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IMPROVEMENT OF NATIVE CORN

It starts in the field and continues at home

Improvement of native corn

It starts in the field and continues at home

Rosa Jacoba Raimundo is from the hamlet El Nance in El Salvador (Metalio canton of the Municipality of Acajutla, Department of Ahuachapán). As a leader of a women's group, she works with CVX in several programs, including the local seed sanctuary. When it comes to improving corn seed, Doña Rosa Jacoba says:

"I learned how to improve native corn seed from my dad. He got really involved in native seed preservation with a group started here in El Nance. Since he couldn't keep up with all the work, he asked me to help him make the selections. So little by little I started learning about native corn, and about all the chemical poisons and fertilisers present in the hybrid corn that the government promotes.

At first, he sowed hybrid seeds without thinking, but then he started realising that the losses outweighed the benefits. With the group, we tested these outside varieties against ours. Then the truth came out about costs, performance, and the advantage that native corn needs less fertiliser than the other corn. Native corn even tastes different because it's sweeter and softer to eat, and the other one is harder and tougher. Now we are improving in the field and at home...".

Purpose of improving native corn seed

Native corn is robust, and it is relatively easy to improve its characteristics to help it adapt to the effects of climate change. The corn plant is a free pollination species. That means it's easy to cross-pollinate with other plants, especially through the wind. This represents an opportunity to make a type of seed improvement called phenotypic (or mass) selection.

By promoting mass selection of corn seeds in each area, we obtain a more resistant corn that gives greater yield and is better adapted to the local environment.

Each farming family, by producing their own seeds, gets greater control and food sovereignty, as well as autonomy by not relying on external resources and expensive and harmful technological packages.

Step by step: Mass selection

Mass selection has been practised for thousands of years and is the easiest to perform because it is largely based on observation. The main objective of this method is to eliminate unwanted plants and select the best ones in the field.

This process of improving native corn seeds, in turn, strengthens the farmer organisation to start seed sanctuaries or banks to save and preserve native and traditional seeds.

Before using mass selection for any crop, it is important to know the characteristics of the flowers of the plants. The corn plant is distinguished by having two types of flowers in the same plant: a female flower called corn or ear, and a male flower known as tassel or panicle.

Each silk or hair on the cob will give rise to a kernel of corn when it is fertilised by a grain of pollen from the tassel, either from the same plant, from another within the same crop, or from another plot by the effect of wind. This is called cross-fertilisation. And as you can see, in a corn crop there are differences between plants. For example, some plants are taller, produce different types and colour of kernels, and some produce two ears.

These differences, which are visible to the naked eye, are taken into account in the process of mass selection.In the case of corn, mass selection is done in two parts: one in the cornfield and the other at home after harvest.

In-field selection

1. One problem is that corn plants, especially very tall ones, can get flattened by wind and rain, so you should prefer plants of average height. That's why the first important characteristic you need to pay attention to is when the crop first begins to tassel and produce ears. Doña Rosa Jacoba prefers plants that produce ears a metre above the ground. Another reference is that the distance from the ear to the ground

should be less than the distance from the ear to the tassel, with seven leaves above and below the ear. After 50 days these will have already developed. The more leaves the plant has and the bigger and greener they are, the stronger and more productive the plants will be.

2. Other important characteristics to keep in mind when making the selection are: which plants are the healthiest, resistant to pests and diseases, of good bearing, with about 14 leaves, stout, of medium height, have thick stalks, and no burn or insect damage.

3. So as not to lose sight of them, Dona Rosa Jacoba ties a coloured ribbon to those that flower first and produce ears. She is careful not to select plants by the side of the road or at the edge of the fence.

4. At harvest time, the last selection is made in the field. It is advisable to choose the most developed ears which are well covered by the husks because they are more protected from birds and diseases. The drier ones are also good because they are early bloomers.

In-house selection

1. After husking the cobs, another good indicator of productive plants is when the ears have more than 12 rows of kernels.

2. Another good characteristic is cobs with straighter rows that go all the way to the tip of the cob.

3. The best corns are those with same-colour kernels because it indicates that they were not crossed with crops from other plots.

4. Triangle-shaped kernels will produce weak plants. You must choose the plumper kernels.

5. Remove the kernels from the base and tip of the cob. Prefer the plump kernels from the centre of each corn shelled by hand.

6. The best seed kernels are heavy, smooth, unblemished, and make a tinkling sound when shaken.

Materials and tools required

- ✔ Billhook machete
- ✔ Pick
- ✔ Hoe
- ✔ 10-15 pounds of sowing seeds
- ✔ Organic fertiliser
- ✔ A roll of ribbon or string
- ✔ Bags or sacks

Costs and difficulties

Estimated costs for six tareas (2,614.5 square metres)

Activities / Supplies	Costs and labour	Unit Cost	Total
Clearing	2 days	$5 USD/per day	$10 USD
Fertiliser	10 quintals	$10 USD	$100 USD
Application of fertiliser	1 day	$5 USD/per day	$5 USD
Sowing	1 day	$5 USD/per day	$5 USD
Clearing and ridging	2 days	$5 USD/per day	$10 USD
Fold and harvest	2 days	$5 USD/per day	$10 USD
Shelling, seed selection and drying	2 days	$5 USD	$10 USD
Total	**10 days**		**$ 150 USD**

Difficulties in implementing the selection technique

- Requires attending off-site training workshops.
- Not knowing correct in-field selection times.
- Requires lots of labour.
- Recognising the indicators of a good plant and ear selection.
- Discarding flattened plants.
- People are accustomed to using cobs closer to the tassel.
- Not valuing the importance of not selecting the plants on the edges of the field.
- Not knowing the minimum distance between corn crop plots to avoid unwanted crosses.

Recommendations

- Receive training workshops on the reproduction of maize plants, know the characteristics of a breeding plant and how to select the best ears of corn.
- Form a group of experimenters in each village.
- With this practice of mass selection for the improvement of native corn, CVX promises 11 pounds of seed to each person to cover an area of six tareas (a tarea is approximately 2,600m2). A manzana (0.7h) has 16 tareas and six tareas cover 2,614.5 square metres.
- Make a habit of going regularly to the garden and watching the cornfield's progress. That makes selection easier.

- Bending or flattening is a bad sign. Any plant that bends must be discarded.
- During a second planting, do the second selection of the chosen corns during April and May. Separate the large, heavy ears. These are laden with the most rows of kernels and are the best for sowing.
- Once husked, put the ears and husks aside. Some people pile them up with ash, others hang them in the kitchen or shell them into plastic containers.
- It's not the same thing to sow a big kernel than to sow a small one. That's why it's wise to use the cobs with the biggest, evenest kernels full of corn. Corn kernels mature unevenly. That's why you get rid of the kernels at the stem because they ripen first, and the kernels at the tip because they ripen last and are smaller. Choose the kernels from the middle.
- To plant a manzana-sized plot, set aside some 4,000 plants to have enough for sowing. One manzana of land is the equivalent of 0.7 hectares and 6,972 square metres.
- Do the germination test before planting.
- Choose an area where corn has not been sown before and that has been treated with organic fertiliser. After clearing, leave the stubble and cuttings as ground cover, don't burn them. Then sow with zero tillage.
- Out of six tareas, Doña Rosa Jacoba selected 300 ears to expand to 14 tareas. Her advice: "When I sowed in June, I harvested in November. I kept the sheaves and waited until the North winds began to blow to start sowing again. For me, the advantage is that I know that these seeds are mine, they're healthy, most of the grains germinate, and they are adapted to the area."

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www.sciaf.org.uk
Scottish Catholic International Aid Fund
19 Park Circus
Glasgow G3 6BE
T: 0141 354 5555
E: sciaf@sciaf.org.uk

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