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Conservation Horticulture for Dipterocarpaceae

Section 3: Collection and nursery propagation



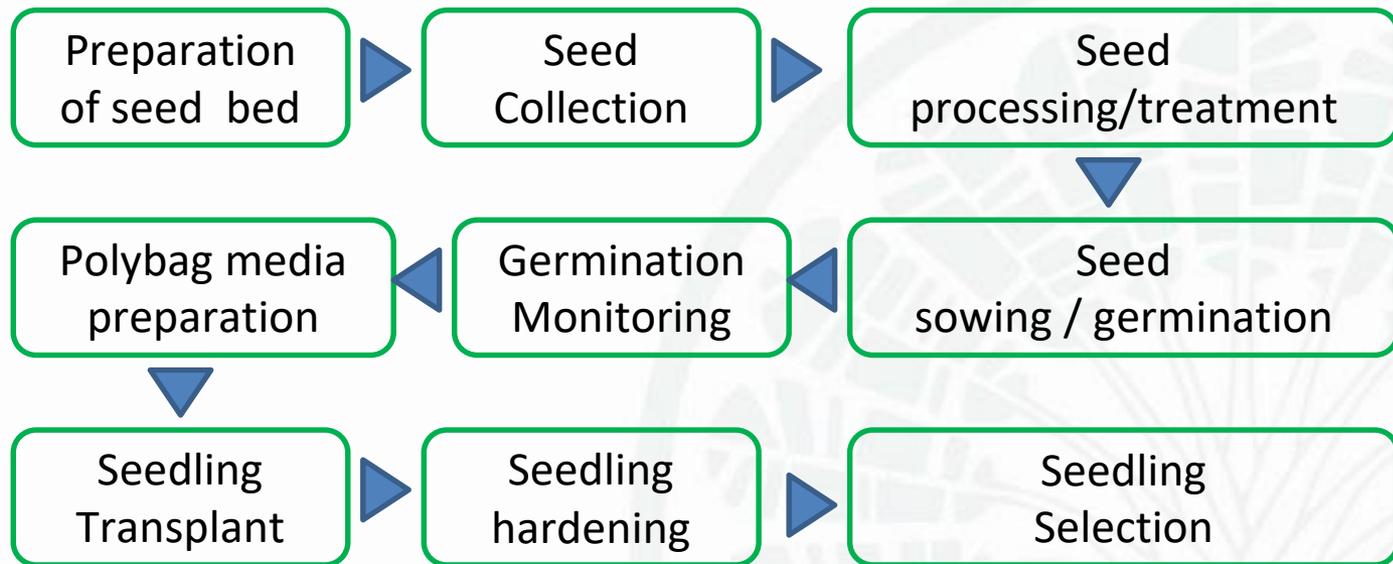
Adapted from presentations by: Tropical
Rainforest Conservation & Research
Centre & Mr. Randi Agusti



Nursery Workflow



Steps in workflow of nursery preparation, seed collection and growing of dipterocarps:



Preparation of Seed Bed 1



Dimensions and materials:

- 6" x 4' x 8' seed bed
- Treated wood planks seed bed frame
- Treated river sand

Grounded Seed Bed

Pros:

- Easy and fast to set up
- Low setup cost

Cons:

- takes more effort in handling and monitoring of seed germination
- higher chances of fungal infection
- more effort to control pest (insect/ mice feed on seed)
- overgrown roots penetrate into ground, causing root damage
- unable to control seed bed moisture during rainy season

Preparation of Seed Bed 2



Dimensions and materials:

- 6" x 4' x 8' seed bed; 4' elevation from ground
- C-Purlin frame
- Treat wood plank seed bed frame
- BRC seed bed platform with woven layout
- Treated river sand

Elevated Seed Bed

Pros:

- Easy handling and monitoring of seed germination
- Effective infection and pest control
- Able to prevent overgrowth and root penetration
- Able to control soil moisture

Cons:

- high initial material cost
- takes time and skill to set up

Preparation of Seed Bed - Tips



Tip:

The sand used in the seed beds should be treated with fungicide or heated to prevent fungal infection and to remove weeds and mold

Preparation of Seed Bed 3



Gunny sack germination method

- Stimulate seed with ground heat and moisture to encourage seed germination

Pros:

- Fast results
- Easy setup
- Direct transplant to media poly bag

Cons:

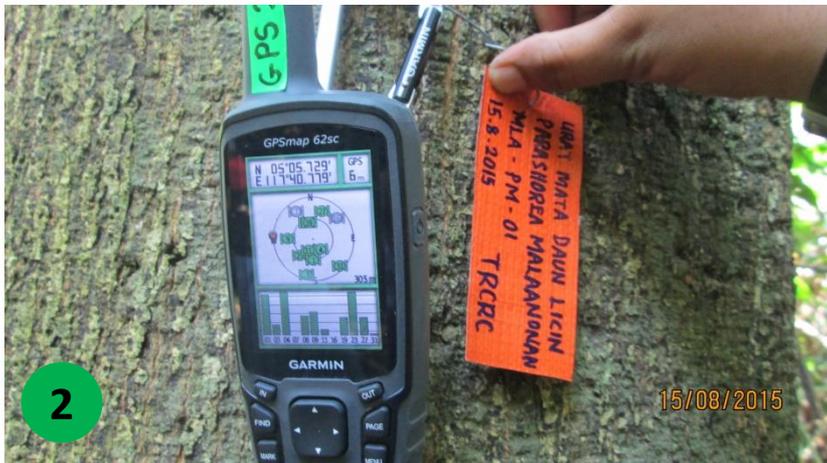
- only works with specific seeds
- constant monitoring of seeds is needed
- high risk of seed damage from being overheated

Seed collection from the wild: Survey and Identification of mother trees



1. Prepare suitable equipment:
 - Binoculars
 - Distance laser pointer
 - GPS
 - Map
2. Start from existing trail or easily accessible route
3. Utilise higher ground to look for fruiting canopy
4. Target/ estimate tree canopy/ crown

Seed collection



1. Identify target tree species. (e.g. *Parashorea malaanonan*)
2. Tag/ label target tree for future data and seed collection
3. Take sample and document the leaf and seed morphology

Seed collection – Data examples



Documentation of seed germination stage for future study:

1. *Dipterocarpus applanatus* van Slooted (Keruing Daun Besar)
2. *Dipterocarpus caudiferus* (Keruing Putih)
3. *Shorea hopeifolia* (Seraya Kuning Jantan)

Seed collection



- Seeds from seed collection expedition should be placed into the germination beds at the nursery **no more than 3 days** following collection
- Handle seed properly to prevent damage such as:
 - Germinated seed root damage
 - Insect infestation
 - Fungal infection

Seedling collection from the wild

****Seedlings should only be collected from the wild if absolutely necessary for conservation or restoration purposes and the collection does not harm the wild population.****



- Wrap the roots with a wet cloth or wrap the root with aluminum foil including a bit of soil
- Remove all leaves except the leaf buds
- Store in a dry and airtight place
- Plant no more than 5 days following collection
- Keep soil moist following planting

Seed Processing and Treatment



Sort seeds and carefully remove the wings and dirt



Soak the seeds in fungicide to prevent infection

Sowing seed in germination bed



Credit: J. Linsky

1.a) Fungicide treated seeds are sown on the sand bed. (e.g. *Parashorea malaanonan*)

1.b) Place seeds on their side near the soil surface (e.g. *Dipterocarpus kerrii*)

2) Use UV plastic shade to cover the sand bed to induce heat and speed up germination

Sowing seed in germination bed



Tips:

For some Dipterocarp species you can use a 90% shade filter to speed up leaf development in the seedlings.

Keep the soil moist for seed germination.

Germination Monitoring



Why carry out germination monitoring?

Monitor the germination rate of seeds for documentation and scientific finding. (Photo: *Parashorea malaanonan*)



Identify seed germination difficulties and find solutions. E.g. *Parashorea malaanonan* seed germinated with a delay of leaf development. The suspected cause is over exposure to light.

Seedling Monitoring



Observe and document seedling development stages to understand seedling development challenges

1. Germinated seed developing healthy roots
2. Germinated seed developing terminal bud
3. Germinated seed which has lost its cotyledons, with delayed formation of primary leaf
4. Seedling with early branching and short primary root development
5. Healthy seedling with well developed primary root

Polybag media preparation



Mix ingredients together



Fill polybags loosely with media and store near nursery area

Seedling Transplant

From germination bed to polybag:



1. Carefully remove seedlings from seed bed, do not damage roots; trim leaves to reduce evapotranspiration



2. Ensure that stick used to make hole in polybag soil is the same length from root collar to bottom of roots

Seedling Transplant

From germination bed to polybag:



3. Make a hole in the soil of the poly bag the same depth as the root length
4. Carefully place seedling into soil, keeping the root collar at the surface of the soil
5. Gently press soil around the seedling to ensure it is secure in the poly bag

Seedling Hardening

Stage 1: Seedling hardening process from germination bed to polybag



- Store seedling in a nursery/shade house with an shade intensity of 70 - 80%
- Flush with water 1-2 times a day

Seedling Hardening

Stage 2: Seedling hardening process from under 70%-80% shade to full exposure



- Let seedlings grow under less and less shade until they can grow under full exposure
- Seedlings should be acclimatized in conditions similar to the planting location for 5-10 days prior to planting

Tip: Seedlings can be planted into the field or garden site when 1 m high

Seedling Hardening



Stage 3: Prune branches to increase seedling trunk diameter for seedling that need to be kept longer in the nursery

Stage 4: Trimming branches to stimulate hardening process before planting

End of Section 3

Go to Section 4: Seedling selection, site preparation and planting



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