Diseases and defects of slaughtered farmed deer

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Introduction

The number of farmed deer slaughtered in New Zealand is undergoing rapid growth. An estimated 158 000 farmed deer were slaughtered in 1991, a 56% increase on the total for 1990. The forecast for number of slaughtered farmed deer in 1992 is 211 000 (1).

The rapid increase in the number of farmed deer presented for slaughter has important implications for the regulatory authority providing a meat inspection service. Scientifically-justified specifications that are tailor-made for the New Zealand situation should govern the programme, and delivery must be able to cope with seasonal variations in supply and increasing workloads.

Detailed information is required on the prevalence of diseases and defects in different classes of slaughtered deer if the above requirements are to be met. In the absence of a national data base on disease and defect statistics, a study was carried out in the 1988-1989 season to gain preliminary information on the prevalence of diseases and defects (2). This involved 4762 deer over a three-month period, and it was demonstrated that trauma-related conditions were by far the most frequent abnormalities.

This study provides further information on the prevalence of diseases and defects in a large number of farmed deer over a full slaughter season, with particular emphasis on trauma-related conditions. With uniformity of product and standardisation of procedures coming to the forefront in terms of processing profitability, procurement of uniform raw material with a low level of trauma-related defects is becoming increasingly important.

Materials and methods

The survey was carried out in the largest North Island deer slaughtering premises over a 12-month slaughter period (March 1990 to February 1991). Routine post mortem inspection includes inspection of the head, viscera and carcass and data were recorded from a total of 18193 animals. Abnormalities affecting the viscera but having no effect on the disposition of the carcass were not recorded in this survey.

Particular emphasis was placed on description and recording of trauma-related conditions, and extraction of commercial grade data from Company records. Acute trauma-related conditions were those subjectively assessed to have occurred at some time between yarding on the farm of origin and slaughter. Chronic trauma-related conditions were those assessed to be long-standing and having occurred on the farm of origin.

Commercial losses associated with particular diseases and defects were calculated from the commercial grades used and the respective returns per kg of venison. Under the grading system, any condition or damage to a primal cut (forequarter or hindquarter) renders that carcass unsuitable for the prime grade. Removal of, or damage to primal cuts also results in a weight loss due to trimming. Losses due to downgrading were calculated on the mean difference in price per kg throughout the season. The weight loss due to trimming of downgraded carcasses was calculated from the average weight of the remaining carcasses in the line, as no pre-trim weights are taken.

Results

The age distribution of deer presented for slaughter (Table 1) showed a marked increase in older animals compared with the situation in 1988-89 (2). The sex distribution of slaughtered deer also demonstrated a very different pattern to that occurring in 1989; hinds constituting 38% and 0.5% respectively.

The prevalence of diseases and defects is given in Table 2. Trauma-related conditions dominated the statistics, with 71.1% of red deer abnormalities and 82.5% of fallow deer abnormalities being in this category. Traumatic conditions in acute and chronic categories (48.8% and 51.8% respectively) were evenly distributed for red deer, but there was an excess of acute traumatic conditions in fallow deer (76.9%).

Apart from tuberculosis, emaciation and chronic pleurisy were the only other abnormalities that had a notable effect on quality of raw material presented for slaughter. Together with trauma-related conditions, these abnormalities accounted for 95.9% and 93.5% of the recorded diseases and defects of red deer and fallow deer respectively (excluding tuberculosis).

A total of 92 cases of lesions suspicious of tuberculosis were detected during routine post mortem inspection of non-reactor deer. Lesions from all cases were submitted for laboratory examination. Gross pathological, histopathological and bacteriological findings resulted in 79 cases being considered to be tuberculous (0.43%). Thirty-two

Table 1: Age distribution of slaughtered farmed deer

Age	Red deer		Fallow deer	
	88/89*	90/91	88/89	90/91
less than two years	3472	353	700	237
two years	540	8536	20	237
three years and over	30	6777	0	2053
Total	4042	15666	720	2527

* Reference (2)

Table 2: Prevalence of diseases and defects in slaughtered farmed deer

Category	Condition	Red deer (%)	Fallow deer (%)
Trauma	Acute arthritis	0.01	0
	Acute wounds/bruises	1.34	1.02
	Acute fractures	0.17	0.55
	Chronic arthritis	0.38	0.07
	Chronic wounds/bruises	0.08	0
	Chronic fractures	1.16	0.39
Other	Acute pleurisy	<0.01	0
	Chronic pleurisy	0.37	0.23
	Tuberculosis	0.50	0.04
	Emaciation	0.24	0
	Pyogenic lesions	0.05	0.03
	Septicaemia	0.03	0
	Peritonitis	<0.01	0
	Jaundice	0.01	0
	Hernia	0.01	0
	Liver fluke	0	0.07
	Other	0.01	0.03

cases were bacteriologically confirmed as Mycobacterium bovis. Three further cases were identified by culture as M. avium and there was one case of M. paratuberculosis.

A total of 208 reactor deer were submitted for slaughter and lesions suspicious of tuberculosis were found in 15 of these. A combination of histopathological and bacteriological results resulted in 11 cases being considered positive for M. bovis. M. avium was cultured from two cases.

The distribution by sex of conditions resulting in downgrading of carcasses is given in Table 3. Acute trauma-related conditions were far more frequent in stags than in hinds, whereas chronic arthritis and chronic fractures were more common in hinds.

The commercial losses in carcass value associated with diseases and defects in red deer (Table 4) demonstrate that downgrading due to acute wounds and bruises is the major source. The total loss for all acute traumatic conditions was 0.55% of total carcass value. In comparison, the total loss for all chronic traumatic conditions was 0.24%. Emaciation and tuberculosis were also significant causes of loss in total carcass value (0.25% and 0.39% respectively).

Discussion

There has been a marked change in the age and sex distribution of farmed deer presented for slaughter in the last three years, with the predicted increase in older animals and hinds coming to fruition. These changes represent the reaching of a more stable plateau in deer farming, with farmers now willing to cull original herd members and breeding stock as appropriate. There is now little carcass value in young, light-weight carcasses and exporting companies require specific carcass weights from 18-24 month animals.

Trauma-related abnormalities dominated the disease and defect statistics and occurred at almost twice the prevalence seen in the earlier survey of deer at the same slaughterhouse (3.15% and 1.59% respectively for red deer, and 2.05% and 0.83% respectively for fallow deer) (2). This increase was partly due to inclusion of the "roar" in the sampling period (unpublished data), but it also reflected a general increase in chronic conditions due to the increased age of the slaughter population.

The prevalence of acute trauma-related abnormalities reflects the conditions governing yarding on the farm, transportation and holding of deer at the slaughterhouse prior to slaughter. Approximately half the trauma-related conditions were in this category and

Table 3 Distribution by sex of conditions resulting in downgrading of carcasses

Condition	Red deer		Fallow deer	
	Hind	Stag	Hind	Stag
Acute arthritis	0	2	0	0
Acute wounds/bruises	45	166	1	25
Acute fractures	6	22	0	14
Chronic arthritis	40	17	1	1
Chronic wounds/bruises	3	10	0	0
Chronic fractures	108	75	3	7
Emaciation	35	4	0	0
Septicaemia	5	1	0	0
Tuberculosis	53	25	0	1

Table 4. Average loss in value due to downgrading of red deer carcasses

Condition	No. affected	No downgraded			Prev (%)	Average loss in value (%)**
		AD1	AD2	C*		
Acute arthritis	2	0	2	0	0 01	69
Acute wounds/bruises	211	106	44	0	0 96	54
Acute fractures	28	7	1	0	0 05	49
Chronic arthritis	57	11	36	0	0 30	64
Chron. wounds/bruises	13	2	0	0	0 01	47
Chronic fractures	183	3	7	0	0 06	62
Emaciation	39	0	0	39	0 25	100
Septicaemia	6	0	0	6	0 04	100
Tuberculosis***	78	NA	NA	31	0 50	78

* Condemned

** Calculated from relative proportion of downgraded classes, and average weight loss through trimming

*** All tuberculous animals either downgraded or condemned

this should be an area of concern to the venison production industry. An overall prevalence of 1.54% of acute traumatic conditions is of concern in animal welfare terms and the subsequent overall loss in carcass value of 0.55% is of concern in economic terms.

Infectious diseases other than tuberculosis were rarely detected at post mortem inspection of slaughtered farmed deer, and they have negligible effect on carcass values. This finding mirrors that of the previous survey (2). Chronic pleurisy was a relatively common finding, however the majority of cases were subjectively assessed to be a consequence of trauma rather than an infectious process. (No cases of chronic pleurisy resulted in downgrading of carcasses).

Tuberculosis remains a problem in slaughtered deer and is an important cause of economic loss, both on-farm and in terms of carcass value. Additionally, inspection for this disease constitutes a major workload for the regulatory authority. A national data base is currently accumulating information on the prevalence and anatomical distribution of tuberculous lesions in different classes of slaughtered deer. This will allow better application of inspection resources and will enable more cost-effective laboratory diagnostic regimes to be instituted.

Downgrading of carcasses (and economic loss) occurs at a considerably lower prevalence than the prevalence of diseases and defects. Nevertheless, 2.18 % of red deer carcasses were downgraded in the current survey; the major contributor being acute wounds and bruises. It is clear that the major workload in post mortem meat inspection of farmed deer revolves around trauma-related abnormalities and tuberculosis, and the regulatory authority has a continuing responsibility to ensure uniform and scientifically-justified inspection procedures and judgements for these conditions.

References

1. Anonymous (1991): Situation and outlook for New Zealand Agriculture, 1991. Ministry of Agriculture and Fisheries, Wellington.

2. Selwyn, P. and Hathaway, S. C. (1990): A study of the prevalence and economic significance of diseases and defects of slaughtered farmed deer. New Zealand Veterinary Journal, 38: 94-97.