



# THE CUTTING EDGE OF NUTRITION

## The Bulletin for Alumni of the Beef Cattle Nutrition School

**August 1996**



It is impossible to hear but recently it has been making a lot of noise. Ultrasound, that is. Packers' insistence on purchasing cattle on a "formula" basis has caused a search for live animal predictors of quality and retail yield. In order for the packer to sell beef conveniently without a marketing effort, he demands that carcasses meet a rather narrow range of specifications. For this he is willing to pay, when sufficiently high numbers of carcasses in the trading unit (pen, lot, load, etc.) fit the specs. The penalty is dear, however, when just a few carcasses fall out of the range of acceptability. Therefore, the owner of the live-finished product must have confidence in what's beneath the hide. Enter Ultrasound.

### Old Technology

Ultrasound was used in animal research in the 1950's. Since then, great strides have been made in the livestock industry but more so in human medicine. It most commonly is used in routine pregnancy exams, cardiovascular function and more recently, in the search for lesions in soft tissues, e.g., diagnosis of human breast cancer. The same technology and identical equipment are used in the beef cattle industry.

Technically, Ultrasound consists of sound waves with frequencies above 20 kHz (20,000 Hertz or oscillations per second). Human hearing can't go beyond 18kHz. Ultrasound imaging operates on the same principles as sonar on a submarine. High-frequency sound waves are transmitted out and when they strike an object, echoes are reflected back to the receiver. The transmitter/receiver is called a transducer, which converts electrical energy into sound waves. It then receives and converts sound waves into electricity to be pro-cessed. As sound waves are emitted from the transducer

and passed through different tissues with different densities, signals are produced that detect this density difference and then are passed back to the transducer. Muscle and fat have different densities; therefore, they can be differentiated. The most common traits measured in live beef cattle include 12 - 13<sup>th</sup> rib fat thickness, ribeye area and percentage intramuscular fat.

### Corroborators

Ultrasound imagery alone isn't sufficient information to produce accurate prediction equations. Live empty body weight (EBW) as well as frame size are essential components of any equation. *As a practicing Alum, you presently are using these measurements.* Individual animal identification is necessary. An electronic ear tag (button) is used for this purpose.

**EBW.** The Ultrasound + systems with which I am familiar use scale weight, corrected by a constant (e.g., wt times 0.95%) for EBW. This is unsatisfactory because of extreme variation in gut fill relative to forage fiber content. Advancements in associated computer software should correct this. Actually, a better estimate may be derived from the relation between frame size and body condition score (BCS), where BCS is derived from the Ultrasound image.

**FRAME SIZE.** In the School, frame scores have been estimated from hip height. That is about as much as you are going to get from most ranchers. With the Ultrasound + systems, specially positioned cameras photograph height, length and width or thickness. The photos are digitized for computer calculation for a much better estimation of frame size.

With some fairly sophisticated equations, EBW, frame size and Ultrasound values are combined and massaged in a computer. A detailed description of the animal pops out of the computer. With subsequent measurements, graphical interpretations are made, leading to forecasts and/or trends.

### From DOS to Windows

Both the hardware and software used with sonography will be "upgraded" as its use demands. Presently, there is considerable subjectivity on the part of the technician in image interpretation. Software advances will have the computer interpret the images, thus removing all bias.

### Who Needs It

Information (a lot of it) will be necessary in order for value-based marketing to become a reality. In the future, cattle will be bred, sorted and fed with a targeted product in mind. It must begin with the seedstock producer. He successfully has used Expected Progeny Differences (EPD) to alter growth, scrotal circumference, milk production, etc. Now EPD must be used to alter carcass merit. *Backfat, ribeye area and lean meat content are moderately heritable traits while marbling score is highly heritable.* Ultrasound systems + can accelerate the entire process.

With the placement of the electronic ear tag in the newborn, the cow/calf producer will realize performance data from the feedlot and carcass data from the packer. More significantly, he/she will get paid on the basis of the value of the product produced. He/she must remain on the information trail at least long enough to get the \$10.00 ear tag back.

#### Schools In '96 and '97

North Platte, NE September 10 - 13

Kerrville, TX October 7 - 10

Redding, CA October 28 - 31

Wichita Falls, TX January 13 - 16

Tucson, AZ February 24 - 27

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