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Performance of crossbred Welsh Mountain ewes in the hill environment

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Introduction The Welsh Mountain sheep is a numerically important breed in the UK, but its lambs are characterised by low slaughter weights and poor carcass conformation. The reduction in stocking rates that is often associated with environmental conservation schemes, offers the potential for the use of larger ewes. Crossbreeding allows more rapid genetic change to be undertaken than would be possible from selection within breeds, and affords the potential to utilise heterosis and improve the quality of subsequent crosses with the Bluefaced Leicester. This work compared the survival and productivity of purebred Welsh Mountain ewes with a range of crossbred ewe types maintained in a hill environment.

Materials and methods Over a three year period, 600 Welsh Mountain ewes per year were mated to either Cheviot, Poll Dorset, Lleyn or Texel sires (8 high index sires per breed overall) using laparoscopic AI (McLean *et al*, 2006). Up to fifty ewe lambs per year were retained from each breed and a similar number of pure bred Welsh Mountain lambs were also retained each year from the farm flock. These pure Welsh Mountain and crossbred ewes were mated by Suffolk rams and ewe performance was recorded over 3 parities. Ewes were weighed and condition scored on a scale of 1 (thin) to 5 (fat) at the start of the mating period. All ewes in their first parity (two years old) were housed for the final 6 weeks of pregnancy and fed grass silage and concentrates according to predicted litter size. In subsequent parities only twin and triplet bearing ewes were housed, and single bearing ewes were maintained on pastures and fed grass silage supplemented with feed blocks until lambing. After lambing, single bearing ewes were grazed on semi-natural hill pastures at 1.5 ewes per ha, whilst twin rearing ewes were retained on improved perennial ryegrass based swards at up to 10 ewes per ha until lambs were weaned at 18 weeks of age. The data were analysed using the REML procedure of Genstat. For ewe performance traits, the fixed effects of breed, year, ewe age and their interactions were evaluated. Lamb performance traits were adjusted for the fixed effects of breed of dam, year, sex, litter size, ewe age and significant interactions, with age of lamb at the 8 week weighing and/or weaning fitted as covariates where relevant. Dam was fitted as a random effect.

Results There were no significant differences (P>0.05) between ewe types in pregnancy rates and survival to third lambing. Cheviot, Dorset and Texel crossbred ewes were approximately 8 kg (proportionately 0.2) heavier than the Welsh Mountain (P<0.001) and Lleyn cross ewes were intermediate in weight. Relative to the number of ewes that entered the flock, total litter weight weaned over three lamb crops was between 18.7 - 31.3 kg higher in crossbred ewe types than in the Welsh Mountain (P<0.001), although the relative contribution to this of litter size and individual lamb weaning weights varied between crossbreeds. The progeny of crossbred ewes were heavier at birth and weaning than lambs from Welsh Mountain ewes. However, although crossbred ewes supported higher growth rates in early lactation, there were no significant differences in ADG from 8 weeks to weaning (P>0.05).

Table 1 Performance of purebred Welsh Mountain and crossbred ewes and their Suffolk cross lambs

	Cheviot x	Dorset x	Lleyn x	Texel x	Welsh	s.e.d.	Significance
Number of ewes	135	136	145	130	126		
Ewe survival to 3rd lambing	0.72	0.64	0.74	0.62	0.61	0.056	n.s.
Ewe live weight at 3rd mating	50.3	50.9	46.9^{b}	51.2	42.5^{a}	0.86	P<0.001
Litter weight weaned† (kg)	97.1^{a}	103.3^{bc}	109.7^{c}	100.5^{b}	78.4^{a}	4.59	P<0.001
Pregnancy rate	0.85	0.86	0.86	0.85	0.81	0.030	n.s.
No lambs born/ewe lambing	1.49^{bc}	1.57^{cd}	1.63^{d}	1.43^{b}	1.33^{a}	0.049	P<0.001
No lambs reared/ewe lambing	1.42^{bc}	1.50^{cd}	1.52^{d}	1.37^{ab}	1.29^{a}	0.047	P<0.001
Lamb birth weight (kg)	3.8^{bc}	3.9^{cd}	3.7^{b}	4.0^{d}	3.3^{a}	0.07	P<0.001
Lamb weaning weight (kg)	29.4^{b}	30.4^{c}	29.2^{b}	30.7^{c}	27.0^{a}	0.36	P<0.001
ADG birth – 8 weeks (kg/day)	0.26^{b}	0.27^{c}	0.26^{b}	0.26^{bc}	0.24^{a}	0.006	P<0.001
ADG 8 weeks – weaning (kg/day)	0.14	0.15	0.15	0.15	0.13	0.005	n.s.

[a, b, c] Means within a row with different superscripts were significantly different (P<0.05)
† Total litter weight produced over three parities per ewe that entered the flock

Conclusions These results are similar to those of Speijers *et al* (2007) for crossbred Scottish Blackface sheep and demonstrate that, where stocking rates are adequate, larger, more productive crossbred ewes can be maintained in the hill environment without deleterious consequences for survival or pregnancy rate.

Acknowledgement Funding for this work was received from Hybu Cig Cymru – Meat Promotion Wales

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