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*	*Deinbollia borbonica*	**Name/s of propagator/**	*Name(s) of the person or people that carried out the propagation*	
Family	*Plant family of the propagated species*	Sapindaceae	**Organisation**	*Organisation(s) where the propagation was carried out*	
Origin of seeds	*Site(s) and country where seeds were collected*	Tanga, Pugu-Kazimzumbwi nature forest reserve and Ruvu South	**Site and country**	*Site(s) and country where the propagation took place*	Tanga, Pugu-Kazimzumbwi nature forest reserve and Ruvu south

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*	November–March
Fruit/seed transport	*Describe how fruit/seeds have been stored during transport from the field to the nursery*	• Fruits collected directly from tree when fully ripe. • Stored in ventilated crates or baskets, not sealed plastic. • Kept cool and shaded. • Transported to nursery within 1–2 days. • Avoid crushing, as fruits are fleshy.

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...)*	• Fruits depulped manually by squeezing in water. • Pulp removed by rubbing seeds through sieve. • Seeds washed thoroughly to remove sugars (prevents fungal growth). • Air-dried under shade for 1–2 days About 4kg of fruits produce 1kg of clean 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 solution. • Living tissues stain red.
% Estimated seed viability	*(Number of viable seeds) x 100 / (Total number of seed for which viability was estimated)*	Fresh seed viability: 70–90%
Type of seed	*Choose one of these options: Orthodox, Intermediate, Recalcitrant or Unknown*	The seed is intermediate between orthodox and recalcitrant
Seed size	*Include a measuring unit (e.g. mm, cm…)*	Approximately 10–15 mm long Rounded to oval shape
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 3500 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*	• Recalcitrant → Do not store long-term**.** • Short-term storage only (1–4 weeks). • Store in moist vermiculite or sawdust. • Temperature: 15–20°C (not refrigerated below 10°C). • Use perforated plastic container to maintain humidity.

	container, and storage time length.	

+ ***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 treatment.*	Usually no dormancy. Recommended: • Soak in clean water for 12–24 hours before sowing. • Fungicides dip (optional) to prevent damping-off. No scarification required.
	Seed sowing media	*Media composition: include percentages/ratio for the different components*	Recommended mixture: Tree Seed Production-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*	• Deep seed trays or directly in polybags. • Polybags: 10–15 cm diameter, 20 cm depth (deep root system).
	Seed spacing	*Describe the recommended spacing between the seeds when sown. Include a measuring unit (e.g. mm, cm…)*	In seed trays: 5–7 cm between seeds
	Seed depth	*Describe how deep the seeds are sown. Include a measuring unit (e.g. mm, cm…)*	Sown at 1–2 cm depth Cover lightly with soil.

	Watering technique	*Describe watering tool, technique and frequency during sowing and germination*	• Watering can with fine rose head. • Keep medium moist but not waterlogged. • Water once daily or as needed.
	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 (50–70% shade). • Raised beds or trays. • Protected from heavy rain.
	Environmental conditions	*Describe the environmental conditions where germination took place (temperature, humidity, and photoperiod)*	• Temperature: **20–30°C** • Humidity: 60–80% • Light: Partial shade
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*	Germination begins in 7–20 days
	% Germination success	*(Number of seeds germinated) x 100 / (Total number of seeds sowed)*	Typically 60–85% (fresh seed)
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 polybags • Sieves • Buckets • Watering can • Shade net • Labels and marker • Ruler • Fungicide (optional)

+ ***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-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)*	After seedlings establish (4–6 weeks): Organic option: • Well-decomposed compost mixed in soil Inorganic option: • NPK 2:3:2 or 10:10:10 (low concentration) Application: • Mixed into soil • Liquid feed every 2–3 weeks
	Watering technique	*Describe watering tool, technique and frequency while growing the plants*	• Regular watering using watering can or hose with fine spray. • Keep soil consistently moist. • Avoid water stress (species prefers moist conditions).
	Plant growing facilities	*Describe the facilities where the plant growing took place (e.g. glasshouse, outdoors, shaded area...)*	• Shade house (30–50% shade). • Later hardened in partial sunlight.
	Environmental conditions	*Describe the environmental conditions where the plant growing took place (temperature, humidity, light levels)*	• Temperature: 20–30°C • Moderate to high humidity • Bright indirect light
	Number of days until first potting	*Average number of days since the start of seeds*	If sown in tray: 30–45 days after sowing (When seedlings have 2–4 true leaves)

Success		*sowing until first potting*	
	Duration until established plants	*Average number of days/month/years for which the plant growth was monitored until the establishment of plants*	Monitored for 6–12 months before field planting.
	% Plants established	*(Number of plants established) x 100 / (Total number of plants potted)*	Typically 70–85% survival after potting and hardening
	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….)*	Common issues: • Damping-off (germination stage if overwatered) • Root rot in poorly drained soils • Aphids (young seedlings) • Leaf yellowing (nitrogen deficiency)
Materials		*List material needed for potting to help with the planning of this activity. E.g. pots, dibbers, labels…*	• Polybags or pots • Potting mix • Dibber • Labels • Watering can • Wheelbarrow • Trowel

+ ***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.***