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Author:	A. J. Kennedy, M. B. Ferguson, G. B. Martin, A. N. Thompson, D. J. Pannell
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The optimum slaughter weight for different ewe mature sizes

A. J. Kennedy^{A,C,E}, M. B. Ferguson^{C,D,E}, G. B. Martin^B, A. N. Thompson^{C,D,E} and D. J. Pannell^A

^ASchool of Agricultural and Resource Economics, University Western Australia, Crawley, WA, 6009, Australia.

^BSchool of Animal Biology, University of Western Australia, Crawley, WA, 6009, Australia.

^CDepartment of Agriculture and Food Western Australia, South Perth, WA, 6151, Australia.

^DSchool of Veterinary and Biomedical Sciences, Murdoch University, Murdoch, WA, 6150, Australia.

^ECooperative Research Centre for Sheep Industry Innovation, University of New England, Armidale, NSW 2351 Australia.

Lamb producers have the option to market lambs at a range of slaughter weights. However, there are limited price premiums for heavier carcasses on a per kilogram basis. Any economic advantage of heavy lambs is realised by extra weight and not price. Both genetic and on-farm factors contribute to extra weight gain. Firstly, lamb weight and growth is correlated to its mature size and lambs from larger parents grow faster and reach heavier weights, but also have greater feed requirements. Secondly, stocking and reproductive rate account for the majority of variation in whole-farm profit, but increasing these also increases feed requirements. The production of heavy lambs is therefore a trade-off with maximising stocking and reproductive rate within the pool of available feed resources. We hypothesise that slaughter weight does not increase with mature size, due to the priority to increase stocking and reproductive rate for profit maximisation.

A whole-farm sheep enterprise in Hamilton, Victoria, was simulated from 1965 to 2005 using the AusFarm simulation tool (Moore *et al.* 2007). Model and farm descriptions are reported in Kennedy *et al.* (2011). Optimum profit values were selected from a range of stocking rates (4, 6, 8, 10, 12, 14, 16, 18 ewes per hectare) and reproductive rates (75, 100, 125, 150, 175 lambs per 100 ewes joined). An overlay of four mature sizes (50, 60, 70 and 80kg at condition score 3.0), and four lamb slaughter weights (40, 50, 60 and 70kg live weight) was included.

The optimum slaughter weight for lambs increased from 38 to 59 kg when mature ewe size increased from 50 to 80 kg. The most profitable system for each mature size was achieved at a similar weaning rate, lamb weight per hectare and stocking rate expressed as dry sheep equivalent per hectare (Table 1). However, instead of lamb slaughter weight remaining constant as we hypothesised, the number of ewes per hectare declined as mature size increased. This directly reduced the number of lambs weaned per hectare.

Table 1. Metrics for optimising profit from production systems based on ewes with different mature size

Mature size (kg)	Slaughter weight (kg)	Profit (\$/ha)	Stocking rate		Weaning rate (%)	Lamb number (n/ha)	Lamb weight (kg/ha)
			(Ewes/ha)	(DSE/ha)			
50	38.2	871	11.5	23.3	153	14.8	540
60	46.0	902	9.6	23.1	154	12.4	540
70	50.6	899	9.5	25.5	151	12.1	582
80	59.4	928	7.6	23.7	153	9.9	556

Careful consideration is required when interpreting genetic and management information to ensure the correct prioritisation of the factors that optimise whole-farm profit for different ewe mature sizes.

Moore AD, Holzworth DP, Herrmann NI, Huth NI and Robertson MJ 2007. *Agricultural Systems* **95**, 37–48.

Kennedy AJ, Ferguson MB, Martin GB, Thompson AN, Pannell DJ 2011. *Proc. Ass. Adv. Anim. Breed. Genet.* **19**, 339-342