

Effect of defoliation management on component dry matter yield of kikuyu (*Pennisetum clandestinum*) grass

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Abstract

Over an 11 month period, kikuyu (*Pennisetum clandestinum*) grass was cut to 3, 6 or 122 cm stubble height when 2, 4 or 6 new leaves per tiller had appeared. In summer, a defoliation interval coinciding with 2 leaves per tiller maximised leaf dry matter (DM) yield, in autumn it took 4 leaves per tiller and in winter 6 leaves per tiller. Yield of leaf DM was not significantly different when kikuyu was cut at 3 or 6 cm, but both treatments gave significantly higher leaf yield than when defoliated to 12 cm stubble. When total DM yield was considered (leaf, stem and dead material), 4 leaves per tiller maximised yield in all seasons.

Defoliation of kikuyu grass should aim to optimise forage quality if it is to be used by grazing dairy cows. Recent studies by Reeves *et al* (3) have shown that organic matter, digestibility and the levels of protein and some minerals are maximised when kikuyu is cut at 42 leaves per tiller and the post-grazing residual stem, which is of lower quality, is mechanically removed to 5 - 6 cm height (1).

Although this practice optimises forage quality, there may be a penalty on DM yield if pastures are subjected to this relatively severe defoliation. Previous studies (2, 4) have found a positive relationship between grazing interval and DM yield.

The aim of the present study was to determine the effect of defoliation treatment on DM yield of kikuyu leaf and stem.

Materials and Methods

In a completely randomised block design, 2 x 2 m plots of established "common" kikuyu were defoliated, over eleven months in 1997, to 3, 6 or 12 cm stubble height. when 2, 4 or 6 new leaves per tiller had regrown . Treatments were replicated three times giving total of 27 plots. Plots were defoliated with a rotary mower, and a representative sample dried at 80oC for 24 hrs to determine DM yield. At one defoliation in each of the 4 seasons, 2 herbage samples were taken at random in each plot by electric hand shears to the relevant stubble height and sorted into leaf and stem.

Results and Discussion

The leaf yield for each season is shown in Table 1.

Table 1: Leaf yield (kg DM/ha) in the 4 seasons for kikuyu pasture subject to various defoliation treatments.

Defoliation		?	Season			
Height? (cm)	Interval? (Leaf No)	?	Summer 17 Jan- 4 Mar	Autumn 5 Mar-2 Jun	Winter 3 Jun-7 Sep	Spring? 8 Sep - 20 Nov

3	2	?	4427	2202	1304	3409
	4		2887	2814	1347	3557
	6		1655	1244	2662	3038
6	2	?	3478	2193	886	2242
	4		3018	2474	868	3129
	6		1601	1206	2504	2871
12	2	?	2913	1633	764	1693
	4		2353	1924	854	1628
	6		1303	848	1535	1730

The effect of defoliation treatment varied between seasons.

In summer, the most severe defoliation (2 leaves per tiller at 3 cm height) maximised leaf DM yield giving significantly greater ($P < 0.001$) yield than 4 leaves per tiller which in turn was significantly greater ($P < 0.001$) than 6 leaves per tiller. Cutting to 3 or 6 cm stubble height gave similar yields but both were significantly higher ($P < 0.001$) than plots cut to 12 cm. In autumn, defoliating at 4 leaves per tiller tended to maximise yields and, as in summer, plants cut to 12 cm height yielded significantly less ($P < 0.001$) than the other 2 height treatments. In contrast, in winter, yields from plots cut at 6 leaves per tiller were significantly greater ($P < 0.001$) than the other 2 treatments. In spring, only defoliation height was significant ($P < 0.001$) with plots cut at 12 cm yielding less than the other 2 height treatments.

When total DM (leaf and stem) was considered, yield was maximised when plants were defoliated at 4 leaves/tiller in all seasons.

These results are at variance with studies of Whitney (4) who found a negative relationship between DM yield and interval. However, the intervals were 2, 5 or 10 weeks irrespective of season, whereas our longest defoliation interval during the growing season, was at 6 leaves per tiller or 4 weeks.

There would appear to be no benefit in defoliating to 12 cm stubble height at any time. On the other hand, leaving a post-defoliation residue of 3 cm stubble height gave the highest DM yield but this is probably too severe to graze dairy cows with 6 cm being the preferred post-grazing pasture residue.

When these results are integrated with changes in nutrients with regrowth (3) there is clearly no benefit in a defoliation interval greater than 4 leaves per tiller in summer/autumn. In winter, when forage quality is higher (W.J. Fulkerson, unpub.data), extending the interval to 6 leaves per tiller may maximise nutrients although this needs to be confirmed.

REFERENCES

1. Drummond, G., Wright, D., Wetherall, B. and Ware, B. 1997. Farming with kikuyu,. Pub. New South Wales Department of Agriculture.
2. Kemp, D.R. 1976. *Aus. J. of Exp. Agric. and Anim. Husb.* **15**; 637 - 44
3. Reeves, M., Fulkerson, W.J. and Kellaway, R.C. 1996 *Aust. J. of Agric. Res.*, **47**; 1349-59
4. Whitney, A.S., 1974.. *Agron. J.* **66**; 281 - 7