Spatial Scale of Heterogeneity Affects Diet Choice but Not Intake in Beef Cattle

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Spatial scale of heterogeneity affects diet choice but not intake in beef cattle

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Introduction Previous research has shown that sheep (Champion *et al.*, 1998) and dairy cattle (Nuthall *et al.*, 2000) have a partial preference for clover of 70%, and achieve higher daily intakes when offered grass and clover as separate but adjacent monocultures compared with animals grazing mixed swards. This intake benefit could be utilised to increase intake and production on farms by grazing from adjacent strips of the two herbages. This study aimed to establish the minimum strip width required to achieve the benefits of monocultures.

Materials and methods Intake and diet preference were measured using n-alkanes in four groups of two yearling Simmental x Holstein beef heifers. They were rotated in a Latin Square around four paddocks, each containing adjacent white clover and ryegrass strips at different spatial scales: 108 cm, 36 cm and 12 cm, and a mixed sward. Heifers spent 5 days on each paddock. They were dosed daily with a cellulose bung impregnated with 420mg of C_{32} n-alkane. Daily dosing started 8 days prior to the start of the Latin Square rotation to ensure steady-state conditions were achieved. Herbage samples were collected on the fourth day that the heifers were on each treatment paddock. Faecal samples were collected by following the animals and collecting a sample of naturally-voided faeces on several occasions over the final 24 h that the heifers were on each treatment paddock. The herbage and faecal samples were freeze-dried an analysed for n-alkane content. These data were processed using EatWhat? (Dove & Moore, 1995) to determine diet composition, and further analysed to estimate daily intake.

Results There was a significant effect of scale on the proportion of clover in the diet ($F_{3,15}$=5.46, P=0.038). Preference showed a step-function response with 59-60% clover in the diet for 108 cm and 36 cm and 36-38% for 12 cm and the mixed sward (Figure 1). There were no significant differences in daily intake between the four treatments (9.2, 9.9, 8.6 and 9.9 kg DM day^{-1} for 108 cm, 36 cm, 12 cm and mixed sward respectively, Figure 2).

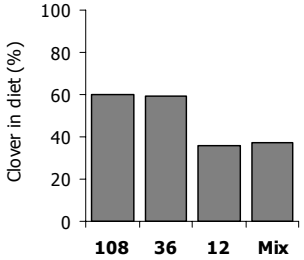

Figure 1 The proportion of clover in the diet and the associated with each of the four treatments

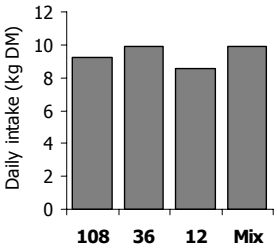

Figure 2 The daily intake (kg DM) associated with each of the four treatments

Conclusions These results indicate that cattle were unable to select the desired proportion of clover at the two smaller scales, but could at the two larger scales, with the critical scale lying between 12 and 36 cm. The fact that the cattle could achieve a higher proportion of clover at the larger scales suggests that, at these scales, they are effectively 'separate monocultures'. However, unlike previous studies with lactating sheep and dairy cattle, intakes from these monocultures were no higher than that from the mixed sward. Further research is needed to establish if this latter result is associated with beef cattle or with using strips.

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