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	*Scientific name of the propagated species*	*Xylocarpus granatum*	**Name/s of propagator/**	*Name(s) of the person or people that carried out the propagation*	
Family	*Plant family of the propagated species*	Meliaceae	**Organisation**	*Organisation(s) where the propagation was carried out*	
Origin of seeds	*Site(s) and country where seeds were collected*	Rufiji delta, kilwa district, Tanga	**Site and country**	*Site(s) and country where the propagation took place*	Rufiji delta, kilwa district, and Tanga-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*	March–August
Fruit/seed transport	*Describe how fruit/seeds have been stored during transport from the field to the nursery*	• Fruits collected directly from the tree or freshly fallen. • Transported in well-ventilated baskets or mesh bags. • Avoid sealed plastic bags to prevent overheating and fungal growth. • Kept shaded and transported to nursery within 24–48 hours.

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...)*	• Large, woody spherical fruits (15–25 cm diameter) are cracked open manually using a machete or wooden mallet. • Seeds are removed by hand. • Cleaned by rinsing in fresh water to remove pulp residues. • Damaged or insect-infested seeds discarded. • Seeds should not be sun-dried. About 1.5kg of fruits produce 1kg 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)*	Fresh seeds: 75–95% viability.
Type of seed	*Choose one of these options: Orthodox, Intermediate, Recalcitrant or Unknown*	Recalcitrant
Seed size	*Include a measuring unit (e.g. mm, cm…)*	• Length: 8cm
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 12 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.*	• Storage is not recommended for long periods.
		• If necessary:
		  ○ Store in moist sand or sawdust
		  ○ Temperature: 20–25°C
		  ○ High humidity (>70%)
		  ○ Duration: Not more than 1–2 weeks

\+ ***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.*	The seed does not require pretreatment
	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*	• Direct sowing in polythene tubes (12–15 cm diameter, 20–25 cm height) is recommended (due to fast root growth). Can also use seed trays for pre-germination.
	Seed spacing	*Describe the recommended spacing between the seeds when sown. Include a measuring unit (e.g. mm, cm…)*	• If in seedbed: 5 cm apart. • If direct in tubes: 1 seed per tube.
	Seed depth	*Describe how deep the seeds are sown. Include a measuring unit (e.g. mm, cm…)*	• Sow at 2–3 cm depth. • Cover lightly with soil.
	Watering technique	*Describe watering tool, technique and frequency during sowing and germination*	• Watering can with fine rose. • Once daily. • Avoid excessive watering (risk of rotting).
	Germination facilities	*Describe the facilities where the germination of seeds took place (e.g. close case, outdoor shaded area, heated bench, covered/bagged container...)*	• Outdoor nursery under 50% shade net • Raised beds or well-drained ground.

	Environmental conditions	*Describe the environmental conditions where germination took place (temperature, humidity, and photoperiod)*	• Temperature: 20–30°C • Moderate humidity • Natural daylight (~12 hours) • Good drainage and aeration.
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*	14–30 days
	% Germination success	*(Number of seeds germinated) x 100 / (Total number of seeds sowed)*	Germination is good and uniform, attaining 80% after four weeks and 95% after five 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 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 media. • Optional: NPK (e.g., 50:10:10) applied lightly after 4 weeks. Application: Dissolved in water and applied to soil.
	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 partial shade initially. • Full sun after 6–8 weeks (hardening stage).
	Environmental conditions	*Describe the environmental conditions where the plant growing took place (temperature, humidity, light levels)*	• Temperature: 20–32°C • Moderate humidity • Increasing sunlight during growth • Good airflow.
Success	**Number of days until first potting**	*Average number of days since the start of seeds sowing until first potting*	• If sown in trays: 30–45 days after germination • If direct sown in tubes: no pricking required.
	Duration until established plants	*Average number of days/month/years for which the plant growth was monitored until the establishment of plants*	4–6 months in nursery before field planting.
	% Plants established	*(Number of plants established) x 100 / (Total number of plants potted)*	Typically 75–85% 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….)*	• Fungal rot if overwatered (during germination) • Leaf yellowing (nitrogen deficiency) during seedling stage • Occasional insect damage (leaf miners)
Materials		*List material needed for potting to help with the planning of this activity. E.g. pots, dibbers, labels…*	• Polythene tubes • 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.***