

Five State Beef Initiative Genetics Action Team: Sire Recommendations and Certification System

The Five State Beef Initiative (FSBI) Genetics Action Team, consisting of individuals from each state, was charged with the task to seek grassroots input for the development of genetic requirements to help producers meet the targeted goals of the program. Input was obtained, processed and the genetic action team plan developed. A system was developed to certify bulls. Angus and Simmental bulls can be certified by each state FSBI coordinator. All other breeds of bulls are to be sent to Purdue University for certification. The initial and current program requirements were established in an effort to increase producer profit by allowing producers and the industry to advance the reputation and quality of beef provided to the consumer. To determine if a bull meets or exceed the genetic expectations, a system for genetic evaluation was required. That system must; 1) be easy to understand, 2) fairly evaluate cattle genetics to improve the quality of the cattle produced in the Five State region, 3) allow for comparisons within a breed, and 4) provide a sire selection index that includes the most economically important EPD traits.

To accomplish the goals set above, a number of possible systems were investigated and developed. The base system that fit all of the criteria is the Power Score System. Below is an explanation of the Power Score System that utilizes information from the American Angus Association as an example. However, a Power Score can be calculated for bulls from any breed using the breed active sire percentile ranking table and the equations as outlined below.

Performance Power Score (PPS). The PPS will be calculated for a beef sire based on performance EPDs. The PPS for sires uses percentile ranking for the birth weight (BW), weaning weight (WW), yearling weight (YW), and maternal milk (MM) EPDs in the following equation:

$$\text{Performance Power Score} = (\text{BW}\% + \text{WW}\% + \text{YW}\% + \text{MM}\%) / 4$$

In the equation, BW% is the sire's percentile rank within his breed for BW, WW% is his percentile rank for WW, YW% is his percentile rank for YW, and MM% is his percentile rank for MM. The scoring system is similar to golf. Lower scores mean a more genetically desirable bull. The active sire top percentage breakdown will serve as the genetic base for each breed. Additionally, cattle that rank better than 10% (1-9% for the breed), for BW and MM can receive a BW and/or MM score of no better than 10% to allow a realistic approach to the EPDs and cattle production. The rationale here is that selection for ultra-light BW can have a negative effect on calf survival and growth. Similarly, ultra-heavy milk can have a negative effect on reproduction. This formula allows for a balance of traits, yet allows producers to find and utilize bulls that fit the needs of their specific herd.

For a sire to meet, or exceed FSBI genetic requirements, a sire must have a calculated PPS of 65% or lower. Effectively, this will eliminate the bottom third of the genetic pool for the selected economically important production traits from consideration. **A sire will be certified for 3 years and may be re-certified using his current (updated) EPDs and current year active sire percentile breakdown.**

For example, consider the following four Angus bulls for a rotational system in which the females will be used as replacements in the cow herd:

Sire	BW	WW	YW	MM
A	+2.3	+43	+69	+15
B	+5.7	+36	+88	+18
C	-1.3	+31	+50	+27
D	+6.0	+28	+53	+14

To calculate the PPS for the sires above, use the guidelines established through the FSBI program and the example table (at the back of this article) from the Fall 2002 Angus Sire Evaluation Report for 2002 active sires to determine the percentile rankings for the bulls.

$$\text{Sire A: } \text{PPS/A} = (40+15+35+60) / 4 = 150 / 4 = 37.5$$

$$\text{Sire B: } \text{PPS/B} = (95+40+5+40) / 4 = 180 / 4 = 45.00$$

$$\text{Sire C: } \text{PPS/C} = (10+65+80+10) / 4 = 165 / 4 = 41.25$$

$$\text{Sire D: } \text{PPS/D} = (96+75+75+70) / 4 = 316 / 4 = 79$$

Through the calculation of the PPS, Sires A, B, and C would be eligible to cover cows that would be used to produce FSBI cattle, however, Sire A offers the most balanced data. Sire D would not be eligible to sire calves for the FSBI program because his PPS is higher than 65.

Using the information from the Fall 2002 Sire Summary for Angus, most bulls will have a PPS between 40 and 80. A small number of bulls will have a PPS below 30. An average bull within a breed will have a PPS of 50. Producers that truly want to improve their herd should attempt to utilize bulls with a score of 45 or lower.

The PPS does not insure that a bull will be profitable within a specific herd, but will serve as a way to assist in ranking sires on an economical basis. Producers should find sires that address the needs for their cowherd, yet still have a desirable PPS.

Carcass Power Score. A separate Power Score needs to be calculated for carcass traits. This can be done with carcass EPDs or ultrasound EPDs. The Carcass Power Score (CPS) should utilize two traits; marbling (or % intramuscular fat [%IMF] for ultrasound data) and percent retail product (%RP, carcass or ultrasound) as shown in the following ultrasound equation:

$$\text{Carcass Power Score} = (\% \text{IMF}\% + \% \text{RP}\%) / 2$$

In the equation, %IMF% represents the percentile rank of the sire for %IMF, while %RP% is the percentile rank of the sire within his breed for %RP (ultrasound) within his

breed. The rationale for utilizing these two traits for the calculation is that marbling (%IMF) is the major factor determining quality grade in young cattle and %RP includes both muscle and fat for carcass yield. The percentile table to be used to determine the percentile ranks and calculate the CPS for a bull will depend on the sire's type of carcass EPD data (Ultrasound or Carcass). If a bull has both ultrasound and carcass EPDs, a CPS will be calculated utilizing each set of data. If a bull meets the requirements in either one of the data sets, the sire will be eligible for certification. For a sire to meet the FSBI requirements and become certified, the CPS must be 80 or lower.

For an example, consider the following four Angus bulls with ultrasound data:

Sire	%IMF	RE	Fat	%RP
A	+0.08	+0	+0.015	-0.10
B	-0.06	+0.02	-0.003	+0.02
C	+0.21	-0.31	+0.01	-0.23
D	-0.08	+0	+0.02	-0.30

To calculate the CPS for the sires above, use the guidelines established through the FSBI program and the table from the Fall 2002 Angus Sire Evaluation Report for active sires to determine the percentile rankings for the various traits. Remember that the CPS only utilizes two of the carcass traits, %IMF and %RP.

Sire A: $CPS/A = (20+70) / 2 = 90 / 2 = 45$

Sire B: $CPS/B = (75+45) / 2 = 120 / 2 = 60$

Sire C: $CPS/C = (4+85) / 2 = 89 / 2 = 44.5$

Sire D: $CPS/D = (80+90) / 2 = 170 / 2 = 85$

Through the calculation of the CPS, the only bull that could **not** be used in the FSBI would be sire D. If purchasing a bull to enhance the marbling component of the calf crop, Sire C would be the sire of choice. Yet, both sires A and C would be the more desirable bulls for the overall carcass component.

Bulls from breeds that do not calculate %RP. For the breeds that do not yet calculate an EPD for %RP and cooperate with the FSBI a CPS can be calculated. To complete this task the breed association provides the necessary information to Purdue University to develop a percentile breakdown for the %RP required for the CPS. This percentile breakdown table is then utilized to calculate the CPS for that breed. If the breed publishes the marbling trait figures, Purdue will provide the percentile information concerning marbling. The percentile rank for the %RP will not be published and the CPS will simply be a pass/fail or certified/not certified status.

Bulls without EPDs for carcass traits. There are two ways for bulls without EPDs to be certified in the FSBI program. One method that may be used utilizes the carcass numbers from the sire and maternal grandsire (MGS) of the bull. This will use the

percentile rank of the marbling or %IMF EPDs and the percentile rank of the corresponding %RP EPD. The sire EPDs will represent 50% of the genetic information and the MGS EPDs will represent 25% of the genetic information for the pedigree carcass power score (pedigree CPS). Below are the two formulas used to determine the genetic information needed for the quality and yield portions of the CPS. For example purposes, the formula used below will utilize the information from the ultrasound database.

$$\text{Pedigree \%IMF EPD} = 0.5(\text{Sire EPD for \%IMF}) + 0.25(\text{MGS EPD for \%IMF}) / .75$$

$$\text{Pedigree \%RP EPD} = 0.5(\text{Sire EPD for \%RP}) + 0.25(\text{MGS EPD for \%RP}) / .75$$

Once the pedigree EPDs have been determined, the corresponding percentile rank of the pedigree EPDs are then determined from the active sire percentile table. The two pedigree % rankings are then combined for the final formula to determine the pedigree CPS and if a bull is eligible for the FSBI genetic certification.

$$\text{Pedigree CPS} = [(\text{Pedigree \%IMF\%} + \text{Pedigree \%RP\%}) / 2]$$

For a sire to meet the FSBI requirements and pass the CPS, the pedigree CPS must be 80 or lower.

Bulls that are sired by bulls that do not have carcass EPDs or pedigree EPDs for carcass traits may also be used in the program, if they have ultrasound data. For bulls at a state sponsored central test station to be eligible for use in the FSBI, the bull must have ultrasound data in the upper 2/3 of his tested contemporary group. A contemporary group is defined as six (6) bulls or more of the same breed. If six (6) bulls of the same breed are not available, then the individual is compared with the group of similar breeds (ie., British and European). Bull tests are required to have the CUP data sent to the respective national breed association for the generation of ultrasound and/or carcass EPDs. In all cases, EPDs will take precedence over raw data.

On-Farm tested bulls. For bulls tested on the farm without any carcass data or pedigree data, but ultrasound data was obtained, there must be at least three (3) bulls in the contemporary group as defined by the national breed association. It is required that the CUP data be reported to the respective breed association for the generation of carcass or ultrasound EPDs.

Other requirements and criteria for FSBI.

- 1) All breeds and breed combinations are eligible, but cattle cannot have more than a 2" hump at harvest. Producers are encouraged to utilize breeds that have carcass and/or ultrasound database(s).
- 2) Cattle must have performance EPD data from a breed association that utilizes a national cattle evaluation program to participate in the FSBI program.
- 3) EPDs for embryo transfer cattle without an EPD will be calculated based on the average of the sire and dam EPDs.
- 4) Bulls must meet both the PPS and CPS requirements to be eligible. **The exception is for the calendar year 2002. Bulls two years of age or older that**

do not and cannot have ultrasound carcass data collected can become certified by successfully meeting or exceeding the PPS.

Other considerations. It is recognized that the Power Score System is not the final answer in sire selection. Once a sire meets the PPS and CPS requirements for certification, producers must further evaluate bulls on traits that will help them better meet the market targets within their herd. Traits such as structural correctness, udder quality, frame size, disposition, etc. must be selected (independent culling strategy) to improve cow herd deficiencies.

Compiled by: FSBI Genetic Action Team. Team members include; Darrh Bullock, Matt Claeys, Dan Faulkner, Brad Halbrook, Dave Hawkins, Don Hutzal, Dick Jurgens, Maury Kaercher, Ray Ramsey, Harlan Ritchie, Nevil Speer, Norm Voyles, Jr., and Roy Wallace.

EFFECTIVE DATE: February 24, 2003

NOTE:

Active Sire Percentile Breakdown tables are subject to change once or twice a year, depending on the breed.

2002 Fall Angus Sire Evaluation Percentiles											
EPD Percentage Breakdown Current Sires											
Top Pct	Production EPDs				Carcass EPDs			Ultrasound EPDs			
	BW	WW	Milk	YW	Marb	%RP	%IMF	%RP	%RP	Top Pct	
1%	-2	56	31	100	0.57	1.04	0.33	0.65	1%		
2%	-1.3	53	29	94	0.52	0.89	0.27	0.55	2%		
3%	-0.9	51	28	92	0.46	0.83	0.24	0.49	3%		
4%	-0.6	50	27	89	0.42	0.74	0.21	0.45	4%		
5%	-0.4	49	27	88	0.39	0.69	0.2	0.42	5%		
10%	0.3	45	25	82	0.29	0.56	0.14	0.3	10%		
15%	0.8	43	23	78	0.23	0.47	0.1	0.23	15%		
20%	1.2	41	22	76	0.19	0.41	0.08	0.18	20%		
25%	1.5	40	21	73	0.17	0.35	0.06	0.14	25%		
30%	1.8	39	20	71	0.14	0.3	0.04	0.1	30%		
35%	2	37	19	69	0.11	0.25	0.03	0.07	35%		
40%	2.3	36	18	67	0.09	0.21	0.01	0.05	40%		
45%	2.5	35	18	65	0.07	0.17	0	0.02	45%		
50%	2.7	34	17	63	0.05	0.12	0	0	50%		
55%	2.9	33	16	61	0.03	0.08	-0.01	-0.02	55%		
60%	3.2	32	15	59	0.01	0.03	-0.02	-0.04	60%		
65%	3.4	31	15	57	-0.02	-0.02	-0.03	-0.07	65%		
70%	3.7	29	14	55	-0.04	-0.06	-0.04	-0.1	70%		
75%	3.9	28	13	53	-0.06	-0.12	-0.06	-0.14	75%		
80%	4.2	27	12	50	-0.1	-0.19	-0.08	-0.18	80%		
85%	4.6	25	10	47	-0.13	-0.25	-0.1	-0.23	85%		
90%	5	22	9	43	-0.17	-0.34	-0.13	-0.3	90%		
95%	5.7	18	6	36	-0.25	-0.48	-0.17	-0.4	95%		
100%	12.3	-33	-18	-46	-0.68	-1.23	-0.66	-1.39	100%		