

## fact sheet 5. Planting

### Land Preparation

The key to reliable and successful Leucaena establishment is adequate planning and paddock preparation. Ensuring high levels of soil moisture before planting from fallowing is one of the most critical success factors, especially in non-monsoonal or drier in-land locations.

Best establishment is achieved through ensuring a fine seed bed with competition from grass and weed removed through repeated cultivation or herbicide application. Deep ripping (50cm+) along the rows at the start of the fallow period may be beneficial in non-cracking or tight soils.

Producers may consider total removal of existing grass with subsequent re-planting of an improved grass; or retaining grass strips to allow some grazing during the fallowing period and reduce preparation costs, reduce the potential of soil erosion, and enable grass re-establishment without planting grass seed. However, if the existing grass pasture is either rundown or contains undesirable species, it is highly recommended to totally remove the existing pasture across the whole paddock and replace with improved pasture.

If the location is unsuitable for cultivation due to erosion concerns, herbicide application to a strip of at least 4-5 metres centered over the intended planting zone to remove competition from grass and weeds may be required.

### Timing

The right planting time and adequate soil moisture are critical for reliable leucaena establishment. In sub-tropical regions (Central and North Queensland), plant as early as possible between September and March (depending on winter temperatures and frost potential), but only when there is at least 60-90cm (preferably 1 metre minimum) of sub-soil moisture and soil temperature is rising above 18°C.

Tropical Monsoonal (Northern Territory, coastal and NQ) plantings may have a shorter planting window to avoid seed or seedling losses due to heavy wet-season rain earlier in the season and the potential of an early cessation to the wet-season. Typically, the most reliable establishment occurs by planting between mid- December and mid-February. If multiple storms with heavy rain are typical during this period of time, pushing planting into autumn (mid-February to April-May) could be suitable while temperatures are still warm enough for quick seed germination and initial growth. Young seedlings can struggle if they emerge in extremely hot conditions in January and February in lighter textured soils, but can survive if roots are growing into a good soil moisture profile.

### Inoculate the planting seed

The productivity of the leucaena stand and the companion grass depends upon efficient nitrogen fixation. Nitrogen fixation is caused by a symbiotic relationship between the plant. Native rhizobium present in the soil do not form effective nodules, so the seed must be treated with commercial rhizobium inoculum (either CB3060 or CB3126). The rhizobium inoculant is available in both a peat and freeze-dried form for either direct seed application or water injection. Seed should be inoculated immediately before planting. Store the rhizobium in a refrigerator before use and observe the expiry date. Rhizobium is sensitive to drying out, heat, sunlight, fertilisers and chemicals. Consider the further step of water injecting the inoculum in the seed trench to maximise plant nodulation.

### Seed quality and planting rate

Planting quality seed with high germination percentage (scarified seed) and high viability (low percentage of dead seed) is another critical success factor. Ensure seed germination percentage is known prior to planting by either obtaining a commercial test certificate or testing the germination yourself.

Aim to place each seed 5cm apart in the row (20 seeds / metre row), which equates to a planting rate of between 1 – 2kg/ha depending on row spacing, row configuration and seed size.

### **Row Spacing**

Row spacing chosen is highly dependent on soil type and climate. The aim in determining the appropriate row spacing is to have sufficient leucaena and grass to graze both evenly all year round. Very close rows can result in insufficient grass pasture to go with leucaena when cattle are actively consuming the grass (typically in summer) whilst very wide rows can result in a lack of leucaena to match the pasture at times when cattle are actively consuming leucaena (typically throughout autumn, winter and spring).

Depending on the orientation, overgrown or tall leucaena planted on narrow rows may reduce sunlight penetration needed for adequate grass growth.

Suggested row spacings are between 7m to 15m depending on soil type, rainfall (or irrigation), and the grass:leucaena forage balance required. These spacings allow maintenance of a strong grass sward between rows, machinery access for leucaena maintenance and optimal grazing pressure. Planting twin rows (as opposed to single) can ensure a continuous hedge if one row doesn't establish.

If sowing Leucaena into fallowed strips, ensure the strips are at least 5m wide (if planting twin rows on 1m centres) to allow about 2m of weed free conditions either side of the rows until Leucaena is at least 1.5m high to minimise competition from grass.

### **Seed planting depth**

Seed planting depth is also dependent on the soil characteristics however generally a fairly shallow planting depth of 25mm to 50mm (maximum) has the highest rate of successful germination. It is preferable to ensure the seed is in wet soil for 5-7 days for reliable germination. Shallower seed placement will provide quicker emergence as long as soil moisture isn't quickly depleted which might be risky in marginal moisture conditions or on lighter soil types.

### **Germination and early emergence**

Germination and emergence should occur within 7 days but this time is influenced by a range of factors including soil moisture, temperature, seed quality and scarification level, uniformity of planting depth, and seed-soil contact. Using presswheels to ensure seed-soil contact is very important for reliable establishment, however too much pressure can be detrimental. Presswheels ideally need to run beside the planted row, not over the top. Dual press wheels are ideal.

In the early stages of establishment, the seedling is very susceptible to predation from soil insects, native animals and weed competition. Ensure weeds are controlled after planting, assess the need for soil insect control, and plant a large enough area (at least 40ha) to allow for native animal predation.

### **Weed Control after planting**

Young leucaena seedlings initially concentrate on developing a strong root system, rather than above ground shoot growth. Effective weed control for the first 3-6 months is generally required. This slow shoot growth increases susceptibility to weed and grass competition, therefore post planting weed control (either mechanical or herbicide) is essential to ensure vigorous early growth. Mechanical options include over-the row (scufflers) or inter-row (tined or off-set disc) implements which need precision placement to minimise damage to Leucaena and effective weed control.

Chemical options include herbicides (for example Spinnaker and Fusilade Forte) applied either over the entire area or in a band along the planting rows prior to planting, at planting or after planting depending on the situation and weed control needed.