

## CARCASS COMPOSITION OF NATIVE PUREBRED BARBADOS BLACKBELLY AND DORSET CROSSBRED SHEEP

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### INTRODUCTION

BLACKBELLY sheep have been in Barbados for well over three hundred years. Although the breed has aroused interest among visitors and locals alike, very little real scientific knowledge is recorded about the breed. The objectives of this study were:

1. To evaluate a number of carcasses for quality and cutability to use as a base to plan for future genetic, nutrition and management studies.
2. To determine detailed carcass composition and muscle/bone ratios on a limited number of carcasses.
3. To train local personnel in the techniques of carcass evaluation and fabrication.
4. To make recommendations for future development of the Blackbelly for meat and by-product production.

### MATERIALS AND METHODS

FORTY-NINE rams and ewes, including 27 purebred Blackbellies (BB) and 22 Blackbelly X Dorset crossbred (BD) were slaughtered at average age of 397 days and their carcasses evaluated at the Barbados Marketing Corporation, Bridgetown, Barbados, West Indies.

All lambs and mutton were quality and yield graded using USDA standards approximately 24 hours following slaughter. For grading and evaluation, each carcass was ribbed at the 12th rib, for rib eye and fat depth measurement.

Twelve carcasses were broken into wholesale cuts and then completely dissected into muscle, fat and bone, according to procedures described by Romans and Ziegler (1977) and Romans (1979). As much fat was removed from the muscles as possible by hand trimming. The boneless leg did not include the shank muscles nor the popliteal lymph node. The boneless loin contained only the longissimus and psoas muscles. The boneless rib included only the longissimus and spinalis muscles. The prescapular lymph node was removed from the shoulder.

### RESULTS

TABLE 1 lists the sire identification, dam breed and number of progeny tested.

TABLE 1. BREED CHARACTERISTICS

Sire	Breed	ID	Dam breed	Number graded	Number fabricated
1	BB <sup>a</sup>	45377	BB	10	2
2	BB	45377	D <sup>b</sup>	2	1
3	BB	10025	BB	10	2
4	BB	45379	BBX	6	1
5	BB	60	BB	7	0
6	BB	Unknown	X <sup>c</sup>	4	1
7	D	614	BB	5	2
8	D	Unknown	BB	3	2
9	Sire and Dam Unknown			2	1
Totals	9			49	12

a. Blackbelly    b. Dorset    c. Crossbred

Progeny of sires 1, 3 and 5 were purebred Blackbelly (BB), (n=27 graded, 4 fabricated) while the balance (n=22 graded, 8 fabricated) were Blackbelly X Dorset or unknown crossbreds (BD).

Percent muscle of carcass weight as estimated by USDA Yield Grade and by actual determination is shown in Table 2 for BB and BD progeny.

TABLE 2. PERCENT MUSCLE OF CARCASS WEIGHT

	Estimated by USDA Yield Grade			Actual Determination		
	High	Low	$\bar{x}$	High	Low	$\bar{x}$
BB	71.1	70.8	69.1	68.8	65.6	67.1
BD	72.4	57.9	69.4	74.5	60.2	68.3

The BD lambs were more variable in this trait, those with more Dorset blood having a lower percent muscle. One-hundred-seventy-five lambs representing many U.S. breeds and evaluated at the University of Illinois had actual percent muscle of carcass weight of 68%, (Romans and Ziegler, 1977) essentially equal to the muscle yield of lambs in this trial.

Percent bone of carcass weight and muscle/bone ratios are shown in table 3.

TABLE 3. PERCENT BONE<sup>a</sup> AND MUSCLE/BONE RATIOS<sup>b</sup>.

	Percent bone <sup>a</sup>			Muscle/bone ratios <sup>b</sup>		
	High	Low	$\bar{x}$	High	Low	$\bar{x}$
BB	25.9	23.5	24.7	2.9	2.5	2.8
BD	29.2	20.4	24.4	3.1	2.3	2.8

a. percent of carcass      b. in carcass

Lambs of BD breeding were more variable in both percent bone and muscle/bone ratios than the BB lambs, although the means for each trait were very similar. A sample of U.S. lambs (n=175, Romans and Ziegler, 1977) had average percent bone of 17% and average muscle/bone ratios of 4. Thus lambs with Blackbelly breeding had higher percent bone and lower muscle/bone ratios than U.S. sheep.

Table 4 shows the muscle/bone ratios in the various primal cuts for all lambs fabricated in this Barbados study.

TABLE 4. MUSCLE/BONE RATIOS IN THE VARIOUS PRIMAL CUTS

	Muscle/bone ratios		
	High	Low	$\bar{x}$
Leg	3.2	2.4	2.8
Loin	4.2	1.6	3.1
Rib	3.0	1.4	2.1
Shoulder	3.8	1.8	3.4

The ratios in table 4 include all muscle from each wholesale primal compared to the bone in each wholesale primal. If only the valuable roast and chop muscles are considered, the average muscle/bone ratio in all primal cuts drops to 1.8, ranging from 1.6 to 2.0. The ratio between the valuable roast-chop muscles and all trim muscle was 1.9, ranging from 1.7 to 2.5, thus these carcasses contained nearly twice as much muscle to be utilized in an intact form as that which would require comminution for ultimate consumer use.

All shank bones were included in the wholesale leg prior to boning, while the foreshank was removed from the shoulder prior to boning, which would widen the difference in muscle/bone ratios between the leg and shoulder. Yet all BB and BD carcasses appeared light muscled in the legs with an inordinate proportion of weight in the shoulders. The low muscle/bone ratio in the rib is indicative of the small rib eyes in these sheep. (Table 5.)

TABLE 5. RIB EYE AREAS

	Rib eye areas					
	in <sup>2</sup>			cm <sup>2</sup>		
	High	Low	$\bar{x}$	High	Low	$\bar{x}$
BB	2.0	0.80	1.45	12.9	5.16	9.35
BD	2.23	1.00	1.60	14.39	6.45	10.32

Dorset breeding tended to increase rib eye areas. Rib eye areas in a sample of U.S. lambs (n=175, Romans and Ziegler, 1977) averaged 2.35 in<sup>2</sup> (15.2 cm<sup>2</sup>), thus improvement is needed and is possible for the BB. Rib eye area is a reasonable indicator of overall muscling, and thus can be used as an excellent carcass evaluation tool. Furthermore, the consumer should be able to expect a reasonable serving from two chops, but if the rib eye area is under two square inches, two one-inch thick chops will not equal a 100 gm. (3 1/2 oz.) serving.

Fat (kidney fat and fat trim) is shown in table 6.

TABLE 6. PERCENT KIDNEY FAT AND FAT TRIM

	Percent Kidney fat			Percent Fat trim		
	High	Low	$\bar{x}$	High	Low	$\bar{x}$
BB	2.5	1.4	2.1	9.0	6.7	8.2
BD	4.7	0.8	2.3	19.4	1.2	8.1

BD lambs were more variable in fatness than the BB lambs although the means were very close. Both BB and BD lambs were trimmer in kidney fat, 2.2% vs. 3.8%, and fat trim, 8.2% vs. 15%, compared to U.S. lambs (Romans and Ziegler, 1977). The overall leanness of the Blackbelly is an attribute to be held to, and not bred away by crossbreeding. Some of the Dorset breeding has apparently introduced an undesirable level of fatness, as indicated by the high values in table 6.

USDA quality grades were summarized omitting any consideration of conformation, even though it is officially a part of the USDA grade, because carcass shape has no relationship to palatability, and quality grade is supposed to predict palatability. The get of only one sire (unknown breed) failed to grade Choice, and he had only two lambs out of the 49. Thus the Blackbelly looked to be completely adequate in terms of quality.

This trial has characterized the Blackbelly carcass as lean with adequate quality, but lacking in muscle development in relation to its skeletal framework. The Blackbelly can be improved by selection within the breed. Non-Blackbelly breeding should be used with extreme caution, and then using only sires with tested and proven traits of muscling and leanness.

#### LITERATURE CITED

- ROMANS, John R. and P. Thomas Ziegler. 1977. *The Meat We Eat* (11th Ed.). The Interstate Printers and Publishers, Inc., Danville, Illinois.
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