



By the Numbers

► by **Sally Northcutt**, director of genetic research

Yearling performance points

Yearling records are important contributors to the profile of expected progeny differences (EPDs) for Angus cattle. These data points on registered animals go far beyond just the classic yearling weight trait. The traits measured at yearling time on Angus seedstock are economically relevant traits to the beef production system. Determining superior feedlot performance, enhanced end product value and identifying genetics that are most suited to your particular environment can be determined by the performance data generated on yearling cattle.

Yearling weights and measures

The acceptable age range for yearling weights is 320 to 440 days of age. Proper contemporary grouping at yearling still applies in order for an animal's own record to be utilized as part of the National Cattle Evaluation (NCE) and to be meaningful in genetic predictions of how future progeny are expected to perform.

Remember that the yearling contemporary group is no larger than the weaning contemporary group. If one bull calf is sent to a bull test station, for example, he becomes a yearling contemporary group of one since his peers are the bulls at home from his weaning contemporary group. EPDs cannot be generated using his individual record if the bull has no contemporaries. For more information on contemporary groups, see www.angus.org/performance/documents/contemporary_grp.html.

If you do not submit yearling weights, you still receive a yearling weight EPD through the NCE biannual run. The genetic correlation between weaning weight and yearling weight that is accounted for in the NCE methodology allows this to be possible. You may receive a yearling weight (YW) EPD because of this correlation, but you fail to identify animals that may excel in the postweaning gain period. To better characterize the cattle and make the EPDs more informative, the yearling weight data collection on your cattle is a pivotal step.

In addition to calculating YW EPDs, yearling weights are used in the analysis of yearling height (bull and heifer; YH) and scrotal circumference (SC) EPDs. The YH and SC evaluations use yearling weight as a genetically correlated trait, at a moderate level of 0.54 with height and 0.29 with scrotal circumference.

As a reminder, the acceptable age range

for yearling heights and scrotal measures on bulls is also 320 to 440 days of age. Long yearling measures on scrotal and height are not utilized in the EPD calculations.

In the case of embryo transfer (ET) calves, yearling weights are only used on ET calves recorded out of a registered Angus recipient female. As a note for scrotal and yearling height, the ET calf's individual records can be used in the NCE provided all other NCE requirements are met. If a registered Angus recipient female is not used, then no age-of-dam adjustment is made for these two traits.

Selection pressure at yearling time

A common question received in the Angus Herd Improvement Records (AHIR®) Department is why the ratio is not easily calculated on yearling weights reported. If weaning ratio uses the animal's own performance compared with the average of the contemporary group, why does this not apply in the math for yearling ratio in some cases?

If selection pressure has been placed on calves following weaning and not all calves are weighed at yearling that have had weaning data recorded, then special adjustments must be made. This situation can occur in on-farm performance testing, where only the heavier calves in the weaning contemporary group have been retained for postweaning measures. Without correction for this occurrence, the yearling weight ratios can be biased downwards. These results would contrast the situation where all calves (unselected) were evaluated at weaning and yearling for that contemporary group.

The *Beef Improvement Federation (BIF) Guidelines* (available online at <http://beefimprovement.org/library.html>) for uniform beef improvement programs contains a reference to this adjustment.

The guidelines recommend calculating a corrected adjusted yearling weight ratio to eliminate the culling bias from removing calves from the group that were measured at weaning.

Also, this issue of selection bias must be addressed in the calculations for the YW EPDs. Multiple-trait genetic evaluation models are used to help overcome bias from incomplete reporting and selection. In the case of yearling weight, the American Angus Association's NCE for growth is designed to analyze weaning weight and yearling weight in a multiple-trait approach. You are probably already aware of this fact, in that young animals in the evaluation receiving weaning weight (WW) EPDs also receive a YW EPD from the model even if a yearling weight has not been reported.

What about the heifer weights?

Granted, there is culling between weaning and yearling time, but many just do not submit yearling weights, especially on their females. It's important to also weigh heifers at yearling. In addition to being used in yearling EPD predictions, these weights are utilized in the development of mature cow size EPDs, which also influence weaned calf value (\$W) and cow energy value (\$EN). For heifers, the use of yearling weights and heights has more merit than ever before. The mature size evaluation uses repeated measures on females to generate mature weight (MW) and mature height (MH) EPDs. If you have the ability to capture yearling weights and heights on your heifers, these records will be used to better characterize Angus cow size genetics.

Adjusting yearling weights

A common question is how are adjusted yearling weights calculated?

Adjusted 365-day weights are computed to adjust an actual yearling weight taken by the breeder to a standard animal age (365 days, typically) and age of dam (this adjustment takes place through the use of the 205-day weaning weight). Acceptable calf ages for yearling measures are 320-440 days of age.

The suggested period between weaning and yearling weight is 160 days. A common mistake is that the two weights are taken too closely together. Although the window of acceptable weaning weight ages is 120 to 280, and yearling weight age 320 to 440 days of age, you need to try to allow for more days on feed during the postweaning gain timeframe to better characterize the trait.

Adjusted 365-day yearling weight formula:
= [(actual yearling weight – actual weaning weight) ÷ No. of days between measure ages] × 160 + 205-day adjusted weaning weight

Example:

Actual yearling weight = 1,085 lb.

Yearling measure age = 363 days

Actual weaning weight = 660 lb.

Weaning measure age = 209 days

205-adjusted weaning weight = 731 lb.

Adjusted 365-day Yearling Weight =

$$[(1,085 - 660) \div (363 - 209)] \times 160 + 731 = 1,173 \text{ lb.}$$

In contrast, weight per day of age (WDA) is not computed the same and can be a source of confusion, if you thought that was the case. The WDA is calculated as follows:

$$\text{WDA} = \text{Actual weight} \div \text{days of age}$$

In the above example using weaning weight as the actual weight taken:

$$\text{WDA} = 660 \div 209 = 3.16 \text{ lb. per day of age.}$$

Yearling temperament score

Temperament is one of the most important behavioral traits in cattle. Cattle behavior has been documented to influence economically important traits. Researchers at Colorado State University have studied cattle temperament as related to beef cattle production systems, handling facilities and carcass end product.

The Association released its first docility EPDs in a research format using the AHIR yearling temperament score database in the Spring 2008 NCE. Although temperament scores have been an available performance field in the cow data details, the primary focus is to collect less selected temperament data on bulls and heifers at a year of age. The heritability was estimated to be 0.37 in the Angus field data by Bob Weaver, a researcher at the University of Missouri. A heritability of this magnitude indicates that genetic selection for more docile cattle can be effective. To read more about docility EPDs go to www.angussiresearch.com.

To contribute to the yearling temperament database, a scoring system is used consisting of six subjective categories. These scores range from 1 (docile) to 6 (very aggressive). As with other scoring systems of this nature, such as body condition scores, for example, consistency is the key. Calves in the same yearling contemporary group should be scored by the same person. Your neighbor may not interpret the scoring system the same way you do, but your scores relate to the contemporary group of cattle you evaluate in your herd.

Ultrasound

Rounding out the complex of yearling measures is ultrasound data collection. Acceptable age ranges are 320 to 440 days of age for bulls and 320 to 460 days for heifers.

The contemporary group definition starts

Table 1: Temperament scores

Codes	Description
1) Docile	Mild disposition. Gentle and easily handled. Stands and moves slowly during processing. Undisturbed, settled, somewhat dull. Does not pull on headgate when in chute. Exits chute calmly.
2) Restless	Quieter than average, but may be stubborn during processing. May try to back out of chute or pull back on headgate. Some flicking of tail. Exits chute promptly.
3) Nervous	Typical temperament is manageable, but nervous and impatient. A moderate amount of struggling, movement and tail-flicking. Repeated pushing and pulling on headgate. Exits chute briskly.
4) Flighty (wild)	Jumpy and out of control, quivers and struggles violently. May bellow and froth at the mouth. Continuous tail-flicking. Defecates and urinates during processing. Frantically runs fence line and may jump when penned individually. Exhibits long flight distance and exits chute wildly.
5) Aggressive	May be similar to Score 4, but with added aggressive behavior, fearfulness, extreme agitation, and continuous movement, which may include jumping and bellowing while in chute. Exits chute frantically and may exhibit attack behavior when handled alone.
6) Very aggressive	Extremely aggressive temperament. Thrashes about or attacks wildly when confined in small, tight places. Pronounced attack behavior.

Table 2: Acceptable scanning ages for Angus cattle

Breed	Yearling bulls	Developing heifers
Angus	320-440 days	320-460 days

with weaning. This makes the submission of your weaning weights and the barn sheets a necessary part of the AHIR ultrasound process. Contemporaries are from the same weaning group, and there must be at least two calves of the same sex to form a usable contemporary group for EPD calculations. Scan weights are required and should be taken within seven days of the technician capturing the ultrasound data. For the animals within the contemporary group, they should be scanned on the same day or over no more than two consecutive days. Many breeders will schedule the scanning date to coincide with data collection for other yearling traits.

The Association now accepts ultrasound data from multiple approved labs. Consult with your ultrasound field technician as part of the decision process on where to send your scan data for interpretation. Details on ultrasound breeder protocol, field technicians, authorized labs and policy can be found online at www.angus.org/performance/index.html.

An important point to remember: Scan weights that are submitted on barn sheets with your ultrasound data are not automatically provided to the Association as yearling weights. You must submit yearling weight data directly to the Association through the appropriate channels used for this trait.

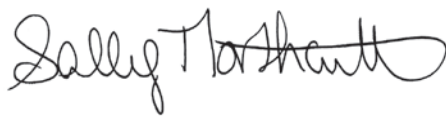
Importance of ultrasound measures for carcass EPDs

The Fall 2008 NCE will contain a new

release of enhanced carcass trait EPDs. This new evaluation will produce four EPDs for carcass merit (weight, marbling score, ribeye area and fat thickness) and will integrate the ultrasound and carcass phenotypic databases simultaneously. The units of measure would be in carcass trait format and analyzed on an age-constant basis. The existing ultrasound EPDs will no longer be published following the July 2008 release.

Scans taken on yearling Angus bulls and heifers will be increasingly important to generate interim and NCE EPDs. The classic carcass EPD pedigree interims based on sire/maternal grandsire estimates with 0.05 accuracy will no longer exist under this new evaluation. Interims in fall 2008 will be accessing genetic contributions on the sire and dam, as well as the contemporary group deviation information. Thus, ultrasound scans from a proper contemporary group on bulls and heifers will be meaningful in deriving genetic predictions on animals that in the past had relied solely on pedigree estimates for their carcass EPDs and dollar values (\$Values).

Details regarding the new carcass evaluation for the fall 2008 NCE can be found in the December 2007 "By The Numbers" column.



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