

## Suppression of kikuyu grass to allow oversowing in autumn

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### Introduction

Kikuyu grass (*Pennisetum clandestinum*) is widely grown in coastal New South Wales where it is highly productive and persistent on high fertility soils. It is the base pasture on most coastal dairy farms north of Sydney and widely used for both beef cattle and horse grazing.

Kikuyu grass grows rapidly during humid, wet summers with growth rates slowing in autumn as temperatures cool and stops completely in winter due to a combination of low temperatures and frost.

To fill the winter feed gap kikuyu pastures are commonly oversown in autumn with high quality temperate grass species such as annual ryegrass (*Lolium multiflorum*), or oats (*Avena sativa*). Depending on species, variety selection and sowing time, the temperate forages can provide feed for as short as 4 months and up to 8 months of the year. Many dairy farmers aim to maximise the production of these temperate pastures by sowing in early autumn, which requires management of the actively growing kikuyu for successful establishment.

The kikuyu grass can be suppressed by slashing or mulching, however quick recovery in early autumn means the kikuyu will smother emerging ryegrass. The herbicides glyphosate and paraquat have been used as a knockdown spray to suppress kikuyu prior to oversowing for many years with mixed success.

If glyphosate is applied at label rates of 1.1 L/ha of the 450 g/L formulation the kikuyu will be knocked out and unable to recover in spring. A feed gap occurs the following summer with invasion of the more glyphosate tolerant couch

grass (*Cynodon dactylon*) and crab grass (*Elusine indica*) which are normally smothered by the vigorous kikuyu growth.

Paraquat 250 g/L formulation has become popular in some areas because it does not cause excessive damage to kikuyu but it also only provides a narrow window of suppression, in some cases not much longer than slashing. If oversowing is delayed then kikuyu regrowth may cause poor establishment of ryegrass. The higher mammalian toxicity of paraquat is a further disadvantage if farms lack suitable equipment to ensure safe use.

### Methods

Randomised trials were conducted at Tocal and Taree in 2006 and 2008 to evaluate the knockdown and suppression of kikuyu grass using glyphosate and paraquat herbicides. Plot size was 3m x 5m with 3 replications.

Glyphosate 450 g/L formulation was applied at 200, 400, 600, 800, 1,000 ml/ha. Paraquat was applied at 1 and 2 L/ha. Trials were sprayed three times during March and April to assess effect of application time.

A second series of trials using the same herbicide rates assessed the effect of kikuyu height on knockdown and suppression. Pasture heights of 2-3 cm, 10-15 cm and 30 cm+ of green leaf were achieved by mowing 2 and 14 days or left unmown prior to the day of spraying. In these trials three pasture heights 2-3 cm, 10-15 cm and 30 cm+ were sprayed on the one day coinciding with the final timing spray in April.

At Tocal 2008 all trials were broadcast with ryegrass seed on 2 June which was the first wet period after the final spray and 7 weeks after that spray.

The plots were assessed visually for kikuyu suppression using brownout (knockdown) as the criterion and then scored for percentage groundcover - kikuyu, ryegrass and white clover (self sown). Once ryegrass was established the trials were grazed by dairy cattle.

**Results and discussion**

**Herbicide rate and timing**

Glyphosate rates at 600 ml/ha and above were effective in suppressing kikuyu and allowing establishment of ryegrass broadcast up to 11 weeks following herbicide application (Figure 1). However at 11 months after herbicide application the kikuyu had not fully recovered from the combination of herbicide effect and vigorous competition from ryegrass, which resulted in the invasion of couch and crab grass over summer (Figure 2).

Glyphosate at 400 ml/ha caused effective brownout and suppression of kikuyu and allowed acceptable establishment of ryegrass when sown in June. At this rate a timing response was observed with establishment better in the later sprayed trial (sown 7 weeks after spraying) than the early spraying (sown 11 weeks after spraying).

Better establishment would be expected if sowing was not delayed due to dry weather.

Glyphosate at 200 ml/ha caused suppression of kikuyu seen as some brownout, yellowing or fasciation (distorted regrowth). Often plots were green but growth was suppressed and would have been suitable for direct drilling. Delayed broadcast seeding in these trials was not effective.

Paraquat at 1 and 2 L/ha caused rapid brownout but then allowed the kikuyu to recover and, in particular at the lower rate applied. At the 2 L/ha rate paraquat suppressed kikuyu and achieved moderate success when the ryegrass seed was broadcast.

**Herbicide rate and pasture height**

This study confirmed the recommended practice of moderate pasture growth when spraying. Best results were seen where pasture was 10 – 15 cm high when sprayed. Treatments mown 2 days before spraying showed greatly reduced herbicide efficacy and greater kikuyu recovery even at higher rates of glyphosate. This effect was most likely due to the lack of foliage available to absorb the herbicide.

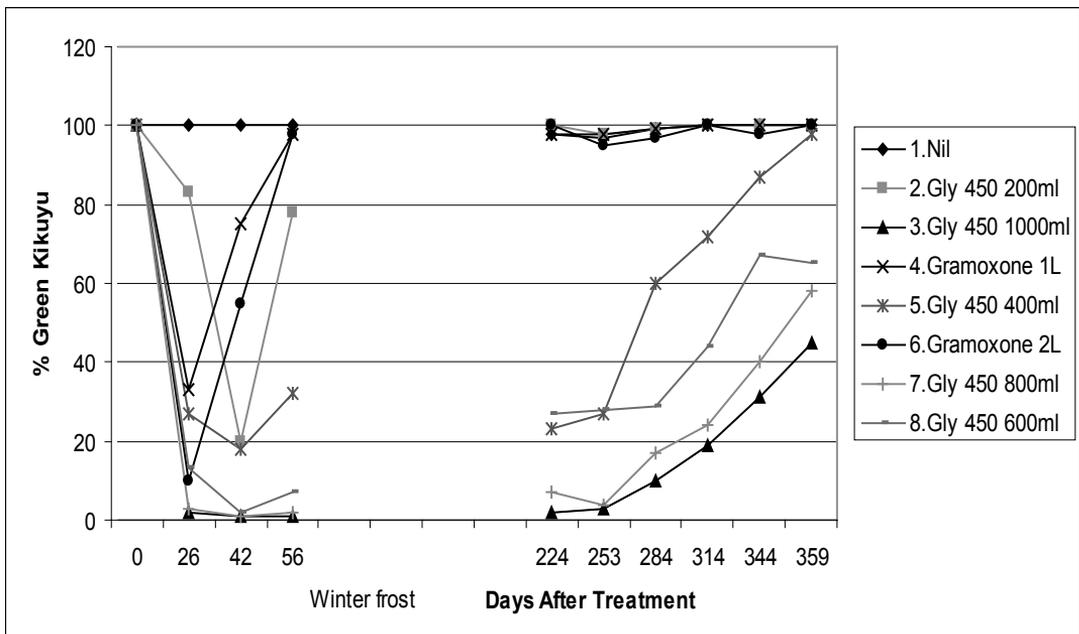


Figure 1: Change in kikuyu groundcover (%) with time following the application of glyphosate and paraquat based herbicides.

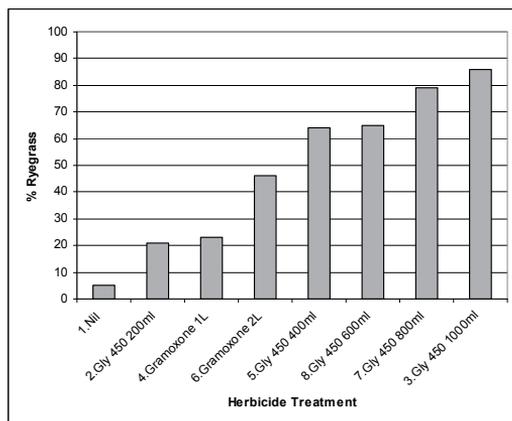


Figure 2: The effect of herbicide rate and type on ryegrass establishment.

Applying herbicide when the kikuyu was 30 cm high resulted in a longer period to show the full herbicide effect but eventually had greater 'kill'. However, even when the herbicide was effective at this 30 cm height the excessive kikuyu mulch resulted in poor ryegrass establishment.

### Conclusions

Current label rates for suppression of kikuyu using glyphosate 450 g/L at 1.1 L/ha for NSW will cause unacceptable long term damage to the kikuyu sward. We have applied for a permit to allow use of glyphosate 450 g/L in NSW at 300 – 500 ml/ha for suppression of kikuyu in NSW (Queensland label permits use at 500 ml/ha).

Label rates of paraquat 250 g/L at 1.6 – 2.4 L/ha are effective provided sowing is not delayed after spraying.

When applying suppression herbicides the kikuyu should be 10 – 15cm high so as to provide sufficient green foliage for the herbicide to be effective but will not shade out the emerging ryegrass seedlings.

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