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The seasonal botanical composition, calcium and phosphorus content of kikuyu oversown with ryegrass and clover

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Introduction Kikuyu (*Pennisetum clandestinum*) is one of the major grasses used for summer and autumn grazing in the Southern Cape coast area of South Africa. Annual ryegrass (*Lolium multiflorum* spp.), perennial white (*Trifolium repens*) and red clover (*Trifolium pratense*) can be incorporated into an existing kikuyu stand to improve pasture quality and spring production. The aim of this study was to determine the persistence of these species and effects on the calcium and phosphorus content of kikuyu (K), kikuyu oversown with annual ryegrass (KR), kikuyu oversown with a mixture of perennial ryegrass (*L. perenne*) and perennial white and red clovers (KRC) and kikuyu oversown with a mixture of perennial white and red clovers (KC).

Materials and methods 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. 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. Botanical composition, calcium and phosphorus content of each pasture was monitored at monthly intervals during the year. The number of animals per paddock was adjusted daily to insure a forage availability of 10 kg DM/cow per day.

Results The clover content of the KC pasture was respectively 86%, 85%, 79% and 70% during the spring, summer, autumn and winter of the first year and 66%, 64% and 48% during the following spring, summer and autumn. The clover content of this pasture declined during spring (41%) and summer (15%) of the third year after it was oversown with annual ryegrass during the previous autumn and received a monthly application of 60 kg N/ha. The clover content of the KRC pasture was respectively 48%, 52%, 49% and 30% during the spring, summer, autumn and winter. The grass content of the KR pastures consisted mainly of annual ryegrasses during spring.

Table 1 The Ca and P content and Ca:P ratio 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		Pasture	%	Pasture	%	Pasture	%	LSD 0.05
1	Ca	KC	0.87	KR	0.30	K	0.34	0.081
	P		0.40		0.41		0.54	0.049
	Ca:P		2.18:1		0.73:1		0.63:	-
							1	
2	Ca	KC	0.85	KC	1.18	KR	0.43	0.081
	P	(Second	0.43		0.46		0.49	0.049
	Ca:P	year	1.98:1		2.57:1		0.88:	-
		growth)					1	
3	Ca	KR	0.46	KC	0.60	KRC	0.66	0.081
	P		0.52	(Second year	0.51		0.53	0.049
	Ca:P		0.89:1	growth)	1.18:1		1.24:	-
							1	

Discussion and conclusions The clover content of the KC pasture was maintained at levels higher than 30% for more than two years. The clover content of the KRC pastures decreased to 30% within a year. The Ca content of the KC pasture was higher than the nutritional requirement for dairy cattle (0.67%), but decreased as the grass content increased (KRC). The Ca content of the grass pastures (K and KR) was low and cows should receive Ca supplementation. The P content of both the legume and grass pastures exceeded the requirement for dairy production (0.38%). The low Ca content in the grass pastures resulted in a Ca:P imbalance that was lower than the 1.6:1 ratio needed by dairy cows.