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Managing kikuyu for milk production

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INTRODUCTION

Kikuyu grass (*Pennisetum clandestinum*) forms the basis of a high proportion of dairy pastures on the coast of New South Wales and southern Queensland. It is a vigorous summer growing grass that will survive dry conditions, stabilise erodible soils and suppress weeds.

Kikuyu produces large amounts of dry matter but under typical pasture management its quality is low. Dairy cows grazing kikuyu without supplementation produce about 12 L of milk per cow per day.

Recent research at Wollongbar Agricultural Institute showed that kikuyu managed appropriately would yield 14–15 L milk/cow/day. Supplementation with a cereal-based (energy) concentrate at 3 kg/cow/day produced 18–19 L milk/cow/day and a supplement of 6 kg/cow/day with an added sodium bicarbonate buffer produced 21–22 L milk/cow/day.

Dairy cows grazing kikuyu need to be supplemented with energy, sodium (Na) (as salt), phosphorus (P) and calcium (Ca) to overcome inherent deficiencies of kikuyu and meet the nutrient requirements of the cow.

KIKUYU MANAGEMENT

After grazing

After grazing kikuyu pasture, mulch (preferred) or slash the residue back to 5 cm stubble. Begin mulching in early summer to top weeds, then perhaps 2–3 times through the peak growing period, and then again in late summer if ryegrass and clover are to be oversown into kikuyu. Hard grazing using dry or young stock may also be used to reduce the post-grazing pasture mass.

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Cows grazing well-managed kikuyu may produce 14 to 15 L milk/cow/day

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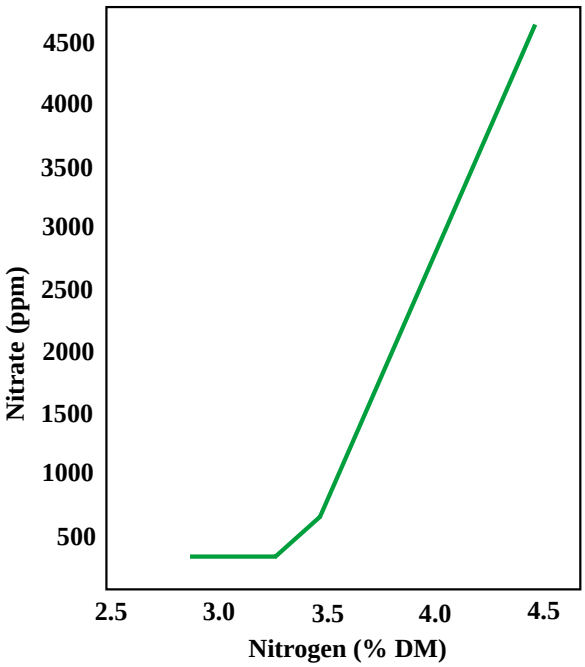
Begin mulching in early summer.

Removal of the low quality kikuyu allows light to initiate new kikuyu growth and allows white clover and ryegrass to successfully establish in early autumn.

Fertilising

Apply adequate nitrogen (N) fertiliser after every second grazing. An application rate of 100 kg urea or 120 kg of ammonium nitrate per hectare appears optimal if rainfall/irrigation is assured. Fertiliser at rates higher than these may cause the level of nitrate in the pasture to rise.

Figure 1. The relationship between the level of nitrogen (% DM) and nitrate (ppm) in kikuyu pasture above the 5 cm stubble height.



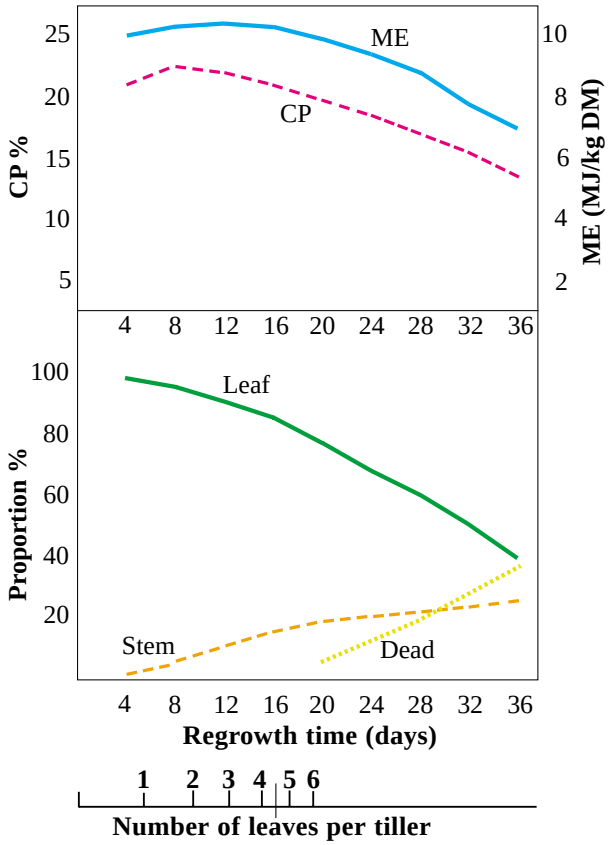


Figure 2. Changes in the proportion of (a) leaf, stem and dead material and (b) crude protein (CP) and metabolisable energy (ME) in total regrowth of kikuyu above the 5 cm stubble height

High nitrate levels have a detrimental effect on pasture digestibility or in extreme cases can cause 'nitrate poisoning'. Nitrate in kikuyu rises dramatically after the N level exceeds 3.5%, which is equivalent to 22% crude protein (CP) (see figure 1).

Application of higher rates of N also leads to a lower N use efficiency – from higher cost per unit DM and the potential loss of N to the environment.

Grazing interval

Graze at the appropriate interval. The stem of kikuyu grass is of lower quality than the leaf, as shown below.

Forage quality	Leaf	Stem
ME (MJ/kg DM)	8.8–9.0	7.4
Protein (%)	21.3	16.7

Studies at Wollongbar Agricultural Institute have shown that the optimal quality of pasture on offer occurred when 4½ new leaves appeared per tiller. After this stage the proportion of stem and dead leaves rose, and the CP and metabolisable energy (ME) declined. (Figure 2).

The 4½ leaf stage is a convenient in-field indicator of the time to graze. The time taken to

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Kikuyu at about the 4½ leaf stage

reach 4½ leaves varies mainly with temperature. In mid-summer, the grazing interval may be as short as 10–12 days, but in late autumn it may be extended to 35 or 40 days on the north coast of NSW. The time will generally be longer in southern coastal districts.

Strip grazing

Provide a new strip of kikuyu after each milking. This will reduce contamination and selection of the pasture by the stock.

THE KIKUYU / WHITE CLOVER / RYEGRASS SYSTEM

The addition of white clover and ryegrass complements the kikuyu and increases the quality and yield of the pasture. White clover and ryegrass re-establish or are established in April/May as the growth rate and quality of kikuyu declines. Kikuyu growth starts in December after white clover and ryegrass have set seed and their growth has slowed.

Strict management is necessary to establish or re-establish both white clover and ryegrass. The time to do this is about six weeks before the first expected frost. On the north coast, frosting can occur from mid-May so it is desirable to re-establish white clover in early April. Frosting occurs earlier further south, so establishment time on the south coast should be in early March.

Sowing preparation and management

Suppress kikuyu grass growth

The options are:

- Remove the kikuyu mat by heavy grazing with the equivalent of 150–200 dry cows/ha. If insufficient dry cows are available, mulch after the second last grazing to 5 cm stubble height. This will allow the mulch to settle by sowing time.
- Spray with a non-residual herbicide. Provided the kikuyu is growing rapidly with a high proportion of leaf, good results are attainable. For early sowing this is the only option.
- Graze, mulch, fertilise, and lock up the kikuyu one month before sowing, and then take a silage crop. After the silage has been taken, the kikuyu is slow to recover, allowing clover and ryegrass to establish.

Sowing

The seed may be broadcast on ground that has been lightly disc harrowed and then rolled. Leaving several head of dry stock for several days to compact the soil around the seed is also beneficial.

Haifa white clover at 4 kg/ha seems ideal because its growth complements that of kikuyu.

The seed may be direct drilled into the kikuyu, provided the mat of dense kikuyu has been removed by the previously described methods. The seed should be sown about 1 cm deep, and be in close contact with the soil. Rolling after drilling is often beneficial.

Haifa white clover in kikuyu in October

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Fertilisers

The results of soil tests will determine fertiliser needs. White clover requires adequate phosphorus (superphosphate) and potassium (muriate of potash). It also needs molybdenum (Mo) for nodulation, which can be applied as Mo superphosphate or by spraying sodium molybdate at 140 g/ha. Molybdenum is a trace element, and minute quantities (50 g/ha) are needed every 3–5 years.

The Mo may be applied to the white clover seed during the pelleting procedure after the seed has been coated with the glue and inoculant mix and before the lime coat. The rate is 76 g of molybdenum trioxide (66% Mo) applied to the quantity of seed to be sown per hectare. This will allow Mo at 50 g/ha. (e.g. for a white clover seeding rate of 4 kg/ha, apply molybdenum trioxide at 76 g per 4 kg of seed).

When clover is to be sown, apply lime at 1–5 t/ha if the soil pH ($CaCl_2$) is less than 5.

Irrigation

On the north coast, white clover requires irrigation in late winter to spring.

Grazing

In the first 5–7 weeks after establishment, graze when new kikuyu shoots exceed 8 cm – perhaps every 7–8 days. This practice prevents clover seedling death from shading by the kikuyu and retards the kikuyu regrowth, and cows are willing to quickly reduce the mass of kikuyu. Once the clover is dominant, graze hard every 30–40 days during winter/spring.

Grazing lightly at 10–14 day intervals from late November removes shading by clover or ryegrass and favours kikuyu growth.

The benefit from white clover is the addition of up to 80–150 kg/ha/year of soil nitrogen from the root rhizobia.

Perennial ryegrass will increase the amount of quality pasture available during the winter.

MAKING KIKUYU SILAGE

Making kikuyu silage is not only a useful management tool to cope with excess growth in summer and to maintain kikuyu quality, it is also economically worthwhile in terms of $/kg DM.

However, kikuyu is a medium quality grass so it is vital that its quality be maintained during the silage making process by taking the following steps.

- Slash or mulch the kikuyu as close to the ground as possible to remove the stem.
- Immediately apply 100–150 kg urea/ha.
- Harvest for silage when there is an average of 5½ leaves per tiller. This should not exceed 4 weeks. Use a precision-chop machine to create small pieces, which are then easily compacted to remove air quickly and give the silage a better consistency for feeding out.
- Allow the cut material to wilt to 25–30% DM (when a strand of kikuyu is wrung out by hand, it does not leave surface moisture). A quick wilt is essential. If wilting takes longer than 24–36 hours, the silage will not be worth making.
- Wilting, placement in the stack, and the start of cold fermentation must occur as quickly as possible to retain sugar and maximise the energy value.
- Incorporate a silage inoculant to assist the fermentation process.
- Cover with strong black plastic as quickly as possible, and seal cracks with silage tape to make the stack watertight. Make sure the plastic is weighted tightly against the silage with old tyres or a cover of earth.

NEIL GRIFFITHS

Direct drilling into mulched kikuyu

FURTHER INFORMATION

See also Agfact A0.9.25 *Kikuyu poisoning in cattle* and Agnote DPI-290 *Kikuyu*.

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