The seasonal nutritional value of kikuyu oversown with ryegrass and clover

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Introduction To overcome the seasonality and relatively low forage quality of kikuyu (*Pennisetum clandestinum*), 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 quality of kikuyu (K), kikuyu oversown with annual ryegrass (KR), kikuyu oversown with a mixture of perennial ryegrass (*Lolium perenne*) and perennial white and red clover (KRC) and kikuyu oversown with a mixture of white and red clover (KC), in swards grazed by dairy cows.

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. Dry matter production, growth rate and grazing capacity were determined. Cows were fed 2 kg of dairy concentrate after each milking. During each grazing cycle, two 0.09 m^2 samples were cut at a height of 50 mm before grazing on three paddocks for each pasture. Samples were dried at 60°C for 72h and *in vitro* organic matter digestibility (IVOMD), crude protein (CP) and neutral detergent fibre (NDF) was determined. Metabolisable energy (ME) (MJ/kg DM) was calculated from IVOMD values (ME = 18.4 X IVOMD% / 100 X 0.81).

Results The DM % of K, KR and KC was respectively 16.8, 12.0 and 10.0 during spring, 14.2, 11.7 and 11.7 during summer and 16.6, 11.6 and 11.6 during autumn of year 1 (LSD = 0.97 at P = 0.05). During year 2 the DM % of KR, KC (first year of growth), KC (second year of growth) was 12.1, 9.6 and 13.2 during spring, 14.8, 12.4 and 15.7 during summer and 13.3, 12.4 and 15.8 during autumn respectively (LSD =0.67). In year 3 the DM% of KR, KC (second year of growth) and KRC was 12.8, 13.9 and 11.7 during spring, 16.6, 16.2 and 14.6 during summer and 15.9, 16.5 and 16.8 during autumn respectively (LSD = 0.93).

The ME (MJ/kg DM) of K, KR and KC was respectively 8.9, 10.2 and 11.4 during summer and 8.1, 8.2 and 11.1 during autumn of year 1 (LSD = 0.91). During year 2 the ME (MJ/kg DM) of KR, KC (first year of growth), KC (second year of growth) was 11.5, 11.3 and 11.1 during spring, 9.1, 10.4 and 10.2 during summer and 8.0, 10.1 and 8.8 during autumn respectively (LSD = 0.87). In year 3 the ME (MJ/kg DM) of KR, KC (second year of growth) and KRC was 11.3, 11.0 and 11.5 during spring, 9.3, 9.5 and 9.3 during summer and 7.9, 8.1 and 8.7 during autumn respectively (LSD = 0.73).

The CP% of K, KR and KC was respectively 23.7, 23.7 and 28.8 during summer and 23.1, 23.5 and 26.9 during autumn of year 1 (LSD = 3.43). During year 2 the CP % of KR, KC (first year of growth), KC (second year of growth) was 21.8, 27.9 and 27.2 during spring, 18.9, 25.6 and 21.8 during summer and 23.1, 25.3 and 19.5 during autumn respectively (LSD = 2.94). In year 3 the CP % of KR, KC (second year of growth) and KRC was 20.8, 24.2 and 22.8 during spring, 16.1, 18.4 and 18.5 during summer and 17.3, 15.8 and 18.4 during autumn respectively (LSD = 2.46).

The NDF % of K, KR and KC was respectively 64.7, 56.8 and 37.4 during summer and 62.6, 65.6 and 40.9 during autumn of year 1 (LSD = 8.38). During year 2 the NDF % of KR, KC (first year of growth), KC (second year of growth) was 50.1, 36.4 and 37.0 during spring, 66.9, 42.2 and 48.7 during summer and 67.4, 50.9 and 58.8 during autumn respectively (LSD = 6.20). In year 3 the NDF % of KR, KC (second year of growth) and KRC was 46.0, 44.6 and 43.2 during spring, 64.4, 59.6 and 54.6 during summer and 70.1, 69.9 and 60.2 during autumn respectively (LSD = 4.89).

Conclusions Oversowing of kikuyu with clover resulted in lower ($P < 0.05$) DM and NDF values and higher ($P<0.05$) CP and ME values. The ME value of KC and KR pasture was very high during spring and therefore a lower milk response to concentrate feeding can be expected during spring compared to summer and autumn. The lowest CP % in KR pasture was found summer and autumn. The CP content of the concentrate supplement fed to cows should be increased during summer and autumn when cows graze kikuyu dominant pasture.