

The evaluation of kikuyu oversown with ryegrass and clover in terms of milk production

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Introduction Kikuyu (*Pennisetum clandestinum*) comprises the greater part of irrigated summer and autumn pasturage for milk production in the Southern Cape. Milk production per cow is limited by low forage quality. The aim of the study was to determine the milk production from kikuyu (K), kikuyu oversown with annual ryegrass (*Lolium multiflorum* spp. cv Energa) (KR), kikuyu oversown with a mixture of perennial ryegrass (*Lolium perenne* cv Yatsyn, Dobson) and perennial white clover (*Trifolium repens* cv Haifa, Waverley) and red clover (*Trifolium pratense* cv Kenland, Cherokee) (KRC) and kikuyu oversown with a mixture of perennial white and red clover (KC). The trial was carried out under irrigation using Jersey cows in a put-and-take grazing system. Fertiliser was applied to raise phosphorus level to 35 mg/kg, potash level to 80 mg/kg and the pH (KCl) to 5.5. No nitrogen fertiliser was applied to the KC and KRC pastures.

Materials and methods The study was carried out on 9 ha kikuyu pasture divided into seven blocks. Each block was divided into three experimental paddocks and pasture treatments were randomly allocated to paddocks. Cows strip grazed four days on each paddock resulting in a 28-day grazing cycle. The K pasture was fertilised at a rate of 420 kg N/ha in seven applications of 60 kg N/ha and the KR pasture at a rate of 600 kg N/ha in ten applications of 60 kg N/ha. Dry matter production, growth rate and grazing capacity were determined. Thirty-six mid-lactation cows were randomly allocated to three different pasture treatments (12 cows per treatment) at the start of spring, summer, autumn and winter. The groups were balanced for milk production (four weeks prior to experimental period), days in milk and lactation number. The number of cows per paddock was adjusted daily to ensure a forage availability of 10kg DM/cow per day. Cows were fed 4 kg of dairy concentrate per day during milking and were milked twice daily. Milk production and number of cows on each paddock was recorded daily. Milk composition was determined monthly.

Results The results are presented on a yearly basis in Table 1. The KR carried more cows/ha than KC during the three years of the study. During year 1, milk production per cow was higher ($P < 0.05$) on KC than on KR and K. Milk production/ha did not differ ($P > 0.05$) between KR and KC during its first year of growth in years 1 and 2 of the study.

Table 1 The carrying capacity (cows/ha), average milk production per cow and milk production per hectare of kikuyu (K), kikuyu oversown with annual ryegrass (KR), kikuyu oversown with a mixture of perennial ryegrass and perennial white and red clover (KRC) and kikuyu oversown with a mixture of perennial white and red clover (KC)

Year	Parameter	KC first year of growth	KR	K
1	Cows/ha	5.27 ^{de}	8.03 ^b	6.72 ^c
	Milk/cow per d (kg)	15.7 ^b	14.0 ^c	13.8 ^c
	Milk/ha (kg)	25940 ^{bcd}	25953 ^{bcd}	21377 ^d
2		KC second year of growth	KC first year of growth	KR
	Cows/ha	5.37 ^{de}	5.78 ^d	9.03 ^a
	Milk/cow per d (kg)	16.8 ^{ab}	17.4 ^a	17.0 ^{ab}
	Milk/ha (kg)	22761 ^{cd}	34615 ^a	38406 ^a
3		KR	KC second year of growth	KRC
	Cows/ha	6.76 ^c	5.77 ^d	4.80 ^c
	Milk/cow per d (kg)	16.8 ^{ab}	17.2 ^a	18.1 ^a
	Milk/ha (kg)	27109 ^{bc}	24148 ^{cd}	29298 ^b

^{a, b, c, d} Means with no common superscript differ ($P < 0.05$)

Conclusions The KC supported higher milk production per cow than KR and K during the first year. During year two of the study, milk production per hectare of KC and KR was higher than that of KC in its second year of growth. The oversowing of kikuyu with clover and/or ryegrass increased milk production per cow and milk production per hectare. Milk produced per hectare was very high on KR and KC pastures. Carrying capacity was higher on KR pasture than on KC and KRC pastures.