Meat Production from Fallow Deer

G. W. Asher

Ruakura Animal Research Station, Ministry of Agriculture and Fisheries, Hamilton, New Zealand

Abstract

Sixty-four fallow bucks (*Dama dama*), 1.2 – 4.2 + years old, were slaughtered in January 1982. Liveweights and slaughter/carcass component weights, obtained during processing at a commercial deer slaughter premises, are presented in relation to age. Fat trimmed off carcasses increased significantly as age and weight increased, resulting in significant decreases in the trimmed yields (83.6% and 74.9% for 1.2- and 4.2+- year-olds respectively).

Keywords: Dama dama, *carcass composition, slaughter, fatness*

Introduction

Farming of fallow deer *(Dama dama)* in New Zealand is heavily reliant on the production of high-quality and high-priced venison, as velvet production does not add significantly to the overall annual income.

Slaughtering of male fallow deer in export licensed deer slaughter premises (DSP) started in New Zealand in 1982. Difficulties in handling bucks retaining vestiges of hard antler have restricted the slaughtering season to late spring/summer (November – February). This period coincides not only with the growth of velvet antler but also with increased fat deposition in mature bucks. Consequently batches of over-fat animals have been processed with surplus fat having to be trimmed from the carcasses to provide primal cuts acceptable to particular markets. This represents an additional processing cost and wastage of animal tissue at the expense of the farmer.

This paper describes aspects of fat wastage and salable yields of mixed-age fallow bucks slaughtered in summer.

Methods

Slaughter details

Sixty-four mixed-age fallow bucks were weighed off feed and transported 200 km by road to a commercial DSP. After being held off feed for a total of 12 – 18 hours they were stunned with a captive bolt pistol, and dead weight was recorded prior to bleeding. All components except blood were weighed.

Carcasses were cooled at 10°C for 24 hours before further processing at the adjacent game packing house. Weights of the cold carcass primal cuts and kidney fat were recorded prior to trimming of subcutaneous and intermuscular fat. Bone was then removed from the neck and rib flap portions and weighed. The *trimmed yield* is defined as the untrimmed yield minus the fat trimmed from the primal cuts.

Biometrics

Data were analysed by least squares to investigate the relationships, by age group, of starved liveweight to slaughter component proportions, and of cold carcass weight to carcass/wastage component proportions. Logarithmic transformation did not reduce the heterogeneity due to age group, particularly considering the 1.2-year-olds *versus* the rest. Results are presented as actual means together with standard deviations.

Results and Discussion

Liveweights and weights of components at slaughter are presented in Table 1 with the weights prior to and after boning and trimming in Table 2. There was a consistent loss in body weight averaging 7.4%, through withholding from feed overnight. The difference between the dead weight and the sum of the components was mainly blood and averaged 6.6%. The carcass weight loss after cooling averaged 1.7%.

In addition to absolute means, component proportions were examined by least squares analyses adjusting for either starved liveweight (slaughter components) or cold carcass weight (carcass and wastage components). None of the components maintained the same proportion with increasing age group.

Table 1: Mean liveweight (kg ± s.d.) and weights at slaughter

Age group (years):	1.2	2.2	3.2	4.2 +
No.	8	14	12	30
Liveweight	49.8 (1.5)	57.5 (4.5)	63.3 (5.1)	70.6 (7.0)
Dead weight[1]	46.3 (1.1)	52.8 (3.8)	59.1 (4.3)	65.8 (6.4)
Head (skinned)	2.03 (0.07)	2.31 (0.15)	2.46 (0.13)	2.58 (0.15)
Feet	1.18 (0.04)	1.23 (0.04)	1.23 (0.07)	1.31 (0.08)
Liver	0.82 (0.04)	0.88 (0.06)	0.89 (0.06)	1.05 (0.15)
Lungs	0.75 (0.04)	0.94 (0.09)	1.01 (0.11)	1.00 (0.15)
Gut and contents	6.54 (0.47)	6.61 (0.59)	7.85 (0.53)	8.62 (0.94)
Hide	2.73 (0.09)	3.32 (0.29)	3.84 (0.31)	4.17 (0.53)
Penis and testes	0.39 (0.03)	0.43 (0.05)	0.49 (0.05)	0.55 (0.08)
Hot carcass	28.1 (0.66)	33.6 (2.72)	37.0 (3.36)	41.7 (4.84)

[1] Equivalent to fasted liveweight

Of the slaughter components only the proportions of the hide, pizzle, and hot carcass ($P<0.05$) increased with starved liveweights. The 4.2 + -year-old bucks had the heaviest hot carcasses for a standard starved liveweight; however, the latter also had significantly lower ($P<0.001$) weights for gut and contents.

Of the untrimmed and bone-in carcass components, the proportions of the neck and rib flaps increased with increasing cold carcass weight (Table 2). However, the neck cut showed a highly significant ($P<0.001$) age-group effect, with 1.2-year-old bucks having a markedly lower proportion than other age groups at a standard carcass weight. A similar situation was noted for red deer stags (Drew and Greer 1977) and is probably brought about by muscular changes during the first rut. The increasing proportion for the rib flaps was probably the result of an increase in intermuscular fat with carcass weight.

The proportions of the shoulders, saddle, and hind legs decreased with carcass weight, but individually none showed significant age-group effects. The overall proportions of these components were similar to those for 2-year-old r stag carcasses (Drew and Greer 1977; Drew 1981

Trimming subcutaneous and intermuscular f from the primal cuts was considered necessary f most carcasses. The 2 resultant weights, fat tri and trimmed yield (Table 2), both showe significant ($P<0.001$) and opposite age-grou effects for their proportions of cold carcass weigh Successively increasing age groups yielde proportionally more trim fat and less trimmed yie (carton weight) for a standard cold carcass weigh Consequently, the trimmed yield relative to co carcass weight ranged from 0.836 for 1.2-year-ol down to 0.749 for 4.2 + -year-olds (Table 3). Mo of the difference can be explained by the increa in fat trim.

The overall trimmed yield relative to starv liveweight (Table 3) slightly favoured 2.2- ov 1.2-year-old bucks, but the difference betwe actual trimmed yields (Table 2) for the 2 age grou was small (3.9 kg) for the 12 months difference grazing. However, it is possible that the 1.2-yea old bucks were heavier than would normally expected for bucks of this age. In this respect, buc

Table 2: Mean weights (kg ± s.d.) of cold carcass components

Age group (years):	1.2	2.2	3.2	4.2 +
Cold carcass	27.7 (0.70)	33.1 (2.68)	36.3 (3.10)	40.9 (4.73)
Cuts				
Shoulders	4.69 (0.16)	5.62 (0.40)	6.06 (0.47)	6.76 (0.79)
Hind legs	11.10 (0.32)	12.89 (0.89)	13.74 (1.14)	15.06 (1.40)
Saddle	3.99 (0.10)	4.75 (0.36)	4.96 (0.34)	5.58 (0.65)
Neck	3.17 (0.07)	4.05 (0.30)	4.44 (0.44)	5.09 (0.61)
Rib flaps	4.32 (0.33)	5.26 (0.74)	5.98 (0.93)	7.12 (1.37)
Waste				
Kidney fat	0.30 (0.09)	0.33 (0.14)	0.41 (0.20)	0.57 (0.23)
Bone (neck and flaps)	2.50 (0.06)	3.05 (0.10)	3.17 (0.23)	3.48 (0.31)
Fat trim	1.30 (0.35)	2.11 (1.20)	3.27 (1.55)	4.91 (2.12)
Total	4.10 (0.42)	5.49 (1.36)	6.85 (1.86)	8.96 (2.45)
Trimmed yield	23.2 (0.62)	27.1 (1.41)	28.2 (1.29)	30.6 (2.30)

Table 3: Summary of yield data

Age groups (years):	1.2	2.2	3.2	4.2 +
Cold carcass/dead weight	0.599	0.627	0.613	0.622
Trimmed yield/dead weight	0.500	0.512	0.477	0.467
Trimmed yield/cold carcass	0.836	0.817	0.777	0.749

of the same age on other farms in 1982 ranged from 38 kg to 44 kg compared with 50 kg for the sampled farm. Such a liveweight difference would have influenced the absolute yield. Consequently decisions on slaughter age should take into account potential growth after the first year, as well as possible loss through fat trim in older bucks.

The grazing of bucks beyond about 2 years of age appears unwarranted other than for sires. Cull sires (represented by the 3.2 and 4.2 + age groups) presented a problem in terms of "over-fatness". The loss in overall trimmed yield, the reduced aesthetic appeal of excessively trimmed primal cuts, and the additional processing costs incurred were undesirable aspects of the operation to both the processor and the farmer.

Further studies on carcass production from fallow deer not only need to optimise per hectare production but should also investigate methods of reducing aggressive behaviour during yarding. It may then be possible to extend the killing season perhaps leading to an increased carton weight and a reduced fat trim, if the animals could be slaughtered in winter when fat reserves are lowest.

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References

Drew K R 1981: Meat production from deer. *Proc. N.Z. Deer Farmers Ann. Conf. No. 6:* 11 – 15.

Drew K R and G J Greer 1977: Venison production and carcass composition of red deer. *N.Z. Agric. Sci. 11:* 187 – 189.