CARCASS COMPOSITION OF PUREBRED AND CROSSBRED ANGUS STEERS

J. J. BASS, F. COLOMER-ROCHER*, R. L. BAKER, A. H. CARTER, M. P. JARNET, and E. G. WOODS

Ruakura Agricultural Research Centre, Hamilton

SUMMARY

Steers from 10 sire breeds crossed with Angus cows were compared. The Simmental sired the heaviest steers at 20 months of age. The Blond d'Aquitaine crosses had the heaviest carcass and the Charolais crosses the highest yield of boneless meat relative to their fasted liveweights and hot carcass weights. Progeny of the Jersey, Angus and Hereford sires had the lowest weights of boneless meat of all the breeds compared.

INTRODUCTION

PREVIOUS TRIALS of different beef breds in New Zealand have compared some of the sire breeds now available to the beef farmer (Bass *et al.*, 1975; Carter, 1975). The present paper reports preliminary carcass data from a limited number of sires per breed and progeny per breed of 10 different sire breeds crossed with Angus cows.

MATERIALS AND METHODS

Sires of the Simmental (S) (Pie Rouge, German, Swiss and Austrian Simmental), Blond d'Aquitaine (BA), Friesian (F), Charolais (C), Maine Anjou (MA), Hereford (H), South Devon (SD), Jersey (J), Limousin (L) and Angus (A) breeds were mated with Angus dams at Tokanui Research Station. The male progeny were castrated at birth in the spring of 1973 and a representative half transferred after weaning to Rukuhia Soil Research Station. The numbers of progeny and sires per breed are presented in Table 1.

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*Present address: Centro de Investigacion y Desarrollo Agrario del Ebro, Zaragoza, Spain.

Slaughter Procedures

Slaughter procedures were similar to those reported by Bass *et al.* (1975). The weights of the hides, full rumens and intestines were collected at slaughter and the weights of the subcutaneous and intermuscular fat of the right hind-quarter were collected during muscle dissection. The New Zealand commercial cut (Everitt and Jury, 1964) and muscle dissection were limited to the left and right hind-quarters, respectively. Chemical analysis was carried out on the fat clean muscles of the right hind-quarter using the method described by Kirton *et al.* (1962).

Biometrical Methods

Least square analysis was carried out on all data collected and the effects of sire breed, sires within breeds, facial eczema, age of dam, grazing location, and its interaction with sire breed were tested.

Facial eczema scores and the interaction of grazing location with sire breed were not significant for most of the traits analysed and so were deleted from the final model. The weights of carcass and non-carcass components were adjusted for age at slaughter.

RESULTS

The weights for fasted liveweight, and the weights of hides, full rumen and intestines show that there were significant differences between sires (Table 1). Although there were no common breed ranking orders for the different weights. Simmental crosses were heaviest for fasted liveweight. The F × A had the heaviest full rumen weight, whereas the BA × A had relatively light rumen and intestine weights. These observations account for the high dressing percentage (hot carcass weight/fasted liveweight) of the BA × A and the low dressing percentage of the F × A, although differences between breeds did not reach significance.

There were significant differences between sires for the weights of the hot carcasses and their component parts from the New Zealand commercial cut (Table 2). The breed rankings for both hot carcass and boneless meat weights were similar to that of the fasted liveweight. The exceptions were BA × A which had a high meat yield and the J × A which had low meat yields. It is of interest to note that the progeny from the local breed

TABLE 1: FASTED LIVEWEIGHTS AND NON CARCASS COMPONENTS

Sire Breeds × Angus	*Sires*	*Number Progeny*	*Age in Days*	*Fasted Liveweight*	*Weight (kg) Hide*	*Rumen Full*	*Intestine*	*Dressing %*
Simmental	12	32	606	422	34.4	47.4	22.9	59.1
Blond d'Aquitaine	4	14	594	409	31.1	45.3	21.3	60.2
Friesian	3	14	613	418	30.7	50.6	24.0	58.5
Charolais	3	7	610	409	31.6	46.2	22.8	59.4
Maine Anjou	4	9	609	406	31.4	49.1	22.5	59.4
Hereford	4	12	611	389	31.4	45.9	21.3	59.3
South Devon	2	8	624	392	29.8	50.1	23.5	57.8
Jersey	4	13	618	385	28.5	42.9	23.6	57.9
Limousin	4	9	608	374	27.0	43.2	20.9	59.0
Angus	5	11	626	376	28.5	46.2	23.8	58.1
Sire differences				*	**	†	*	ns

†$P < 0.10$

TABLE 2: CARCASS COMPONENTS (kg) ADJUSTED FOR AGE AT SLAUGHTER
(N.Z. Commercial cut, left hind-quarter)

Sire Breeds × Angus	*Hot Carcass*	*Boneless Meat*	*Excess Fat*[1]	*Bone*
Simmental	249.8	42.2	9.7	11.0
Blond d'Aquitaine	246.6	42.9	7.8	10.7
Friesian	244.7	39.7	9.8	10.9
Charolais	243.5	42.7	8.8	10.4
Maine Anjou	241.6	41.0	9.1	10.9
Hereford	231.0	36.0	10.3	9.9
South Devon	226.4	37.1	8.9	10.4
Jersey	223.0	33.9	11.6	9.7
Limousin	221.9	37.6	7.8	9.4
Angus	218.2	36.5	8.1	9.5
Sire differences	*	***	**	***

[1] Excess fat includes all fat removed from hind-quarter.

TABLE 3: WEIGHTS OF DIFFERENT FAT DEPOTS (kg)

Sire Breeds × Angus	*Subcut. Fat*	*Internal Fat*	*Inter-muscular Fat*	*Total Fat*
Simmental	6.4	3.8	3.0	19.6
Blond d'Aquitaine	4.9	3.6	2.1	12.0
Friesian	6.0	4.6	2.6	15.0
Charolais	6.7	3.6	2.3	14.4
Maine Anjou	6.8	3.8	1.9	14.3
Hereford	7.6	3.8	2.8	16.1
South Devon	6.4	3.7	2.3	14.0
Jersey	7.3	6.0	2.6	17.8
Limousin	5.1	3.3	2.0	12.2
Angus	5.3	3.4	2.0	12.6
Sire differences	**	**	ns	**

of German Simmentals had more excess fat than the other local Simmental breeds used in this trial when adjusted for differences in carcass weight.

The weights of the various fat depots (except intermuscular fat) showed differences between sires (Table 3). The traditional dairy sire breeds had the heaviest weights of internal fat and J × A also had the heaviest weights of all the other fat depots weighed relative to its carcass weight. The BA × A was the leanest breed for both total fat and percentage muscular fat (Table 4).

There were significant differences between sires for the percentage composition of the hind-quarter muscles and breed rank-

TABLE 4: PERCENTAGE CHEMICAL COMPOSITION OF RIGHT HIND-QUARTER MUSCLES

Sire Breeds × Angus	*% Water*	*% Protein*	*% Fat*	*% Ash*
Simmental	74.3	20.5	4.4	0.88
Blond d'Aquitaine	74.8	20.7	3.5	1.00
Friesian	73.8	20.5	5.1	0.70
Charolais	74.2	20.2	4.7	0.92
Maine Anjou	74.1	20.3	4.6	0.91
Hereford	73.3	19.9	5.8	0.99
South Devon	74.3	20.1	4.8	0.92
Jersey	72.8	20.0	6.5	0.90
Limousin	74.1	20.2	4.7	1.00
Angus	74.2	19.7	5.2	0.90
Sire differences	***	***	***	***

ings were broadly similar for percentages of both water and protein and consequently in the reverse order of fat.

The export grade percentages are presented in Table 5 and some of the newly imported breeds had better grades than the purebred Angus.

DISCUSSION

The provisional nature of these findings must be stressed as they relate to only one season at one location in an extensive breed evaluation project. The validity of the present results is conditioned by the small number of steers involved and the limited sampling of sires. It is reassuring, however, that the differences reported here concur substantially with corresponding breed differences reported by Bass *et al.* (1975) for the previous year at the same location and involving the A, H, SD, F and C sire breeds.

TABLE 5: PERCENTAGE EXPORT GRADES

Sire Breeds	*Chiller*	*GAQ*	*FAQ*	*Manufacturing*
Simmental	45	25	24	6
Blond d'Aquitaine	29	36	29	8
Friesian	23	29	50	—
Charolais	43	43	15	—
Maine Anjou	45	45	12	—
Hereford	67	34	—	—
South Devon	50	13	38	—
Jersey	39	47	16	—
Limousin	67	23	—	12
Angus	37	37	28	—

The Simmentals, which were composed of four local Simmental breeds, had the heaviest fasted liveweights and hot carcass weights of all the breeds. This agrees with the results from a comparison of progeny from German and Swiss Simmental sires with Limousin, Friesian and Hereford sires out of Friesian cows (Anon., 1974). The work of Newman *et al.* (1974) showed that hot carcass weights from the male progeny of Maine Anjou × Hereford were heavier than those of the Simmental × Hereford. However, there were no real differences between sire breeds in this latter work which may also be the case in the present study.

The BA × A which ranked only sixth for fasted liveweight had the highest dressing percentage and a high percentage of boneless meat. This was unfortunately associated with a lack of subcutaneous fat which leads to a low export grade and therefore a poor return per kilogram of hot carcass weight to the farmer.

The Limousin crosses had a lower liveweight and carcass weight than Friesian crosses which supports overseas findings (Anon., 1974).

The results reported are of a preliminary nature and are only an approximate guide to the relative rankings of the various breeds.

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