



Establishing Kikuyu Pastures on the NSW Far North Coast

Kikuyu is a stoloniferous C4 summer grass originating from Kenya in Africa. A single plant was introduced into Australia in the early 1900s. As this original plant produced hardly any seed, propagation was by stolons. Kikuyu was established this way in Australia until Whittet, a seeding line of Kikuyu was selected by Graeme Wilson at Grafton Agricultural Research station on the north coast of NSW. Whittet was grown for commercial seed production by the Eykamp Kikuyu Company at Quirindi, NSW in 1970.

As a dairy pasture and a high-quality beef pasture, kikuyu grass has many favourable attributes, compared to other C4 summer grasses, including:

- More tolerant of low temperatures
- Yield potential is very high with reasonable herbage quality under conditions of adequate soil fertility and moisture
- Fairly salt tolerant
- Easier to over sow with 'annual' temperate grasses in autumn than the tufted C4 grasses.

As a result, it is now naturalised throughout the warm temperate, subtropical and Mediterranean (under irrigation) climates on the east and south-west coasts of Australia.

ESTABLISHMENT

Like other C4 summer grasses, kikuyu is slower, more difficult and costly to establish when compared to most temperate grasses. For this reason, to ensure the successful establishment, it is worthwhile spending some time on 'seedbed' preparation.

1. A fully prepared seed bed:

The aim of a good seed bed is to have ideal conditions for the seed to germinate (soil to seed contact) and reduce or deplete the weed seed bank. The weed seed bank is a real issue with vigorous growing annual summer grasses such as Crowsfoot presenting a challenge.

- Time of sowing:** The best time to sow kikuyu is early March and wait until late April to over sow with ryegrass. The worst time to sow kikuyu is from December to the end of February when competition from annual summer grass is most significant.

Even though kikuyu can be planted when the minimum soil temperature at 9 AM, at 10cm soil depth is 12°C and rising; about early October on the far north coast, a spring planting should only be considered if there is access to irrigation as rainfall in spring is often unreliable and most importantly the paddock is clean from annual summer grass weeds such as Crowsfoot.

Competition from annual summer grass weeds creates a significant challenge for the emerging kikuyu as they can not be controlled effectively. Even with grazing cows will select the more palatable soft kikuyu and leave the 'hard' grass e.g. Crowsfoot to dominate further. In this instance a light grazing followed by a heavy slashing or mulching is the only option.

For more information or specific advice about ESTABLISHING KIKUYU PASTURES call **1300 795 299** to contact your Local Land Service office

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Local Land Services

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- b. **Depleting the weed seed bank:** It is ideal to kill existing pasture with an herbicide, then sow a summer crop, preferably a broadleaf crop such as cowpeas or lablab. Using a broadleaf means grass weeds can be controlled during the growing period with a grass specific herbicide or with a pre-emergent herbicide after sowing. Use herbicide again before sowing a winter pasture (ryegrass) or crop (oats). Assess paddock in late September for emerging summer grass weeds and spray again before planting another summer crop. An additional spray may still be required in late February before planting kikuyu in March. Poor summer grass weed control will result in poor kikuyu establishment.
- c. **Soil preparation:** As kikuyu seed is small, having large cloddy soil will be a problem. Work the soil to a reasonably fine tilth but not to the extent that it destroys the soil structure. Unless it is a wet clay soil, a heavy rolling is essential. Press wheels on the drill are usually not sufficient.
- d. **Sowing depth and rate:** Sow kikuyu seed at about 4 kg/ha, no deeper than 1 ½ cm. The germination rate of fresh kikuyu seed is over 80%. The seed can be mixed with fertiliser but must be sown within 1 hour of mixing. The seed can also be mixed with prilled lime at a ratio of 1kg seed to 3-4kg prilled lime and there is no need to sow immediately. See tips for mixing seed on page 3.
- e. **Immediately post sowing:** Under right conditions (moisture and temperature) kikuyu will germinate over 7-21 days, the extended period is due to hard seed gradually germinating. The young seedling is like a ryegrass seedling, but there are hairs on both sides of the leaf, and it's not shiny like ryegrass. The most vulnerable time for heat damage or moisture stress is when the single spike appears – once this starts to branch, it means the plant's roots are developing. Grass weeds will be a problem. Once the emerging seedlings are beginning to be shaded by the weeds the best option is to graze lightly so that the tops of the weeds are removed to let light in but, before the animals begin to search and graze the kikuyu seedling which are usually more palatable than the weeds. If the kikuyu seedlings are still in danger of shading after grazing, topping with a slasher to about 5 cm is often required. Don't worry about the cows trampling the young kikuyu seedlings. A lot more plants will be killed from shading than from cow's hooves
- The pasture will need some Nitrogen fertiliser (at least 50 kg Urea/ha), but this can be delayed until well after seedling emergence as the seedbed preparation would have aerated the soil providing improved conditions for mineralisation of organic matter and liberation of Nitrogen. At this stage of kikuyu growth, the symptoms of insufficient Nitrogen for seedling growth is that the seedlings will remain thin and spindly.

2. Spray out the existing pasture and sow

Full seedbed preparation is costly and sometimes not advisable due to the potential for erosion.

An alternative is to kill the existing vegetation with an appropriate herbicide, wait for about a week then direct drill, ideally with a disc drill followed by a heavy rolling.

An alternative to direct drilling is to broadcast the seed, followed by a heavy harrowing and rolling to achieve soil to seed contact. Any disturbance of the soil (by harrowing) will also promote the germinating of weed seeds.

Weed control will be better if the steps outlined above at 1b are followed rather than a single spraying event and planting a week later. However, the more soil that is disturbed, the higher likelihood of more weed seed germination.

Post sowing management is the same as steps outlined above at 1 except that Nitrogen fertiliser will be needed earlier as without the seed bed preparation, there is no increased liberation of Nitrogen from organic matter. More Nitrogen will be required to break down the decaying organic mat.

3. Over sow into the existing pasture

This method is even more economical but relies on good weather and proper management to be successful. Also, the existing vegetation needs to be grazed hard to suppress growth, while the kikuyu seedlings are emerging. There are three approaches:

- Broadcast seed in the afternoon (after the dew has lifted so that the seed does not stick to the vegetation but drops to the ground) immediately before grazing and rely on the grazing animal's hooves to 'push' the seed into the ground. This method is best suited to dairy herds, or intensively managed cell grazed beef herds, to ensure the stocking density over the planted area is adequate.
- Direct drill into the existing pasture followed by a heavy rolling, or graze immediately after as above.
- An alternative is after grazing, mulch existing pasture hard, then direct drill kikuyu seed followed by a heavy rolling.

Weed control and competition from existing grasses are the main issues with the *Over sow into the existing pasture* method. The only way to manage this is by grazing frequently and lightly to remove shading of the establishing seedlings. This is critical and may mean grazing as often as every ten days or even a light topping.

4. Vegetative propagation with harvested stolons

This method was used before kikuyu seed became commercially-available and is still occasionally used today.

Kikuyu spreads prolifically from stolons, with early autumn and late spring, ideal times to harvest and plant stolons. The stolons are cut to provide at least three nodes (growing points) with two nodes buried in the ground, to form the roots, and one node above the ground to form the new tiller.

Because of the soil disturbance required, weeds will be a problem so again graze lightly if the new shoots look like being shaded.

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It is critical to remove stock if they start to graze the new kikuyu shoots hard as they will be more palatable than the weeds. If grazing is inadequate follow with a topping/mulching.

A rotary hoe can be used to harvest Stolons from existing kikuyu pasture. These stolons are picked up and spread over the area to be planted, disced in and then followed by a heavy rolling.

The strips of kikuyu left intact will recolonise the harvested areas.

5. Let the cows do the establishment

Studies to determine the viability of C4 summer grass seed once eaten by a ruminant animal and passes through to the faeces (dung) have been undertaken. Interestingly, the germination rate of nearly all summer grasses, except kikuyu, was close to zero. The germination rate for excreted kikuyu seed was over 20%, providing an opportunity to use this as a method of establishing kikuyu. This method is more suitable for dairy herds.

In this method kikuyu seed is added to the cow's dairy feed (place on top of the regular feed) at AM or PM milkings, 2- 2 ½ days before they graze the paddock where the kikuyu seed needs to be sown (it takes 48-60 hours for the feed and seed to pass through the ruminant and be excreted). Note: it must be clean seed without any seed coating.

Given the germination rate of kikuyu is 20% (normally it's 80%) after passage through the ruminant and that the cows excrete six times per day, five seeds per dung pad will be needed (only 20% of seed viable). Six dung events will give a total of 30 seeds per day but to be sure it is best to multiply by three to result in 90 seeds, approximately a pinch of seed between 2 dry fingers.

The dung pad forms an excellent seed bed, providing insulation from heat, a number of balanced nutrients and initially enough moisture. If the moisture is retained through rain or irrigation, then it will give the perfect medium for kikuyu seed to germinate. If the dung pad dries out the kikuyu seed is protected from the elements until there is enough moisture.

POST ESTABLISHMENT

Management after establishment is often neglected and is critical to success.

What to expect: Newly established kikuyu pastures, that have had to be grazed or topped lightly to prevent shading competition from other summer grasses, may not have achieved 100% ground cover in its first summer growing season. There will be less dense patches and possibly some 'bare patches', do not be worried about this. If managed well, i.e. not overgrazed and appropriate fertiliser applied based on soil tests, the kikuyu will spread by its stolons and fill these areas. This will occur mainly in late autumn and early spring.

Over the first summer growing season grazing events for the kikuyu pasture will be influenced by the need to reduce shading competition from other summer grasses.

As a result, the grazing events will often be frequent yet light. This is to prevent the cattle from overgrazing the young kikuyu in preference to the other 'weed' species, as the kikuyu is more palatable. The ideal grazing time for kikuyu is when there are 4.5 leaves /stolon. For the first 'true grazing' of a newly established kikuyu pasture, provided it is well anchored which can be easily assessed by taking a handful of leaf material, twisting and pulling. If the plants do not come away from the soil, the kikuyu is established enough to be grazed without causing plant loss.

Over sowing in the first winter

If kikuyu is established in late spring, or even if sown in early autumn, it can be over sown with ryegrass in autumn to offset some of the establishment costs, provided these steps are followed:

1. Sow ryegrass late, towards the end of April to give the kikuyu more time to establish and reduce competition until it is semi-dormant in winter.
2. Reduce the seeding rate to about 20kg of short-season tetraploid ryegrass per hectare, which will also help to reduce competition.
3. Most critically, on the far north coast, at the end of the winter/spring season prevent the ryegrass shading the kikuyu from about mid-September. This may mean grazing frequently, even at less than two leaves /tiller for ryegrass or 8-10 days. This will reduce the yield of ryegrass, but the priority is to allow the kikuyu to grow when it wants to.
4. The adverse consequences of shading kikuyu at this stage can be significant, with growth suppressed well into January, making the kikuyu susceptible to weed invasion.
5. The other issue is that the kikuyu needs ample Nitrogen fertiliser to promote growth, equivalent to 100kg Urea/ha per month.

This transition management (late spring/early summer) is as relevant to newly-established kikuyu as it is to well established kikuyu. However, in a newly established kikuyu pasture a fair amount of Nitrogen accumulates to form an organic mat in the first three years; therefore, it requires 100kg Urea/month equivalent for optimal growth. After three years, the amount of Nitrogen fertiliser applied to kikuyu pastures can be reduced to the equivalent of 80 kg Urea/ha per month, this is because from this time the amount of Nitrogen being stored in the organic mat is similar to that being broken down from the mat and used for growth.

Important tip for mixing seed with prilled lime

Prilled lime and seed mixture is often best delivered through the fertilizer box of the seeder as the distributors are more capable of handling granules without crushing them than those in the seed box.

The prilled lime and seed mixture can separate out due to vibration whilst operating in the paddock, to avoid this don't fill the box completely and be prepared to stir the mixture up every few hectares especially if the paddock is rough or there are frequent hydraulic movements in the case of small paddocks.