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*	*Diospyros kirkii*	**Name/s of propagator/**	*Name(s) of the person or people that carried out the propagation*	
Family	*Plant family of the propagated species*	Ebenaceae	**Organisation**	*Organisation(s) where the propagation was carried out*	
Origin of seeds	*Site(s) and country where seeds were collected*	Tabora, and Katavi	**Site and country**	*Site(s) and country where the propagation took place*	Tabora, and Katavi-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*	October–February
Fruit/seed transport	*Describe how fruit/seeds have been stored during transport from the field to the nursery*	• Collect mature fruits directly from tree or freshly fallen fruits. • Transport in ventilated crates or baskets. • Avoid stacking deeply to prevent bruising. • Keep shaded and cool. • Deliver to nursery within 1–2 days (fruits ferment quickly).

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 soaked in water for 24 hours to soften pulp. • Pulp removed manually by rubbing through sieve. • Seeds washed thoroughly to remove sugars. • Air-dried under shade for 1–2 days. • Avoid excessive drying if seeds are fresh. About 5kg of fruits produce 1 kg of seed
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)*	Fresh seeds: 60–85% viability
Type of seed	*Choose one of these options: Orthodox, Intermediate, Recalcitrant or Unknown*	Orthodox
Seed size	*Include a measuring unit (e.g. mm, cm…)*	Approximately 2.5cm long Hard, oval to oblong seed
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 **2500** 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*	Can be stored for three years at room temperature without significant loss of viability if kept dry and free of insect

	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.***

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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.*	No pre-treatment required though soaking the seeds in cold water for 12 hours hastens germination
	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**
	Container	*Describe size and material of the container in which seeds are sown*	• Deep seed trays initially OR • Direct sewing in polybags Polybags: 15 cm diameter × 20–25 cm depth (deep taproot development).
	Seed spacing	*Describe the recommended spacing between the seeds when sown. Include a measuring unit (e.g. mm, cm…)*	In seedbed: 7–10 cm between seeds
	Seed depth	*Describe how deep the seeds are sown. Include a measuring unit (e.g. mm, cm…)*	Sown at 2–3 cm depth Cover firmly but not compacted.
	Watering technique	*Describe watering tool, technique and frequency during sowing and*	• Watering can, with fine rose head. • Maintain moist (not waterlogged) conditions. • Water once daily or as needed.

		germination	
	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 rainfall.
	Environmental conditions	*Describe the environmental conditions where germination took place (temperature, humidity, and photoperiod)*	• Temperature: 20–32°C • Moderate humidity • Bright indirect light initially
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*	10-45 days
	% Germination success	*(Number of seeds germinated) x 100 / (Total number of seeds sowed)*	Germination is good and moderately uniform; it attains 10% after three weeks and 70% after six weeks 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 • Sand and forest soil • Compost • Hot water container • Watering can • Labels and marker • Ruler • Shade net

+ ***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 transplanting: Type: • Organic compost (preferred) OR • NPK 15:15:15 Application: • Mixed in potting media OR • Liquid fertilizer every 2–3 weeks
	Watering technique	*Describe watering tool, technique and frequency while growing the plants*	• Watering can or hose with fine nozzle • 2–3 times per week • Reduce watering during hardening
	Plant growing facilities	*Describe the facilities where the plant growing took place (e.g. glasshouse, outdoors, shaded area...)*	• Shade nursery during early stage • Gradual exposure to full sunlight
	Environmental conditions	*Describe the environmental conditions where the plant growing took place (temperature, humidity, light levels)*	• Temperature: 20–30°C • Moderate humidity • Increasing sunlight after 4–6 weeks
Success	**Number of days until first potting**	*Average number of days since the start of seeds sowing until first potting*	If sown in trays: 45–60 days after sowing, when seedlings have 2–3 true leaves.
	Duration until established	*Average number of days/month/years for which the plant growth*	Monitored for 8–12 months before field transplanting

	plants	*was monitored until the establishment of plants*	
	% Plants established	*(Number of plants established) x 100 / (Total number of plants potted)*	Usually 60–80% 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….)*	• Damping-off during early germination • Slow growth in poor soils • Termite damage • Leaf spot (fungal) in humid conditions • Yellowing leaves (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.***