

# 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@bqci.org](mailto:africa@bqci.org)

## GENERAL INFORMATION

<b>Taxon name</b>	<i>Scientific name of the propagated species</i>	<i>Afzelia quanzensis</i>	<b>Name/s of propagator/</b>	<i>Name(s) of the person or people that carried out the propagation</i>	Fandey H. Mashimba, Mwamtolo Said, Doris Macha
<b>Family</b>	<i>Plant family of the propagated species</i>	<b>Leguminosae</b>	<b>Organisation</b>	<i>Organisation(s) where the propagation was carried out</i>	<b>TFS</b>
<b>Origin of seeds</b>	<i>Site(s) and country where seeds were collected</i>	<b>Tanzania</b>	<b>Site and country</b>	<i>Site(s) and country where the propagation took place</i>	<b>Tanzania</b>

## SEED DESCRIPTION & PROCESSING

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

<b>Time of year for seed collection</b>	<i>List month/s of the year when seed collection is best</i>	August-October 2025
<b>Fruit/seed transport</b>	<i>Describe how fruit/seeds have been stored during transport from the field to the nursery</i>	<ul style="list-style-type: none"> <li>• <b>Containers:</b> Use breathable containers such as gunny bags, canvas bags, or mesh bags.</li> <li>• <b>Ventilation:</b> Do not overfill bags; ensure maximum ventilation during transport to prevent overheating, which reduces viability.</li> <li>• <b>Environment:</b> Keep pods and seeds in the shade, out of direct sunlight during transit.</li> <li>• <b>Handling:</b> Keep different provenances or collection consignments separate and clearly labeled.</li> <li>• <b>Timing:</b> Transport should occur as soon as possible after collection to minimize pest damage.</li> </ul>

<b>Processing of fruits/seeds</b>	<i>Describe how the fruits/seeds are processed in situ or in the nursery (seed extraction methods, seed cleaning, handling of fruits/seeds...)</i>	<ul style="list-style-type: none"> <li>• Pods dried in the sun to a moisture content of 6-10%</li> <li>• The hard, black seeds with red arils are then easily removed</li> <li>• Seeds that are cracked, shrivelled or infested are then removed</li> <li>• stored in sealed, cool, and dry containers for long-term viability.</li> </ul>
<b>Method to assess seed viability</b>	<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"> <li>1. <b>Cut test:</b> <ul style="list-style-type: none"> <li>• Cut seeds longitudinally.</li> <li>• Viable seeds have firm, white/cream embryos.</li> <li>• Empty or darkened seeds are non-viable.</li> </ul> </li> <li>2. <b>Floating test:</b> <ul style="list-style-type: none"> <li>• Place seeds in clean water.</li> <li>• Viable seeds often sink; empty seeds float. (Note: Less reliable due to winged structure.)</li> </ul> </li> <li>3. <b>Tetrazolium red test (more accurate):</b> <ul style="list-style-type: none"> <li>• Not tested</li> </ul> </li> </ol>
<b>% Estimated seed viability</b>	<i>(Number of viable seeds) x 100 / (Total number of seed for which viability was estimated)</i>	Good collection typically, <b>90-98%</b>
<b>Type of seed</b>	<i>Choose one of these options: Orthodox, Intermediate, Recalcitrant or Unknown</i>	Orthodox
<b>Seed size</b>	<i>Include a measuring unit (e.g. mm, cm...)</i>	<ul style="list-style-type: none"> <li>• Length: 3cm</li> <li>• Wide/Broad: 1.5 cm</li> </ul>
<b>Number of seeds per gram</b>	<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>	One kilogram contains approximately 480–485 seeds and may produce about 450 seedlings under ideal conditions, although around 330 seedlings are commonly obtained under nursery conditions.
<b>Seed storage</b>	<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>	Seeds can be stored for several years without significant loss of viability when maintained dry in sealed airtight bags or other airtight containers. For long-term storage, maintain approximately 15°C, 15% relative humidity and seed moisture content of 4–6%. For optimum germination performance, sow seeds within one year after collection or receipt.

+ **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.

<b>Procedures</b>	<b>Seed treatment</b>	<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>	<ul style="list-style-type: none"> <li>• <b>Remove the Aril:</b> Remove the red, fleshy aril (cap) at the end of the seed using a knife or secateur, as it can inhibit water uptake.</li> <li>• <b>Mechanical Scarification:</b> Carefully nick or sand the black seed coat, preferably on the opposite side of the hilum (the spot where</li> </ul>
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			<p>the aril was attached), to allow moisture to reach the embryo.</p> <ul style="list-style-type: none"> <li>• <b>Water Soak:</b> Soak the scarified seeds in water for 12 hours or until they imbibed. The seeds should swell to roughly double in size, or wrinkled seed testa indicating readiness for sowing.</li> <li>• <b>Alternative (Sulphuric Acid):</b> Soaking in concentrated Sulphuric acid for 6 minutes can also be used to break dormancy.</li> </ul> <p><b>NOTE:</b> Note recommended as the chemical is corrosive must be done under supervision of experienced staff.</p>
	<b>Seed sowing media</b>	<i>Media composition: include percentages/ratio for the different components</i>	<p>Recommended mixture: Tree Seed Production-Morogoro</p> <ul style="list-style-type: none"> <li>• Top Black Forest soil – 63% (5)</li> <li>• Well decomposed manure – 25% (2)</li> <li>• Rice husk – 12% (1) in place of sand.</li> </ul> <p><b>Potting ratio is 5:2:1</b></p>
	<b>Container</b>	<i>Describe size and material of the container in which seeds are sown</i>	<ul style="list-style-type: none"> <li>• Direct sowing in polythene tubes (12–15 cm diameter, 20–25 cm height) is recommended (due to fast root growth).</li> <li>• Can also use seed trays for pre-germination.</li> </ul>
	<b>Seed spacing</b>	<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"> <li>• <b>Spacing in Bed:</b> a space of about 1.5 cm should be left between the seeds.</li> </ul>
	<b>Seed depth</b>	<i>Describe how deep the seeds are sown. Include a measuring unit (e.g. mm, cm...)</i>	<ul style="list-style-type: none"> <li>• Sow at 2–3 cm depth or twice the size of the seed.</li> <li>• Cover lightly with soil.</li> </ul>
	<b>Watering technique</b>	<i>Describe watering tool, technique and frequency during sowing and germination</i>	<ul style="list-style-type: none"> <li>• Once daily is enough during dry season using sprinklers, water cans or any specialized equipment.</li> <li>• Avoid excessive watering (risk of rotting and damping off).</li> </ul>
	<b>Germination facilities</b>	<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"> <li>• Nursery bed, or seed tray with high shade (approx. 50% shade)</li> <li>• Raised beds or well-drained ground.</li> </ul>
	<b>Environmental conditions</b>	<i>Describe the environmental conditions where germination took place (temperature, humidity, and photoperiod)</i>	<ul style="list-style-type: none"> <li>• Temperature: 20–30°C</li> <li>• Moderate humidity</li> <li>• Natural daylight (~12 hours)</li> <li>• Good drainage and aeration.</li> </ul>
<b>Success</b>	<b>Time of year for seed germination</b>	<i>List month/s of the year when seed germination is best</i>	October- December
	<b>Duration until germination</b>	<i>Average number of days/months/years until seeds germinated</i>	10–28 days

	<b>% Germination success</b>	<i>(Number of seeds germinated) x 100 / (Total number of seeds sowed)</i>	<p>Germination of <i>Afzelia quanzensis</i> (Pod Mahogany) seeds is generally easy, with rates often reaching up to 80–90%</p> <p>Successful propagation requires careful moisture management and protection from extreme conditions during the early stages</p>
<b>Materials</b>		<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"> <li>• Seed trays</li> <li>• Sand and forest soil</li> <li>• Compost</li> <li>• Hot water container</li> <li>• Watering can</li> <li>• Labels and marker</li> <li>• Ruler</li> <li>• Shade net</li> </ul>

- + ***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	<b>Growing Media</b>	<i>Media composition: include percentages/ratio for the different components</i>	<i>A well-drained potting mixture consisting of Top forest soil (63%), well-decomposed manure (25%), and rice husk or coarse sand (12%) in a ratio of 5:2:1 is recommended. The medium should be friable, fertile, free from weeds and pathogens, and capable of retaining moderate moisture while ensuring adequate drainage</i>
	<b>Container</b>	<i>Describe size and material of the container in which plants are potted</i>	<i>Direct seeding into polythene pots measuring 15–20 cm diameter and 25–30 cm depth. Larger containers are preferred due to the species' rapid taproot development.</i>
	<b>Fertiliser</b>	<i>If used, include: type (organic or inorganic); nutrient composition and its ratio; and application (added to soil, dissolved on water, foliar application)</i>	<i>Where necessary, apply well-decomposed organic manure mixed into the growing medium before potting. If inorganic fertiliser is used, a balanced NPK (20:10:10 or similar) may be applied at low rates during active growth</i>
	<b>Watering technique</b>	<i>Describe watering tool, technique and frequency while growing the plants</i>	<i>Water seedlings using a watering can fitted with a fine rose, sprinkler system, or hose with gentle flow. Water once daily during dry periods and reduce frequency during rainy periods. The medium should remain moist but never waterlogged.</i>
	<b>Plant growing facilities</b>	<i>Describe the facilities where the plant growing took place (e.g. glasshouse, outdoors, shaded area...)</i>	<i>Afzelia need light, seedlings should be maintained in a nursery under 50% shade netting during early establishment. Gradual hardening-off should be undertaken before field planting by reducing shade exposure over time</i>
	<b>Environmental conditions</b>	<i>Describe the environmental conditions where the plant growing took place (temperature, humidity, light levels)</i>	<i>Optimal growth occurs at temperatures between 20–30°C, under moderate humidity and natural daylight. Seedlings require good air circulation and protection from strong winds and prolonged drought</i>
Success	<b>Number of days until first potting</b>	<i>Average number of days since the start of seeds sowing until first potting</i>	<i>Seedlings are normally ready for first potting approximately 21–30 days after sowing, when they have developed a strong root system and at least one to two fully expanded leaves.</i>
	<b>Duration until established plants</b>	<i>Average number of days/month/years for which the plant growth was monitored until the establishment of plants</i>	<i>Plant growth should be monitored for approximately 6–12 months after potting. Seedlings are generally considered established when they exhibit vigorous growth, a well-developed root system, and can withstand routine nursery conditions without intensive care.</i>
	<b>% Plants established</b>	<i>(Number of plants established) x 100 / (Total number of plants potted)</i>	<i>Afzelia have no difficult if seed were collected when well matured. Under good nursery management, establishment rates of 80–98% can be achieved.</i>
	<b>Health observations</b>	<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>	<i>During germination and early seedling stages, monitor for damping-off disease, root rot associated with excessive watering, insect feeding on young leaves, and mechanical damage during transplanting. Nutrient deficiencies may appear as leaf yellowing (nitrogen deficiency) or poor growth. Afzelia quanzensis is generally hardy once established, provided adequate drainage is maintained. Some seedlings may come out with chrolysis (albino seedlings/white seedlings without</i>

			green pigment) it is a genetic caused eventualt seedling die.
<b>Materials</b>	<i>List material needed for potting to help with the planning of this activity. E.g. pots, dibbers, labels...</i>		

+ **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.**

