To wether – short scrotum or leave lambs as entire rams? Revisiting an old question using new genetics

P.L. JOHNSON[1,2], P.R. KENYON[1], D.L. BURNHAM[1] and D.M. WEST[1]

[1]Institute of Veterinary, Animal and Biomedical Sciences, Massey University, Palmerston North, New Zealand

ABSTRACT

A comparison of wethers (WTH), short scrotum (SSC) and rams (RAM) was made on 552 7/16 Romney, 3/16 Poll Dorset, 3/16 Texel and 3/16 East Friesian lambs. Lambs were drafted for slaughter using commercial criteria on weight and condition score at weaning (D81), D120, D154 and D192. Due to faster growth rates, by the end of the 2nd kill (D120) approximately 31% of RAM and SSC lambs were slaughtered compared with 16% of WTH lambs ($P<0.01$), although the difference was no longer significant by the end of the 4th kill. The carcass weight of WTH (17.6kg) was significantly heavier ($P<0.01$) than the RAM (17.2kg) but not significantly different to the SSC (17.5kg), despite similar kill liveweights, due to the increased dressing out percentages of the WTH lambs (43.6%, 43.1% and 42.5% respectively; $P<0.05$). Based on GR, 8.7% of WTH carcasses graded overfat, compared with only 0.6% of RAM and SSC carcasses ($P<0.001$). Over the kill period the price schedule ($/kg carcass weight) dropped, so for the WTH given their longer time to slaughter and poorer grading due to over fat carcasses the price for WTH carcasses ($49.16) was lower ($P<0.01$) than RAM or SSC carcasses ($50.37 and $50.70). When the added cost of feeding and drenching was taken into consideration, the net value of the WTH was even less. Composite wether lambs of still potentially present an opportunity cost, except in certain situations where the management benefits outweigh the direct financial cost.

Keywords: Ram; short scrotum; wether; growth rates; carcass; lamb.

INTRODUCTION

An on farm management decision made every docking is whether to leave ram lambs entire, to castrate them (wether lambs) or to push the testes within the body cavity and remove most of the scrotum (short scrotum lambs sometimes known as cryptorchids). For some farmers this decision is based on the management ease of not having ram lambs (less crutching required, reduced ram behaviour and pregnancy risk). For other farmers the decision is based on economics. Tarbotton *et al.* (2002) showed a lack of farmer knowledge on the relative growth rates of ram versus short scrotum lambs and how the different groups of lambs grade. Wethers are slower growing, lay down more fat, but have higher dressing out percentages (Lee *et al.*, 1990; Probert & Davies, 1986; Young & Dolling, 1972).

Over the past 15 years the New Zealand lamb industry has undergone significant changes with an overall increase in carcass weight and a decrease in carcass fatness through both changes in ewe and sire genotypes, and selection within the more traditional genotypes.

The purpose of this study was to re-evaluate different male types in composite type lambs reared under commercial New Zealand conditions, for growth rate, slaughter pattern, carcass characteristics and net value.

MATERIALS AND METHODS

Animals

Five hundred and fifty two ram lambs born as twins to 5/8 Romney 1/8 Poll Dorset 1/8 Texel 1/8 East Friesian, two-tooth ewes mated to the same ¼ Romney ¼ Poll Dorset ¼ Texel ¼ East Friesian composite bred rams run on a commercial hill country property near Taihape, Northern Rangitikei, New Zealand. The pasture grazed by the lambs was classified as a hill country ryegrass/white clover predominant pasture with some brown top in it. At docking (18 October 2005, D1 when lambs were five weeks old) lambs from each paddock were randomly allocated to one of three treatment groups: entire ram lambs (RAM; n=185), create wether lambs (WTH; n=186), or create short scrotum lambs (SSC; n=181). Lambs were weaned on January 4th 2006 (D81) and run as one mob. Liveweights were recorded at D1, D81, D120, D154 and D192. Note that at D192 only lambs destined for slaughter were weighed, meaning that liveweights for lambs still alive, but that did not reach the slaughter criteria were not available for D192. Lambs were drafted for slaughter based on visual assessment of live weight with a target liveweight of at least 36kg at the last

[2]AgResearch, Invermay Agricultural Centre, Mosgiel, New Zealand

four dates and slaughter was within five days of weighing. Lambs were trucked for approximately 2 hours to a commercial abattoir, held overnight and killed the following morning. Hot carcass weight, GR tissue depth and grade were recorded with grade being determined based on the carcass weight and GR of the lambs (New Zealand Meat Classification Authority, 2003).

Costings

The value of each lamb carcass was estimated using the schedule price per kg for each of the different grades multiplied by the carcass weight of the lambs (supplied by Con Williams, Meat & Wool New Zealand Ltd, Economic Service).

The cost of the extra time involved at docking for WTHS and SSC was assumed to be nine cents per lamb. The extra feed costs were estimated using the ME requirements of growing lambs at pasture (Geenty & Rattray, 1987) For the purpose of calculating intake it is assumed that the ME content of the pasture was 10.5 MJ ME/kg DM and the cost 8cents/kg DM. The fixed costs per lamb were assumed to be 30 cents/drench for every drench. These extra costs were deducted from the carcass value to provide a net value of the carcass.

Data Analysis

Lamb growth rates between each measurement period, final liveweight of lambs prior to slaughter, carcass weight, dressing out percentage, GR, value of the lamb carcass, extra costs incurred and net value were analysed using the General Linear Model procedure in SAS (2005) with paddock fitted as a fixed effect and previous liveweight fitted as a covariate as appropriate. Additional models were fitted for the carcass traits including carcass weight as a covariate was fitted, however, the results were not different and these results are not reported. The D154-D192 growth rates were not analysed as D192 weight was only measured on lambs that were slaughtered. Additional models were fitted for the growth rate data that did not include fitting previous liveweight as a covariate, however, the results did not and these results are not reported.

The proportion of lambs sent for slaughter at each time point and within carcass grades was analysed using the Frequency procedure in SAS, using the chi-squared and risk difference options.

RESULTS

Random allocation of lambs to the three male groups at docking was effective, with no significant difference in the docking weights of the three groups (P=0.35).

Of the 563 lambs present at the start of the study only 456 lambs met the slaughter criteria and were slaughtered as part of the trial, with the remaining 107 kept on farm for the winter by the farmer, with no further data collected on these animals.

Wether lambs were significantly slower growing for the first three time periods when all alive lambs were weighed (Table 1). There were no significant differences between the growth rates of the RAM and SSC.

Table 1: Least squares means (± SE) for growth rates (g/d) of ram, short scrotum and wether lambs.[1][2][3]

Time Period (number measured)	Ram	Short Scrotum	Wether
D1-D81 (552)	224 ± 3.3[a]	216 ± 3.3[a]	207 ± 3.3[b]
D81-D120 (438)	147 ± 4.1[a]	156 ± 4.1[a]	135 ± 3.9[b]
D120-D154 (365)	159 ± 4.7[a]	159 ± 4.7[a]	133 ± 4.1[b]

[1]D1 was docking, note that at D81 and D120 lambs were drafted for slaughter, therefore the number of lambs included in subsequent analyses was lower
[2]Means within rows with different superscripts differ (P<0.05)
[3]Growth rates were adjusted for differences in weight at the start of each period

Significantly more RAM and SSC had been slaughtered by end of the first, second and third kills, than WTH (Table 2). By the end of the fourth kill there were no significant differences in the number of lambs killed from each group.

Table 2: The cumulative percentage (%) of either ram, short scrotum or wether lambs sent for slaughter at D81, 120, D154 and D192 (mean with 95% confidence interval).[1]

	Ram	Short Scrotum	Wether
n	185	181	186
D81	14.4 (9.4–19.5)[b]	13.4 (8.5–18.3)[b]	5.8 (2.5–9.1)[a]
D120	32.8 (26.6–39.7)[b]	30.7 (24.0–37.3)[b]	15.5 (10.6–21.0)[a]
D154	70.6 (64.1–77.1)[b]	6.9 (70.8–82.9)[b]	57.0 (50.3–64.4)[a]
D192	84.3 (79.1–89.6)	84.5 (79.2–89.6)	79.3 (73.7–85.2)

[1]Percentages within rows with different superscripts differ (P<0.05)

The carcass weights of the WTH and SSC were significantly heavier than the RAM due to the higher dressing out percentages of the WTH and SSC lambs. The carcasses of the WTH were significantly fatter than the RAM and SSC (Table 3) and more WTH graded overfat (Table 4).

The average price per kilogram of carcass received for the WTH was lower (Table 5) and decline further when net value was examined relative to the other two groups. There were no differences in the value and costs of the RAM and SSC.

Table 3: Least squares means for carcass traits and carcass values of ram, short scrotum and wether lambs (mean ± SE).[1]

	Ram	Short Scrotum	Wether
Carcass Traits			
Liveweight prior to slaughter (kg)	40.5 ± 0.2	40.5 ± 0.2	40.3 ± 0.2
Carcass weight (kg)	17.2 ± 0.1[a]	17.5 ± 0.1[b]	17.6 ± 0.1[b]
Dressing Out Percentage (%)	42.5 ± 0.2[a]	43.1 ± 0.2[a]	43.6 ± 0.2[b]
GR (mm)	5.6 ± 0.2[a]	5.5 ± 0.2[a]	6.7 ± 0.2[b]
Carcass Value			
Price per kg carcass weight ($)	2.94 ± 0.02[a]	2.91 ± 0.02[a]	2.80 ± 0.02[b]
Value of carcass ($)[2]	50.37 ± 0.31[a]	50.70 ± 0.31[a]	49.16 ± 0.31[b]
Post weaning costs ($)[3]	7.55 ± 0.32[a]	7.62 ± 0.32[a]	9.10 ± 0.32[b]
Net value of carcass($)[4]	42.84 ± 0.57[a]	43.17 ± 0.56[a]	39.95 ± 0.58[b]

[1]Means within rows with different superscripts differ (P<0.05)
[2] Based on carcass weight and GR, using schedule prices at time of slaughter
[3]Based on the estimated extra pasture consumed post weaning and fixed costs of drench costs for every additional period the lambs were on the property
[4]Value of carcass minus additional costs post incurred post weaning

Table 4: Percentage (Mean with 95% Confidence Interval) of lambs falling into the New Zealand Meat and Wool Classification Authority Grades (2003).[1]

Grade	Weight (kg)	Fat (mm)	Ram	Short Scrotum	Wether
YM	13.3 – 17.0	< 7	34.9 (27.3 – 42.4)	33.8 (26.4 – 41.2)	24.7 (17.8 – 31.6)
YX	> 17.1	7 – 9	46.1 (38.1 – 54.0)	51.0 (43.1 – 58.8)	50.0 (42.0 – 58.0)
PM	13.0 – 17.1	7 – 12	13.2 (7.8 – 18.5)	10.8 (6.0 – 15.7)	8.7 (4.2 – 13.2)
PX	17.0 – 21.0	9 – 12	4.6 (1.3 – 7.9)	3.8 (0.8 – 6.8)	7.3 (3.2 – 11.5)
TM	13.3 – 17.1	12 – 15	0.1 (0.0 – 1.9)	0	0
TH	> 17.1	12 – 15	0[a]	0[a]	5.3 (1.7 – 8.9)[b]
FM	13.3 – 17.1	> 15	0	0	0.1 (0.0 – 2.0)
FH	> 17.1	> 15	0[a]	0.1[ab]	2.7 (0.1 – 5.2)[b]
Overfat[2]			0.1 (0.0 – 1.9)[a]	0.1[a]	8.7 (4.2 – 13.2)[b]

[1]Means within rows with different superscripts differ (P<0.05)
[2]Overfat are grades starting with T or F

DISCUSSION

Overall, the growth rates of the lambs are comparable to other reports on hill country properties (Litherland & Lambert, 2000). The lower proportion of WTH lambs killed over the first three kills was directly related to their slower growth rates. Although data was not available for all live animals from D154-D192, it can be inferred that the growth rate of the WTH was higher, relative to the RAM and SSC, given there was no significant difference in the proportion of lambs slaughtered from each group by the end of the fourth kill. Other studies have showed continued significant growth rates differences between ram and wether lambs over longer periods than in this study (Lee *et al.*, 1990; Probert & Davies, 1986), why this did not occur for the final period in this study is unclear, one possible reason is that only poorer RAM and SSC were left which did not have the same potential for growth. Using improved breeds/composites that are either genetically leaner or have undergone selection for reduced fat, it was hypothesised that the overall fat production across the groups may be less and that overfatness may be less of a problem in composite WTH, however, this was not the case with over 8% of the WTH graded overfat.

During the period of the kill season the value per kilogram of carcass weight decreased through till late April and optimum returns at any time are achieved for carcasses of moderate to heavy weight with low to medium fat covers so the overfatness and the time taken to reach slaughter weight resulted in poorer returns from WTH. It is common practice for all lambs to be kept until weaning, with the only differential price between the groups to that point being the additional cost at docking for creating the WTH and SSC. However, for every lamb that is not sent for slaughter at weaning there are direct costs of drenching the lambs and the opportunity costs associated with the feed that could be otherwise used for other purposes (finishing store brought lambs or grazing other classes of livestock). Thus because the WTH were on the property longer, on average, their associated costs were higher. There were no differences in the costs for the RAM and SSC, despite the slight increase in costs associated with the SSC at docking. Further modelling is required to estimate what the impact of slaughtering WTH lambs at a lighter weight, before they become

overfat, would be.

Based on these results then it would appear that there is no difference between RAM and SSC for any of the growth, carcass and value traits considered, and therefore using SSC will not compromise the profitability of the lamb finishing system. Wethers are less profitable and therefore should only be used where management issues outweigh the financial difference.

ACKNOWLEDGEMENTS

The authors wishes to acknowledge the help of Paul Hughes of Taihape Veterinary Services, the team at Kaiongaroa Farms for their help with sourcing the animals for this trial.

REFERENCES

Geenty, K.G.; Rattray, P.V. 1987: The energy requirements of grazing sheep and cattle, Christchurch, New Zealand, New Zealand Society of Animal Production.

Lee, G.J.; Harris, D.C.; Ferguson, B.D.; Jelbart, R.A. 1990: Growth and carcass fatness of ewe, wether, ram and cryptorchid crossbred lambs reared at pasture: effects of weaning age. *Australian Journal of Experimental Agriculture* **30**: 743-747.

Litherland, A.J.; Lambert, M.G. 2000: Herbage quality and growth rate of single and twin lambs at foot. *Proceedings of the New Zealand Society of Animal Production* **60**: 55-57.

New Zealand Meat Classification Authority 2003: New Zealand meat guide to lamb and mutton carcass classification.

Probert, A.D.; Davies, A.S. 1986: A study of short scrotum, castrated and entire ram lambs. *Proceedings of the New Zealand Society of Animal Production* **46**: 55-58.

SAS 2005: SAS 8.02, SAS Inst. Inc.

Tarbotton, I.S.; Bray, A.R.; Wilson, J. A. 2002: Incidence and perception of cryptorchid lambs in 2000. *Proceedings of the New Zealand Society of Animal Production* **62**: 334-336.

Young, R.S.; Dolling, C.H.S. 1972: Effects of induced cryptorchidism on lamb weaning and carcass weights. *Australian Journal of Experimental Agriculture and Animal Husbandry* **12**: 600-603.