Improved feedback of carcass information from freezing works to farms

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ABSTRACT

Increased payment to farmers for leaner lamb carcasses places greater emphasis on specifying target carcass weights and grades on individual farms. In the past there has been little objective information available to help the farmer set these targets and make livestock buying and selling decisions.

At the Tomoana freezing works in Hawkes Bay new computer outputs have been introduced to provide the farmer with better information for farm management decision-making. A more detailed lamb grading analysis presenting the number of carcasses within each grade at each carcass weight, and a new output named a "fat trend report" are provided.

The fat trend report estimates the relationship between the GR fat depth and carcass weight for each mob of lambs slaughtered. Combined with an iso-dollar overlay, the fat trend report assists in establishing production targets in future mobs for each sheep breed and sex farmed. It is suggested that financial incentives for leaner lamb carcasses should be further increased, to bring carcasses closer to the New Zealand Meat Producers Board's ideal.

Keywords *Lamb carcass; lamb grading analysis; fat trend report.*

INTRODUCTION

The farmer must place increased emphasis on setting target areas for lamb carcass production because of emphasis in the export lamb schedule on high prices for leaner carcasses.

On-farm pre-slaughter weighing with appropriate lamb drafting provides a basis for achieving carcass weight and grade targets. More detailed reporting of carcass slaughter weight and grade information is now available to assist in setting these targets.

At the commencement of the 1984-85 killing season, the Tomoana Freezing works in Hawkes Bay used its extensive process control system (Pownall, 1984) to provide more comprehensive kill reports which are available to farmers on request. These are in the form of a lamb grading analysis and fat trend report. Data analyses described in this paper were conducted to provide parameters for the fat trend report.

LAMB GRADING ANALYSIS

Traditionally freezing works have provided very little information beyond the number and total weight of carcasses in each grade. The new lamb grading analysis shown in Fig. 1 provides a visual representation of each carcass in the mob giving its fat thickness by the density of the character. The aim is to present the weight, fatness and frequency in a way that can be assimilated almost at a glance. The average carcass value for each kilogram interval is shown along the dressed carcass weight axis to identify the most profitable weight ranges. While the graph is informative and users are at ease with it, it contains largely historical information.

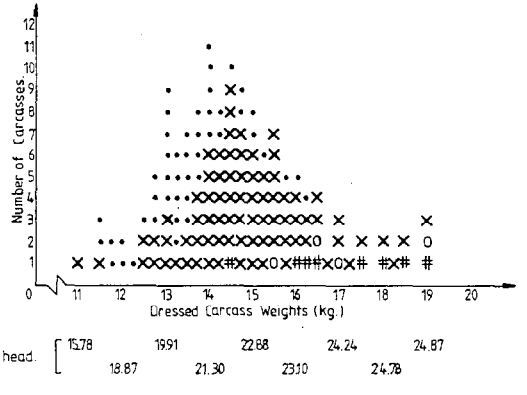

FIG. 1 Example of the Lamb Grading Analysis supplied to farmers. Symbols are identified in Table 1.

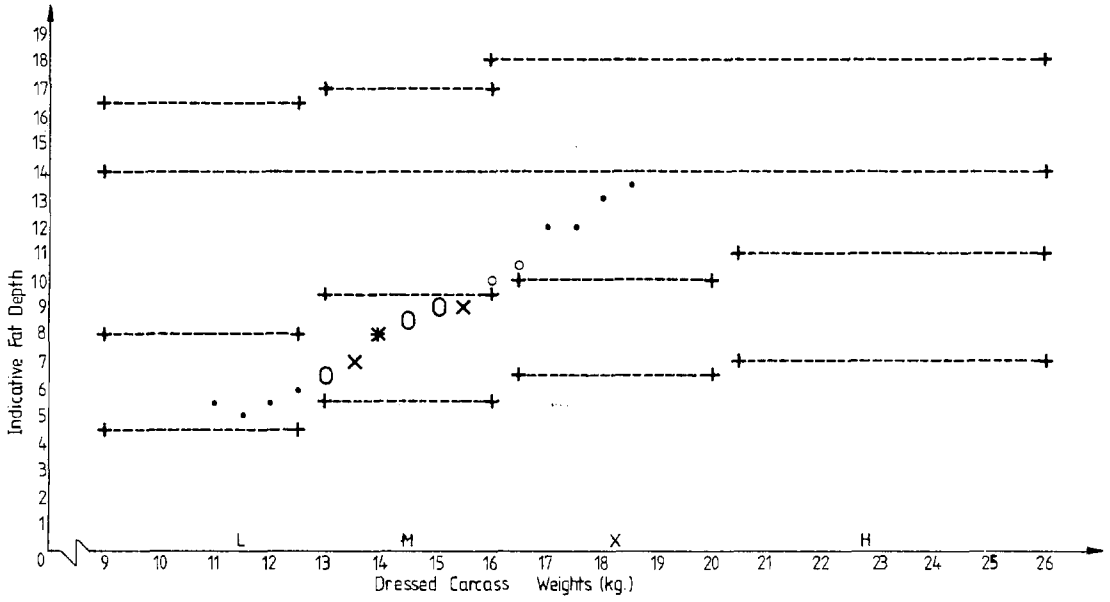

FIG. 2 Example of the Fat Trend Report supplied to farmers. Lines marked + ------ + show the GR fat depth used to indicate a grade. Symbols indicate numbers of carcasses in this example as follows:—
* = 17 to 20; 0 = 13 to 16; X = 9 to 12; o = 5 to 8; • = 1 to 4.

TABLE 1 Symbols used in the Lamb Grading Analysis (Fig. 1) to denote GR range (mm) and carcass grade.

	GR range			
	1-7*	8†-12	13-15	>15
Symbol	•	X	0	#
Weight range (kg)				
9.0-12.5	YL	PL	TL	FL
13.0-16.0	YM	PM	TM	FM
16.5-20.0	PX	PX	TH	FH
20.5-25.5	PH	PH	TH	FH

*6 mm for YL grade
†7 mm for PL grade

THE FAT TREND REPORT

Because actual GR fat depth measurements are not routinely available from freezing works, a substitute measure that we call "the indicative fat depth" was derived that can be predicted from extended carcass weight and grade data that are routinely collected by the unique Tomoana process control system.

GR depths were measured on 377 ram, 320 wether and 203 ewe carcasses from 11 farms (Table 2) during a carcass GR monitoring study conducted in the Hastings region (Dodd, 1984). The average GR calculated for each grade as specified by fatness category (Y, P, T, F) and weight range (L, M, X, H) (Table 2) is used as the "indicative fat depth" in producing fat trend reports (Fig. 2) of mobs of lambs

TABLE 2 Carcass measurements of 900 lambs slaughtered at Hawkes Bay Freezing Works in the 1983-84 killing season (377 ram, 320 wether and 203 ewe lambs).

Grade	No carcasses	Mean carcass GR (mm)	Mean carcass weight (kg)
YL	86	4.2	11.6
PL	22	7.9	12.1
YM	205	5.6	14.4
PM	241	9.7	14.8
TM	28	13.7	15.1
FM	8	16.8	14.9
PX (1-7 mm)	30	6.4	17.2
PX (8-12 mm)	178	9.9	17.6
TH (16.5-20 kg)	59	14.3	17.9
FH (16.5-20 kg)	29	17.3	18.2
PH	3	11.3	20.8
TH (20.5-25 kg)	4	14.5	21.3
FH (20.5-25 kg)	7	19.4	21.4

on which measured GR values are not available. The report was designed to allow prediction of the most profitable weights in future mobs.

The accuracy of the method was examined by randomly selecting records from 750 of the 900 measured carcasses and calculating mean GR values equivalent to those in Table 2. These values were then applied to the weight and grade data of the remaining 150 carcasses to give "indicative fat depths" which were compared with actual GR

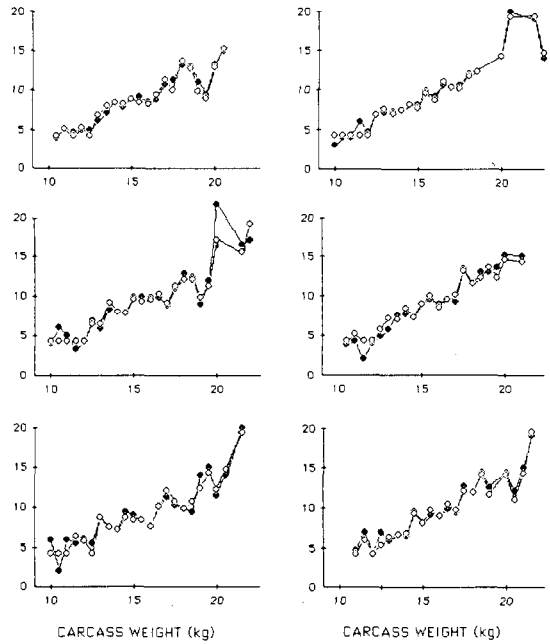

FIG. 3 Trends in actual (•) and indicative (o) GR depths (mm) with carcass weight (kg) for each of 6 tests (Table 3).

measurements. The regression of actual GR on "indicative fat depth" was calculated (Table 3), and the whole procedure was repeated 5 more times. In each of the 6 samplings, there was good agreement between the means of actual and indicative GR at each carcass weight over the full range of carcass weights (Fig. 3).

DISCUSSION

Presentation and Interpretation

The assumption is made that the fat trend line indicates the average growth path of the mob if the lambs had continued to grow under the same conditions. Further analysis of kill reports is required however, to better define the conditions under which it is possible to extrapolate to future mobs of the same breed and sex. Differences in the fat-weight relationships were observed between mobs slaughtered 2 months apart in the study of Nicoll (1984).

Seasonal trends on individual farms can be refined through the examination of accumulated reports; hence the longer the farmer has been receiving the new information on his lambs the more valuable the information becomes. It is recommended that the separate sexes be slaughtered as separate lines for the information to be most valuable.

Forward killing of a sample from a large mob approaching slaughter can also be conducted to make better decisions on the timing of the main kill to achieve optimal target carcass weights and grades.

TABLE 3 Regression of actual GR on indicative GR for 150 lamb carcasses drawn randomly from 900 (Table 2) in 6 tests. In each test, mean GR values of the remaining 750 carcasses were calculated for each weight and grade category to provide indicative GR values for the 150 test carcasses.

Test	Regression				r
	Intercept (SE)		Slope (SE)		
1	0.18	(0.29)	0.98	(0.03)	0.93
2	0.34	(0.28)	0.97	(0.03)	0.94
3	−0.40	(0.32)	1.05	(0.03)	0.93
4	−0.22	(0.30)	1.00	(0.03)	0.94
5	0.19	(0.30)	0.98	(0.03)	0.86
6	0.21	(0.30)	0.98	(0.03)	0.94

While examining the fat trend reports of "normal production" mobs passing through Tomoana, we have noticed that the fat trend has a distinct tendency to become steeper as weight increases, consistent with the trends discussed by Black (1983). It would appear that there is a point where there is a distinct change in the growth pattern (as indicated by the change in the slope of the fat trend line). Any attempt to increase average weight beyond this point results in a rapid increase in fat thickness.

We have produced an "iso-dollar" overlay for the fat trend report which gives the carcass meat value for every point on the fat trend graph. The overlay is in Fig. 4 with a broken line which shows the actual fat trend from a recent unusual production mob. As the lambs grew along the fat trend line from A to B, each kilogram increase in weight was worth $2.00 (approx). From B to C though, the total carcass weight increased by about 3 kg but the value increased by only about $2.00 (or 66c/kg). In this unusual mob, as weight continued to increase above C, the value actually decreased.

Thus using the fat trend report and the iso-dollar overlay, we can be specific about the way the average carcass values will change as the lambs in the mob grow. It therefore becomes relatively easy for a farmer to balance up the amount of feed he has and the additional payment he can expect from the increase in carcass weight, at the same time allowing for the expected grading changes. Thus, reference to past reports and the use of live-weight scales, with an allowance made for dressing-out % (Kirton, 1984), allows better selection of slaughter lambs.

Observations on the Schedule

It is clear from observations of mobs that pass through Tomoana (it is very quick and easy to "see"

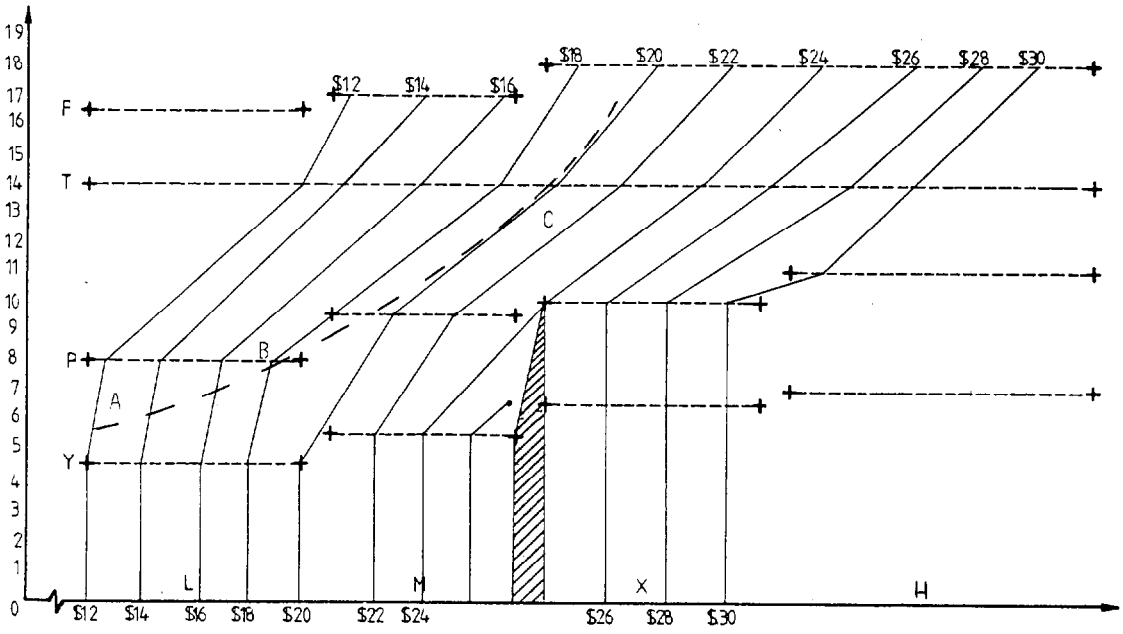

FIG. 4 The iso-dollar overlay available to aid farmers' interpretation of the Fat Trend Report (Fig. 2).

a mob by using the Lamb Grading Analysis and the Fat Trend Report) that the mobs up to the end of January in the 1984-85 season were very lean. We believe that in addition to seasonal feed supply shortages in some districts, this is attributable more to the farmers perception of the fat thickness problem than the present monetary effect of the schedule.

The current schedule does not provide a disincentive for weight gain when carcasses fall into the trimmer and fat grades. Thus the slopes of the iso-dollar lines are about 1.6 mm/kg as they pass through the trimmer grade while "normal production" mobs show a fat depth gain of about 1.3 mm/kg in the trimmer region. Therefore as weight and fat thickness increase, the fat trend line crosses the iso-dollar line so that even near the "trimmer" region, the farmer is paid more for the heavier and fatter carcass.

A solution, if the Meat Producers Board wishes to provide a positive disincentive, is to set the schedule so that the slope of the iso-dollar line above the required maximum fat thickness matches the slope of the fat trend in "normal production" mobs. To deter the production of carcasses fatter than the prime grade the slope of the iso-dollar lines above 12 mm should be around 1.3 mm/kg.

Further there is presently little incentive to produce the heavier lean carcasses as a marked reduction of $2.92/carcass is evident for carcasses of GR less than 8 mm, as carcasses increase in weight from 16 to 16.5 kg. The introduction of a higher paying "YX" grade is therefore highly desirable to encourage production of the very lean carcasses at heavier weights.

Industry Experiences

Tomoana is supplying only a few clients with the reports, which are available on client request only. We have given minimal publicity until now as the layouts and analysis methods were being further developed. In addition the early part of the 1984-85 season has been one for light lean lambs in Hawkes Bay and there has been little difficulty in coping with the "overfat" problem. It is anticipated that as autumn approaches the fat trend report will become increasingly useful with its application to heavier and fatter lamb mobs.

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REFERENCES

Black J.L. 1983. Growth and development of lambs. In *Sheep production.* Ed. W. Haresign. University of Nottingham School of Agriculture. pp. 21-28.

Dodd C.J. 1984. Hawkes Bay observations on optimal management and breed choice for quality lamb production. *Proceedings of the second sheepfarmers' conference,* July 1984, Waipukurau pp. 57-64.

Kirton A.H. 1984. Sheepmeat; Export lamb; Dressing percentage. AgLink FPP 732. Ministry of Agriculture and Fisheries, Wellington.

Nicoll G.B. 1984. The effect of flock, sex and time of slaughter on carcass weights and GR measurements of lambs in the Tihoi comparison on Wairakei Lands and Survey block. Report to the Lands and Survey Department, Wellington.

Pownall M.J. 1984. The Tomoana project: High technology in the meat industry. *Proceedings of the electro-technical group, Institution of Professional Engineers' Conference,* Hastings, February, 1984.