Age-of-Dam Effects on Weaning Weight in the Angus Breed

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Selection for increased pre- and post-weaning gain in the Angus breed over the past 15 years has been very successful. This success is easily visible in EPD trend lines for weaning and yearling weights appearing in each new Angus Sire Evaluation Report. An increase in genetic merit for the early growth traits can also be seen when reviewing average phenotypic weaning weights recorded by breeders and submitted to the American Angus Association for AHIR processing.

Figure 1 presents average 205-day adjusted weaning weights for bull calves. The average weights are classified into four groups corresponding to dam birth-year groups. The weights are plotted as a function of age of dam at the time of calf weaning.

There is little difference observed in weaning weight trends by age of dam for the first two birth-year groups, dams born in 1966-70 and those born in 1971-1975. Starting with the third birth-year group, 1976-80, increased average weaning weights can be seen. More changes occur in the dam birth-year group 1981-85. Figure 2 presents similar trends for heifer calves.

Figures 1 and 2 not only illustrate that significant changes have been made across the Angus breed relative to increased weaning weights, but also that age of dam has a lot to do with 205-day weaning weights.

For cows born in 1971-75, peak production occurs when the cow has her fourth calf and she is between five and six years of age (at calf weaning time). For cows born in 1981-85, this peak production seems to have shifted to the right when the cows have their fifth calf, or when they are between six and seven years old.

Probably a more important fact to point out is the spread between first- and second-calf heifers and mature cows relative to calf weaning weight. The difference increases with each new generation of cows. The following table gives differences in average weaning weights for non-creep fed bull calves for each of four dam birth-year groups.

	Average Weaning Weight*, lbs.		
Dam Birth-Year Group	First Calf	Fourth Calf	Difference
1966-70	421	463	41
1971-75	425	470	45
1976-80	447	499	52
1981-85	472	529	57

*Bull calf 205-day weights, non-creep fed.

Differences shown in this table point out the need to analyze the Angus data base to establish new age-of-dam adjustment factors. In addition, it is likely that the spread will be even larger when dams born in 1986-90 are included in the analysis.

Correct age-of-dam adjustment factors are essential for fair genetic comparisons among animals for both direct weaning weight and maternal weaning weight (milk production).

Sires bred only to first- and second-calf heifers will have direct weaning weight EPDs biased downward relative to sires that are bred to mature cows. Sires with first- and second-calf heifers in production will have maternal weaning weight (milk) EPDs biased downward relative to sires that have mostly mature daughters in production.

An analysis was undertaken to determine more appropriate age-of-dam adjustment factors than are currently being used for the modern day Angus female population. The analysis included over 780,000 weaning weight records collected by breeders from 1970-1988. The analysis model accounted for contemporary group season effects, type of management (creep vs. non-creep), sex of calf and age-of-dam. The model also included individual dam effects to help remove bias due to cow selection.

The model included statistically significant interaction terms of calf sex, age-of-dam and calf sex management type. The analysis grouped younger cows by age in six-month intervals: less than 33 months at calf weaning time, 34-39 months and 46-51 months. Older cows are grouped in 12-month intervals: 52-63 months at calf weaning time, 64-75 months, etc.

Results of the age-of-dam analysis show an even larger difference in age-of-dam effects than is apparent from the phenotypic means for weaning weight presented in Figures 1 and 2.

Major results of the analysis are

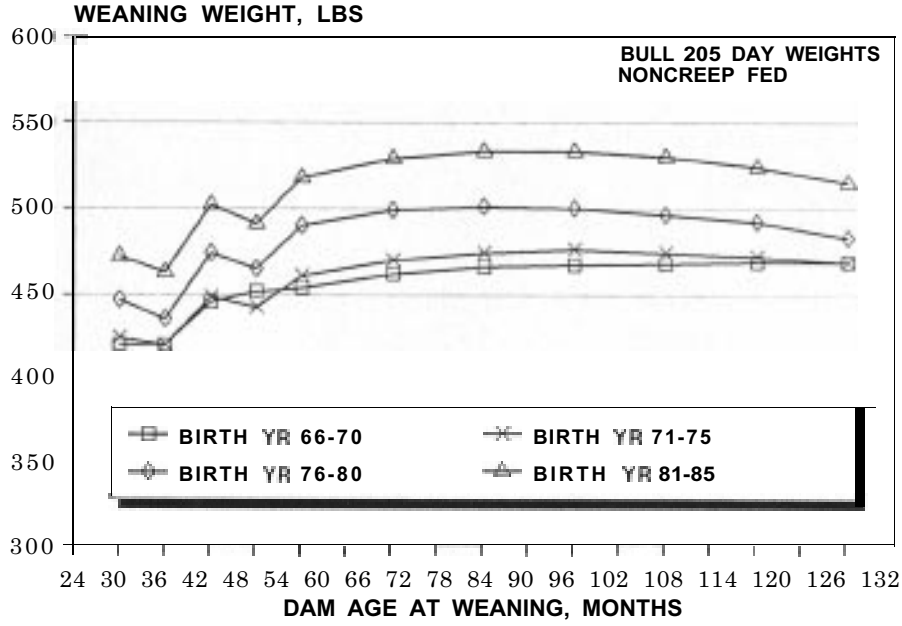

Figure 1. Phenotypic trends in bull calf 205-day weaning weights by dam birth-year groups and age-of-dam at calf weaning time.

plotted in Figure 3 for bull and heifer calves. This figure shows the amount of additional pounds that must be added to weaning records of calves from young dams to put them on a five-year-old mature cow basis.

The American Angus Association began using these additive adjustment factors for all new weaning records processed after January 1, 1989. New age-of-dam adjustment factors for birth weight were implemented at the same time. The new adjustmenta are summarized in Tables 1 and 2.

The bi-annual cattle evaluations conducted by the American Angus Association use a data base of weaning weight records that begins in 1970. Because of the dramatic changes occurring in the Angus breed relative to mature size over the last 15 years, it is unreasonable to expect that one set of dam adjustment factors can be applied to all records across all of these years.

Evaluations may eventually be needed that include age-of-dam fixed effects in the genetic evaluation models similar to how contemporary group effects are handled. When including age-of-dam effects in the evaluations, there would be no need to pre-adjust weaning weight records for these effects. The model would automatically account for age effect differences in each new evaluation.

The American Angus Association will continue to monitor age-of-dam effects on birth and weaning weights. As long as there is a positive trend in pre-weaning growth traits, the data base will be needing further analysis to determine the best method for removing potential biases in the genetic evaluation programs.

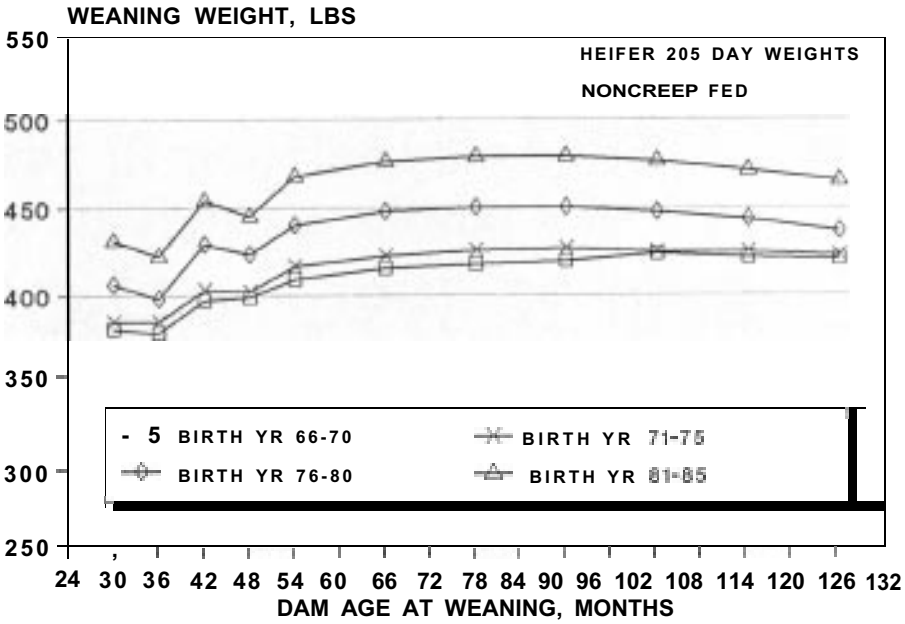

Figure 2. Phenotypic trends in heifer calf 205-day weaning weights by dam birth-year groups and age-of-dam at calf weaning time.

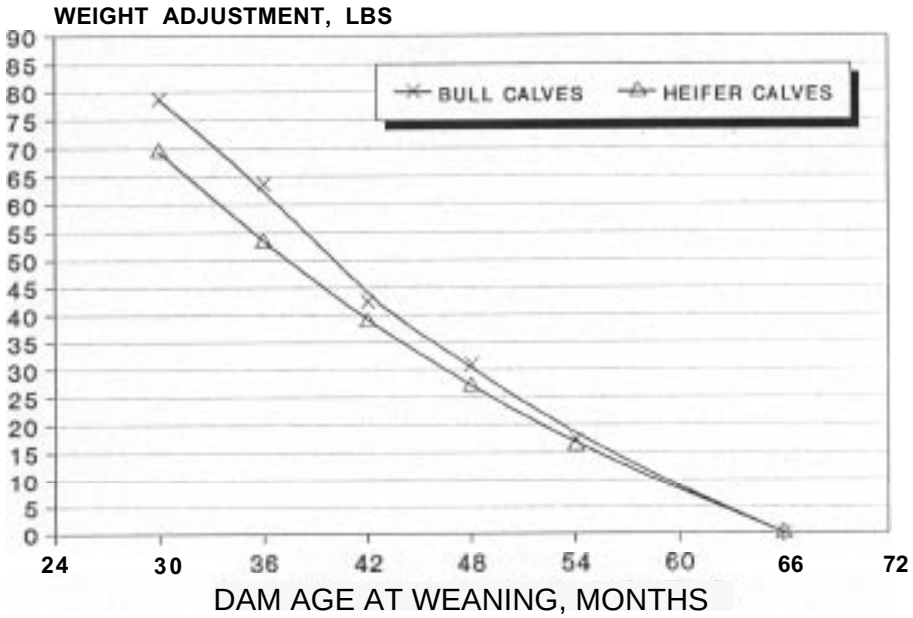

Figure 3. Additive adjustments for weaning weight for age-of-dam to a mature cow (5 years) equivalent.

	Pounds to add	
If age-of-dam is:*	Bulls and Steers	Heifers
Thru 2 years (y) and 243 days (d)	79	69
2y 244d- 3y 91d	64	63
3y 92d- 3y 273d	42	39
3y 274d- 4y 91d	31	27
4y 92d- 5y 91d	18	16
5y 92d- 6y 91d	0	0
6y 92d - 10y 91d	0	0
10y 92d and older	10	0

*Age-of-dam at calf weaning time.

Table 1. Weaning weight (205-day) additive adjustment factors for age-of-dam to a mature cow basis (5 years).

Ifageofdamis:	Add pounds to birth weight
Thru 2 years (y) and 243 days (d)	6.7
2y 244d- 3y 91d	5.5
3y 92d- 3y 273d	2.6
3y 274d- 4y 91d	1.5
4y 92d- 5y 91d	.7
5y 92d- 5y 91d	0
6y 92d - 10y 91d	0
10y 92d and older	1.0

Note: lb adjust heifer birth weights to a bull equivalent, multiply the heifer's age-of-dam adjusted birth weight by 1.055.

Table 2. Birth weight adjustments to a mature cow (5 years) equivalent.