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The seasonal dry matter production and carrying capacity of kikuyu oversown with ryegrass and clover

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Introduction In the main milk producing areas of the Southern Cape, kikuyu (*Pennisetum clandestinum*) is considered an important summer and autumn pasture which is climatologically well adapted. The main problem experienced with kikuyu is that winter and spring production is low and the exclusion of legumes make it dependent of nitrogen fertiliser and that increases the input cost. The aim of the study was to quantify the seasonal dry matter (DM) yield and carrying capacity of kikuyu (K) through treatments involving kikuyu oversown with annual ryegrass (*Lolium multiflorum* spp.) (KR), kikuyu oversown with a mixture of perennial ryegrass (*L. perenne*) and perennial white (*Trifolium repens*) and red (*Trifolium pratense*) clovers (KRC) and kikuyu oversown with a mixture of only 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. Annual ryegrass (KR) was oversown (25 kg/ha) into kikuyu using a mulcher (1.6 meter Nobili with 32 blades) and perennial clover (red clover 6 kg/ha plus white clover 5 kg/ha) (KC) and perennial ryegrass-clover (perennial ryegrass 10 kg/ha, red clover 4 kg/ha, white clover 4 kg/ha) (KRC) were oversown with a rotavator (1.55 meter Celli with 36 blades) during May. 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 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. Dry matter production, growth rate and grazing capacity were determined. Cows were fed 2 kg of dairy concentrate after each milking. The number of animals per paddock was adjusted daily to insure a forage availability of 10 kg DM/cow per day.

Results The growth rates during spring were highest for Kikuyu-clover (KC) (59 kg DM/ha per d), KR (58-66 kg DM/ha per d) and KRC (57 kg DM/ha per d) pastures ($P<0.05$). During summer and autumn K (67 and 72 kg/ha per d) and KR (66-82 and 70-76 kg DM/ha per d) were more productive ($P<0.05$) than KC (55-58 and 38-43 kg DM/ha per d) and KRC (52 and 47 kg DM/ha per d). Kikuyu clover (KC) and KRC produced 27 and 26 kg DM/ha per d during winter. The second year autumn growth rate of KC (49-57 kg DM/ha per d) was higher ($P<0.05$) than that of the first year (38-43 kg DM/ha per d).

Both KR (15953-19292 kg DM/ha) and KRC produced higher ($P<0.05$) annual yields than K (13786 kg DM/ha). The lowest annual yield was produced by KC (12609-12954 kg DM/ha) during the second year of growth ($P<0.05$) but this was not significantly different ($P>0.05$) from K (13786 kg DM/ha).

Kikuyu-ryegrass (KR) had a higher ($P<0.05$) grazing capacity (7.2-7.6 cows/ha) during spring than K (3.9 cows/ha), KRC (5.8 cows/ha) and KC (6.5-6.8 cows/ha) during the first year of growth and was not statistically different ($P>0.05$) from KC (6.81 cows/ha) during the second year of growth. The grazing capacity of K during summer and autumn (8 and 8.5 cows/ha) and KR (8.1-9.1 and 8.4-10.8 cows/ha) was higher ($P<0.05$) than KRC (5.3 and 5.0 cows/ha). It was also higher ($P<0.05$) than the grazing capacity of KC during the summer of the first year (6.4 cows/ha) but with no statistical difference ($P>0.05$) during the summer of the second year (7.6 cows/ha) and higher ($P<0.05$) during the autumn of year 1 and year 2 (4.9-5.5 cows/ha).

Conclusions The incorporation of annual ryegrass, perennial clover or perennial ryegrass-clover into kikuyu changed the fodder flow and increased the spring dry matter production and grazing capacity. The incorporation of clovers into kikuyu pasture resulted in a lower grazing capacity. The oversowing of kikuyu with a annual ryegrass during May had no effect on the dry matter production of kikuyu during the summer and autumn. Kikuyu and kikuyu-ryegrass, fertilised with nitrogen, have a high dry matter production rate resulting in a high grazing capacity.