

Section 2.2

Management of sweetpotato plant materials in quarantine greenhouse

Zósimo Huamán, Humberto Asmat, César Aguilar

Collecting activities allow us to obtain new samples that could be introduced into the collections. It is important, therefore, to be careful in handling these materials when they arrive to the place where the collection is maintained.

Sweetpotato germplasm collectors should consider the following precautions to reduce as much as possible the introduction of new diseases or pests to the place where the collection is maintained:

- Take vegetative samples from plants that look healthy.
- Emphasize the collection of sexual seed of wild species.
- Collect stem cuttings of cultivars and, insofar as possible, make transfers to in vitro culture at the collection site.
- Avoid collecting storage roots as much as possible.

Every introduction of new materials should be done according to the rules established in each country. An introduction of new materials usually requires the following documents:

1. Phytosanitary certificate issued by the exporting country.
2. Permit of importation of the target country.
3. List of the accessions sent and their passport data from the place where they were collected.

Quarantine inspection

All materials from new collections should be inspected in a quarantine greenhouse, where all the necessary precautions should be taken to avoid the entry of new pests or diseases into the area where the collection is maintained.

If all the plant material is collected in vitro, the risk of introducing pathogens or pests will be reduced. However, in most cases, collectors obtain stem cuttings, storage roots, or seeds.

Plant materials obtained by collectors usually arrive in a container that should be opened inside the quarantine greenhouse and should be inspected by an entomologist and a phytopathologist. This inspection should be carried out as soon as possible to avoid the deterioration of the collected materials and to avoid the involuntary escape of any pathogen that could come with them.

Introduction of stem cuttings

After the quarantine inspection, the stem cuttings should be disinfected preventively by soaking them in a solution containing Furan (2,3-dihydro-2,2-dimethyl-7-benzofuranyl methylcarbamate), Benlate (methyl 1-(butylcarbamoyl) benzimidazol-2-ylcarbamate), and Morestan (6-methyl-1,3-dithiolo[4,5-6]quinoxalin-2-one), all at 2%, for 5 minutes.

Once the stem cuttings are disinfected, put them in wide-spout containers with clean water (for example, milk bottles) and keep them

there until the axillary buds develop into lateral sprouts. During this period, you must maintain the level of water in the bottles, or renew the water totally if necessary.

When the lateral sprouts reach 10 to 15 cm in height, cut them with a disinfected surgical blade, and plant them in small containers that have a substrate with moss, soil, and sand. All the vegetative parts of the stem cuttings originally collected should be burned.

Once the plants are established and start their vegetative development, transplant them to bigger containers that have approximately 400 grams of substrate composed of 2 parts moss, 1 part agricultural soil, and 1/2 part washed sand.

These plants should be inspected frequently by specialists to eliminate those with symptoms of unknown diseases.

Introduction of storage roots

The storage roots have the potential high risk of transporting nematodes, insects, and many other pathogens. Therefore, the quarantine inspection should be more rigorous.

Those storage roots that look healthy should be disinfected by immersion in a solution with Morestan and Tecto 60, both at 2%, for approximately 10 minutes. The storage roots should be dried at room temperature and diffused light inside the quarantine greenhouse.

The development of sprouts in the storage roots is induced under environmental temperature above 20°C for about 15 days and planting them in a sprouting bed installed inside the quarantine greenhouse. The substrate of these beds consists of river sand that is washed in running water and then disinfected for 4 hours with steam at 100°C. The washing of the sand makes it possible to eliminate salts that could cause phytotoxicity in the plants.

Once sprouts of 10 to 15 cm of height are obtained, cut them with a surgical blade and plant them following the same process as the one explained for the stem cuttings.

You should burn all residues of storage roots, fibrous roots, etc., and sterilize with steam at high temperature the substrate used for the sprouting of these storage roots.

Introduction of botanical seed

Quarantine specialists should also inspect the botanical seed obtained by collectors. All those seeds that have insect exit holes should be incinerated. Those seeds that are apparently healthy

should be treated immediately with an insecticide with fumigating properties, such as Vapona (DDVP). This treatment consists in placing the seeds in Petri dishes with approximately 2 cm² of Vapona for about 30 days. Germplasm collectors should treat the seed with Vapona as soon as the capsules are collected.

Vapona [DDVP (ANSI), dichlorvos (ISO, BSI)] is composed of 2,2-dichlorovinyl dimethyl phosphate or 2,2-dichloroethenyl dimethyl phosphate. As a tablet, it gasifies in the environment. It is used to control weevils in grain storage.

Introduction of in-vitro micro-stem cuttings

In-vitro plantlets are also inspected, especially to establish whether contaminated by bacteria or fungi. Those plantlets that are free of contamination are removed from the test tubes by means of a disinfected clamp, and introduce the plantlet root into a hole made in the substrate of pots containing moss, or any other source of organic matter. The plantlets should not be touched with your hands. It is important to disinfect the clamp in alcohol and sterilize it over a burner before transplanting a new plantlet.

Maintenance of sweetpotato accessions in a greenhouse

In addition to the maintenance of all the accessions introduced into the collection in a quarantine greenhouse, it is usually necessary to keep some accessions of the sweetpotato collection in a greenhouse to avoid their loss. This is necessary especially when some accessions do not produce storage roots at harvest.

Always disinfect your hands and the instruments used to cut the stem cuttings of a new accession. Workers should therefore wash their hands with soapy water, quaternary ammonium (fungicide and bactericide) at 2 per 1000, and calcium hypochlorite (bactericide) at 2 per 1000.

We recommend using stem cuttings obtained from the apical part of the stem. Plant these stem cuttings in containers that have a substrate with 2 parts of moss, 1 part agricultural soil, and 1/2 part washed sand.

You can use a 12 N-12 P₂O₅-12 K₂O fertilizer in a dose of 5 g per liter of water to maintain soil fertility. Apply 300 ml of this solution in a container of 20 cm diameter having approximately 2 kg of substrate.

The most commonly used pesticides in plants that grow in the greenhouse are the following:

| Common name | Chemical Name | Controls | Dose |
|--------------------|----------------------|-----------------|-------------|
| Acarin | Dicofol | Mites | 1.5/1,000 |
| Pirimor | Pirimicarb | Aphids | 1.5/1,000 |
| Tecto 60 | Thiabendazole | Fungi | 1.5/1,000 |
| Benlate | Benomyl | Fungi | 1.5/1,000 |
| Furadan | Carbofuran | Whitefly | 1.5/1,000 |