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Carcass Ultrasound 101

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The Importance of Ultrasound Rump Fat

It's fairly easy for any cowhand to understand the necessity of collecting ribeye area, fat thickness, and a measure of marbling via ultrasound. Those images largely attempt to mirror what a grader looks at in assessing USDA quality and yield grade. However, the image taken over the rump often escapes breeders as to why it's necessary or how the information is used in the carcass Expected Progeny Differences (EPD) of their respective bull or heifer. While their dedication to science and research has certainly been appreciated, purebred producers are certainly due an explanation on the importance of rump fat.

The research behind ultrasound rump fat data collection is somewhat limited. A small number of studies appear in The Journal of Animal Science including: Williams et al., 1997; Greiner et al., 2003; and Tait et al. 2005. The basic objective of this research was to improve the prediction of retail product or overall carcass fatness using ultrasound technology on live cattle. As an animal stands in a head chute, the top of the round is a primal cut that's safely accessed. A practical and repeatable location is the "line" between the hooks and pins. Using ultrasound, two distinct muscles are clearly visible in all beef animals at that location, the *gluteus medius* and the *biceps femoris*. A number of variables including image position/location, rump fat, muscle area, and muscle depth were studied. When the dust settled, the only measure that remained to be collected was rump fat.

As beef cattle grow and mature, rump fat is an early developing fat tissue. Textbooks of beef cattle anatomy often refer to it as the "breeding pad," a protective fat Mother Nature put in place for mating, making the process more comfortable for both bull and cow alike. On a typical growing ration used by purebred operations, rump fat will be deposited at a younger age than rib fat. Thus, seedstock will often scan with more rump fat than rib fat at a year of age. A high-energy feedlot diet can significantly alter the rate at which cattle fatten. Pre-harvest ultrasound data results for fat cover are more variable with rib fat outpacing rump fat in many instances. As a result, it becomes very difficult to parallel purebred yearling bulls and heifers with crossbred steers of varying ages and genetic backgrounds being fed to maximize gain and quality grade premiums. Research results are mixed when using rump fat to help predict USDA Yield Grade in feedlot cattle. Graders must quickly view the carcass moving down the rail when assessing carcass yield; sometimes they adjust the Yield Grade based on visible fat indicators other than 12th rib backfat. When using 12th Rib fat, Ribeye Area (REA), % Kidney, Pelvic, and Heart Fat (%KPH), and Hot Carcass Weight to calculate USDA Yield Grade, 12th Rib fat thickness has the most influence on the equation by far. Many times, fat thickness over the ribeye alone is an accurate indicator of yield. As a result, collecting rump fat to improve retail product prediction is simply unnecessary in a lot of feedlot carcass trials.

Fortunately, using ultrasound rump fat in a genetic evaluation tells a different story. Heritability estimates for ultrasound rump fat are very encouraging. The 2004 Iowa State University Animal Industry Report showed that ultrasound rump fat was highly heritable

(h^2=0.40), even slightly more than rib fat in the same study (h^2=0.29) when testing yearling Angus bulls and heifers. This certainly validates using ultrasound technology as a viable tool for genetic selection and the accuracy at which rump fat can be collected. However, making broad conclusions across breeds may be a risky assumption.

It is well-known that Continental breeds of cattle are later maturing and often leaner than their British breed counterparts. As a result, scanning purebred Continental cattle at a year of age often limits the amount of variation in 12th-13th rib fat thickness and rump fat, since these breeds have likely not reached the "plateau" of their growth cycle. That's not to say that scanning Continental breeds later in life is the answer; goals of the breed and the breeder can be compromised in this scenario. In some cases, an animal may not be genetically able to reach 0.4 inches of rump fat or rib fat, regardless of the diet or length of the feeding period. It's simply not enough to be able to measure a trait; you must find differences in a population in order to make progress. In the end, British breed associations may find rump fat to be more useful in predicting retail product since more genetic variation is expressed. Continental breeds often find that rump fat is not statistically significant in retail product prediction because the measure more closely mirrors rib fat.

Many cattle producers question the usefulness of a rump fat measurement for the simple fact that grids neither pay nor discount for the trait directly. Besides, the image takes more time to collect and requires additional preparation (clipping/oiling) of the animal. Agreeably, very few breeders select bulls or replacement heifers based solely on rump fat. Regardless, rump fat may still be used to identify potentially lower maintenance animals within a contemporary group. Similar to rib fat, rump fat needs to be managed and maintained. Progress can be made in red meat yield, but extreme selection pressure could harm reproductive traits. USDA Graders take a quick look at the rump to see if a yield grade adjustment is necessary as the carcass rolls by on the chain. I would suggest breeders do the same when examining their genetics for retail product, especially if heifers are retained in the operation or sold as replacements.