FEEDING CAMELINA FOR HEAVY LAMB AND HOGGET PRODUCTION: CARCASS TRAITS, COMPOSITION AND MEAT QUALITY

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I. INTRODUCTION

Low feed availability and low nutrient concentrations of feed in hot and dry conditions may lead to loss of body weight due to under-nutrition, which can compromise health and wellbeing of ewes and their progeny. These periods typically occur from November to April in Southern Australia and this influences day-to-day feed consumption, weight gain and body condition. Brassicas often have high lipid concentrations which we hypothesise could improve feed efficiency, animal performance and carcass weight. One brassica that can remain productive under hot and dry conditions is camelina (*Camelina sativa* L. Crantz) [1]. This study investigated the use of camelina forage or meal as a component of dry finishing diets on carcass traits, carcass composition and meat quality of Maternal composite lambs and Merino hoggets produced during hot and dry season in temperate zone of southern Australia.

II. MATERIALS AND METHODS

Eighty Maternal composite wether lambs of 28-38 kg liveweight in 10 pens (n = 8) and 80 Merino wether hoggets of 37-43 kg liveweight in 10 pens (n = 8), were used in a 2 × 3 factorial design experiment with two genetic lines (Composite vs Merino) and three finishing diets (standard diet (STDD), camelina forage diet (CAMF) and camelina meal diet (CAMM)) tested. The metabolisable energy (ME) and crude protein (CP) concentrations of all 3 diets were 10-11 MJ /kg DM and 14-15% CP, respectively. A subset of animals (60) based on sheep type and dietary treatment, i.e., 3 animals from each pen, were slaughtered after 10 weeks of feeding as focal animals for carcass-traits,-composition and meat quality measures.

III. RESULTS AND DISCUSSION

There were no significant diet × genetic line interactions ($P > 0.10$) for any of the reported measures, therefore all results are presented as main effects of diet and genetic line. Despite the liveweight of animals being similar at the commencement of the experiment, at slaughter the liveweight of animals fed the camelina diets were 2-3 kg greater ($P = 0.02$) than the animals fed the STDD. This was reflected in hot carcass weight with CAMF and CAMM being 1-1.5 kg heavier ($P < 0.002$) than STDD (Table 1). Carcass lean percentage (%) reduced ($P < 0.001$) and fat % increased ($P<0.001$) in the sheep fed camelina diets compared with STDD. Diet had no effect ($P > 0.05$) on mineral concentrations of meat (Table 1) or retail colour as assessed by redness of meat (Figure 1A). Composites had higher hot carcass weight ($P = 0.002$) and GR fat ($P = 0.06$), higher ($P < 0.001$) carcass lean % and lower ($P < 0.001$) carcass fat % compared with the Merinos (Table 1). Iron and Zn concentration of meat were higher ($P < 0.001$) for Merino hoggets than composite lambs (Table 1). The current 10-week feeding study produced carcasses of 24 – 25 kg for Camelina diets vs 23 kg for standard diet in average, which was above the range that were observed for several studies conducted in the same state or regions during summer in animals fed with cereal grain based diet [2] or autumn in animals fed with cereal grain and oilseed meal supplements [3]. The slower growth rate with Merino genetics has been reported by others [4] when compared with first- and second-cross lambs of diverse genetics. The effects of the diets containing camelina on liveweight, carcass weight and carcass composition were consistent for the

two contrasting sheep types that varied in genetic line and age, providing a degree of confidence that the findings are applicable to sheep of other genetics and ages.

Table 1: Carcass weight, fatness, carcass composition and meat mineral concentration of Maternal composite (COMP) lambs and Merino hoggets fed camelina meal (CAMM), camelina forage (CAMF) and standard (STDD) diet.

Carcass composition and mineral content	Diet (D)			Breed (B)		SED		*P-value*		
	STDD	CAMF	CAMM	COMP	MERINO	Diet	Breed	Diet	Breed	D X B
Carcass weight (kg)	23.5^{a}	25.1^{b}	24.4^{b}	24.9^{x}	23.6^{y}	0.39	0.33	0.002	0.005	0.18
GR fatness (GR, mm)	13.5	16.0	14.4	15.3	13.7	0.95	0.78	0.058	0.065	0.43
Carcass lean (%)	64.19^{b}	62.13^{a}	62.30^{a}	64.20^{y}	61.81^{x}	0.65	0.54	0.01	0.001	0.67
Carcass fat (%)	34.96^{a}	36.82^{b}	36.84^{b}	34.48^{x}	37.68^{y}	0.92	0.76	0.08	0.001	0.85
Iron (mg/100 g meat)	1.52	1.54	1.60	1.36^{x}	1.75^{y}	0.08	0.06	0.61	0.001	0.19
Zinc (mg/100 g meat)	2.23	2.19	2.37	1.90^{x}	2.63^{y}	0.11	0.09	0.28	0.001	0.48

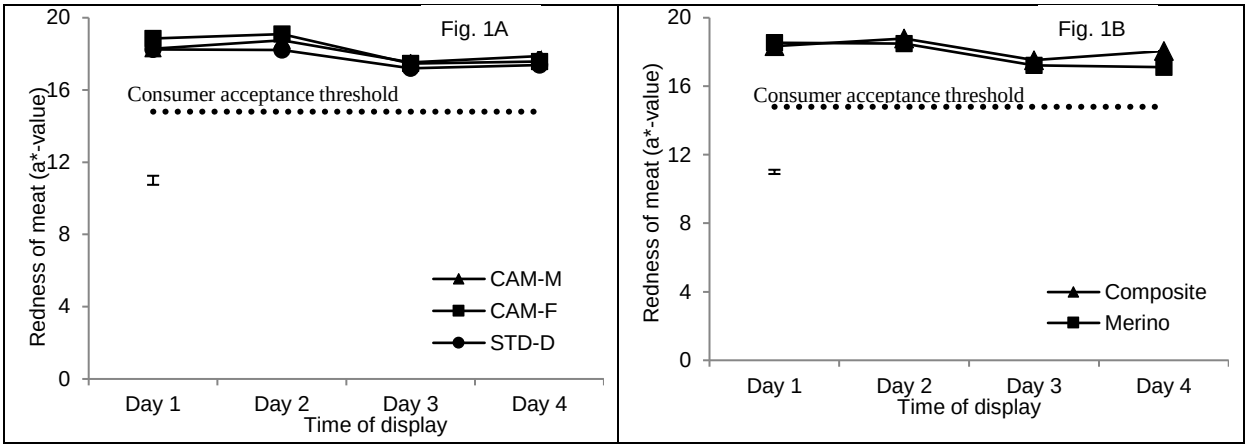

Figure 1. Effect of diet (Fig. 1A) or genetic line (Fig. 1B) on meat colour i.e., redness (a*-value) of muscle *longissimus lumborum* (LL) displayed for 72 hours (1 h, 24 h, 48 h and 72 h display).

IV. CONCLUSION

On average, both Maternal composite lambs and Merino hoggets were able to deliver 'heavy weight' carcasses in the range of 23.5-25.0 kg, while the GR fat score was below 4 (< 20 mm), which is suitable for international markets. The redness of meat obtained for 72 h retail display from all diets and genetics were above the threshold points for consumer acceptance. Diets had no effect on meat mineral concentration.

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