



## Ultrasound in Beef Production

The use of real-time ultrasound to evaluate beef cattle has improved dramatically since 1990. Beef producers routinely measure backfat thickness, ribeye area (REA), and percent intramuscular fat (%IMF) on yearling bulls and heifers. Most beef producers assume that selection of bulls and/or heifers with larger ribeye measurements will increase muscling and that selection for %IMF will improve quality grade in their offspring. However, differentiating relatively small differences in REA and %IMF on individuals at yearling age is beyond the capability of current ultrasound technology. The value of ultrasound is to measure and compare sire group differences within a herd. Therefore, there is little value in measuring single-sire contemporary groups and/or sire groups containing one or two animals. Iowa State researchers have reported relatively high rank correlations for sires between ultrasound data and actual carcass data when accuracies were high (0.8 and above), but rank correlations were relatively low when accuracies were .7 and lower.

Does this mean that ultrasound data on individual animals, such as yearling bulls, is useless? No, but it does mean that one should be cautious not to put too much emphasis on the individual's ultrasound measurements alone. Likewise pedigree EPD estimates have little meaning by themselves. The astute breeder will use every piece of information available when making decisions and combine ultrasound information with EPDs and actual carcass

data. Let's examine a few possibilities in yearling bulls:

1. The individual has much above herd average ultrasound values for REA and %IMF, and the sire of the bull has high EPDs for both traits with high ACC (above 0.8). Our confidence this bull should be high that he is above average for both traits and his progeny would show improvement in both traits. This is a best-case scenario.
2. The individual has above average ultrasound values for REA and %IMF and the sire has average EPDs for both traits with high ACC. Our confidence in this bull's ability to sire progeny that will exhibit improvement in both traits is limited. We would probably expect this bull to be average to slightly above average for both traits, but he could easily be average.
3. The individual has slightly above average ultrasound values for both REA and %IMF, and the calf's sire has EPDs slightly above average for both traits, but low accuracies. Our best estimate is that this bull will perform from slightly below average to slightly above average. This is not a bull that should hurt us, but neither should we expect significant help.
4. The individual has below-average values for both REA and %IMF, and his sire has very good EPD values for both traits. In this case, we would expect the bull's genetic value

to be between below average to slightly above average.

Remember, when it comes to carcass traits, we generally know very little about the dam's genetic makeup even though we may have a pedigree EPD estimate. For muscling, we should phenotypically analyze each calf for muscle down his top, through his hindquarter and his stifle and in his forearm. This evaluation should be used in conjunction with pedigree EPD estimates and ultrasound measurements for REA. If the goal is to improve cutability or yield grade, ultrasound measurements for REA should be converted to REA per 100 pounds live weight. Some suggest that this will lead to smaller cattle and lower carcass weights. However, this can be avoided by establishing a minimum for frame size and for monitoring hot carcass weights in finished cattle. If the objective is to improve yield grade in slaughter cattle, you will need at least 1.2 square inches REA per 100 pounds live weight. REAs per 100 pounds live weight of 1.0 to 1.2 square inches will do little to change yield grade as long as fat thickness at the 12<sup>th</sup> rib remains constant.

Since we cannot visually evaluate % IMF or marbling, ultrasound data will be especially valuable to those trying to make significant change in this trait. It may provide us with an opportunity to identify "outliers" (especially on the lowerend) before they have been retained as heifer replacements or herd bulls. In addition, ultrasound data may provide us with an early indication that a sire group might be substantially lower than the herd average, which would allow us to adjust breeding decisions accordingly. For example, if we found a sire's progeny in his first calf crop to have very poor % IMF values, we might simply cull the bull and not breed any more cattle to him.

Ultrasound offers seedstock producers an opportunity to evaluate carcass traits in live animals without harvesting them. Not only

can we evaluate yearling bulls, but we can also measure and evaluate replacement heifers. The real value of this technology may be that it will allow us to identify individuals with extremely poor values that are likely to be below herd or breed average. We can eliminate them from the gene pool earlier than before the application of ultrasound technology. Current technology does not allow us to identify the individual that will be the next "super bull" for either REA or % IMF.

Several breed associations are accepting ultrasound data in place of feedlot data because of the relatively high correlation between the two types of data and the ease of acquiring ultrasound data as compared to actual carcass data. Centralized Ultrasound Processing (CUP) has been adopted by many breeds as a means to collect high-quality ultrasound data. Jim Pritchard is certified to submit images to CUP. Contact him at the Pocahontas County WVU Extension Office, 304/799-4852.

Before you decide to ultrasound your cattle, you must be able to meet certain requirements. These criteria are necessary to achieve high-quality images satisfactory for breed improvement.

1. You must have a squeeze chute (not just a head gate) and scales. Cattle must have an empty weight within seven days of scanning.
2. You must have the chute and cattle under roof. You cannot get good images of wet cattle, and the equipment must be in the dry.
3. You must have facilities that prevent sun glare, windchill, and electrical interference. (These are the biggest reasons for poor image quality.)
4. You must have a minimum of seven contemporaries (preferably more) with at least one calf sired by a bull that ties the group to the national database. Calves must have weaning weights reported in

Figure 1: Example Blank Barn Sheet from American Angus Association.

Customer: 99999  
Anybody's Farm

**ANGUS CENTRALIZED ULTRASOUND PROCESSING**  
**BARN WORKSHEET**

**DO NOT DISCARD**

For use in reporting ultrasound data through AAA Centralized Ultrasound Processing.

Scanning Technician \_\_\_\_\_

ANIMAL IDENTIFICATION				Scan		Scan Date	Group Code	Test Type	Scan Sex	Diet	Remarks	
HEAD NUMBER	SEX	BIRTH DATE	AAA REGISTRATION NO.	AAA REGISTRATION NO.	WT							WT Date
11	B	12/29/98	11950709	11523863	1275	2-13-00	2-13-00	1	R	B	3	
15	B	2/23/99	11950709	12321387	1035	2-13-00	2-13-00	1	R	B	3	
23	B	1/1/99	11950709	11940782	1255	2-13-00	2-13-00	1	R	B	3	
27	B	1/25/99	12574440	12763889								
34	B	2/21/99	11950709	12124353	1085	2-13-00	2-13-00	1	R	B	3	
85	B	3/16/99	11950709	12321392								
93	B	1/13/99	11950709	11940775								
95	B	2/23/99	12574440	12321393								
107	B	2/27/99	12784435	12836955								
117	B	2/25/99	12574440	12763895								
135	B	3/5/99	11950709	12321396	1045	2-13-00	2-13-00	1	R	B	3	
157	B	2/15/99	11105489	12767523	1005	2-13-00	2-13-00	1	R	B	3	
189	B	1/1/99	12574440	11558849	1140	2-13-00	2-13-00	1	R	B	3	
396	B	2/22/99	11950709	12563488								
426	B	4/19/99	11950709	12563489								
774	B	3/31/99	11950709	10946288								
920	B	1/10/99	11950709	11588673	1160	2-13-00	2-13-00	1	R	B	3	

TEST TYPE: C - CENTRAL TEST, D - DEVELOPING HEIFER, F - FEED LOT, R - RANGE TEST  
DIET: 1 - 0% CONCENTRATE, 2 - 50% CONCENTRATE, 3 - 50% CONCENTRATE

Page 1

their breed improvement program and listed on ultrasound “barn sheets.” An example from the Angus Association is shown in Figure 1. You must have these “barn sheets,” which are provided by the respective breed associations, at the time of scanning. Figure 1 also shows a completed barn sheet. The bulls were weighed the same day they were scanned. An example of output returned on these bulls from the Angus Association is shown in Figure 2. You will notice that both actual and adjusted measures are printed, along with a trait ratio. Although REA/100 pounds is not provided, it can easily be calculated by dividing actual REA by scan weight and multiplying by 100.

5. Cattle must comply with age requirements specified by the appropriate breed association.

6. Cattle handling must comply with Beef Quality Assurance practices.
7. Costs vary among technicians but our current charges are:
  - a) Minimum of \$150 plus mileage at 35¢/mile.
  - b) Per-head charge of \$10; therefore, 15 cattle will satisfy the minimum charge.

Heifers should be well grown to get good measurements. The ideal Body Condition Score (BCS) is 6-7. Heifers under 700 pounds may be a problem to collect good images for ribeye area and percent intramuscular fat.

