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## Effect of mixed and sequential grazing by cattle and sheep of upland permanent pasture on liveweight gain

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**Introduction** Previous work has shown benefits of sequential grazing by cattle and sheep, with superior liveweight gains being recorded for lambs grazing swards previously grazed by cattle. A preliminary study of the effects of mixed sheep and cattle grazing also suggested that more extensively grazed swards offer scope for complementary grazing between sheep and cattle. The aim of this experiment was to directly compare these two approaches of integrating the grazing of cattle and sheep.

**Material and methods** The experiment was conducted on a ryegrass/white clover-dominated permanent pasture. Four treatments were compared: 1) sheep only grazing during the growing season from May to October (S/S); 2) cattle only grazing during May to July, followed by sheep only grazing from August to October (C/S); 3) cattle and sheep grazing during May to July, sheep only grazing for the rest of the growing season (C+S/S); and 4) cattle and sheep grazing for the whole grazing season of May to October (C+S/C+S). Individual plot sizes were 2.0, 1.0 and 0.5 ha for treatments 3, 4, and 2 and 1 respectively, and each treatment was replicated three times. On cattle-grazed plots Charolais-cross steers with a mean turnout weight of approximately 350 kg were used throughout the season. On sheep-grazed plots, Beulah Speckle Face ewes and their Suffolk cross lambs were used as core group animals from the start of the experiment until weaning at the end of July, and then from weaning until termination of grazing the plots were grazed by weaned lambs. The number of "core" animals on individual plots of the four treatments were: 1) 8 ewes + 11 lambs until end of July; 8 lambs thereafter, 2) 4 steers until end of July; 16 lambs thereafter, 3) 4 steers and 16 ewes + 22 lambs until end of July; 32 lambs thereafter, and 4) 4 steers and 16 ewes + 22 lambs until end of July; 4 steers and 16 lambs thereafter. Sward heights were maintained at a target height of 6 cm using a "put and take" stocking system. Results are presented for years 2 and 3 of an experiment which began in 2001.

**Results** Liveweight gains for the different classes of livestock before and after weaning during each of the grazing seasons are summarised in Table 1. During the post-weaning phase in 2002, growth rates of lambs were higher on the C/S and C+S/C+S treatments than on the S/S treatment, while in 2003 the growth rates recorded for the lambs grazing the C+S/C+S plots post-weaning were higher than those for lambs on any of the other three treatments.

**Table 1** Effect of sequential and mixed grazing of sheep and cattle on liveweight gain (g/d)

Year	Treatment	Pre-weaning			Post-weaning	
		Ewes	Lambs	Cattle	Lambs	Cattle
2002	S/S	37	240	-	40	-
	C/S	-	-	1166	67	-
	C+S/S	73	274	1362	57	-
	C+S/C+S	80	262	1107	79	662
	s.e.d.	16.4	10.6	93.5	11.5	
	Significance	*	*	*	*	
2003	S/S	86	238	-	95	-
	C/S	-	-	1407	97	-
	C+S/S	100	262	1338	97	-
	C+S/C+S	95	253	1295	125	1037
	s.e.d.	21.2	10.0	89.7	11.5	
	Significance	ns	ns	ns	*	

**Conclusions** The results demonstrate the potential production benefits of mixed grazing. Although systems based on sequential grazing were found to have the potential to improve performance, the treatment which gave the most consistent benefits in terms of post-weaning lamb growth rates was mixed grazing by cattle and sheep throughout the season.