

Seed Propagation Protocol Form

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	<i>Scientific name of the propagated species</i>	<i>Khaya anthotheca</i>	Name/s of propagator/	<i>Name(s) of the person or people that carried out the propagation</i>	
Family	<i>Plant family of the propagated species</i>	Meliaceae	Organisation	<i>Organisation(s) where the propagation was carried out</i>	
Origin of seeds	<i>Site(s) and country where seeds were collected</i>	Morogoro, Mbeya, Arusha	Site and country	<i>Site(s) and country where the propagation took place</i>	Morogoro, Mbeya, and Arusha-Tanzania

SEED DESCRIPTION & PROCESSING

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

Time of year for seed collection	<i>List month/s of the year when seed collection is best</i>	August–October.
Fruit/seed transport	<i>Describe how fruit/seeds have been stored during transport from the field to the nursery</i>	<ul style="list-style-type: none"> • Fruits collected in breathable bags such as jute or paper sacks • Avoid plastic bags (causes heating and fungal growth). • Transported in shaded, well-ventilated conditions. • Delivered to nursery within 1–2 days after collection.
Processing of fruits/seeds	<i>Describe how the fruits/seeds are processed in situ or in the nursery (seed extraction methods, seed cleaning, handling of fruits/seeds...)</i>	For small quantity <ul style="list-style-type: none"> • Capsules dried in the sun until fully open. • Seeds extracted manually by shaking/splitting capsules. • Wings removed carefully if necessary.

		<ul style="list-style-type: none"> • Debris removed by sieving and winnowing. • Only well-filled, undamaged seeds selected. <p>For bulk quantities</p> <ul style="list-style-type: none"> • Capsules dried in the sun until fully open. • Seeds extracted by pour the capsules in fresh extract machine to release seeds • Debris removed by sieving and winnowing. • Only well-filled, undamaged seeds selected. <p>About 15 kg of fruits produce 1 kg of seeds</p>
Method to assess seed viability	<i>Describe method used to estimate seed viability (e.g. floating test, cut test, tetrazolium test, X-ray test)</i>	<ol style="list-style-type: none"> Cut test: <ul style="list-style-type: none"> • Cut seeds longitudinally. • Viable seeds have firm, white/cream embryos. • Empty or darkened seeds are non-viable. Floating test: <ul style="list-style-type: none"> • Place seeds in clean water. • Viable seeds often sink; empty seeds float. <i>(Note: Less reliable due to winged structure.)</i> Tetrazolium red test (more accurate): <ul style="list-style-type: none"> • Seeds soaked and treated with tetrazolium red PRoductiosolution. • Living tissues stain red.
% Estimated seed viability	<i>(Number of viable seeds) x 100 / (Total number of seed for which viability was estimated)</i>	<ul style="list-style-type: none"> • Typical viability: 70–90% when fresh.
Type of seed	<i>Choose one of these options: Orthodox, Intermediate, Recalcitrant or Unknown</i>	Recalcitrant to intermediate
Seed size	<i>Include a measuring unit (e.g. mm, cm...)</i>	<ul style="list-style-type: none"> • Length: 2.5cm • Broad: 1.5cm
Number of seeds per gram	<i>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)</i>	Approximately 4000 seeds per kilogram
Seed storage	<i>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.</i>	<p>Best sown fresh, if storage is necessary:</p> <ul style="list-style-type: none"> • Short-term only (1–3 months). • Temperature: 4–10°C (refrigerator). • Humidity: 8–10% moisture content. • Container: Airtight container with desiccant. <p>Viability declines rapidly after 3 months.</p>

+ **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	<i>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.</i>	No dormancy; no scarification needed.
	Seed sowing media	<i>Media composition: include percentages/ratio for the different components</i>	Recommended mixture: Tree Seed Production Station-Morogoro <ul style="list-style-type: none"> • 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	<i>Describe size and material of the container in which seeds are sown</i>	<ul style="list-style-type: none"> • Seed trays or germination beds. • Polythene tubes: 15–20 cm height × 8–10 cm diameter.
	Seed spacing	<i>Describe the recommended spacing between the seeds when sown. Include a measuring unit (e.g. mm, cm...)</i>	<ul style="list-style-type: none"> • In trays: 2–3 cm apart. • In seedbeds: 5 cm × 5 cm spacing.
	Seed depth	<i>Describe how deep the seeds are sown. Include a measuring unit (e.g. mm, cm...)</i>	<ul style="list-style-type: none"> • Sow at 1–2 cm depth. • Cover lightly with fine sand or soil.
	Watering technique	<i>Describe watering tool, technique and frequency during sowing and germination</i>	<ul style="list-style-type: none"> • Use watering can with fine rose head. • Light watering daily or as needed. • Keep moist but not waterlogged.
	Germination facilities	<i>Describe the facilities where the germination of seeds took place (e.g. close case, outdoor shaded area, heated bench, covered/bagged container...)</i>	<ul style="list-style-type: none"> • Shaded nursery area (50% shade net). • Raised seedbeds or trays under shade structure.
	Environmental conditions	<i>Describe the environmental conditions where germination took place (temperature, humidity, and photoperiod)</i>	<ul style="list-style-type: none"> • Temperature: 25–30°C. • High humidity (60–80%). • Partial shade. • Natural photoperiod (12 hours light typical in tropics).
Success	Time of year for seed germination	<i>List month/s of the year when seed germination is best</i>	<ol style="list-style-type: none"> Northern & Eastern Zone <ul style="list-style-type: none"> • October – December • March – May Central Zone <ul style="list-style-type: none"> • November – April • May – October Southern & Western Zone

			<ul style="list-style-type: none"> • November – April
	Duration until germination	<i>Average number of days/months/years until seeds germinated</i>	<ul style="list-style-type: none"> • Germination begins in 7–14 days. • Complete within 3–4 weeks.
	% Germination success	<i>(Number of seeds germinated) x 100 / (Total number of seeds sowed)</i>	Germination is very good but sporadic. It attain 20% after one week and 90% after three weeks
Materials		<i>List the materials needed for seed germination to help with the planning of this activity. E.g. trays, sieves, dibbers, labels, ruler...</i>	<ul style="list-style-type: none"> • 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	<i>Media composition: include percentages/ratio for the different components</i>	<p>Recommended mixture: Tree Seed Production Stations-Morogoro</p> <ul style="list-style-type: none"> • Top Black Forest soil – 63% (5) • Well decomposed Manure – 25% (2) • Rice husk – 12% (1) <p>Ratio is 5:2:1</p>
	Container	<i>Describe size and material of the container in which plants are potted</i>	Black polyethylene bags of height 8–10 cm and diameter 101.4 mm or 4”
	Fertiliser	<i>If used, include: type (organic or inorganic); nutrient composition and its ratio; and application (added to soil, dissolved on water, foliar application)</i>	<ul style="list-style-type: none"> • Organic compost mixed in media. • Optional: NPK (e.g., 20:10:10) applied lightly after 4 weeks. <p>Application: Dissolved in water and applied to soil.</p> <p>NB: Being a legume, it fixes nitrogen (low N fertilizer required).</p>
	Watering technique	<i>Describe watering tool, technique and frequency while growing the plants</i>	<ul style="list-style-type: none"> • Water once daily during dry periods. • Reduce watering during rainy season. • Avoid waterlogging.
	Plant growing facilities	<i>Describe the facilities where the plant growing took place (e.g. glasshouse, outdoors, shaded area...)</i>	<ul style="list-style-type: none"> • Outdoor nursery under shade net. • Hardened gradually by reducing shade after 2–3 months.
	Environmental conditions	<i>Describe the environmental conditions where the plant growing took place (temperature, humidity, light levels)</i>	<ul style="list-style-type: none"> • Temperature: 20–32°C • Moderate humidity • Gradual exposure to full sunlight during hardening phase
Success	Number of days until first potting	<i>Average number of days since the start of seeds sowing until first potting</i>	If sown in seedbed: transplant at 21–30 days when 2–3 true leaves appear
	Duration until established plants	<i>Average number of days/month/years for which the plant growth was monitored until the establishment of plants</i>	<ul style="list-style-type: none"> • 4–6 months in nursery before field planting. • Ready when seedlings reach 30–40 cm height.
	% Plants established	<i>(Number of plants established) x 100 / (Total number of plants potted)</i>	Typical: 80–95% under good management.

	<p>Health observations</p>	<p><i>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....)</i></p>	<ul style="list-style-type: none"> • Damping-off during germination (fungal). • Leaf-eating caterpillars during seedling stage. • Nutrient deficiency (yellowing leaves – nitrogen deficiency). • Root rot if overwatered.
<p>Materials</p>	<p><i>List material needed for potting to help with the planning of this activity. E.g. pots, dibbers, labels...</i></p>	<ul style="list-style-type: none"> • Polythene tubes • Potting soil mixture • Dibber • Watering can • Labels • Shade net • Wheelbarrow 	

- + ***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.***