

MERINO LIFETIME PRODUCTIVITY - ECONOMIC VALUE OF MEAT AND WOOL FROM WETHERS AT YEARLING AND ADULT AGE

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SUMMARY

The Merino Lifetime Productivity project is evaluating the lifetime productivity of the ewe progeny of industry sires at five sites around Australia. Additional work at the Pingelly site is evaluating the productivity of the wether progeny. Liveweight, carcass traits and wool production data for wether progeny born in 2016 and 2017 have been collected. This paper presents a preliminary analysis of the value of production of the 2016 and 2017 drop wethers at yearling and adult age. The difference in value of production to 18-22 months of age between the top and bottom ranking sire groups was approximately \$50 per head, excluding differences in mortality between sire groups. In future analyses the wether data will be compared to the productivity of the ewes as well as combined with ewe data to calculate flock profitability so comparisons can be drawn between sires in feed intake and whole-body energy.

INTRODUCTION

The Merino Lifetime Productivity (MLP) project is evaluating the productivity of the ewe progeny of industry sires at several sites around Australia (Ramsay *et al.* 2019). At the Pingelly site an additional project is also evaluating the productivity of the wether progeny. Liveweight, carcass traits and wool production data for wether progeny born in 2016 and 2017 have been collected. This paper presents a preliminary analysis of the value of production of the 2016 and 2017 drop wethers at both yearling (10-12 months) and adult (18-22 months) age.

MATERIALS AND METHODS

Animal measurements. Data were collected on F1 wether progeny born in 2016 (n=363 at weaning) and 2017 (n=600 at weaning) from 29 different Merino sires at the Pingelly MLP site (Ramsay *et al.* 2019). There were 15 sires joined by artificial insemination (AI) each year, with one sire used as a link sire across years. The F1 wethers were assessed for fleece, growth and carcass traits until first adult shearing (2016 drop n=341; 2017 drop n=550).

Analysis. Liveweight (WT), condition score (CS), fleece and carcass traits were analysed for the 2016 and 2017 drop progeny separately using the restricted maximum likelihood method (REML, Genstat, 2018). Birth -type-rear-type (BTRT) and sire, as well as their interaction, were fitted as fixed effects. AI date, dam source (nested within AI date), Dam ID (nested within dam source), and Group (prelambing management group for the 2016 drop) were fitted as random terms. The interaction between BTRT and sire was not significant so was excluded from the model.

Economic analysis. The net value of production per animal was calculated to include value of wool produced and sale value of the animal net of selling costs. Mortality was not included in this analysis. Wool value was calculated for the whole progeny group as if sold as one line of fleece wool. Total wool income per head was calculated using average fibre diameter and other wool quality traits of the individuals in a sire group along with the average weight of wool produced. Total wool weight per animal was estimated from measured fleece weight by allowing for the components measured and assuming fixed proportions of fleece (79%), pieces (8%), bellies (8%), stains (1%) and locks

(4%, half board and half table). Nine to ten month measured fleece weight (which excluded belly wool, stains & board locks) was scaled by 112% and adult shearing (which excluded stains and board locks) was scaled by 103%. Prices were calculated to represent the whole clip, “net sweep the floor” for all wool from a flock. The price is net of the cost of selling, wool tax and freight to store. Fleece prices (17 μ 2775c/kg clean, 18 μ 2450c/kg, 19 μ 2305c/kg) and staple strength discounts were based on Fremantle Sale 50 (15 June 2018).

Individual animal value at 10 months of age assumed the top group of animals were sold as prime lamb, the next group as lamb sold into the airfreight market (bag lamb) and the remaining animals as store lambs. Each group was sold on a c/kg dressed weight basis assuming that the dressing percentage was 46%. The top 40% of the entire drop of lambs were valued as prime lambs (\$6.27/kg), 30% as air freight lambs (\$5.91/kg) and the remaining 30% as store lambs (\$4.29/kg). Measured WT, CS and ultrasound fat depth (FAT) was used to allocate individual lambs in each sire group into each category. The prime lamb was the animals with the combination of high WT and FAT. The store lamb was those with the lowest CS. Dividing the entire drop into the 3 groups results in a different average sale price per kg for each sire group based on WT, CS and FAT. Meat prices were based on MLA Prices & Markets Statistics for the week ending Tuesday, June 12, 2018 for WA. Merino lamb (16-22kg) was used to price the animals classed as Prime Lamb, Light Lamb (12-18kg) was used to price the air freight lamb and restocker (0-18kg) was used to price store lamb. The animal value at older ages was based on estimates by Nathan King (pers. comm.) for live shipping trade wethers. The lightest 2% of the entire wether group were classed as unsuitable for export and then the export price grid was applied to all remaining animals. Both wool & meat values are based on spot prices for the market conditions in mid 2018, in subsequent analyses evaluating prices for a broader range of scenarios is justified.

RESULTS AND DISCUSSION

Adjusted sire means for wool and weight traits are given in Tables 1 and 2. There are significant sire differences for all of these traits at both ages.

Table 1. Adjusted sire means for clean fleece weight (CFW), fibre diameter (FD), staple strength (SS), liveweight (WT) and condition score (CS) at postweaning (PW) yearling (Y) and adult (A) age of 2016 born wethers at Pingelly (highlighted cells are trait leaders)

Sire	PWCFW (kg)	ACFW (kg)	PWFD (μ m)	AFD (μ m)	PWSS (N/ktex)	ASS (N/Ktex)	YWT (kg)	AWT (kg)	YCS	ACS
Sire 1	2.0	3.9	16.9	16.8	36.3	23.3	43.3	55.0	2.77	2.91
Sire 2	2.0	3.9	16.2	15.7	30.9	20.1	41.7	55.4	2.67	2.89
Sire 3	1.9	3.6	17.7	17.6	35.7	22	42.3	52.0	2.93	2.91
Sire 4	2.2	4.1	16.7	16.7	35.5	22.5	44.2	57.1	2.90	3.07
Sire 5	2.0	4.0	17.1	17.8	41.3	28.6	46.0	60.0	3.08	3.20
Sire 6	1.9	3.7	17.3	17.3	36.1	22.4	43.1	56.0	2.87	2.99
Sire 7	2.0	3.6	16.6	16.2	39.8	23.5	43.9	54.6	2.82	2.92
Sire 8	2.3	4.2	18.8	19.2	44.8	29.5	45.4	58.4	2.85	2.99
Sire 9	2.1	3.9	16.8	16.6	37.7	25	42.5	52.9	2.75	2.83
Sire 10	2.2	4.2	17.0	16.9	41.5	21.2	42.6	56.4	3.03	3.24
Sire 11	1.7	3.5	16.2	16.2	38	23.1	42.3	54.5	3.00	3.16
Sire 12	2.0	3.7	16.1	15.9	33.3	18.7	43.7	57.4	2.82	3.03
Sire 13	2.1	4.2	16.8	17.2	36	24.1	43.9	58.0	2.89	3.07
Sire 14	2.0	4.0	16.8	16.9	33	21.2	43.7	58.1	2.69	2.93
Sire 15	2.0	4.0	17.3	17.5	38	27.5	45.1	60.4	2.80	3.01
<i>P value</i>	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01
LSD	0.19	0.37	0.72	0.8	2.18	2.27	2.77	3.57	0.16	0.20

Table 2. Adjusted sire means for clean fleece weight (CFW), fibre diameter (FD), staple strength (SS), liveweight (WT) and condition score (CS) at yearling (Y) hogget (H) and adult (A) age of 2017 born wethers at Pingelly (highlighted cells are trait leaders)

Sire	YCFW (kg)	HCFW (kg)	YFD (um)	HFD (um)	YSS (N/ Ktex)	HSS (N/ Ktex)	YWT	AWT	YCS	ACS
Sire 1	2.3	2.9	15.6	17.8	27.9	33.4	38.3	55.8	2.95	3.10
Sire 2	2.3	2.6	17.1	19.4	30.5	41.6	44.6	62.6	3.12	3.25
Sire 3	2.3	2.8	16.5	18.8	27.3	35.2	40.1	54.0	3.03	3.07
Sire 4	2.4	2.9	16.3	18.7	24.4	37.3	41.4	54.6	2.97	2.97
Sire 5	2.3	2.9	15.8	17.9	27.5	39.7	44.7	59.9	2.99	3.13
Sire 6	2.4	2.7	16.6	18.7	25.9	37.2	42.3	55.9	3.21	3.22
Sire 7	2.3	2.6	16.2	18.6	24.7	37.6	42.0	57.1	3.16	3.24
Sire 8	2.2	2.4	16.4	18.6	26.1	33.8	43.8	59.3	3.18	3.19
Sire 9	2.3	2.7	16.3	18.3	27.2	38.3	40.1	55.1	2.92	2.95
Sire 10	2.4	2.9	16.3	18.7	31.2	39.4	39.1	55.5	2.80	2.98
Sire 11	2.3	2.7	16.2	18.6	27.3	36.8	39.5	53.2	3.00	2.98
Sire 12	2.3	2.7	16.5	19.1	29.0	37.6	42.8	60.5	3.04	3.18
Sire 13	2.4	2.7	16.7	18.6	26.8	38.7	42.8	57.2	3.00	3.06
Sire 14	2.5	2.9	15.5	18.3	24.9	40.4	41.6	55.8	3.13	3.02
Sire 15	2.3	2.7	16.1	18.6	29.7	43.0	41.9	57.2	3.02	3.11
<i>P value</i>	<0.01	<0.001	<0.001	<0.001	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001
LSD	0.2	0.23	0.94	1.16	4.76	5.37	2.68	3.48	0.13	0.13

Economic analysis of the production data (Table 3) shows that, for the 2016 drop wethers, the variation in net value of production was \$43.59 at 10 months, and \$39.75 at 22 months. Similarly, the variation in net value of production for the 2017 drop (Table 4) was \$50.22 at 10 months and \$32.27 at 18 months. The re-ranking of sires at 10 versus 18-22 months in combined value of production justifies further analysis of impact of flock structure (turn off age of wethers) on profit.

Table 3. Value of production of 2016 born wethers if sold at 10 and 18 months (highlighted cells are trait leaders). Wool value at 22 months includes wool value at 10mo and 22mo

Sire	Wethers sold at 10 months					Wethers sold at 22 months			
	Wool Value	Sale Value	Proportion in category (%)			Combined	Wool Value ¹	Sale Value	Combined ¹
	\$/hd	\$/hd	Prime	Air Freight	Store	\$/hd	\$/hd	\$/hd	\$/hd
Sire 1	54.24	85.37	0%	28%	72%	139.61	151.30	117.72	269.02
Sire 2	58.54	74.38	0%	4%	96%	132.92	168.18	117.72	285.89
Sire 3	46.95	106.14	30%	70%	0%	153.08	128.43	117.72	246.14
Sire 4	61.05	115.46	74%	26%	0%	176.51	164.25	117.72	281.96
Sire 5	53.25	120.73	91%	9%	0%	173.98	142.19	117.72	259.91
Sire 6	49.22	108.52	40%	56%	4%	157.74	136.02	117.72	253.73
Sire 7	56.37	108.32	54%	31%	14%	164.69	152.45	107.97	260.42
Sire 8	52.95	116.16	83%	11%	6%	169.11	138.98	117.72	256.70
Sire 9	57.71	78.69	10%	0%	90%	136.40	157.25	117.72	274.97
Sire 10	59.23	107.71	33%	67%	0%	166.94	162.30	117.72	280.02
Sire 11	50.06	108.15	48%	52%	0%	158.21	143.44	117.72	261.15
Sire 12	59.31	104.45	43%	30%	26%	163.76	160.99	117.72	278.70
Sire 13	57.62	115.91	80%	20%	0%	173.53	157.44	117.72	275.16
Sire 14	54.73	83.45	0%	17%	83%	138.18	152.89	117.72	270.61
Sire 15	51.90	100.03	23%	35%	42%	151.94	144.03	117.72	261.74
Average	54.87	102.23	41%	30%	29%	157.11	150.68	117.07	267.74

Table 4. Value of production of 2017 born wethers if sold at 10 and 18 months (highlighted cells are trait leaders)

Sire	Animals sold at 10 months						Animals sold at 18 months		
	Wool Value	Sale Value	Proportion in category (%)			Combined	Wool Value ¹	Sale Value	Combined ¹
	\$/hd	\$/hd	Prime	Air Freight	Store	\$/hd	\$/hd	\$/hd	
Sire 1	72.99	73.98	0%	0%	100%	146.97	138.48	117.49	255.98
Sire 2	60.32	120.53	100%	0%	0%	180.86	115.01	117.72	232.72
Sire 3	64.64	100.54	0%	100%	0%	165.18	122.58	114.52	237.10
Sire 4	69.62	86.43	37%	0%	63%	156.05	129.77	116.71	246.48
Sire 5	69.32	116.76	95%	5%	0%	186.08	132.57	117.72	250.28
Sire 6	68.21	111.85	76%	24%	0%	180.06	125.84	117.59	243.44
Sire 7	66.51	108.90	57%	43%	0%	175.41	120.65	117.43	238.08
Sire 8	61.91	117.25	100%	0%	0%	179.16	112.54	117.72	230.25
Sire 9	70.08	71.91	0%	0%	100%	141.98	130.77	114.67	245.45
Sire 10	66.62	69.77	0%	0%	100%	136.39	125.24	116.66	241.89
Sire 11	67.89	85.14	0%	53%	47%	153.03	125.92	102.56	228.48
Sire 12	64.58	107.75	50%	50%	0%	172.33	121.33	117.72	239.05
Sire 13	65.57	112.84	92%	0%	8%	178.41	123.36	117.70	241.06
Sire 14	79.70	106.91	24%	76%	0%	186.61	143.52	117.23	260.75
Sire 15	66.44	107.74	69%	20%	11%	174.18	124.34	117.46	241.81
Average	67.63	99.89	47%	25%	29%	167.51	126.13	116.06	242.19

¹ Value includes wool value at 10mo and 18mo.

CONCLUSIONS

This preliminary analysis of MLP wether data, showing significant variation in production value, will contribute to a whole-flock profit per hectare analysis of MLP groups at the Pingelly site. The accuracy of this evaluation will be improved from using measured data from the wethers rather than inferred from ewe production. Together with data on ewe production and reproductive performance, and knowledge of sire group differences in mortality, feed intake and whole-body energy from additional projects linked to MLP Pingelly, this data will contribute to a more consistent and technically rigorous system for calculating profit per hectare for MLP and other bloodline comparisons.

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