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Venison as a game product has a well earned reputation for leanness or for having a low fat content. It is most important that as New Zealand develops a game meat product from our deer farms the essential feature of leanness is retained. But we need to ask the question "how fat is overfat"? In order to answer this question adequately we need to know both how to measure and record carcass fatness and how to assess consumer tolerance to fat in venison. We will concentrate on the former and cover some other aspects of venison production from stags.

LIVEWEIGHT, CARCASS WEIGHT AND DRESSING %

The deer has a very seasonal growth pattern in that almost all the useful weight gain occurs in the spring and summer months. For meat production from young animals (up to 2 years of age) these growth events clearly indicate that slaughter should be at the end of summer. Table 1 indicates the proportion of live weight which is carcass from red deer stags at several ages, from 2 year old N.Z. Wapiti type bulls and hybrid males.

TABLE 1Liveweight, carcass weight and dressing % from stags

	Summer liveweight (kg)	Carcass weight (kg)	Dressing % (<u>Cold carcass wt</u> unfasted liveweight)
RED DEER			
Yearlings	96	55	57.3
2 years	133	77	58.2
3 years	166	100	59.9
4 years	185	111	59.9
WAPITI/RED HYBRID			
2 years	165	91	55.1
N.Z. WAPITI TYPE			
2 years	189	97	51.3

- Points to note:
- * Dressing % increases with age.
 - * The figures given allow nothing for carcass trim due to damage.
 - * If the dressing % is calculated on the basis of fasted weight just before slaughter rather than "farm weight" the figures will rise by about 4% units.
 - * Dressing % decreases in 2 year olds from red to hybrids and further to Wapiti.

FAT CONTENT OF CARCASSES

Fat measurement over the rib

The objective of any carcass grading system is basically to put "like with like" so that the customer knows what sort of product is being bought. In devising a system for grading deer carcasses for fatness it has been possible to use the experience gained by the sheep industry where a "CR" tissue depth

measurement taken at a point 11 cm round the 12th rib from the mid line of the back (skin surface to rib) gives a good estimate of carcass fatness. In an effort to translate this principle to the deer carcass a series of "tissue depth" measurements (GRD) were made at the 12/13 rib and at varying distances from the mid line. Table 2 shows the results from 23 yearling stags ranging in carcass weight from 50-67 kg.

TABLE 2

GRD tissue depths (mm) at 12th rib in yearling stags

Distance from midline (cms)	Mean GRD (mm)	Range in GRD (mm)
14	7.8	3.5-11.0
16	6.1	2.0-9.5
18	5.0	2.0-8.0
20	4.9	2.0-6.5

- Points to note:
- * GRD decreases less as you move progressively away from the mid line.
 - * The range narrows as you move away from the mid line.
 - * One "freak" animal with a carcass weight of 65 kg had GRD measurements of 20.5 mm at 14 cm decreasing to 14 mm at 20 cm from mid line. Odd animals like this will occasionally occur.
 - * The 16 cm position is probably the most practical spot to make the GRD measurement and will be used in the rest of this paper.

GRD measurement and total carcass fat

Some work has been done to relate a GRD carcass measurement in deer carcasses to the chemical fat content. Preliminary results are as follows.

<u>GRD</u> (mm)	<u>Chemical fat (% of carcass weight)</u>
5	7.3
10	9.0
15	10.7
20	12.6
40	18.5

Export lamb carcasses are commonly 25-30% chemical fat and lean cattle carcasses (bull beef) will be 15-18% fat. It is obvious that deer carcasses with GRD's of 10 are very lean and that at 15 GRD are not much fatter. It is, however, true that what fat is deposited in a deer carcass tends to be on the surface when compared with beef and is therefore more noticeable while at the same time more easily trimmed.

Fat trim and chemical fat

It is relatively easy, if rather expensive, to measure chemical fat in a carcass by mincing up a side and measuring fat content on small samples of mince.

How does this relate to taking a knife and trimming off the visible fat?

Table 3 shows the result of comparing chemical and trim fat from mature stags slaughtered pre or post rut.

TABLE 3

	<u>Pre-rut</u>	<u>Post-rut</u>
Carcass weight (kg)	119	83
Dissected fat (kg)	25.0*	1.1
Dissected fat (% carc.)	21.0	1.3
Chemical fat (% carc.)	20.9	3.6

* 60% cut off saddle and hind quarter

- Points to note * The pre-rut stags are very fat and there is very good agreement between fat measurements methods.
- * Fat content in stags after the rut is very low. The small difference between chemical and trim fat is due to the fact that what little fat there is cannot be easily trimmed.
- * We can conclude that if GRD gives a good estimate of chemical fat it will also relate well to trim fat.

Industry carcass assessment

During the 1983/4 season information from several sources about animal age, carcass weight and grading has been analysed.

1. Yearlings

Carcasses from 155 yearling stags slaughtered during February and March had a mean carcass weight of 49.5 kg (range 30-74) and a mean GRD value of 6.1 mm (range 1-16 mm) at 16 cm from the mid line over the 12th or 13th rib. Twelve carcasses (8%) had GRD values 11-16 mm. Since virtually no fat trimming was necessary on any of these carcasses there would seem to be little justification for classifying any as AD (overfat).

2. 2-Year Olds

Carcasses from 213 2-year olds slaughtered in March had a mean carcass weight of 61.2 (range 42-86 kg) and a mean GRD value of 10.7 (range 2-29 mm). The distribution of GRD values within weight groups is shown in Table 4.

TABLE 4

The distribution of 213 2-year old stag carcasses by GRD grade and carcass

<u>weight</u>	<u>Carcass weight (kg)</u>					
GRD values (mm)	40-50	51-60	61-70	71-80	81+	TOTALS
less than 11 mm	23	43	56	7	1	130
11-15 mm	1	17	26	10	1	55
greater than 15 mm	0	5	12	8	3	28
TOTALS	24	65	94	25	5	213

Points to note * 39% of the carcasses have GRD values greater than 10 mm and are therefore graded overfat.

* 13% of the carcasses have GRD values greater than 15 mm.

* Almost half the carcasses are less than 60 kg leaving a great deal of room for improvement in farm management practises. With good husbandry and feeding there should be relatively few carcasses weighing less than 60 kg.

It is true of course that it is the poorest 2-year olds which are being slaughtered and this will change as stag numbers build up on farms.

CONCLUSIONS

The present carcass grading system as regards fatness would appear to be too restrictive particularly for heavier carcasses. The lamb industry has recently recognised this problem by increasing the allowable GR figure for heavier carcasses. We will suggest that the farmed deer industry could allow a GRD measurement at the 12th rib (16 cm from mid line) of 12 mm for carcasses weighing up to 60 kg and 15 mm for carcasses over 60 kg before declaring them overfat. If these allowances had been applied to the 368 carcasses studied in this paper the results are contrasted with the present grading system in Table 5.

TABLE 5

Percentage of carcasses graded overfat under the present and suggested systems

	<u>Present grading system *</u>	<u>Suggested grading system *</u>
<u>Yearlings (n = 155)</u>		
Up to 60 kg carc. (n = 145)	5	3
Above 60 kg carc. (n = 10)	40	nil
<u>Two-year olds (n = 213)</u>		
Up to 60 kg carc. (n = 89)	26	6
Above 60 kg carc. (n = 124)	49	18

* Present system: overfat = GR > 10 mm

* Suggested system: overfat in carcasses up to 60 kg = GR > 12 mm

overfat in carcasses more than 60 kg = GR > 15 mm

We believe that very few carcasses which really need to be trimmed would get through the suggested grading system undetected as "overfat".

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