

Vegetable Seedling Production Guide

Summary

Profitable vegetable production starts with good quality, healthy seedlings. Crops including tomatoes, sweet pepper, lettuce, pechay, ampalaya and eggplant produce quality crops with the highest yield if they are first sown in seedling trays and then transplanted into the field. However some crops such as beans and sweet corn are best sown directly into the field.

Trials in Leyte have confirmed average yield increases of 50-70% for lettuce and pechay when using seedling trays instead of direct sowing in the field. Yield increases have also been observed for tomatoes and sweet pepper from the use of seedling trays compared to growing seedlings in nursery beds and transplanting.

Nursery management

It is important to grow seedlings in a protected, raised area off the ground. Growing in seedbeds on the ground exposes plants to weather damage and early disease infections.

Vegetable seedlings should be produced in nursery areas which have the following characteristics:

- Shade cloth or UV stabilized plastic roofing. If using plastic, make sure it is cleaned regularly to allow light to penetrate
- If possible, have screened well enough to prevent insect entry
- Raised benches at least 1 m off the ground with metal mesh benchtops
- Good light – do not locate under trees
- Good ventilation to avoid heat buildup: 20-25°C is best for seedling growth



Seedling nursery with plastic roofing and insect screen that allows for good light and ventilation (left). Raised benches with metal mesh benchtops (right)

Germination medium

Ingredients	Vermicast based media	Soil-based media (loam soil)	Soil-based media (clay soil)
Main substrate	70% Vermicast	1 part loam soil	1 part clay soil
Manure/compost	-	1 part manure or decomposed manure	2 parts compost or manure
Rice Hull	30% Carbonized rice hull	1 part decomposed rice hulls	1 part decomposed rice hull or sieved sand
Lime - or dolomite depending on pH (kg/m ³)	2.0	2.0	2.0
Superphosphate -fine milled (kg/m ³)	2.0	2.0	2.0
Potassium nitrate (kg/m ³)	1.0	1.0	1.0
Trace element mix (g/m ³)	200-400	200-400	200-400

Thoroughly mix the media components together on a clean surface. If using the vermicast mix, store the media off the ground, in a sheltered location. If using the soil based media, it must be pasteurized before use.

Soil pasteurization

The growing media should be pasteurized prior to use to protect the seedlings from damping-off diseases, weed seeds and insects.

Pasteurization requires the medium to be heated to 70°C for 30 minutes. This could be done in several ways: in an oven for 30 minutes or in a sterilized barrel on top of a fire. Steam is also a good way to sterilize growing medium. Alternatively, pre-sterilized potting mixture can be purchased.

Containers and tools also need to be sterile, these can be disinfected by soaking in a 1 part chlorine bleach to 9 parts water solution for 30 minutes.



Soil pasteurization over the top of a fire



Plastic seedling trays

Seedling containers

The seedling containers can be either commercially available trays or individual containers made from banana leaves, known as the Lokong method.

1. Seedling trays

- Available in different sizes (50 to 128 cells per tray)
- The soil is filled into the plastic trays
- Depending on the crop, one to two seeds are planted into each cell
- Depth of sowing depends on size of the seed. As a rule, it should be only twice the size of the seed



Lokong (banana leaf) seedling containers can be used in the absence of plastic trays

2. Lokong method

- Used in the absence of seedling trays and makes use of banana leaves
- Banana leaves are rolled into a dimension of 2 cm in diameter and 15 cm long
- The soil media is placed into the rolled banana leaves and placed in rows on a leveled area
- Seeds are placed into each lokong. All other practices follow that of the cellular method

Container filling and sowing

It is very important to start off with good quality seed. That means seed obtained from a reliable source; disease free, uniform, high germination and stored under cool, dry conditions.

Fill the seedling trays with growing media and level off so that the top of the media is level with the top of the trays. If you are using the Lokong method, group the containers together, fill with media, and level it off.

Sow seed to a depth of 1 cm, 1 seed per cell and cover with media. Place the trays on metal benches and water in with a fine water breaker.

Covering the trays or lokong with sacks after sowing conserves moisture and maintains a uniform temperature that hastens germination. Covers should be removed at seedling emergence to prevent deformation and abnormalities.

Watering

Keep the seedlings moist by watering several times per day (less often before seedlings germinate). The media



Use a watering can with a fine water breaker to avoid disturbing seeds

must always be kept moist but not over wet. Large water droplets tend to disturb the small seeds, so water with a watering can with a fine water breaker.

Fertilization of seedlings

Fertilizer should only be applied from 10 days after germination. A soluble fertilizer (calcium nitrate or potassium nitrate) at the rate of *one tablespoon per gallon of water* should be applied by drenching the seedlings as a starter solution, every 7-10 days. Leaves should be rinsed off afterwards with clear water, though minimal water should be used to avoid leaching out the fertilizer.

Pest and diseases

Strict sanitation practices need to be followed to minimize the entry of diseases or insect pests into the seedling house. Try to schedule activity in the seedling house first, and never handle seedlings after handling diseased or insect infested crops.

Monitor seedlings for disease signs such as thinning of stems, brown lesions or spots on leaves or stems. In early stages a fungicide application may be required. Similarly monitor for insect pests, usually found on the undersides of leaves or in growing tips. Apply insecticide if necessary. Remove diseased or infested plants from the house and destroy to prevent spreading to other seedlings.

Pests and diseases of seedlings

- Aphids and other sucking insects (note: these insects spread viruses). You may need to use a systemic insecticide



Damping-off can cause seedlings to die, particularly under warm and wet conditions

- Damping off diseases (avoiding use of soil in growing media will help prevent these diseases)

Damping-Off: A Common Problem in the Nursery

- A disease commonly caused by fungi of the genera Rhizoctonia, Fusarium, Phytophthora and Pythium.
- Symptoms are water-soaked lesions which soften the stem causing the seedlings to lodge, dry up and die.
- The disease is favored by warm conditions and wet soil medium.
- Keep seedlings in the nursery moist but not overly wet.

Hardening seedlings

- Seedlings should be prepared for the stress of transplanting into the field by moving the seedlings into the full sun prior to transplanting.
- This is accomplished by a process known as “hardening” which is the gradual reduction of water application and gradual exposure of the seedlings to full sunlight, about 5 to 10 days before transplanting.

Transplanting

Prior to transplanting, the beds should be well prepared and thoroughly irrigated. It is important to use only transplants (e.g. seedlings, plant and tuber cuttings) that are healthy (free from pathogens and insects) and are in good condition.



Sweet pepper seedlings ready for transplant

The seedlings can be transplanted into the field after approximately 4 weeks, when they have 4-5 true leaves. Fully wet the seedlings before transplanting. Watering with a calcium nitrate solution of 1 tablespoon per gallon of water can help reduce transplant shock.

Handle the seedlings carefully to reduce transplant shock. Avoid damaging roots when removing seedlings from the seedling tray or lokong.

Dig a small hole and carefully place the seedling in the hole, along with 1 tablespoon (10g) of 16:16:16 NPK fertilizer, making sure the fertilizer is not in direct contact with the seedling roots. Cover the root ball with soil and gently press the soil around the roots. The soil should not be above the level of the root ball.

Water the seedlings in with a generous amount of water as soon as possible after transplanting. Transplanting is best done early in the morning or late in the afternoon to minimize transplanting shock.



Seedlings should be transplanted into a well-watered field, with fertilizer incorporated



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