

6. SEEDLING DISEASES AND THEIR CONTROL

Name	Vascular Streak Dieback (VSD)
Causal Organism	<i>Oncobasidom theobromae</i>
Symptom	Drying of the leaves at the shoot

Control Measures:

- To protect seedlings, nursery sheds should have plastic roots to avoid the leaves from getting wet at night.
- Spray Triadimenol fungicide at the rate of 2.5 ml / 10 L of water once a week starting from the appearance of the first two leaves until the seedlings are transplanted to the field.
- To protect replants, drench the bases with 200 ml of 0.1% Triadimenol of fungicide once a month.

Name	Fungal Diseases
Casual Organism	<i>Collectotrichum</i>
Symptom	Defoliation of the shoot
Control Measures	Spray copper-based fungicide once every two weeks

7. CULLING OF UNDESIRABLE SEEDLINGS

Seedlings that remain too long in the nursery develop curved roots. This is not good since it will reduce the ability of the plant to absorb nutrients and water from the soil. Seedlings with bent roots, poor development or damaged by pest are culled.

8. SHADE REGIMEN

Shading percentage is maintained at 75% during seed germination period. This is gradually reduced to 40% and eventually, on the last week, the shade is totally removed to induce hardening.



SEEDLING CARE AND MANAGEMENT

1. WATERING

- Water the seedlings as often as necessary to keep the soil moist.
- Avoid too strong water pressure when watering.
- Water seedlings in the afternoon before the scheduled foliar fertilizer application.
- Skip the next round of watering after application of foliar fertilizer

2. WEEDING

This is done for the seedlings in the polybag and the nursery as a whole:

Remove weeds to avoid competition for nutrient uptake between seedlings and the weeds and for proper sanitation.

3. SPACING

This practice in the nursery is important to avoid overcrowding:

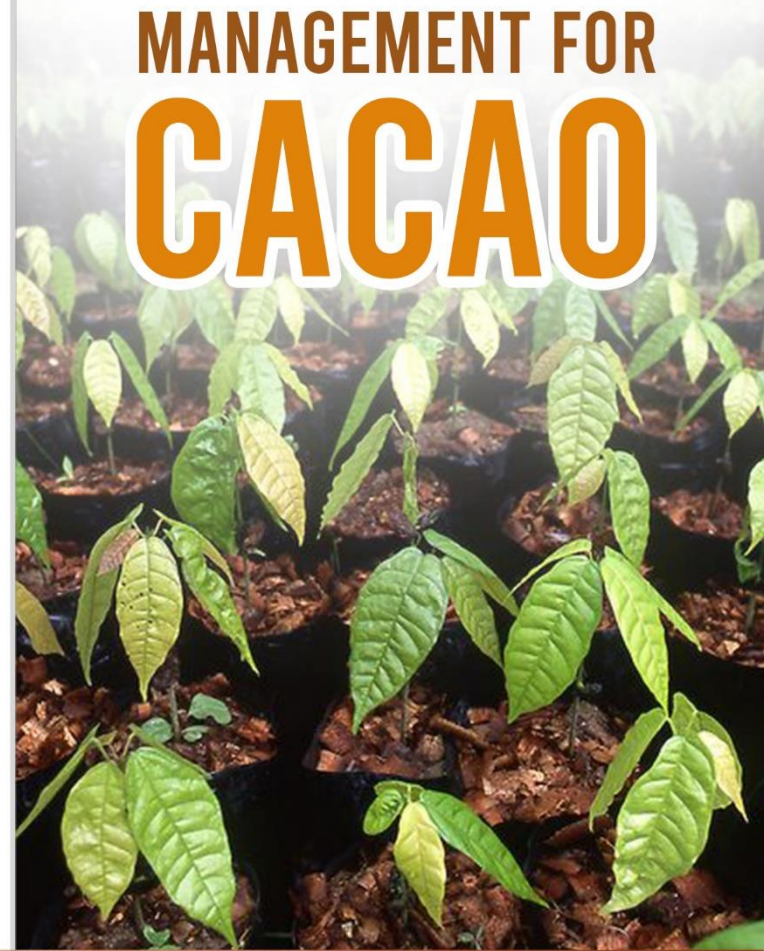
- Beds of 100 cm wide will hold six rows of bags spaced at 15 cm between centers
- After two months, spaces are increased to 20 to 35 between centers to improve growth between centers.

Developed and Reproduced by
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El Salvador City, Misamis Oriental



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NURSERY ESTABLISHMENT & MANAGEMENT FOR CACAO



NURSERY ESTABLISHMENT AND MANAGEMENT

Nursery establishment for cacao seedlings are similar to most tree nurseries. Young seedlings require ample shading, adequate supply of clean water and drainage. General characteristics of seedling nursery is discussed in this chapter.

SITE SELECTION

High quality cocoa beans comes from properly nurtured cacao trees. Proper care starts with selecting the right site for seedling nursery . The criteria for selecting the nursery site should consider the following.

- Accessible to good water source
- Located near the source of growing medium
- Location is near level or atmost gently sloping
- Good soil drainage
- Readily accessible and strategically located within the population

SHADE ESTABLISHMENT

Shade is very important for growing seedlings. It protects the soft tissues of seedlings against exposure to intense sunlight, strong winds and heavy rains. It also provides optimum temperature and relative humidity needed by the seedlings.

PREPARING THE GROWING MEDIUM

Materials needed :

- One part soil
- One part sawdust or carbonized ricehull
- One part compost
- Black Polyethelene bag

STEPS IN PREPARING THE GROWING MEDIUM

1. Mix thoroughly a combination of soil, sawdust or carbonized rice hull and compost. Depending on the pH of the soil, lime may be added. If the soil has pH below 5, apply 300 grams of lime per cubic meter of soil.
2. Place growing medium in 8"× 10; or 6"× 10" black Polyethelene bag. It is important that the bag is punched with holes to provide drainage.
3. Fill the bags with prepared growing medium up to two to three cm from the top.
4. Lay-out the nursery area in such a way that these are blocks with paths in between for easy sowing and other maintenance activities.



GERMINATION AND SOWING

1. SEED SELECTION

- Collect seeds only from ripe and healthy pods.
- Select seeds that are big and uniform in size to produce vigorous and fast growing seedlings.

2. SEED GERMINATION

- Rub the seeds with sawdust or fine sand or rice ass to effectively remove the mucilage that covers the seeds since they favor the growth of fungi and other microorganisms that hinder the germination.

- Wash the seeds to effectively remove mucilage.
- Soak the seeds overnight in fungicide solution.
- After soaking spread seeds over wet cloth and cover with wet newspaper for 24 hours.
- Keep in moist and well-ventilated place to pre-germinate.

3. SOWING

- When radicle starts to emerge after two or more days, collect the seeds and sow in prepared medium.



4. FERTILIZER APPLICATION

For healthier seedlings, proper nutrition should be provided. In general, urea, zinc phosphate and foliar fertilizers are used.

Below are the general recommendations for fertilizer application.

Kind	Urea (46-0-0)
Age of seedlings	0 to 4 months old
Rate of application	2 grams per seedling
Frequency of application	Every 2 weeks starting from emergence of the first true leaves
Kind	Zinc sulphate (hepto)
Rate of application	2 grams per seedling
Frequency of application	Only once
Kind	Foliar fertilizer with microoorganism
Frequency of application	In between application of urea

5. CONTROL OF PEST IN NURSERY

Common Name	Typical Damage	Pesticide	Dilution rate
Night flying beetles	Holes in leaves	Cyhalotrin	146 g / 112. 5 Liter of water
Grasshoppers	Large portion of leaves consumed	Delmatrin	Follow product recommendation
Mites	Tiny chlorotic spots	Mono crotophos	Follow product recommendation
Aphids	Leaf distortion	Mono crotophos	Follow product recommendation
Mealy bugs	Pale foliage and lack lusters	Chlorpyrifos	Follow product recommendation