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

Date of publication: 25th April 2026

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*	*Bridelia micrantha*	**Name/s of propagator/**	*Name(s) of the person or people that carried out the propagation*	
Family	*Plant family of the propagated species*	Phyllanthaceae	**Organisation**	*Organisation(s) where the propagation was carried out*	
Origin of seeds	*Site(s) and country where seeds were collected*	Singida, Dodoma and Tabora	**Site and country**	*Site(s) and country where the propagation took place*	Singida, Dodoma and Tabora-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*	November – February • Fruits should be collected when they have turned dark purple to black, indicating full physiological maturity. • Collection should preferably be undertaken immediately after fruit fall or directly from the tree to avoid deterioration and insect attack.
Fruit/seed transport	*Describe how fruit/seeds have been stored during transport from the field to the nursery*	• Store in well-ventilated baskets or cloth bags. • Avoid plastic bags to prevent fermentation. • Transport within 1–2 days to prevent pulp decay. • Fruits should be protected from direct sunlight during transportation. • Avoid stacking fruits in deep containers.

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 are fleshy drupes. • Soak fruits in water for 24 hours to soften pulp. • Remove pulp manually by rubbing fruits over a sieve. • Wash thoroughly to remove all flesh. • Shade-dry seeds for 1–2 days before sowing. • Alternatively, ripe fruits may be squashed by hand to remove skin and pulp. • Seeds should be washed repeatedly in clean water. • Dry under shade for approximately two days. • Approximately 10 kg fruits yield about 1 kg 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 2. Floating test 3. Tetrazolium red test 4. Germination test: Germination above 90% within 25–30 days indicates high viability.
% Estimated seed viability	*(Number of viable seeds) x 100 / (Total number of seed for which viability was estimated)*	• Typical viability: 60–80% fresh seed. • Under proper handling, viability may exceed 90%. • Germination can reach 90% after 25 days and 100% after 30 days.
Type of seed	*Choose one of these options: Orthodox, Intermediate, Recalcitrant or Unknown*	Orthodox to intermediate (short storage life, best sown fresh). • Recalcitrant characteristics have also been reported. • Seeds should be treated as recalcitrant and sown as soon as possible.
Seed size	*Include a measuring unit (e.g. mm, cm…)*	• Length 5–8 mm • Width 4 mm • Light green when freshly extracted. • Almost egg-shaped with four longitudinal grooves.
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 19,500 seeds per kilogram. • Equivalent to approximately 19–20 seeds per gram.
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.*	• Best sown fresh. • Refrigerator 4–8°C. • Airtight container. • Up to 6 months storage. • Seeds are sensitive to drying and should not fall below 25% moisture. • Avoid freezing temperatures. • Cotton, sisal, jute bags or wire mesh trays may be used. • Storage beyond two weeks is generally not recommended.

\+ ***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-sowing treatment required. • Seeds can be sown immediately after extraction and cleaning. • Seeds should be washed thoroughly to remove fruit pulp and dried under shade for approximately 2 days before sowing.
	Seed sowing media	*Media composition: include percentages/ratio for the different components*	• Well-drained germination medium recommended. • Suggested medium: 50% river sand : 50% forest topsoil or loamy soil (1:1 ratio). • Medium should be free from weeds, pathogens, and waterlogging. Recommended mixture: Tree Sees 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 nursery tubes • Tube size: 12–15 cm depth, 6–8 cm diameter • Material: Plastic nursery tubes or rigid trays
	Seed spacing	*Describe the recommended spacing between the seeds when sown. Include a measuring unit (e.g. mm, cm…)*	• Sow seeds approximately 2–3 cm apart within rows. • Maintain 5 cm between rows to facilitate germination monitoring and pricking out
	Seed depth	*Describe how deep the seeds are sown. Include a measuring unit (e.g. mm, cm…)*	• Sown at 0.5–1 cm depth • Light soil covering.
	Watering technique	*Describe watering tool, technique and frequency during sowing and germination*	• Water 2–3 times per week depending on rainfall. • Ensure good drainage to prevent root rot.
	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 shade initially. • Gradual hardening to full sunlight.
	Environmental conditions	*Describe the environmental conditions where germination took place (temperature,*	• Temperature: 20–32°C • Moderate humidity • Full sun after hardening stage

		humidity, and photoperiod)	
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*	If sown in trays: 30–40 days after germination when 2–3 true leaves appear.
	% Germination success	*(Number of seeds germinated) x 100 / (Total number of seeds sowed)*	• Typical survival: **70–85%**
Materials		*List the materials needed for seed germination to help with the planning of this activity. E.g. trays, sieves, dibbers, labels, ruler…*	• Poly pots (15–20 cm deep) • Potting mix • Trowel • Labels • Watering can • Shade net

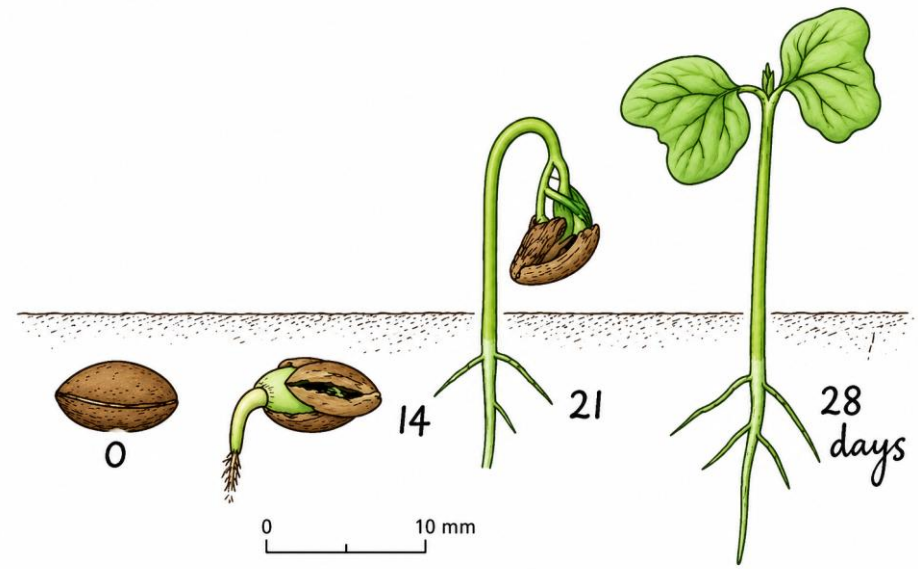
+ ***Add photographs of the germination process. Make sure to include a detailed description of the photo, such as the growth stage, date, activity or process.***

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 Sees 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 plants are potted*	Seed trays (plastic) and 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)*	Type: • Organic compost preferred. • Optional inorganic: NPK 10:10:10 (low rate) Application: Mixed in soil or applied as diluted liquid fertilizer after 3–4 weeks.
	Watering technique	*Describe watering tool, technique and frequency while growing the plants*	• Water 2–3 times per week depending on rainfall. • Ensure good drainage to prevent root rot.
	Plant growing facilities	*Describe the facilities where the plant growing took place (e.g. glasshouse, outdoors, shaded area...)*	• Outdoor nursery under shade initially. • Gradual hardening to full sunlight.
	Environmental conditions	*Describe the environmental conditions where the plant growing took place (temperature, humidity, light levels)*	• Temperature: 20–32°C • Moderate humidity • Full sun after hardening stage.
Success	**Number of days until first potting**	*Average number of days since the start of seeds sowing until first potting*	If sown in trays: 30–40 days after germination 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*	5–8 months before field transplanting.

	% Plants established	*(Number of plants established) x 100 / (Total number of plants potted)*	Typical survival: 70–85%
	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 stage. • Leaf spots in high humidity. • Occasional insect feeding during seedling growth. • Yellowing leaves (possible nutrient deficiency).
Materials		*List material needed for potting to help with the planning of this activity. E.g. pots, dibbers, labels…*	• Poly pots (12 × 20 cm) • Potting mix • Dibber • Labels • Watering can

+ ***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.***



Stages in seed germination and early development of Bridelia micrantha seedlings. At sowing (0), at 14 days, at 21 days and at 28 days.