Less Cost and More Return

Hereford magnifies the power of heterosis.

by ***Wes Ishmael***

Increased profit potential borne by effective, structured crossbreeding systems continues to drive more demand for Hereford genetics.

"The use of crossbreeding offers two distinct and important advantages over the use of a single breed. First, crossbred animals have heterosis or hybrid vigor. Second, crossbred animals combine the strengths of the parent breeds," explains Bob Weaber, Kansas State University Extension beef cattle specialist and geneticist. "The term 'breed complementarity' is often used to describe breed combinations that produce highly desirable progeny for a broad range of traits."

For instance, feed efficiency always matters, but its value is magnified when feed costs increase, as they are currently.

A multi-year study of pasture cow feed efficiency at Oklahoma State University highlights the benefit of incorporating Hereford's documented feed efficiency into a crossbreeding program. Compared to straightbred Angus cows, Hereford-sired black baldy females consumed 2 pounds less modest-quality pasture forage per day. (see Table 1). That's about 725 pounds less per cow over the course of a year, equivalent to about an acre of the pasture in the study. These advantages translated to at least $50 of savings in annual feed costs per black baldy female, all while they maintained a 0.5 higher body condition score throughout the study.

Likewise, pricing hay at $150 per ton, Hereford-sired black baldy females cost about $90 less per head per year to feed in ongoing research at the University of Illinois Urbana-Champaign (UIUC). That's compared to staightbred Angus counterparts. The UIUC study is designed to quantify the differences between breeding either Hereford or Angus bulls to commercial Angus cows over time when retaining replacement heifers.

"Seventy percent of the feed resources in the beef industry go to the cow herd, and 70% of that feed that goes to the cow herd goes to her maintenance," explained Dan Shike, during last year's American Hereford Association (AHA) Educational Forum. "Multiply those two numbers. It's 0.49. I'm going to round that to 50%. Half of the feed in the beef industry goes to just maintaining the cow, and I haven't produced anything." Shike is head of the UIUC animal sciences department and has served as lead researcher in the study.

Maternal heterosis unmatched

Of course, it's maternal heterosis captured and managed through crossbreeding that shines the brightest.

"The value of maternal heterosis (see Heterosis by the Numbers sidebar) is most visible in the increased number of calves (lifetime), cow longevity and cumulative weaning weight (lifetime)," explains Shane Bedwell, AHA chief operations officer and director of breed improvement. "Advantages associated with heterosis can be magnified based on the inherent strengths of the breed components in the crossbreeding plan, as well as the complementarity between the breeds."

The UIUC study corroborates the value of baldy females' maternal heterosis.

Compared to the straight black females, 14% more black baldy females weaned their first calf at 2 years of age (see Table 2). Plus, 18% more of the Hereford-sired females bred back on time for their second calf. The study began with 600 commercial Angus cows in a fall calving herd. Half were bred to six different Hereford bulls; the other half to Angus bulls. All bulls used represented the top 15% of each breed for its maternal and terminal indexes.

"I'm not looking for the cow that wins in one year. I'm looking for the cow that wins over her lifetime and stays in the herd, stays in production, because she has some built-in fertility, some resilience, which leads to longevity," Shike noted.

Heterosis by the Numbers

Direct heterosis increases performance of the crossbred calf relative to the average of the straightbred parental breeds, according to the U.S. Meat Animal Research Center (USMARC).

- Survival to weaning (+1.9%)
- Weaning weight (+3.9%)
- Post-weaning gain (+2.6%)
- Yearling weight (+3.8%)
- Feed conversion (+2.2%)

Maternal heterosis increases performance of the crossbred cow relative to the average of straightbred females of the parental breeds.

- Calving rate (+3.7%)
- Weaning weight (+3.8%)
- Longevity (+38%)
- Number of calves (+17%)
- Cumulative weaning weight (+25.3%)

Table 1: OSU research in cow efficiency		
	Black baldy cow	Straightbred black cow
Body condition score	6.0	5.5
Dry matter intake	28 lbs./day	30 lbs./day
Annual basis (lbs.)	10,220 lbs./year	10,950 lbs./year
Annual basis (tons)	5.1 tons/year	5.5 tons/year
Annual hay cost ($125/ton)	$638	$688
Hereford advantage: $50 savings		

Lalman's research allowed for the following assumptions:
1. On average, baldy cows had a 0.5 higher body condtion score than straightbred black cows.
2. On average, baldy cows consumed 2 pounds less of voluntary forage intake per day than straightbred black cows.

"They wean more calves, and more of them breed back. That's Hereford genetics; that's maternal heterosis."

Bedwell points out that Hereford's added heterosis advantage stems from the fact it's the least related of all Bos Taurus breeds, as documented by the U.S. Meat Animal Research Center. That means more hybrid punch, and more profit potential for commercial cattlemen.

"(Hereford's) heterosis and hybrid vigor on the black-hided cow or the red-hided cow, in my opinion, is a genetic explosion, whether it's a steer or a heifer, whether they're going to the feedlot or they're being retained as bred female, as we do," says Paul Koffskey, Groendyke Ranch manager, Nash, Okla. "The baldy female, in my opinion, is second to none as a replacement female, from the milking ability we get from the Hereford and the carcass merit to sustainability. If you're not using that to your advantage, I think you're leaving money on the table."

The sustainability Koffskey speaks of is two-fold — economic and environmental — thanks to the breed's increased efficiency generating more output with fewer inputs.

Greg Thoma, AgNext director for agricultural modeling and lifecycle assessment at Colorado State University, used data from the UIUC study to conduct a lifecycle assessment for a 1,000-head operation over 10 years. The model considered a 1,000-cow commercial Angus herd using Hereford bulls and retaining its own replacement heifers or using Angus bulls and retaining its own replacement heifers.

Although weaning weights were heavier in the Angus-sired scenario, increased fertility, breed-back and longevity meant more weaned calves over time in the Hereford-sired model. Never minding the associated economics, this led to a 7.8% decrease in greenhouse gas (GHG) emissions intensity for the Hereford-sired cattle when considering only factors influencing weaning rate. When fertility, body weight and intake factors also were matched to the UIUC trial data, GHG emission intensity was 15.6% less for the Hereford-sired cattle.

Table 2 Implications of Fertility/Longevity			
	Angus	Hereford	% Difference
2-year-olds calved	89%	95%	6%
First-calf weaning rate	76%	90%	14%
Pregnant 2-year-olds	75%	93%	18%
3-year-olds calved	69%	83%	14%
In herd at 4 years old	67%	80%	13%

Residual returns

Maternal heterosis pays even more over time, as demonstrated by an analysis conducted by the University of Tennessee (UT) in 2023, which utilized current prices at the time, along with documented Hereford production advantages. Specifically, the analysis compared using Hereford bulls rather than Angus bulls in commercial Angus herds with 30 cows or 500 cows. An operation's net worth per cow and the average income generated per cow increased significantly when crossbreeding.

"The key reason is the value of maternal heterosis, in general terms, and the specific performance advantages inherent to the Hereford breed," according to Charley Martinez, when he summarized the results as UT Extension livestock economist. He is now director of the King Ranch Institute for Ranch Management.

"For instance, previous research conducted for the American Hereford Association documented a 7% pregnancy advantage and a weaning weight advantage of 12.1 pounds for Hereford-sired commercial black baldies compared to Angus-sired commercial Angus calves," Martinez explained. "There are fewer open cows with the black baldy females each year, less cow depreciation and more calves to market. At the same time, direct heterosis adds weaning and yearling weight to each calf marketed."

At the end of 10 years, breeding commercial Angus cows to a Hereford bull returned an average of $90 more net farm income per cow per year in a 500-cow herd, compared to breeding commercial Angus cows to an Angus bull. The advantage was $76 per head in a 30-cow herd.

Across 10 years, breeding commercial Angus cows to a Hereford bull returned an average of $305 more net worth per cow per year in a 500-cow herd, compared to breeding commercial Angus cows to an Angus bull. The advantage difference for a 30-cow herd was a staggering $1,326 more per cow per year because each single head contributes more relative value to the smaller herd.

"There is so much more opportunity for commercial cattle producers to utilize heterosis, not just for themselves, but for the industry as a whole, especially as we rebuild the national beef cow herd" Bedwell says. **BA**

