

Better Than Good

The American Angus Association takes a new look at a trait for which Angus is known — calving ease.

by Corinne Patterson

Angus bulls have long been known for calving ease in use on heifers. A tool purebred breeders and commercial cattlemen alike have successfully considered an indicator of calving ease is the birth weight expected progeny difference (BW EPD).

With the release of the Spring 2005 *Sire Evaluation Report*, two new heifer calving ease tools will debut. Calving ease direct (CED) and calving ease maternal (CEM) EPDs have been calculated to provide more clues about using Angus genetics.

Sally Northcutt, American Angus Association genetic research director, says these are not novel EPDs within the beef industry. Other breeds have included them in their genetic evaluations. However, the research endeavor to calculate heifer calving ease for Angus was met with caution from those involved — so as not to jump in with both feet before assessing the best way to analyze the data, Northcutt says.

Basic data

Calculating calving ease involves a multi-trait animal model, including calving score and birth weight. Calving score is a threshold trait — it is measured by a numerical score from 1 to 5, with 1 indicating no assistance, 2 indicating some assistance, 3 indicating

mechanical assistance, 4 indicating a cesarean section (C-section) and 5 indicating an abnormal delivery (which is excluded from calculations).

Nearly 91% of all calving scores turned in on Angus heifers fall into category 1 (see Table 1). Keith Bertrand, a geneticist at the University of Georgia who works with many breeds' EPD calculations, says this extreme data puts Angus among the top breeds for calving ease.

Birth weight is a linear trait, one that has a normal distribution — what some call a bell-shaped curve (see Fig. 1). The genetic correlation between birth weight and calving score is high, at 0.76. "Many of the genes that control birth weight also control the calving score that's recorded. This is not a perfect correlation of 1.00, but it easily depicts that heavier-birth-weight calves tend to be associated with the potential for a higher numerical calving score in heifers — increasing potential for assisted births," Northcutt says. By calculating a calving ease EPD, these two traits can be analyzed together.

"With our vast and dynamic database, we have the opportunity to fine-tune the selection decisions for first-calf heifers by calculating calving ease direct and calving ease maternal EPDs," she adds.

Both CED and CEM will be reported as a percentage of unassisted births, with a higher value indicating greater unassisted calving. CED is reported within the suite of production EPDs, and CEM is reported within the suite of maternal EPDs (see Table 2). Each EPD will include an accuracy value (ACC).

Direct predictions

CED predicts the average difference in ease with which a sire's calves will be born when bred to first-calf heifers, compared to calves from another sire. It's a tool that allows producers to select sires to mate to heifers to increase the chance, or probability, of easier calving.

"You are really dealing with a probability," Bertrand says, adding, all else being equal, "you have a higher probability that one sire is going to have easy calving calves compared to another sire."

Bertrand says it may be easier to understand in terms of an example of a group of 100 heifers. He provides an example in which sire A has a CED value of 10 and sire B has a CED value of -10. If you

Fig. 1: Bell-shaped curve showing normal distribution of a linear trait

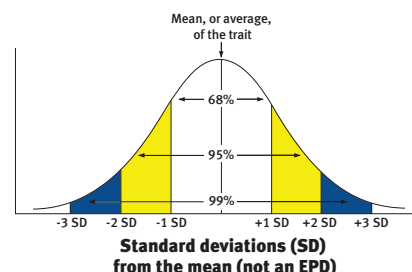


Table 1: Distribution of calving scores in Angus, %

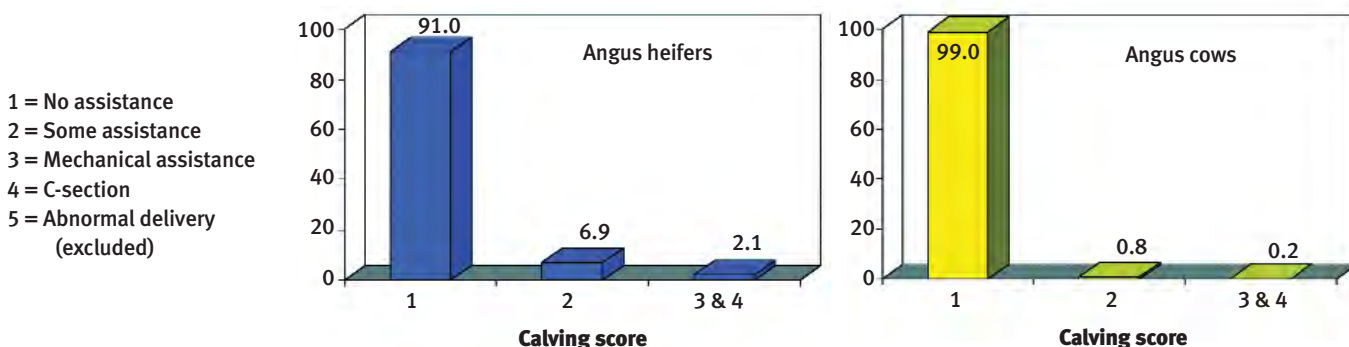


Table 2: Example of *Sire Evaluation Report* entry

Find CED in the suite of production traits

Find CEM in the suite of maternal traits

SIRE STATISTICS	EXPECTED PROGENY DIFFERENCES AN																	
	PRODUCTION						MATERNAL					CARCASS						
	CED ACC	BW ACC	WW ACC	YW ACC	YH ACC	SC ACC	CEM ACC	Milk ACC	MkH MkD	MW ACC	MH ACC	SEN	CW ACC	Marb ACC	RE ACC	Fat ACC	%RP ACC	Grp Pg
A A R NEW TREND 9958634 04-05-81 SIRE: V D A R SHOSHONE 548	3 .88	+5.7 .97	+31 .97	+59 .96	+6 .89	+1.97 .88	6 .91	+27 .96	1,179 3,297	+34 .89	+3 .89	+3.03	+10 .71	+14 .73	+30 .69	+0.08 .67	+0.07 .68	19 97

breed sire A and sire B each to 100 heifers, since the difference between their CED values is 20, you'd expect 20 more calves out of the 100 born from sire A to be calved unassisted (calving score 1) when compared to the other sire.

Bertrand says that the CED EPD is highly related to the BW EPD. So, producers may wonder why they should consider the new value when birth weight selection has been so useful in the past.

"When we use birth weight EPDs, that's a good indirect measurement of calving ease. The biggest indicator of direct calving ease is birth weight," Bertrand points out. "In a sense, instead of indirectly predicting calving difficulty, we can now try to predict it more directly because we are actually predicting direct calving ease."

Bill Bowman, Association director of performance programs, says, "The birth weight database for the Angus breed is an unmatched resource that will not be replaced. Calving ease EPDs will be an enhancement to the birth weight EPDs in describing genetics that can be used with confidence for calving heifers. Calving ease EPDs will not replace or do away with birth weight EPDs."

Maternal predictions

Northcutt says the area where cattlemen using Angus genetics may be able to use heifer calving ease EPDs to the greatest extent will be on the maternal side — fine-tuning with the CEM EPD.

"The maternal side is unique for the Angus breed because this is a measurement to give you an idea of the daughters of a particular sire, and there is no direct measurement right now for the Angus breed to do that," Bertrand says.

With CEM, Northcutt explains, producers will be able to take a quantifiable look into the genetics associated with differences in percentage of unassisted birth in calves out of first-calf daughters of one sire compared to another.

Bertrand provides an example where sire A has a CEM value of 10 and sire B has a CEM value of -10. If you have 100 heifers out of each of those sires, when those heifers calve when bred to similar sires, you would expect the daughters of sire A to have 20 more calves out of 100 that are in the easy calving

category compared to the daughters of sire B.

CEM should be used as a tool to choose sires of replacement heifers. It allows a purebred or commercial breeder retaining heifers the opportunity to increase the chance of first-calf daughters calving without assistance.

"If you are not interested in how future daughters of one sire calve compared to another — you aren't keeping them in your herd or that's not a marketing avenue — you don't have to look at anything in that maternal box of genetic tools in the *Sire Evaluation Report*, including calving ease maternal," Northcutt says.

Variations?

Because CED and CEM both encompass some of the same data, like birth weights and calving ease scores, producers may wonder how one sire can be better for CED than for CEM.

Consider this extreme example of sire A and sire B, the outlier:

	BW	WW	YW	CED	CEM
Sire A	+2.0	36	67	+6%	+4%
Sire B	+4.6	44	80	+0	+8%
Difference	2.6	8	13	+6%	-4%

On average one would expect a 6% difference in ease with which sire A's calves are born compared to sire B's calves when both are bred to heifers. If you kept daughters of both bulls, then sire B's daughters have a 4% advantage in percent unassisted births for their first calves over the daughters of sire A. Bertrand reminds producers that sire B defies the positive correlation (0.42) between CED and CEM EPD values. So, the example is not the norm.

"As you look at the genetic trend in Angus for CED and CEM, improvements have occurred in both, particularly since the mid-1980s (see Table 3)," Northcutt says.

"This movement in the genetic trend shows that we have done a good job of simultaneously improving both direct and maternal calving ease by maintaining selection pressure on birth weight while also selecting for additional growth in Angus cattle," Bowman adds.

Making choices

Northcutt says these calving ease EPDs are for making choices regarding a specific management group — heifers.

"In all breeds, the instance of calving difficulty amongst cows is very low," Bertrand agrees. "It's really in the heifers that you have the primary concern."

Breed average of current Angus sires is 4% for CED and 6% for CEM (see Table 4). Northcutt says, "It's a fine-tuning tool when you are looking at less than 9% of the heifers requiring any assistance."

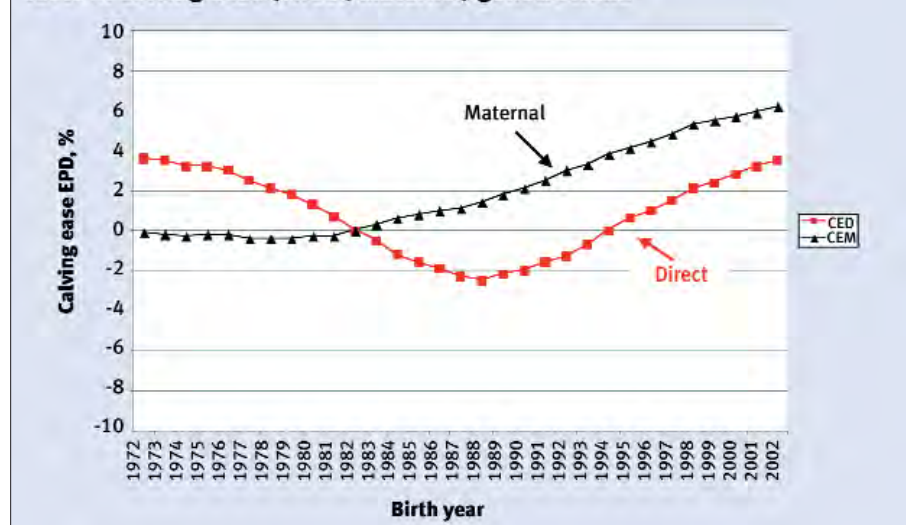


Table 4: Calving ease EPD percentile breakdown for current sires

Top percentile	Calving ease direct (CED)	Calving ease maternal (CEM)
1%	+13	+13
5%	+10	+11
10%	+9	+10
25%	+7	+8
50%	+4	+6
75%	+1	+4
90%	-2	+1
95%	-5	0
100%	-28	-19
Average		
	CED	CEM
	+4%	+6%

(Spring 2005; n=21,280)

Table 3: Calving ease (direct, maternal) genetic trend



ID \$VALUES

ULTRASOUND					\$VALUES		
%IMF ACC	RE ACC	Fat ACC	%RP ACC	Grp Pp	\$W	\$F \$G	\$B
-.14	+.58	-.018	+.74	258	14.17	+6.86	+25.22
.87	.87	.87	.87	453		+15.29	