

PERFORMANCE ADJUSTMENTS AND RATIOS

Contemporary Groups

One of the most important aspects of a conscientiously applied performance program is the proper identification of contemporary groups. If similarly treated cattle are not properly grouped when sending in performance data, the resulting reports lose much of their value.

Calves which fall into different contemporary groups but are submitted at the same time should be grouped separately and clearly identified as being in different groups. It is helpful, but not necessary, to separate bulls and heifers for reporting.

The following guidelines for identifying contemporary groups should be used when submitting performance information.

1. All calves should have received the same management from birth to weaning. That is, calves getting creep should only be compared to other creep-fed calves and so forth. Embryo transfer calves are not compared to calves reared by their natural mothers.
2. Calves should be the same breed. Brangus calves should not be compared to half-bloods, etc.
3. Calves should all have been reared at the same location. Environmental differences exist between locations even in the same general area.
4. Calves must all be born in the same season. It is not fair to compare spring calves to fall calves, for example. A rule of thumb to remember is that a fair comparison probably can't be made if calves are born more than 90 days apart.
5. All calves in a contemporary group should be weighed the same day. It is impossible to make fair comparisons if weigh dates are more than seven days apart. Contemporary groups should be broken accordingly.

Since the new registry system has been on-line, members have repeatedly asked what rules are being used when contemporary grouping the animals at each stage of data reporting. The grouping criteria used are listed below and conform as closely as possible to those outlined in the Beef Improvement Federation Guidelines for Uniform Beef Improvement Programs:

- Birth Contemporary Groups:
 1. Premise ID (member id used in lieu of premise if not provided)
 2. Pasture ID (defaults to 1 unless otherwise provided)
 3. Dam/Heifer Management Code
 4. Sex of calf
 5. Service Type (ET grouped separately from NS/AI)
 6. Season (currently defaulted to Dec-Jan-Feb, Mar-Apr-May, Jun-Jul-Aug, Sep-Oct-Nov -- however you can override the default)
 7. Genetic Composition (Full Brangus grouped apart from 1/4, 1/2, and 3/4 bloods)
 8. Self-reported contemporary group
- Weaning Contemporary Groups:
 1. Premise ID (member id used in lieu of premise if not provided)
 2. Pasture ID (defaults to 1 unless otherwise provided)
 3. 7-day window of weighing
 4. Sex of calf
 5. Feed/Management Code
 6. Self-reported Contemporary Group

* animals under 160 days of age or over 250 days of age are single contemporary grouped
- Yearling Contemporary Groups:
 1. Premise ID (member id used in lieu of premise if not provided)
 2. Pasture ID (defaults to 1 unless otherwise provided)
 3. 7-day window of weighing
 4. Sex of calf
 5. Feed/Management Code
 6. Weaning Contemporary Group (animals NOT in the same WCG will not be CG'ed at yearling)
 7. Self-reported Contemporary Group

* animals under 320 days of age or over 600 days of age are single contemporary grouped

- **Ultrasound Contemporary Groups:**
 1. Premise ID (member id used in lieu of premise if not provided)
 2. Pasture ID (defaults to 1 unless otherwise provided)
 3. Scan Date
 4. Sex of calf
 5. Feed/Management Code
 6. Weaning/Yearling Contemporary Group
 7. Self-reported Contemporary Group

* animals under 320 days of age or over 600 days of age are single contemporary grouped

Adjusted Birth Weight

Because of the economic importance of calving ease and the relationship of birth weight to this trait, it is important to weigh calves at birth. Actual birth weights of all calves in a group must be adjusted for differences in age of dam, before the weights can be used in ratio and EPD calculations. The following factors are used in adjusting Brangus birth weights for age of dam:

1. Calculate the age of the dam in days when the calf was born. The age of dam (AOD) used in the calculation is set to 650 days for dams younger than 650 days, and to 5350 days for dams older than 5350 days:
 - AOD = 650 (if dam <= 650 days old)
 - AOD = 5350 (if dam >= 5350 days old)
 - AOD = actual age (if dam between 650 and 5350 days old)

2. Select the appropriate age of dam cutoffs and coefficients for the sex of the calf from the following table:

Sex	AOD Cutoffs (Days)		Coefficients		
	A1	A2	C1	C2	C3
Male	1929	2900	0.01867209	0.00000484	0.00229253
Female	2122	2900	0.01392181	0.00000328	0.00177874

3. Select the appropriate adjustment formula for the age of dam from the following table, and calculate the adjustment factor:

Age of Dam	Adjustment Formula
AOD < A1	(C1 * (A1 - AOD)) - (C2 * ((A1*A1) - (AOD*AOD)))
A1 <= AOD <= A2	0 (no adjustment)
AOD > A2	C3 * (AOD - A2)

4. Add the adjustment factor to the actual birth weight to produce the adjusted birth weight.

Birth Weight Ratio

Birth weight ratio is calculated using the adjusted birth weight. The birth weight ratio is a much more accurate performance measure for selection than is actual birth weight.

The birth weight ratio is calculated as follows:

$$\text{Birth Weight Ratio} = \frac{\text{Calf's adjusted birth weight}}{\text{Average birth weight of the contemporary group}} \times 100$$

Weaning Weight

Only weaning weights obtained between 160 and 250 days of age can be adjusted and used in ratio calculations. Calves weighed out of this range will only have weight per day of age (WDA) calculated and will receive no adjustments or ratios. It is important to weigh as many calves as possible on the same day. Select a weigh date when as many calves as possible fall within the 160 to 250 days of age range.

Weight per day of age (WDA) is calculated as follows:

$$\text{WDA} = \frac{\text{Actual weaning weight}}{\text{Days of age when weighed}}$$

Adjusted 205 Day Weight

Weaning weight reflects both the milking ability of the dam and the growth potential of the calf. In order to compare calves of different ages and from different aged dams it is necessary to adjust the actual reported weight to a constant number of days of age and mature dam constant (ET calves are adjusted for age of calf, but not for age of dam).

1. Calculate the calf's 205 day weight as $((WWT - BWT) / \text{Age of calf}) * 205 + BWT$. If the calf does not have a valid birth weight (between 30 and 150 lbs.), then perform the calculation using a BWT of 75 for a male calf or 70 for a female calf.
2. Calculate the age of dam adjusted 205 day weight as follows:
 - a. select the appropriate age of dam cutoffs and coefficients for the sex of the calf from the following table:

Sex	AOD Cutoffs (Days)			Coefficients		
	A1	A2	A3	C1	C2	C3
Male	1428	1850	3100	0.061	0.02299	0.007
Female	1150	1850	3225	0.053	0.022	0.011

- b. select the appropriate adjustment formula for the age of the dam from the following table, and calculate the adjustment factor:

Age of Dam	Adjustment Factor
AOD < A1	$(C1 * (A1 - AOD)) - (C2 * ((A1 * A1) - (AOD * AOD)))$
A1 <= AOD <= A2	$C3 * (A2 - AOD)$
A2 <= AOD <= A3	0 (no adjustment)
AOD > A3	$C3 * (AOD - A3)$

- c. add the resulting adjustment factor to the 205 day weight to produce the adjusted 205 day weight.

Weaning Weight Ratio

Weaning weight ratio is calculated using the adjusted 205 day weight. It describes a calf's pre-weaning growth in terms of a percentage of the herd average for that sex. The weaning weight ratio is a much more accurate performance measure for selection than is actual weaning weight.

The ratio is calculated as follows:

$$\text{Weaning Weight Ratio} = \frac{\text{Calf's adjusted 205 day weight}}{\text{Avg. 205 day Wt. of Cont. Group}} \times 100$$

Yearling Weight

Actual yearling weight should be reported for all calves appearing in the weaning contemporary group if they have not been culled or sold prior to the weight date. Cattle may be adjusted to any one of the three yearling weight constants: 365, 452, 550 days. All cattle in a contemporary group should be weighed within the same age range.

Adjusted Yearling Weight

The yearling weight is adjusted for one of the following age constants (R):

R	Age In Days	D
365-day Weight	320 and 410	160
452-day Weight	411 and 501	247
550-day Weight	502 and 600	345

Calculate the adjusted yearling weight as follows:

$$\text{Adj. Year Weight} = \left(\frac{\text{Actual Year Weight} - \text{Actual Wean Weight}}{\text{\# of days between weights}} \right) * D + \text{Adj 205-day Weight}$$

Yearling Weight Ratio

Yearling weight ratio is a much more accurate performance measure for selection than is actual yearling weight. Since some calves which were part of the weaning contemporary group may not be kept until yearling data is collected, it is necessary to adjust their yearling weight ratios for culling. Ratios are biased downward in situations where the lower end is culled and not fed through yearling stage. To compensate for culling, adjusted yearling weight ratio is calculated as:

$$\text{Yearling Weight Ratio} = \frac{w + p}{W + P} \times 100$$

Where

w = calf's adjusted 205 day weight

p = calf's post weaning gain

W = average 205 day weight of all contemporaries

P = average post-weaning gain of all contemporaries having a yearling weight

$$\text{Note: Post weaning gain} = \frac{(\text{Actual Yearling. Wt.} - \text{Actual Weaning Wt.}) \times D}{\text{Days between weights}}$$

D = length of gain period (160, 247 or 345 days, depending on length of adjustment period.)

Scrotal Circumference

There are several studies indicating high correlations between scrotal circumference and total semen output, and between scrotal circumference in yearling bulls and age at puberty of their paternal half-sibs.

Scrotal circumference should be measured at the same time yearling weight is taken. The bull should be confined in the chute and both testicles should be pulled down into the scrotum. Place the measuring tape snugly around the widest portion of scrotum, but not tight enough to wrinkle the skin. The scrotal circumference measurement is reported in centimeters.

Adjusted Scrotal Circumference

As with all performance measures, known sources of non-genetic variation should be adjusted from the scrotal circumference measure before making selection decisions. Adjusting all animals within the contemporary group to a constant age and mature dam equivalent is accomplished as follows (ET calves are adjusted for age of calf, but not age of dam).

1. Select the appropriate age of dam adjustment factor from the following table:

Age of Dam	Adjustment Factor
AOD <= 1003	0.8
1004 <= AOD <= 1338	0.4
1339 <= AOD <= 1703	0.3
1704 <= AOD <= 3166	0.0 (no adjustment)
AOD >= 3167	0.2

2. Calculate the 365 day adjusted scrotal circumference as:

$$\text{Adjusted Scrotal Circumference} = (365 - \text{Age of Calf}) * 0.041 + \text{Actual SC} + \text{Age-of-Dam Adjustment Factor}$$