Seed Propagation Protocol Form

BOTANIC GARDENS CONSERVATION INTERNATIONAL

SEED PROPAGATION PROTOCOL

This form collates the information about the best method for seed propagation and growing up of the target species.

Authorship *(people that contributed propagation information)*: Tanzania Forest Service Agency

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Logo/s of the affiliated organisation(s):

This propagation protocol is subject to change and updates when new information on the propagation of the species becomes available. If there any comments or changes you would like to make, please send the information to africa@bgci.org

GENERAL INFORMATION

Taxon name	*Scientific name of the propagated species*	*Sterculia africana*	**Name/s of propagator/**	*Name(s) of the person or people that carried out the propagation*	
Family	*Plant family of the propagated species*	Malvaceae	**Organisation**	*Organisation(s) where the propagation was carried out*	
Origin of seeds	*Site(s) and country where seeds were collected*	Ndege forest reserve (Mpwapwa) Zindeni Hill (Tanga) Mafia Island	**Site and country**	*Site(s) and country where the propagation took place*	Tanga, Zanzibar, and Morogoro-Tanzania

SEED DESCRIPTION & PROCESSING

Description of the seeds and the processing of the seeds before seed sowing.

Time of year for seed collection	*List month/s of the year when seed collection is best*	August – October
Fruit/seed transport	*Describe how fruit/seeds have been stored during transport from the field to the nursery*	• Collect mature, unopened or freshly opened pods directly from the tree. • Transport in dry, ventilated bags (jute/hessian sacks) or crates. • Keep in cool, shaded conditions. • Avoid moisture accumulation to prevent fungal growth.
Processing of fruits/seeds	*Describe how the fruits/seeds are processed in situ or in the nursery (seed extraction methods, seed cleaning, handling of fruits/seeds…)*	• Allow pods (follicles) to dry under shade until they split fully. • Remove seeds manually by shaking • Clean by removing debris and damaged seeds. • No pulp removal required (dry fruit).

		• Handle gently to avoid cracking seeds. About 16kg of fruits produce 1 kg of seeds
Method to assess seed viability	*Describe method used to estimate seed viability (e.g. floating test, cut test, tetrazolium test, X-ray test)*	1. **Cut test:** • Cut seeds longitudinally. • Viable seeds have firm, white/cream embryos. • Empty or darkened seeds are non-viable. 2. **Floating test:** • Place seeds in clean water. • Viable seeds often sink; empty seeds float. *(Note: Less reliable due to winged structure.)* 3. **Tetrazolium red test (more accurate):** • Seeds soaked and treated with tetrazolium red solution. • Living tissues stain red.
% Estimated seed viability	*(Number of viable seeds) x 100 / (Total number of seed for which viability was estimated)*	Typical viability: 60–85% under proper storage.
Type of seed	*Choose one of these options: Orthodox, Intermediate, Recalcitrant or Unknown*	Seed is apparently intermediate between orthodox and recalcitrant
Seed size	*Include a measuring unit (e.g. mm, cm…)*	• Length**:** 1cm • Broad: 1.5cm
Number of seeds per gram	*Count a reasonable number of seeds and weigh them. Then, divide the number of seeds by their weight (e.g. 100 seeds / 5 g = 20 seeds/g)*	Approximately 16000 seeds per kilogram
Seed storage	*If seeds have been stored before germination, mention storage facilities (seed bank, fridge, freezer), and describe conditions (humidity, temperature), type of container, and storage time length.*	• Facility: Seed bank or refrigerator • Temperature: 4–10°C • Moisture content: 8–10% • Container: Airtight container (glass jar or sealed foil packet) • Storage duration: 2–4 years if properly dried.

+ ***Add photographs of the fruit and seeds. Make sure to include a detailed description of the photo, such as the growth stage, date, activity or process.***

SEED PROPAGATION PROTOCOL

GERMINATION			
Description of procedures, materials for seed germination and the germination success.			
Procedures	**Seed treatment**	*Describe treatment applied to the seed before sowing (e.g. mechanical scarification, chemical scarification, soaking, stratification, smoke treatment…). If applied, include the duration of*	The seed does not need pretreatment

		the treatment.	
	Seed sowing media	*Media composition: include percentages/ratio for the different components*	Recommended mixture: Tree Seed Production Station-Morogoro • Top Black Forest soil – 63% (5) • Well decomposed Manure – 25% (2) • Rice husk – 12% (1) **Ratio is 5:2:1** Well-drained and sterilized if possible.
	Container	*Describe size and material of the container in which seeds are sown*	• Seed trays or germination beds. • Polythene tubes: 15–20 cm height × 8–10 cm diameter**.**
	Seed spacing	*Describe the recommended spacing between the seeds when sown. Include a measuring unit (e.g. mm, cm…)*	• In seedbeds: 10–15 cm apart. • One seed per pot recommended.
	Seed depth	*Describe how deep the seeds are sown. Include a measuring unit (e.g. mm, cm…)*	Sow at 2–3 cm depth.
	Watering technique	*Describe watering tool, technique and frequency during sowing and germination*	• Outdoor nursery under 50% shade net. • Raised nursery beds or polybags. • Good ventilation.
	Germination facilities	*Describe the facilities where the germination of seeds took place (e.g. close case, outdoor shaded area, heated bench, covered/bagged container...)*	• Shaded nursery area (50% shade net). • Raised seedbeds or trays under shade structure.
	Environmental conditions	*Describe the environmental conditions where germination took place (temperature, humidity, and photoperiod)*	• Temperature: 20–30°C • Moderate humidity • Natural photoperiod (approximately 12 hours light in tropics)
Success	**Time of year for seed germination**	*List month/s of the year when seed germination is best*	1. **Northern & Eastern Zone** • October – December • March – May 2. **Central Zone** • November – April • May – October 3. **Southern & Western Zone** • November – April
	Duration until germination	*Average number of days/months/years until seeds germinated*	Usually 2–4 weeks after sowing.
	% Germination success	*(Number of seeds germinated) x 100 / (Total number of seeds sowed)*	Germination is poor but uniform. It reaches 10 after eight days and 40% after 15 days from sowing

Materials	*List the materials needed for seed germination to help with the planning of this activity. E.g. trays, sieves, dibbers, labels, ruler…*	• Seed trays or large pots • Secateurs or hammer (for cracking) • Sieves • Watering can • Labels and markers • Shade net • Soil mixing tools

+ ***Add photographs of the germination process. Make sure to include a detailed description of the photo, such as the growth stage, date, activity or process.***

SEED PROPAGATION PROTOCOL

FIRST POTTING			
Description of procedures and materials for the cultivation of the plants and the success of the growing of the plants.			
Procedures	**Growing Media**	*Media composition: include percentages/ratio for the different components*	Recommended mixture: Tree Seed Production Station-Morogoro • Top Black Forest soil – 63% (5) • Well decomposed Manure – 25% (2) • Rice husk – 12% (1) **Ratio is 5:2:1**
	Container	*Describe size and material of the container in which plants are potted*	Black polyethylene bags of height 8–10 cm and diameter 101.4 mm or 4”
	Fertiliser	*If used, include: type (organic or inorganic); nutrient composition and its ratio; and application (added to soil, dissolved on water, foliar application)*	Organic compost mixed in substrate. After 6–8 weeks: • NPK (e.g., 10:10:10 or 17:17:17) diluted in water. • Apply every 3–4 weeks at low rate. Avoid excessive nitrogen (can cause weak growth).
	Watering technique	*Describe watering tool, technique and frequency while growing the plants*	• Water once daily during dry periods. • Reduce watering during rainy season. • Avoid waterlogging
	Plant growing facilities	*Describe the facilities where the plant growing took place (e.g. glasshouse, outdoors, shaded area...)*	• Outdoor nursery under shade net. • Hardened gradually by reducing shade after 4–6 months.
	Environmental conditions	*Describe the environmental conditions where the plant growing took place (temperature, humidity, light levels)*	• Water using watering can or drip irrigation. • Frequency: 1–2 times per week, depending on rainfall and temperature. • Reduce watering during hardening-off.
Success	**Number of days until first potting**	*Average number of days since the start of seeds sowing until first potting*	If sown in seedbed: transplant at 21–30 days when 2–3 true leaves appear
	Duration until established plants	*Average number of days/month/years for which the plant growth was monitored until the establishment of plants*	6–8 months in nursery before transplanting.
	% Plants established	*(Number of plants established) x 100 / (Total number of plants potted)*	Typically 70–85% under proper nursery management.

	Health observations	*Record any signs of pest or disease, nutrient deficiency, damage… and the stage when they were observed (e.g. during germination, growing of seedlings, growing of plants….)*	• Damping-off during germination if overwatered. • Occasional leaf-eating insects during seedling growth. • Yellowing leaves may indicate nutrient deficiency or poor drainage.
Materials		*List material needed for potting to help with the planning of this activity. E.g. pots, dibbers, labels…*	• Polybags/pots • Potting soil mix • Dibber • Labels • Watering can • Shade net

+ ***Add photographs of the pricking out, potting, and the growing of plants. Make sure to include a detailed description of the photo, such as the growth stage, date, activity or process.***