Elasticity of ingestive behaviour and intake in sheep associated with food diversity on plurispecific swards

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Introduction Animals on heterogeneous swards generally opt for a varied diet. This may stimulate their intake, unless searching constraints limit intake rate (Champion *et al*., 1998). However the management of plurispecific swards presents a risk of overgrazing the preferred species and undergrazing the less-preferred species. This study aimed to test the effect of type of diversity and type of management on the elasticity of ingestive behaviour and intake in sheep.

Material and methods Five treatments were compared with 5 groups of 5 dry INRA 401 ewes during 5 periods, using a latin-square design: L=grazing a monoculture of *Lolium perenne cv.* Herbie; F=grazing *Festuca arundinacea cv.* Florine; FLF=L+F=grazing conterminal monocultures, 0.50:0.50 by ground area, the animals having a free choice between both species; DLF=grazing L from 1600-0900h and F from 0900-1600h, the choice being made by the researcher; ILF=grazing a mixture of both species that were finely imbricated. Sward height was maintained at 9 cm by regular mowing. Each period comprised a 5-day adaptation period and a 5-day measurement sub-period. Dietary choices and intake were measured using the n-alkanes technique. Grazing time was assessed using the automatic Ethosys system (Scheibe *et al*., 1998). Data were analysed using the SAS-GLM procedure and the Duncan contrast procedure for pair-wise comparisons.

Results The *Lolium perenne*/*Festuca arundinacea* association is a good model to study foraging behaviour and diet selection. Preference for ryegrass was marked (Table 1); n-alkane profiles between both species were steady and contrasting. The proportion of *Lolium* in the diet was 76.9, 75.0 and 78.2% for FLF, DLF and ILF respectively; the proportion of *Lolium* in the corresponding swards was 50, 52 and 65% respectively. Each treatment, period and animal had a significant effect on intake and ingestive behaviour. Intake and intake rate was higher in L than in F. Intake was higher in DLF and ILF than in L (+13% and +17%, respectively). Grazing time was higher in FLF and ILF than in L (+15% and +17%, respectively). There was no difference in diet selection, intake and grazing behaviour between FLF, DLF and ILF. Mediated via an increase in grazing time rather than an increase in intake rate, intake was higher on mixed ryegrass-tall fescue swards than on ryegrass (the preferred monoculture).

Table 1 Ingestive behaviour and intake of ewes offered monocultures of *Lolium perenne*, monocultures of *Festuca arundinacea,* or swards associating both plant species, maintained at 9 cm-high

Treatment	F	L	FLF	DLF	ILF	s.e.
Lolium in total biomass (%)			50	52	65	
Lolium in the diet (%)			76.9 a	75.0 a	78.2 a	7.7
Intake (g OM/day)	1557 c	1822 b	2028 ab	2055 a	2130 a	358
Grazing time (min/day)	383 bc	366 c	420 ab	397 abc	430 a	53
Intake rate (g OM/min)	3.996 b	5.400 a	4.900 a	5.006 a	4.867 a	0.902

Within a row, values with different letters differ significantly ($P<0.05$)

Conclusions Offering a choice of herbage species to ewes increased intake, mediated via an increase in grazing time rather than an increase in intake rate. There was no interaction with the type of diversity (conterminal monocultures vs mixture) or the type of management of the diversity (free choice vs directed choice) on ingestive behaviour and intake.

References

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