



## SEED SAVING GUIDE

### INTRODUCTION

The seeds that farmers hold in their palms at the planting time are leaving chains reaching back into antiquity. Most farmers cannot comprehend the amount of history contained in their seeds both what has come before and what may potentially come after brief involvement.

Our Stone Age ancestors began identifying and domesticating food plants thousands of years ago, where the simple act of selecting seeds for replanting. Whenever farmers begin to select and save their own seeds, they become part of ancient tradition.

Our grandparents and these ancestors were seed savers by necessity. Their best plants were selected to produce next year's seeds, which were traded over the farm fence with neighbors and faithfully passed down to early new generation of farmers. Few of the farm heirloom varieties have never been available commercially until just recently. Many have been growing on the same farm by different generations of farming for 150 years or more. This oven resulted in the seeds slowly developing resistance to local diseases, insect pests, and gradually becoming well adapted to the climate and soil conditions in farming farms throughout the region.

Countless heirloom varieties are still being maintained by farmers/gardeners in isolated rural areas and ethnic enclaves. However, today's society has become extremely mobile with young family [es] moving every few years, often to urban homes where farming may not be possible.

The steady erosion of rural population has been rapidly accelerated by the ongoing farm crisis, leaving fewer farmers and gardeners to save the family history growing in their own backyards. Untold numbers of old-time varieties are lost each year, because elderly gardeners can no longer find family members willing to grow and maintain these living heirlooms. When elderly seed savers pass away, unless their seeds are replanted by other gardeners their outstanding strains become extinct. Invaluable genetic characteristics are lost forever to future generations of gardeners and plant breeders.

There are a few bright rays of hope in what is otherwise a bleak situation. During the last decade, several grassroots genetic preservation projects have started to reverse these losses by collecting and distributing heirloom varieties.

#### **Rapid losses among commercial non-hybrid varieties**

Today's commercial vegetable varieties have also evolved from the same ancient tradition of seed saving as the heirloom varieties, but often were further refined by public breeding programs. A few years ago, public university had plant-breeding programs to produce seeds for their regions but again this is declining. Enrollments at agricultural colleges have also been steadily decreasing for several decades, with ever fewer students choosing careers in traditional

plant breeding. The dynamic breeding programs that characterized the first half of the last century will probably never happen again.

Tremendous consolidation has occurred and is continuing today within the garden seed industry. Multinational corporations, including agro-chemicals conglomerates, are buying out family-owned seed companies and replacing them with their regionally adapted collections with more profitable hybrids and patented varieties.

The new owner usually switch to generalized seed varieties that will grow reasonably well in the areas a cross the country, thus assuring the greatest sales in the company's new nationwide market.

In the US and Canada alone, between 1984-1987, 54 out 230 mail-order companies went out of business .The majority were small seed companies that had rich source of unique varieties. The last 54 companies resulted in 943 non-hybrid varieties [19%] becoming unavailable .The varieties being dropped which sometimes represent the life's work of several generations of seed many are often well adapted to specific regional climates had resistant to local diseases and pests. For from bring absolute or inferior, these may well be the best home garden varieties ever developed. It is entirely possible that half of the non- hybrid varieties still available from seed companies could be lost during the next decade or so.

### **Heirloom loss and hybrid dominance varieties**

The one factor most responsible for destroying garden/farm diversity is the massive shift to hybrid varieties.

Seed companies favor these propriety varieties for several reasons: -

1. Hybrid seeds are usually more expensive to produce and usually sell for several times more than the "open-pollinated" non-hybrid seeds.
2. Seeds saved from hybrid are worthless for replanting so farmers and gardeners must return to the companies for new seed every time they want to plant.
3. The parentage of hybrid varieties can be kept secret, so competing companies can never reproduce them.

Open –pollinated varieties will come "true – to –type [produce plants like their parents] if not allowed to cross with similar varieties growing nearby.

In contrast, hybrids are the result of deliberately crossing two different parent varieties, usually inbred. Hybrids should be avoided for seed saving purposes because they are incapable of producing plants like previous generations. Seed saved from hybrids will either be sterile or will begin reverting from hybrids to the parent varieties during succeeding generation.

It should be noted that hybrid maize are markedly more vigorous and produce than their open – pollinated counterparts due to phenomenon known as "hybrid vigor [the synergistic effect that result when two extremely diverse varieties are crossed] .There is much less difference between hybrid and one open pollinated varieties of self- pollinated crops. Plants that self-pollinate are naturally inbred and contain less diversity when compared to cross-pollinate crops therefore the hybridization of such self – pollinated crops results in less hybrid vigor.

Most of today's breeding programs produce hybrid for:

1. Designed to facilitate mechanical harvesting and long distance shipping.

2. Uniformly characteristics, and often ripen the same time.

It should be noted that these varieties are poorly limited for home gardeners who wish to spread cunning chores and fresh produce over a longest harvest season .Many commercial varieties rely on tough skin and solid flesh to withstand mechanical picking and country cross shipping . Gardeners/farmers on the hand are concerned with tenderness and outstanding flavors.

The old varieties are threatened today not because of any deficiencies but because they are not suitable for factory farmers and the food processing industry. As long as food crops are being bred for machines and large commercial growers, the need for home gardeners will be of marginal importance. The old varieties will survive and flourish only if they continue to be grown by backyard gardeners had sold by local farmer's organic food crops and CSAs.

### **OPEN-POLLINATED VERSUS GMO**

Nowadays, crops, modern seed companies market mostly *hybrid* seeds. Hybrid cultivars are made by planting two cultivars in the same field, allowing only one parent (the male parent) to produce pollen, and harvesting the seed only from the other (the female) parent. If the parents are chosen correctly, the offspring (the hybrid cultivar) will perform much better than the average of the parents, or even better than each of the parents. This is called *heterosis*, or hybrid vigor.

It is very difficult and time-consuming to develop and choose just the right parents, who together will produce the maximum hybrid vigor.

This is why the seed is expensive. It is also very difficult to copy a hybrid. If the farmer keeps and plants seed from the harvest of a hybrid, the (worse performing) parent types will appear again among the following year's crop and most of the hybrid vigor will be lost.

### **Traditional and exotic plants**

New crops have been introduced in many different countries. These are called *exotic* crops. For example, maize, potatoes, tomatoes and chili peppers are originally from South America, but they are now grown all over the world. These crops are now well adapted to the different local conditions, but this has taken many generations.

Exotic plants can be very useful, but it is important that they do not replace *traditional* crops. *Traditional crops* are crops that have a long history in a region and are adapted to local conditions, especially in times of stress or hardship where resources like water and nutrients are less available. They also provide a wide range of nutrients to the diet.

Some exotic crops are unable to produce seed in the new climate and so the farmer must purchase the seed each year.

Some people may think that they do not have a wide variety of traditional crops or they may think that crops from other countries are better than their own. Other farmers, gardeners and older people in the area may have knowledge about traditional crops and how they are used.

The seeds of traditional crops and the knowledge about their growth and use are important resources and should be conserved and used.

The conservation of local crop varieties is important because:

- Crops that have been developed locally are suited to local conditions and are likely to provide a more reliable harvest than plants from outside the local area.
- The use of different varieties will mean that there is less risk of losing the whole crop if, for example, there is a new pest in the area or a change in climate, as some plants may be more tolerant to the changes.
- Farmers can breed for new characteristics that are useful to them and their community.
- Farmers can domesticate wild plants and breed crops from outside the area to be suitable for local cultivation.
- Farmers do not need to buy new seed each year.

### **Disadvantages of Genetically Modified Seed (GM)**

The cross may not happen under natural conditions; there may be a good reason for this that we do not yet understand.

The transferred genes may have an unpredictable effect on the plant. GM varieties are not necessarily adapted to specific local conditions and require more inputs to be grown successfully.

GM crops may cross with and pass on their characteristics to other related plants; for example, this may produce very strong weeds.

GM seeds are normally patented (owned) by commercial companies. As a result, farmers cannot legally save them – new seed must be purchased each year.

Developing a GM variety costs a lot of time and money. It may be more effective to use this on improving other growing problems

### **AREAS OF PRESUMED ORIGIN FOR VARIOUS CROPS**

There are fortunately also advantages to having wild crop relatives around. They are a valuable source of genetic variation, in case new problems such as diseases show up. If you are so far advanced with your seed program that you can start improving your cultivars with introduced traits, the wild crop relatives are one of the places to start looking. This is a long-term process, however, since crosses with wild plants do not only bring you the desired trait, but usually a lot of undesired ones as well. Constant selection among the crossing products will then slowly take you back to your original type, enriched with the new trait.

| <b>Crop</b>       | <b>Area of origin</b>                            |
|-------------------|--|
| Adlay             | East & South East Asia, tropical Africa          |
| Adzuki bean       | Japan, China                                     |
| Bambara groundnut | West Africa                                      |
| Amaranth          | Andes, Central Mexico, Southwest Rocky Mountains |
| Cowpea            | Africa and Asia                                  |
| Black gram        | India (not known in wild state)                  |

|                                   |   |
|-----------------------------------|---|
| Broad bean                        | Mediterranean & South West Asia                                     |
| Buckwheat                         | North India to Siberia  |
| Chickpea                          | West and South Asia (not known in wild state)                       |
| Common bean                       | Central and South America   |
| Barley                            | Libya to Afghanistan  |
| Common millet                     | Central to East Asia (not known in wild state)                      |
| Maize                             | Mexico to Central Andes (not known in wild state)                   |
| Lima beans                        | Central and South America   |
| Lentils                           | South Europe, West Asia, India                                      |
| Kidney bean (scarlet runner bean) | Central America   |
| Groundnuts                        | South America   |
| Foxtail millet Origin China?      | Naturalized as weed almost in all warm regions                      |
| Mung bean (green gram)            | India, Burma (not known in wild state)                              |
| Oats                              | Central and Southwest Europe, Mesopotamia, Ethiopia                 |
| Pearl millet                      | West and Central Africa   |
| Peas                              | Europe to West and Central Asia, Ethiopia (not known in wild state) |
| Pigeon pea                        | Africa, Madagascar, India   |
| Quinoa                            | Central Andes, Central Mexico                                       |
| Rice                              | Pakistan to North Australia   |
| Rye                               | North Africa to Afghanistan   |
| Sorghum                           | Central and East Africa   |
| Soya bean                         | East Asia, mainly China   |
| Teff                              | Ethiopia  |
| Wheat                             | South Balkan to Afghanistan, Ethiopia                               |