

## **THE IMPORTANCE OF KNOWING BREED EPD AVERAGES**

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One thing that may be overlooked when selecting sires for breeding season may be to compare your selection criteria, or the EPDs (Expected Progeny Differences) of bulls you are considering, to the EPD averages for the breed. You should not assume that the average EPD for a trait is zero. If it is greater than zero, a bull with a positive EPD for a particular trait may not be above average. This is especially true for breeds that have a considerable amount of genetic trend included in EPD values. For example, a Hereford bull with a yearling weight EPD of 25 lb might appear above breed average if you were not aware that the average for proven Hereford sires was 33.0 lb, implying that the Hereford bull mentioned is 8 lb below breed average. In contrast, a 25 lb yearling weight EPD bull could be above the average yearling weight EPD of animals in an individual herd. Thus, you should consider the breed and/or herd averages for each trait you use in your selection program.

Most breed associations include average EPDs for each trait, as well as the range in EPDs, for different groups of animals, i.e., sires, young sires, dams and nonparents. These values are generally given for all sires in the breed and/or all active sires listed in the catalog. Most sire summaries include them in the preliminary pages in a table or graph, but they often are not readily noticed due to being presented in different formats by each breed (and because of the tendency to turn right to the sire listings). For example, average Simmental EPD values are given in the preliminary pages preceding the sire listings, and the ranges are given at the bottom of each page of the sire listings. Determination of active sires differs by breed. Some breed associations put minimum accuracy or rank requirements on a bull's EPD for weaning weight before he may be considered an active sire. Yet other breed associations require an active sire to have at least one progeny reported within the last year or two. Definitions of active sires and other terms are generally given in the pages preceding the sire listings.

Another tool to determine where a bull of your choice ranks in the breed for a particular trait is the percentile chart(s) included in some sire summaries. These charts allow you to determine quickly where a bull ranks relative to the current population of active sires for all traits of interest, i.e., the upper 10% or maybe upper 45%, etc. Few bulls rank at the top for every trait, meaning you have to determine the priority of traits in your selection program based on your long-term breeding objectives. The percentile distribution charts may also be available for young bulls, dams and/or nonparents. Such

charts will allow you to compare the respective animals in your herd to those in others by determining at what percentile level they rank for various traits.

Some breed sire summaries also include graphs or tables showing the distribution (number) of animals by EPD categories. These distributions indicate how much variation exists in the population. In addition, you can get a good idea of how many bulls meet or exceed your selection criteria for each trait because the number of sires with EPDs in specified ranges are given. Many bulls are concentrated around the average EPD in each trait distribution, resulting in considerably fewer bulls with extreme positive or negative EPDs. These distributions may be used to get an indication of how many bulls with extreme EPDs there are for any one trait. That is not to imply that you should use only extreme bulls. Finding several bulls to choose from that are "great" for several traits is usually quite a challenge. For example, finding a high yearling weight EPD bull that also has a low birth weight EPD can be difficult because there is a positive genetic correlation between the two traits. Even so, it is important to take into account more than one trait when selecting a bull. Some breed associations offer sire search services that are conducted based on your selection criteria.

Why do EPD averages differ from zero? Choice of what is considered to be the base population of a breed and genetic trend (progress) results in averages that differ from zero. In brief, the base population within the breed may be any group chosen and defined by the breed association. This base group is used as a genetic reference point for comparison. Many breeds use an animal model for genetic evaluation and if a particular base group is not set during the evaluation, the base becomes those animals without known ancestors. For example, Angus cattle were evaluated without a set base until their spring 1991 analysis. Prior to that time, their genetic base for evaluation purposes consisted of those animals that were part of the original performance record-keeping system established by the American Angus Association. The Association recently decided to update their base and chose 1977 as their new base birth year. That means all EPD values were deviated from the average of animals born in 1977 for each trait. EPD averages for each trait of those animals born in 1977 were then set to zero. The magnitude of the difference between two bulls for any trait does not change because the base is changed, only the magnitude of each EPD changes by the same constant amount (the base year average for that trait). Thus, the procedure for comparing two bulls by computing the difference in EPDs is unaffected. Very little change (trend) occurred in the Angus breed during those years prior to 1977 in comparison to genetic trend since 1977. Therefore, by selecting 1977 as the base year, the EPDs for sires (and all other animals evaluated) listed in the 1991 sire summary were only slightly affected. Because selection is practiced to make genetic progress, the genetic merit of animals born each year should be better than those of previous years. Thus, the average EPD in subsequent sire evaluation summaries will increase for traits in which genetic progress is being made.

The result is then that you may own an older bull that ranked in the top percentile of the breed, but his rank will slowly drop as genetically superior, young bulls enter the population. The rate will depend on how much genetic progress is being made in each trait per year. This may seem bad (especially to the owner), but it is not because it is the result of genetic improvement.

Table 1 includes the averages and ranges of EPDs for traits being evaluated in each breed. The values

were obtained from 1991 published sire evaluations for all breeds except Hereford, which are from 1990. In general, averages given are for active sires of each breed. Note that the definition of an active sire may vary by breed and that some breeds use current sires, main sires or proven sires instead of the term active sires. You need to refer to the sire summaries for each breed's terms and definitions. Each breed association stipulates the traits for which their cattle are evaluated. Weight and milk trait evaluations are common for most breeds, but traits such as hip height and scrotal circumference are not common. The table was designed to accommodate traits for all breeds. An effort was made to obtain these values from breeds that participate in genetic evaluation programs. If the averages were not available, the breed was omitted from the table.

Please note that calving ease values listed for Simmental sires are for first-calf heifers. The American Simmental Association also publishes calving ease EPDs for mature cows (not reported in Table 1). Both values are useful because we know some bulls are used more for breeding heifers than for breeding mature cows. These values are computed using advanced methods (threshold model) that differ considerably from those used by other beef breeds. These calving ease EPDs are expressed as deviations of percent unassisted births with larger EPDs representing a higher percent of unassisted births. Also, notice that calving ease values for Gelbvieh are expressed as ratios with a higher ratio being a more favorable calving ease.

It is important to realize that this information is provided so that you can see what the average and range of EPDs are for each trait within each of several breeds. You may have heard about across-breed comparisons, but the methodology to compute across-breed EPDs has not yet been perfected. There is no valid method for comparing EPDs of bulls from breeds A and B using the EPDs given in the current sire summaries, nor this table, that would accurately predict which bull was better for a particular trait. Comparisons of different breed bulls are obviously made, but they will continue to be subjective until an objective procedure is developed for across-breed EPD computations.

**Table 1. EPD Averages and Ranges for Different Breeds and Traits**

Breeds (listing)		Birth Weight	Weaning Weight	Yearling Weight	Maternal		Direct		Maternal		Gestation Length	Scrotal Circum	Yearling Height	Angus	Low	-9.7	
					Milk	Weight	Calving Ease	Calving Ease	Calving Ease	Calving Ease							
		-61.0	-61.0	-39.0													
(Current sires)	<b>Avg</b>	<b>1.1</b>	<b>6.5</b>	<b>10.0</b>	<b>1.6</b>												
Spring 91	High	12.6	63.0	104.0	42.0												
<b>Brahman</b>	Low	-4.4	-18.6	-30.9	-18.6												
(All sires)	<b>Avg</b>	.2	1.0	1.9	.7												
1991	High	6.1	38.8	64.5	20.5												
<b>Brangus</b>	Low	-5.9	-38.2	-42.2	-34.4	-29.6											
(All sires)	<b>Avg</b>	<b>0.4</b>	<b>2.1</b>	<b>3.3</b>	<b>0.3</b>	<b>1.3</b>											
1991	High	9.4	86.7	86.7	23.6	27.3											
<b>Charolais</b>	Low	-11.5	-46.7	-46.1	-27.3												
(Active sires)	<b>Avg</b>	<b>1.3</b>	<b>3.9</b>	<b>5.7</b>	<b>-1.6</b>												
1991	High	12.6	69.6	72.0	28.2												
<b>Gelbvieh</b>	Low	-11.1	-45.3	-19.8	-19.8	-29.9	66.9	65.8	-6.8								
(Active sires)	<b>Avg</b>	<b>0.0</b>	<b>2.9</b>	<b>1.0</b>	<b>1.0</b>	<b>2.5</b>	<b>100.6</b>	<b>100.4</b>	<b>0.0</b>								
1991	High	16.5	55.1	64.7	16.2	32.7	149.2	133.6	7.9								
<b>Hereford</b>	Low	-5.6	-16.0	-17.0	-26.0									-1.2			-0.5
(Proven sires)	<b>Avg</b>	<b>2.1</b>	<b>21.0</b>	<b>33.0</b>	<b>6.0</b>									<b>0.2</b>			<b>0.6</b>
Fall 1990	High	11.2	67.0	108.0	29.0									2.0			1.9
<b>Limousin</b>	Low	-7.1	-23.2	-27.5	-20.7												
(Current sires)	<b>Avg</b>	<b>0.5</b>	<b>2.4</b>	<b>4.3</b>	<b>0.2</b>												
1991	High	6.8	27.3	51.1	20.8												
<b>Polled Hereford</b>																	
(Main sires)	Low	-12.4	-23.4	-35.6	-32.5	-20.6											-0.7
1991	<b>Avg</b>	<b>3.1</b>	<b>19.3</b>	<b>28.7</b>	<b>1.1</b>	<b>10.7</b>											<b>-0.0</b>
	High	15.2	56.4	85.6	38.2	44.3											0.7
<b>Red Angus</b>	Low	-9.2	-36.4	-51.5	-19.8	-21.0											
(Active sires)	<b>Avg</b>	<b>0.9</b>	<b>18.3</b>	<b>26.2</b>	<b>5.3</b>	<b>14.4</b>											
1991	High	10.8	55.2	82.5	25.3	41.8											
<b>Salers</b>	Low	-5.5	-27.1	-29.8	-22.1	-17.3											
(Main sires)	<b>Avg</b>	<b>0.5</b>	<b>3.5</b>	<b>2.3</b>	<b>-0.1</b>	<b>1.7</b>											
1991	High	6.1	30.4	43.9	18.6	24.5											
<b>Santa Gertrudis</b>																	
(Active sires)	Low	-4.5	-36.0	-45.2	-21.6												
1991	<b>Avg</b>	.1	.5	.6	.5												
	High	5.8	45.6	55.3	24.3												
<b>Shorthorn</b>	Low	-4.6	-20.7	-32.1	-28.1												
(Active sires)	<b>Avg</b>	<b>0.4</b>	<b>1.7</b>	<b>3.0</b>	<b>1.3</b>												
1991	High	7.0	44.7	67.1	39.1												
<b>Simmental<sup>a</sup></b>	Low	-11.5	-56.5	-79.7	-25.4	-25.2	-28.9	-29.2									
(Active sires)	<b>Avg</b>	<b>0.1</b>	<b>2.1</b>	<b>7.1</b>	<b>0.8</b>	<b>1.9</b>	<b>0.0</b>	<b>0.0</b>									
Spring 1991	High	9.2	77.2	120.8	25.2	39.5	13.6	11.2									
<b>South Devon</b>	Low	-8.5	-16.5	-34.0	-19.2												
(Active sires)	<b>Avg</b>																
1991	High	5.1	24.6	42.2	28.4												

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are for first-calf heifers. <sup>a</sup> Calving ease values