

ULTRASOUND AND CARCASS EVALUATION PROGRAM

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For the last several years, the major topic of the Annual Beef Cattle Shortcourse has been the changing demand for beef and the evolution of the beef cattle industry from a production orientated to a consumer orientated industry. Numerous speakers have discussed the need to produce cattle that have carcasses and meat in demand by the processor and, ultimately, the consumer. The goal is to remain competitive with other meat sources and the major theme is to: "Reduce plate waste (fat) without reducing taste".

To meet this challenge, we as cow-calf producers need to know more about the raw material (the calf) that we are producing. When our calves are grown and fed, what is the quality and quantity of lean meat produced? More specifically, do the calves when properly finished produce carcasses that meet the demands of the industry in terms of weight, quality and yield grade, and palatability (tenderness, juiciness and flavor)?

In 1987, the Florida Beef Cattle Improvement Association (FBCIA), which promotes the use of production records, became an agent for USDA Carcass Program wherein eartags can be purchased that will stay with the animals until they go to slaughter, carcass data is collected and the data are returned to the tag purchaser. A number of Florida cow-calf producers have used the tags and received carcass data on the calves they produced. The general response has been: "Now that I have this information, what the hell do I do with it".

In January of 1989, the FBCIA decided that the program needed to be broadened to include an expansion of the carcass data program and the implementation of ultrasound technology for use in selection programs to make improvements in carcass and meat characteristics in the cattle produced in Florida. In conjunction with the Animal Science Department, FBCIA has purchased state-of-the-art equipment, trained and certified operators, and initiated the service to cattle producers interested in making improvements.

My purpose today is to discuss this service in terms of what is offered and the costs. I will also discuss what I think is the best approach for a cattle producer in altering carcass characteristics. Dr. Hargrove will follow me and discuss how such information can be used in a selection program, particularly as it relates to selection for muscling. Later this afternoon, a demonstration of ultrasound will be conducted for those who have not seen this technology in action.

THE FBCIA ANIMAL, CARCASS AND MEAT

EVALUATION SERVICE

The FBCIA Animal, Carcass and Meat Evaluation Service was developed to provide a mechanism for cattle producers to obtain information on the products they were producing, to assist with interpretation of the information, and to assist with development of approaches to make any needed changes. This service will be conducted by faculty and staff of the Animal Science Department and administered by the FBCIA. Because of the cost of equipment, personnel and expenses, this is a fee based service as shown in Table 1. There is a per head cost depending on what information the producer wants, and a charge for travel expenses. These charges will allow us to keep our equipment updated as new technology emerges.

The services offered can be divided into two parts: Provide ultrasound data on breeding animals; and, provide carcass and meat palatability data on progeny.

The carcass and palatability data service is an expansion of the capabilities of the USDA eartag program. While the cost of the eartag program is reasonable (\$0.50 for the tag and \$1.50 for the data), the return of data has only been 60 to 70% and this program only provides carcass data, no palatability or gain data. For special groups of calves where you do not want to take the chance of not getting all the data, we will assist you in making arrangements to get the cattle fed, slaughtered and graded. If you want palatability data, we will get the samples, do the evaluations and return the data to you with our analysis and recommendations. If you are obtaining carcass information from other sources, we will assist you in compiling and interpreting the data.

The other part of the service will involve the collection of ultrasound data, specifically fat thickness and ribeye area at this time. We prefer to collect this on yearling bulls and heifers rather than mature breeding animals. These data when collected in conjunction with other production traits such as weight, frame size, scrotal circumference or pelvic measurements will be more useful. We are still debating the best approach for adjusting these figures to a common basis for comparative purposes and need more data to make these decisions. Thus, the service stipulates that we have access to all data for research purposes.

Ultrasound technology involves the use of sound waves at 16,000 cycles/second to produce an image of the different tissues within an animal's body. From this image, various measurements can be made, such as fat thickness and the cross-sectional area of muscles. Sound waves are emitted from a crystal and as the waves strike tissues of different densities, a portion of the waves are reflected back to the crystals. In early equipment, only one crystal was used and, thus, the image was based on one location. In the more modern equipment a probe with 64 crystals is used such that an image of the cross-section at a location is obtained. This modern technology, referred to as "real-time linear array ultrasound", was developed for human medical uses, but is

applicable to meat animals.

Modern ultrasound equipment allows for linear measurements of fat thickness to be made directly on the machine and for the video recording of cross-sectional areas of muscles for later measurement. As technology advances, measurement of areas on the machine should be possible. Perhaps in the future, marbling amount can be measured.

The accuracy of ultrasound measurements as related to those measurements on the carcass has been shown to be high for fat measurements and variable for muscle cross-sectional areas. Houghton (1988) indicated that correlation coefficients between real-time ultrasound and carcass measurements ranged from .42 to .92 for fat thickness and from .47 to .86 for ribeye area. These ranges in correlations indicate that accuracy is dependent on the operator, especially for area measurements where some interpretation of vague portions in the images is required. Accurate interpretation of ultrasound images is dependent on the operator's knowledge of anatomy, proper placement of the probe, proper scanning procedures and a thorough understanding of what the images represent. Because operator technique is so important in obtaining accurate readings, the Beef Improvement Federation (BIF) has developed a program to train and certify operators. Use of certified operators is preferred. The FBCIA service has two operators certified by BIF: Roger West and Randy Huffman. These two operators will make the measurements and the interpretations. Using certified operators will allow producers of purebred cattle to submit these data to the breed association for inclusion in sire summaries.

The recommended approach to improving the cattle you produce is a stepwise process: (1) Determine what you are producing now; (2) Determine where you want to go with your program; and, (3) Develop a plan to get to your goal. The first step is easy. By obtaining carcass and ultrasound data, you can determine quickly how your cattle are performing in the market place.

The second two steps are more difficult. It must be kept in mind that changes in carcass traits may adversely affect production traits. Since we have such limited knowledge in this area, we want to proceed with caution. There must be a happy medium so that our cattle economically optimize both production and meat traits. More research is needed before we feel comfortable with making too many recommendations. Secondly, there is so little information on potential sires relative to expected carcass traits of progeny, it will be difficult to make changes until more is available. However, the cattle industry needs to get started on the first step so that it will be ready to move into the second step when the information is available.

For more information on the program or to schedule services, please call Roger West at 904-392-2992 (office) or 904-373-5251 (home).

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ULTRASOUND MEASUREMENTS^a		
RIBEYE AREA AND FAT		
<50 animal		\$12/head
50- 99 animal		\$ 1 0 / h e a d
>100 animal		\$ 8/head
FAT ONLY		\$ 5 / h e a d

CARCASS MERIT		
CARCASS GRADE DATA		
<100 animal		\$5/carc
>100		\$4/carc

PALATABILITY^b		
SENSORY PANEL		\$15/carc ^c
W-B SHEAR FORCE		\$ 5/carc ^c

TRAVEL
 The livestock owner, show or sale will be expected to pay for all travel expenses which will include transportation, lodging and meals (per diem).

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^a A reduced rate of \$1.00 per head is offered for bonafide youth activities.
^b No minimums, but only done when grade data collected
^c These costs do not include the cost of the meat samples.

LITERATURE CITED

Houghton, P. L. 1988. Application of ultrasound in commercial feedlots and beef breeding programs. Ultrasound Training School for Carcass Merit, Texas A&M University.

Table 1. FLORIDA BEEF CATTLE IMPROVEMENT ASSOCIATION ANIMAL AND MEAT EVALUATION SERVICE FEES