adding new genetics from time to time.

To begin a breeding effort, I recommend using primarily heirlooms and open pollinated varieties. Some hybrids are acceptable.
Importing a landrace from elsewhere is a great way to trial a lot of diversity with little expense. In a 100-seedpacket of my dry bush beans, there might be 40 distinct types. Some family is likely to thrive wherever it gets planted.
The starting seeds may not be locally or regionally adapted. They can still be a valuable source of genetic diversity.
Seeds grown by neighbors and local farmers are a treasure. They are already at least a year ahead in adapting to our conditions.
Occasionally add new varieties to keep genetic diversity high.

Bitterness, Thorns and Other Mutants

People started domesticating plants up to 40,000 years ago. The vast majority of undesirable traits have been eliminated from domesticated crops. I don't observe crossed plants turning into poisonous mutants. When two highly-domesticated varieties cross, the offspring are likewise highly-domesticated. The offspring's traits blend those of the parent varieties.

Landrace Maintenance

Landraces are most easily maintained as a community effort. The best and strongest landrace crops are those which are widely grown throughout a local or regional community.

Remember to:

- Swap seeds with neighbors.
- Occasionally add new genetics.
- Be liberal during selection.
- Give priority to naturally occurring hybrids.
- Save seeds from plants with various sizes, shapes, colors, and textures to maintain genetic diversity.

Diversity allows the seed to adapt to changing climate, bugs, soil, and practices of the farmer.

Ease of Developing Landrace Crops

The following table summarizes the difficulty of creating landraces using various species. Annual species that are highly outcrossing convert most quickly into locally-adapted landraces. The 4th column shows you which F1Hybrids to avoid because of cytoplasmic male sterility (CMS). See the summary at the end for more information on what this is.

Ease of Landrace Development

Avoid Cytoplasmic male sterility (CMS): Commercial hybrids are often made using CMS

	Crop	Crossing Rate	Avoid F1 Hybrids
Very Easy	Bean, Fava	~30%	NO
	Bean, Runner	~35%	NO
	Corn	HIGH	NO
	Cucumber	~70%	NO
	Melons	HIGH	NO
	Spinach	100%	NO
	Squash	HIGH	NO
Easy	Asparagus	100%	NO
	Barley	~10%	NO
	Cabbage, Kale, Broccoli	100%	Yes
	Eggplant	~10%	NO
	Okra	~10%	NO
	Pepper	~10%	NO
	Radish	~85%	YES
	Sunflower	~50%	YES
	Tomatillo	100%	NO
	Wheat	~10%	NO
Hard (due to the difficulty of overwintering roots)	Beet	HIGH	YES
	Carrot	HIGH	YES
	Onion	HIGH	YES
	Parsnip	~30%	YES
	Potato		
	Rutabaga	~20%	YES
	Sweet Potato	100%	
	Tomato, domestic 3*	~3%	
	Turnip	100%	YES
Very Hard (low cross pollination rates)	Bean, common	0.5-5%	
	Bean, garbanzo	low	
	Garlic		
	Lettuce	~3%	YES
	Pea	0.50%	
	Sunroot 7	100%	

1 For non-listed species, you can estimate the ease of conversion to landrace gardening by looking at the flowers. If they areannuals that attract lots of pollinators, or if they use wind dispersal of pollen, they are on the easier end of the scale.

3 I consider domestic tomatoes hard, because of limited genetic diversity and low outcrossing rates.

7 I call sunroots very hard, due to wild traits and difficulty in setting seed.

Go to **GoingToSeed.org** to find the full version of this book,
access the courses, community and seeds.

Local Community Projects:

For anybody interested in collaborating with Going to Seed on developing community landrace projects, please get in touch with julia@goingtoseed.org

We are currently working with a couple of local projects, and we want to hear from you about what will and won't work as this project evolves.

FOOTNOTE:

Cytoplasmic Male Sterility (CMS) is a genetic phenomenon in plants where the male reproductive organs (stamens) fail to produce viable pollen, resulting in infertility. In agriculture, this trait is often used in the production of hybrid seed as it eliminates the need for manual hand-pollination. The CMS trait is caused by a cytoplasmic genetic factor, usually a mitochondria, and is usually maternally inherited, passed from the female parent to the offspring. CMS is associated with changes in the mitochondria, which can sometimes result in offspring displaying some symptoms of CMS such as partially reduced or abnormal male fertility. If a gardener wants to save seed, they should avoid plants produced from CMS lines and opt for open-pollinated or heirloom varieties instead. CMS is found in a range of plant species, including maize, rice, sorghum, sunflower, cotton, brassicas, carrots and onions, among others.