By the Numbers

▶ by **Sally Northcutt,** *director of genetic research, American Angus Association*

Where does my bull rank?

The release of new carcass expected progeny differences (EPDs) in July 2008 brought about renewed interest in percentile rank tables. These tables have always been available but have even greater meaning when breeders are faced with a new trait. Whether you readily understood the mechanics of integrating carcass and ultrasound data into one set of EPDs, one thing is certain: The carcass EPDs must be viewed as a new set of EPDs. So how can breeders determine the relative ranking of their animals for new traits or newly released genetic evaluations?

Where does my animal rank in the breed?

When a new genetic evaluation is released in July and December each year, the tables for percentile rank and breed averages are updated on the web site and in printed form. These tables are available online at *www.angussiresearch.com* or in the printed *Sire Evaluation Report* (see page 344 of this issue for the explanation section).

The percentile tables are available for various classes of animals: current sires, current dams, and non-parent bulls and cows. The most recent evaluation table for non-parents bulls from the Fall 2008 National Cattle Evaluation (NCE) is depicted in Table 1 (see page 356 for an enlarged view of the full table). In the case of new or renovated traits, such as the extensive remodeling of the carcass EPDs, these tables are the only resource to determine an animal's rank in the breed population.

Using Table 1 in an example provides a gauge of where an animal's genetics rank in the breed for non-parent bulls. If a yearling bull's carcass marbling EPD is equal to +0.39, then by locating that EPD in the table and associating it with the percentile in the first column, the relative ranking to all non-parent bulls in the breed can be assessed. In this case, the bull's marbling EPD is in the top 25th percentile.

The best use of the table is to provide a guide or relative ranking. It is helpful to view the table in a quartile format, such as viewing the animals ranked in the top 25%, rather than attempting to split it into 1% increments.

EPDs change with added data

Another overlooked resource is the possible change table. Hidden in the depths of evaluation tables (*www.angussiresearch.com/accuracy.htm*), this table only changes when the genetic parameters used in the NCE are modified. In the Fall 2008 NCE, integrated carcass evaluation of harvest and ultrasound data, the genetic components, such as heritabilities and genetic correlations, were

Table 1: Fall 2008 percentile breakdown for non-parent bulls

	Production						Maternal			Carcass				$Values					
TOP PCT	CED	BW	WW	YW	YH	SC	CEM	Milk	$EN	CW	Marb	RE	Fat	$W	$F	$G	$QG	$YG	$B
1%	+14	-1.9	+63	+111	+1.0	+1.71	+13	+31	+21.83	+26	+.79	+.54	-.038	+33.41	+46.58	+36.66	+30.74	+10.78	+62.12
2%	+13	-1.4	+60	+107	+.9	+1.53	+12	+30	+18.99	+24	+.72	+.49	-.031	+32.41	+43.63	+35.16	+29.40	+10.02	+59.60
3%	+12	-1.1	+59	+105	+.9	+1.42	+11	+29	+17.43	+23	+.67	+.46	-.027	+31.75	+41.83	+34.11	+28.41	+9.53	+57.96
4%	+12	-.8	+58	+103	+.8	+1.35	+11	+29	+16.17	+22	+.64	+.43	-.025	+31.28	+40.42	+33.29	+27.72	+9.25	+56.61
5%	+11	-.6	+57	+102	+.8	+1.28	+11	+28	+15.26	+21	+.61	+.42	-.022	+30.89	+39.38	+32.58	+27.19	+8.97	+55.43
10%	+10	+.0	+54	+97	+.7	+1.07	+10	+27	+12.24	+19	+.52	+.35	-.015	+29.53	+35.66	+30.02	+24.79	+8.01	+51.49
15%	+9	+.5	+52	+94	+.6	+.94	+9	+26	+10.28	+17	+.47	+.30	-.010	+28.59	+33.27	+28.19	+23.30	+7.38	+48.80
20%	+9	+.8	+51	+92	+.5	+.84	+9	+25	+8.79	+16	+.42	+.27	-.006	+27.83	+31.38	+26.65	+22.01	+6.90	+46.70
25%	+8	+1.1	+49	+90	+.5	+.75	+8	+24	+7.59	+15	+.39	+.24	-.003	+27.19	+29.77	+25.34	+20.60	+6.37	+44.97
30%	+7	+1.4	+48	+88	+.4	+.67	+8	+23	+6.43	+13	+.35	+.21	+.000	+26.60	+28.33	+24.13	+19.62	+6.06	+43.38
35%	+7	+1.6	+47	+86	+.4	+.61	+8	+23	+5.49	+13	+.33	+.19	+.003	+26.06	+26.90	+23.04	+18.85	+5.63	+41.86
40%	+6	+1.8	+46	+84	+.4	+.53	+7	+22	+4.54	+12	+.30	+.16	+.005	+25.53	+25.60	+22.01	+17.75	+5.22	+40.49
45%	+6	+2.0	+45	+83	+.3	+.47	+7	+22	+3.64	+11	+.27	+.14	+.008	+25.01	+24.34	+21.01	+17.10	+4.85	+39.16
50%	+5	+2.2	+44	+81	+.3	+.40	+7	+21	+2.76	+10	+.25	+.12	+.010	+24.50	+23.06	+20.05	+15.84	+4.48	+37.83
55%	+5	+2.4	+43	+79	+.2	+.34	+6	+20	+1.86	+9	+.23	+.09	+.013	+23.98	+21.76	+19.09	+15.10	+4.16	+36.53

Table 2: Fall 2008 accuracy and associated possible change

	Production						Maternal				Carcass			
Accuracy	CED	BW	WW	YW	YH	SC	CEM	Milk	MW	MH	CW	Marb	RE	Fat
.05	7.8	2.49	11.0	16.2	.41	.70	9.3	9.2	38	.62	18	.28	.31	.041
.10	7.2	2.36	10.4	15.3	.39	.66	8.8	8.7	36	.58	17	.26	.29	.039
.15	6.7	2.23	9.9	14.5	.37	.62	8.3	8.2	34	.55	16	.25	.27	.037
.20	6.2	2.10	9.3	13.6	.35	.59	7.8	7.8	32	.52	15	.24	.26	.035
.25	5.8	1.97	8.7	12.8	.32	.55	7.3	7.3	30	.49	14	.22	.24	.033
.30	5.4	1.84	8.1	11.9	.30	.51	6.8	6.8	28	.45	13	.21	.23	.030
.35	5.1	1.71	7.5	11.1	.28	.48	6.3	6.3	26	.42	12	.19	.21	.028
.40	4.7	1.58	7.0	10.2	.26	.44	5.8	5.8	24	.39	12	.18	.19	.026
.45	4.3	1.44	6.4	9.4	.24	.40	5.4	5.3	22	.36	11	.16	.18	.024
.50	3.9	1.31	5.8	8.5	.22	.37	4.9	4.9	20	.32	10	.15	.16	.022
.55	3.5	1.18	5.2	7.7	.19	.33	4.4	4.4	18	.29	9	.13	.15	.020
.60	3.2	1.05	4.6	6.8	.17	.29	3.9	3.9	16	.26	8	.12	.13	.017
.65	2.7	.92	4.1	6.0	.15	.26	3.4	3.4	14	.23	7	.10	.11	.015
.70	2.4	.79	3.5	5.1	.13	.22	2.9	2.9	12	.19	6	.09	.10	.013
.75	2.0	.66	2.9	4.3	.11	.18	2.4	2.4	10	.16	5	.07	.08	.011
.80	1.6	.53	2.3	3.4	.09	.15	2.0	1.9	8	.13	4	.06	.06	.009
.85	1.2	.39	1.7	2.6	.06	.11	1.5	1.5	6	.10	3	.04	.05	.007

re-estimated for the traits involved. Thus, the carcass possible change values were recalculated and are presented in Table 2 (see page 358 for an enlarged view).

This table was designed to help determine the relative risk associated with an EPD, or commonly known as the possible change (PC) value for each trait at various accuracy levels. Expressed as "+" or "-" units of the EPD, the possible change provides a measure of expected change or potential deviation between the EPD and the "true" progeny difference (which we never know). If accuracy increases, then the window of expected change narrows.

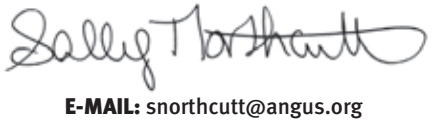
This confidence range depends on the standard error of prediction for an EPD. For a given accuracy, about two-thirds of the time an animal should have a "true" progeny difference within the range of the EPD, plus or minus the possible change value.

For example, a sire with a marbling accuracy of 0.65 and marbling EPD of +0.24 is expected to have his "true" progeny value for marbling falling within ±0.10 of his marbling EPD (ranging between +0.14 and +0.34) about two-thirds of the time. His true breeding value is never really known, but we predict it through the calculation of EPDs. Possible change is an assessment of the error of prediction.

Out with the old, in with the new

With each evaluation run, the toughest part is to let the old evaluation summary go. The integrated carcass evaluation of Fall 2008 NCE was a classic example of this. The most commonly asked question was "Why do the EPDs look different?" when in many cases the percentile ranking of animals stayed the same. The best rule of thumb for each evaluation is to seek out the most current descriptive tables for percentile ranking, as well as breed average EPDs to orient each animal relative to the breed population.

Also, remember that any questions you may have on the subject can be answered by contacting the Association's Performance Programs staff or your Association regional manager.



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Editor's Note: *"By the Numbers" is a column by Association performance programs staff to share insights with Angus members about data collection and interpretation, the NCE, genetic selection, and relevant technology and industry issues. If you have questions or would like to suggest a topic for a future column, contact Sally Northcutt, director of genetic research, or Bill Bowman, director of performance programs, at 816-383-5100.*