



# SELECT THE BEST

POSITIVE SELECTION TO IMPROVE FARM SAVED SEED POTATOES

## FARMER FIELD AID

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Farmer trial demonstrating 'select the best', Narok, Kenya

## **What is positive selection?**

Positive selection means selecting healthy looking plants as mother plants for seed potatoes. The different steps are:

1. Peg healthy looking plants when the first flowers appear in the crop.
2. Check the health of the pegged plants 2 weeks later and remove pegs from plants that have developed disease symptoms.
3. Harvest the pegged plants one by one. Plants with few tubers, only small tubers or a malformed tubers are not used for seed.
4. The small tubers (1 -3 inch) of the final selected plants are stored separately to use as seed.

## **Why positive selection?**

Some potato diseases, like bacterial wilt and viruses, go from the plant to the tubers. If these tubers are planted again, they will produce a sick plant.

Most farmers select seed from their own potato crop, mixing sick and healthy tubers. By pegging plants without disease symptoms for seed selection, the number of sick plants in the next crop can be reduced.

## **Bacterial wilt**

There is no pesticide that can cure bacterial wilt. Plants close to a sick plant also get the disease. They may look healthy, but the tubers carry the bacteria that cause the disease. If used as seed, they will give a sick plant.

Avoid positive selection in a field with more than a few wilting plants (more than 2% of all plants wilting). If you do positive selection in a field with few wilting plants, avoid all plants closer than 3 feet or 1 meter to a wilting plant.

Bacterial wilt survives in the soil. To avoid this do not plant potatoes again for 2 seasons in a field with limited wilting plants (less than 5%) and for 3 seasons on a field with more than 5% infection. Plant another crop that is not from the potato family. Do not plant tomatoes, egg plant, pepper, tobacco or nightshade. Remove all 'volunteer' potato plants from this field. Otherwise bacterial wilt will survive in the soil.

Bacterial wilt is transferred from one field to another through planting sick tubers, through contaminated run-off water and through contaminated soil sticking to tools and shoes.

## Bacterial wilt symptoms

**Bacterial wilt:** starts with a few leaves or a single branch. The neighbouring plant may look healthy but its tubers will carry the disease.



**Oozing eyes** make soil stick



**Ooze** comes from the vascular ring when cut and squeezed



**Rotting** of the tuber starts from the vascular ring



## **How to fight bacterial wilt**

1. Use clean seed
2. Use clean land
3. Use clean tools
4. Do not pass through infected land
5. Do crop rotation of minimal:
  - One season if no bacterial wilt
  - Two seasons if less than 5% of plants wilting
  - Three seasons if more than 5% of plants wilting
6. Remove volunteers when rotating to stop 'feeding' the bacteria
7. Avoid run-off from infected fields
8. Wash tools and shoes or boots with water or diluted household bleach
9. Remove sick plants, all its tubers and carry them out of the field without spilling soil (in a bucket or bag) and throw them in a pit.
10. Put 2 handfull of ashes or 1 handfull of lime in the hole after removing a sick plant

## **Viruses**

Viruses do not kill potato plants, but reduce the yield seriously. Once a plant is infected its tubers will carry the virus. A tuber carrying a virus will give a sick plant. There is no treatment possible once a plant is sick.

Viruses live in the plant sap and are spread from one plant to the other by aphids and other insects who suck sap from potato plants. Some viruses can also be carried by touching and damaging plants.

## **How to fight viruses**

The best way to minimize the effect of viruses is to plant clean seed. This can be done through buying clean seed from reputable sellers. If clean seed is not available or not affordable, positive selection helps reducing the effect of viruses.

The best time to see the virus symptoms is just before flowering, when the plants are not yet touching each other. Virus symptoms differ depending on the type of virus and potato variety. The most important potato virus symptoms are presented here.

## Virus symptoms

**Leaf roll:** leaves roll up, plant more erect, leaves look dry and are brittle



**Mosaic:** Lighter green patches on the leaves; hard to see if mild; best seen in the shade with white paper underneath



**Erectness:** Stems and leaves pointing upwards; leaves and whole plant often smaller



**Crinkling:** The edges of the leaf are not smooth but show crinkles; mild crinkling is difficult to see



**Bunchiness:** Leaves are small and grow tightly together so that they form a bunch



**Chlorosis:** Leaves yellowing, usually starts in the top of the plant, veins may stay green



**Dwarfing:** Plants stay small, may emerge later and can be malformed. A plant may grow normally and then stop growing



**Multiple symptoms:** Leafroll, erectness, chlorosis, mosaic and crinkling



**Tuber symptoms:** Few and/or small tubers (left) and malformed tubers may indicate virus infection



## Late blight

Late blight is an important disease of potatoes but rarely affects tubers. Plants with some late blight can safely be selected as mother plants for seed. Late blight can kill a potato crop and protection is important, but it does not affect seed quality much.

Late blight can be controlled through the combined use of resistant varieties and prudent application of fungicides. Contact the extension service or potato research institute for proper spraying advise.

**Late Blight:** Lesions on the leaves and stems, white mycelia on the back, eventually the whole plant dries up



## Select the best

In short positive selection is to “**select the best**” potato plants as mother plants for the next potato crop.

Healthy seed can be selected by marking the plants that look healthy when the first flowers appear. At harvest the number, size and shape of tubers of every marked plant is checked before accepting its tubers as seed. Large tubers are still sold.

A healthy potato plant is:

1. Big
2. Has many thick stems
3. Has dark green leaves
4. Has many, large and well shaped tubers
5. Does not show virus and bacterial wilt symptoms