

Calliandra calothyrsus

Nursery establishment and management



A pamphlet for farmers and extension staff

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This is pamphlet No. 1 in *Calliandra calothyrsus* series. Pamphlet No. 2 provides information on calliandra tree management and use.

Introduction

Calliandra calothyrsus is a small, leguminous tree with characteristic pink flowers. It grows in a wide range of climatic and soil conditions, from the sea level to the highlands, but it performs best in coffee zones. Acidic soils, waterlogging and frost affect its growth negatively. Calliandra grows relatively fast and its economic benefits can be realized in the first year after planting. The tree can produce fodder continuously for more than 10 years. It can be grown in various sites on the farm since it does not compete much with crops growing adjacent to it, as long as it is properly managed to reduce the shading effect.

Why grow calliandra?

There are at least six good reasons for growing calliandra in your farm—

High-quality fodder supplement for livestock

Calliandra improves milk production of both dairy cattle and goats. It can also be fed to other types of livestock such as sheep, rabbits and chicken. A cow needs to be fed with roughly 6 kilograms of fresh leaves per day, a goat needs about 0.7 kilograms. To harvest 6 kilograms fresh leaves every day, you need to plant about 500 calliandra trees at a spacing of 0.5 metres (1½ feet), making 250 metres (800 feet) of hedge. This seems like a lot but a farm of 1 hectare (2½ acres) has over 400 metres (1280 feet) of external boundary, plus additional sites (along internal boundaries, along contours, around the homestead) where calliandra can be planted.

Soil fertility improvement

Calliandra, being a leguminous species, has root nodules that ‘fix’ (that is, take) nitrogen from the air. This fixation process helps in improving soil fertility because nitrogen is one of the most important nutrients for plant growth. Animals fed with calliandra produce high-quality manure.

Stabilizing soils and water conservation structures

Calliandra has a deep root system. When planted along soil conservation structures, it plays a significant role in holding the soil together. It performs well in soil conservation when planted adjacent to lines of napier grass on ‘fanya juu’ and ‘fanya chini’ terraces. The trees need to be planted at a close spacing of 0.5 metres (1½ feet). They should also be 0.5 metres above the napier line.

Seed production and bee forage

It is advisable that you preserve some calliandra trees for seed production so that you will not need to rely on external sources for future planting. The same trees provide excellent bee forage, so you have the additional benefit of honey production. Leave one tree uncut every 20 metres (about 20 steps) and make sure the total number left is more than 30. This improves the chances of cross-pollination and ensures that the seeds produced are of high genetic quality. In case you leave less than 30 trees, exchange seeds with neighbours and mix seeds from different sources before sowing.

Fuelwood

If left to grow uncut, calliandra produces quality fuelwood. The wood burns better and has less smoke if left to dry well before use.

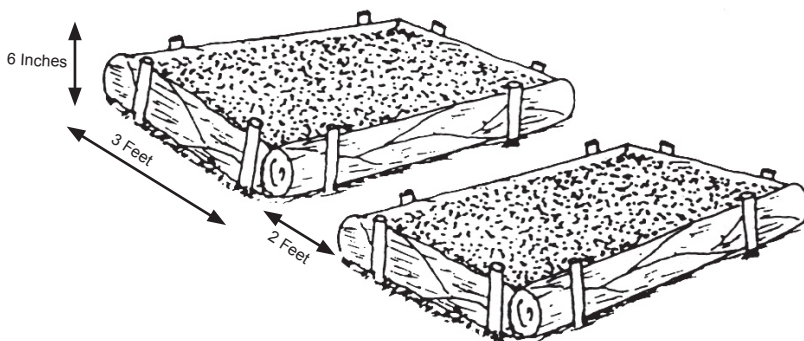
Stakes for climbing beans and tomatoes

Stakes produced by calliandra are good support for other plants such as climbing beans and tomatoes.

Establishing your calliandra nursery

- Locate your nursery near a reliable water source such as a river, a spring, a borehole, a deep well, or reliable piped water (preferably supported by a big storage tank). Ensure that the nursery has access to water throughout the 3 to 4 months it will be in use.

- The seedbed should be about 1 metre (3 feet) in width and can be as long as the available space allows, but 3 metres is the usual length. A path of 0.6 metres (2 feet) should be left between 2 adjacent seedbeds for easy access to both beds. A bed of 1 by 3 metres can produce 400 seedlings.
- After you have decided on the nursery area, apply manure to the beds at the rate of 1 part of manure to 4 parts of soil; this translates to 1 ‘debe’ of manure for every 3 metres length of the nursery. Mix the soil and the manure well.
- Pile up the soil and manure mixture to make a raised seedbed with a height of about 10 to 15 centimetres (4 to 6 inches), and then level the soil.
- Support the sides of the bed with materials like banana stems, timber or stones and prop them firmly with wooden pegs or stones.
- It is very important that the bed is level and the texture of the soil is fine, so as to increase the rate of seed germination.



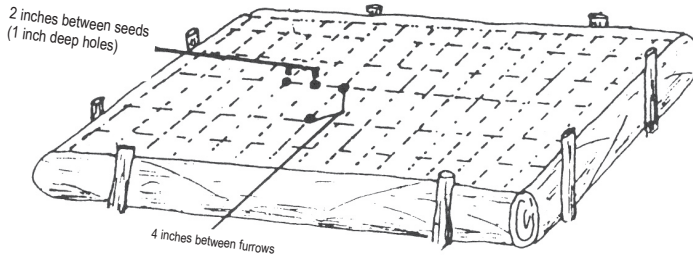
Layout of cañianara nursery

Sowing calliandra seeds

- A seedbed of 1 by 3 metres (3 x 9.6 feet) produces about 400 seedlings and requires 40 grams of seed. One-half kilogram of seeds is sufficient for planting a nursery bed 40 metres (128 feet) long. This bed will produce about 5300 seedlings, enough to feed 10 cows. This means that 100 grams of seeds would need a seedbed of about 7.5 metres (24 feet) that can produce approximately 1000 seedlings, adequate to feed 2 cows.
- To ensure good germination, you need to soak the seeds in cold water for 2 days (48 hours).
- Make a furrow about 2 centimetres (1 inch) deep in your bed for accurate sowing. Place the seeds in the furrow and cover them lightly with soil. Space the furrows 10 centimetres (4 inches) apart, and leave 5 centimetres (2 inches) between seeds within the furrow. Avoid putting the seeds too deep into the soil: this would make them rot.
- Water the bed thoroughly immediately after sowing. You can use a watering can, a perforated tin or leafy branches. If termites are not a problem in your area, cover the seedbed with dry grass until the seeds germinate.
- If you can afford tubing materials, remove the seedlings after they produce two leaves and plant them in tubes filled with soil mixed with manure at the same rate as that for the raised beds. Using the tubes is an extra cost, but it improves the survival rate of the seedlings, especially if there is shortage of water.

It is important to have a level nursery bed and fine soil texture, so as to improve on seed germination.

- Use your hand to estimate distances if you do not have measuring equipment. For example, the width of the palm is about 10 centimetres (4 inches) and the length of the first digit of the pointing finger is about 2.5 centimetres (1 inch).



How to sow calliandra seeds

Applying Rhizobium inoculant

- As with beans, calliandra roots have the ability to join with tiny organisms in the soil, known as *Rhizobium*, to form small, round balls known as root nodules. These nodules, which are usually less than 1 centimetre in diameter, trap and take nitrogen from the air and feed it to calliandra plants. This process is called nitrogen fixation. By trapping nitrogen from the air, the root nodules not only help calliandra plants to grow fast but also leave the soil more fertile than before.
- In most places, the *Rhizobium* population in the soil is not enough to form adequate amounts of root nodules for nitrogen fixation. It is therefore necessary to get *Rhizobium* from other sources, such as the extension services or the soil beneath mature calliandra trees. The *Rhizobium* inoculant has high populations of microorganisms that enhance root nodulation and hence nitrogen fixation.
- Inoculant obtained from the extension services can be applied to either calliandra seeds or young seedlings. For seedlings, mix the inoculant with water in a bucket and stir thoroughly using a stick. A packet of 200 grams of inoculant can make a solution of 60

litres, which is enough for 40 metres (128 feet) of nursery bed in which about 500 grams of seed has been sown. Water the seedlings thoroughly before applying the inoculant, to ensure better spread and distribution of the inoculant in the soil. Apply the *Rhizobium* using leafy branches, repeatedly dipping them into the inoculant solution and shaking it off on the seedlings.

- If the inoculant is to be applied to seeds, mix it with water to make a solution. Mix the pre-soaked seeds with the solution and sow immediately avoiding excessive exposure to heat and light.
- If the inoculant is obtained from the soil beneath mature calliandra trees, scoop the topsoil and spread it on the nursery bed before sowing seeds. The *Rhizobium* will be incorporated into the soil and will assist the plant to grow.

Rhizobium inoculant consists of microorganisms that are destroyed by heat and light, therefore it is best to apply it in the late evening.

Nursery care and management

The following management practices are recommended for calliandra seedlings to enhance their survival:

Watering

Carefully observe the moisture level in the nursery bed and water whenever it becomes dry. It is important to water the bed sufficiently (but not too much) in the first 10 to 14 days after sowing before the seeds germinate. The seedlings should never look limp from moisture stress or suffer from damping off because of excess water.

It may be necessary to water the seedlings twice a day—in the morning and evening—especially within the first 2 months after sowing the seeds. Use a watering can, a perforated tin or leafy branches. Watering may be reduced to once a day, preferably late in the evening.



Watering the nursery

Shading the seedlings

Make a shade structure 1 metre (3 feet) in height and *cover lightly* with grass or tree leaves ensuring that some light passes through. Avoid using branches from eucalyptus (blue gum) tree since its fallen leaves inhibit germination of other plant species. As the seedlings grow, gradually reduce the shade to get the seedlings used to full sunlight.

Weeding

Remove all types of weeds as soon as you notice them to ensure better growth of the calliandra seedlings. Never allow your seedlings to be choked by weeds.

Protection against pests

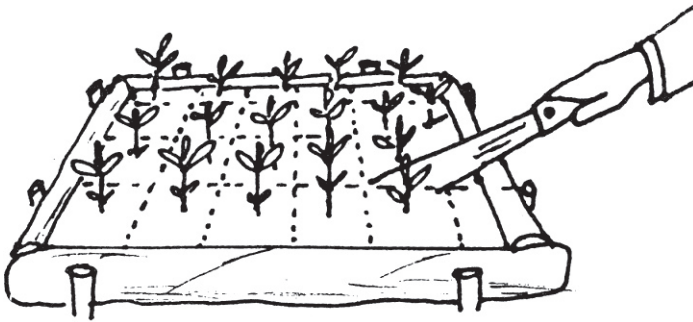
Pests like crickets, grasshoppers and cutworms can cause heavy losses of seedlings if left unchecked. A good and cheap remedy against cutworm is fresh wood ash, which should be sprinkled around the seedlings. Some farmers apply mixtures made from plants like tobacco and garlic to repel insect pests.

Planting out

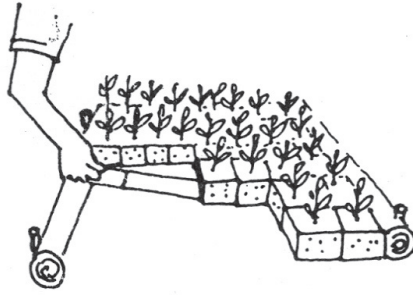
- Calliandra seedlings are ready for transplanting 3 to 4 months after sowing. Depending on the weather, 2 weeks before planting time you should reduce watering to once every 2 to 3 days. By this time you

should have completely removed the shading materials covering the nursery bed to prepare the seedlings to withstand the field conditions when they are transplanted.

- Prepare the planting holes in advance on an appropriate site before removing the seedlings from the nursery. If manure is available, apply a 1-kilogram tin of manure to every hole and mix well with the soil.
- Remove the seedlings carefully from the nursery bed after watering the bed thoroughly. The best method involves using a sharp 'panga' to first cut between the rows, then between the seedlings to form squares, and lastly under the seedlings so that you can lift the seedling with a cube of soil attached to the roots. This improves survival in the field.
- Place a number of seedlings in a container such as a bucket or basin for safe and convenient transportation to the field. Cover the seedlings with a moist cloth or paper and take them to the planting site immediately. Prepare only as many seedlings as you can plant in one hour.



First cut vertically to form squares.



Then cut horizontally, lift the seedling and place it in a container.



Finally, place the seedling on a prepared hole in your preferred planting site.

Planting sites

Farmers have found the following sites on the farm as appropriate for planting calliandra:

- Boundary: plant in both external and internal boundaries of the farm.
- Homestead: use calliandra to make hedges around homestead.
- Along soil and water conservation structures: plant calliandra 0.5 metres above the napier grass line.
- Within a napier grass plot: plant 1 line of calliandra after every 2 lines of napier grass.

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