Performance Matters

Net Versus Gross

by **Shane Bedwell**

Heterosis has more value than ever.

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Human nature often leads us to focus on outcomes in terms of the most, the highest or the fastest — the maximum — while discounting or ignoring the relative cost of inputs.

Consider the extraordinary gains U.S. cattle producers have made in terms of average carcass quality over the past two decades. While it has been a boon for consumer beef demand, various data suggests part of the cost has been reproduction and production efficiency. Key measures of ranch profitability, like pounds of calf weaned per cow exposed, have remained static or declined. Logic says part of the reason is increased straightbreeding focused on the end product and decreased heterosis from crossbreeding. Heterosis increases output at less cost, especially when it comes to the least heritable traits, such as fertility.

Various research projects conducted by the American Hereford Association (AHA) underscore and mirror the economic advantages of direct and maternal heterosis documented by decades of industry research.

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%)

The value of maternal heterosis is most visible in the increased number of calves (lifetime), cow longevity and cumulative weaning weight (lifetime).

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.

Hereford heterosis has more punch

Hereford genetics are often favored in crossbreeding for a couple of real-world reasons.

First are the inherent Hereford strengths of docility, fertility, feed efficiency in the feedlot and on pasture, longevity and production efficiency. Another reason Hereford genetics are commonly favored is the fact that they are the least related to any other Bos Taurus breed — documented by USMARC — which means they offer more heterotic impact.

Most recently, researchers at Oklahoma State University (OSU) conducted a multi-year study of pasture cow feed efficiency (Table 1). Compared to straightbred black Angus cows, Hereford-sired black baldy females consumed 2 pounds less modest-quality pasture forage per day. That's about 725 pounds less per cow over the course of a year — about an acre less per year of the pasture in the study. Plus, the black baldy females maintained a 0.5 higher body condition score throughout the research. These advantages translate to at least $50 of savings in annual feed costs per black baldy female.

Research in real-world production settings consistently documents the advantages of breeding Hereford bulls to straightbred and high-percentage black Angus cows to produce Hereford-sired black baldies.

For instance, heterosis studies conducted by the AHA at Harris Ranch in California and Circle A Ranch in Missouri document superior performance of black baldy calves, compared to their straightbred black Angus counterparts. In these studies, baldy calves consistently weighed 15-20 pounds more at weaning. Black baldy females retained as replacements had a 7% higher pregnancy rate than their straightbred black Angus peers.

Apply these advantages to a 1,000-head black Angus commercial cow herd and Hereford genetics can generate nearly $149,000 in additional revenue after just four years (see tables on opposite page). This is due to the fact you are getting more females bred, which gives you more pounds to sell. Keep in mind, the example offered in the tables disregards the savings in cow depreciation cost that comes with the ability to keep cows productive longer and flatten the herd age curve.

Previous and current AHA research projects compared Hereford-sired black baldy calves and breeding females to straightbred black Angus peers. Experience and logic say the results are similar for Hereford-sired red baldies and tiger-stripes.

Build back with more heterosis

Persistent, widespread drought likely cleaved about 2.5 million beef cows from the U.S. cow herd between the most recent peak number in 2019 and the beginning of this year. That's assuming the beef cow inventory was 3% less year over year when 2023 began. When the USDA releases numbers at the end of January, odds favor the percentage of decline being even higher.

That means individual producers and the collective industry have the opportunity to add lots more heterosis to the nation's herd. In other words, there's plenty of opportunity to increase net revenue potential. **HW**

Table 1: OSU research in cow efficiency

	Straightbred black cow	Black baldy cow
Body condition score	5.5	6.0
Dry matter intake	30 lbs./day	28 lbs./day
Annual basis (lbs.)	10,950 lbs./year	10,220 lbs./year
Annual basis (tons)	5.5 tons/year	5.1 tons/year
Annual hay cost ($125/ton)	**$688**	**$638**
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.

Study the data, count the dollars

Research in real-world production settings consistently documents the advantages of adding Hereford genetics to a black cow herd. The Harris Ranch heterosis project in California and the Circle A Ranch in Missouri both found baldy calves outperfomed straightbred black calves. In these studies, baldy calves consistently weighed 15-20 pounds heavier at weaning compared to their straightbred black counterparts and baldy females showed a 7% higher pregnancy rate when compared to straightbred black females.

When these truths are applied, the dollars add up. When applied to a 1,000-head black cow herd, Hereford genetics can generate nearly $149,000 in additional revenue after just four years. This is due to the fact that you are getting more females bred, which in return gives you more pounds to sell. See the tables below for a full breakdown of how Hereford genetics add value to a straightbred black herd.

Hereford Economic Advantage (see calculations in charts below)

Hereford advantage	Steer revenue	Cull heifer revenue	Total revenue
Year 1	$18,900	$6,882	$25,782
Year 2	$17,010	$6,188	$23,198
Year 3	$27,489	$9,824	$37,313
Year 4	$44,562	$17,973	$62,535
Total	**$107,961**	**$40,867**	**$148,828**

Asumptions:

1. Baldy calves weigh 15-20 pounds heavier than straight black calves
   a. Weaning weight (WW) of straight black steers is 550 pounds and WW for crossbred steers is 570 pounds
   b. WW of straight black heifers is 500 pounds and WW of crossbred heifers is 515 pounds
2. Calf price used was $2.10/cwt. for steers and $1.85/cwt. for heifers
3. Baldy females had a 7% higher pregnancy rate than straight bred females

In year one, the advantages of crossbreeding are apparent in total dollars generated in steer and cull heifer revenue because baldy calves have a heavier weaning weight.

Year 1														
Production scenario	Broodstock	Conception rate	Total progeny		Steer (s); heifer (h) split		Steer revenue		Retention rate (assume 45%)		Cull heifer revenue			Hereford advantage:
			Equation	Total	Equation	Total	Equation	**Total**	Equation	Total	**Culls**	Equation	**Total**	
Straightbred black operation	1,000 cows	90%	1000 x 0.90	900	900 head (hd) ÷ 2	450 s 450 h	450 hd x 550 lb. x $2.10	**$519,750**	450 hd x 0.45	202	**248**	248 hd x 500 lb. x $1.85	**$229,400**	
Black cows crossed to Hereford bulls	1,000 cows	90%	1000 x 0.90	900	900 hd ÷ 2	450 s 450 h	450 hd x 570 lb. x $2.10	**$538,650**	450 hd x 0.45	202	**248**	248 hd x 515 lb. x $1.85	**$236,282**	
Total difference								**$18,900**					**$6,882**	**$25,782**

In year two, heavier weaning weights continue to give baldy calves the edge.

Year 2														
Production scenario	Broodstock	Conception rate	Total progeny		Steer (s); heifer (h) split		Steer revenue		Retention rate (assume 45%)		Cull heifer revenue			Hereford advantage
			Equation	Total	Equation	Total	Equation	**Total**	Equation	**Total**	**Culls**	Equation	**Total**	
Straightbred black operation	900 cows	90%	900 x 0.90	810	810 hd ÷ 2	405 s 405 h	405 hd x 550 lb. x $2.10	**$467,775**	405 hd x 0.45	**182**	**223**	223 hd x 500 lb. x $1.85	**$206,275**	
Black cows crossed to Hereford bulls	900 cows	90%	900 x 0.90	810	810 hd ÷ 2	405 s 405 h	405 hd x 570 lb. x $2.10	**$484,785**	405 hd x 0.45	**182**	**223**	223 hd x 515 lb. x $1.85	**$212,463**	
Total difference								**$17,010**					**$6,188**	**$23,198**

In year three, the retained baldy heifers had a 7% higher pregnancy rate and calved 14 more head than the retained black heifers. This allowed even more pounds of calves to be sold.

Year 3														
Production scenario	Broodstock	Conception rate	Total progeny		Steer (s); heifer (h) split		Steer revenue		Retention rate (assume 45%)		Cull heifer revenue			Hereford advantage:
			Equation	Total	Equation	Total	Equation	**Total**	Equation	**Total**	**Culls**	Equation	**Total**	
Straightbred black operation	810 cows	90%	810 x 0.90	729										
	202 bred heifers	90%	202 x 0.90	181										
	Total females			910	910 hd ÷ 2	455 s 455 h	455 hd x 550 lb. x $2.10	**$525,525**	455 hd x 0.45	**204**	**251**	251 hd x 500 lb. x $1.85	**$232,175**	
Black cows crossed to Hereford bulls	810 cows	90%	810 x 0.90	729										
	202 bred heifers	97%	202 x 0.97	195										
	Total females			924	924 hd ÷ 2	462 s 462 h	462 hd x 570 lb. x $2.10	**$553,014**	462 hd x 0.45	**208**	**254**	254 hd x 515 lb. x $1.85	**$241,999**	
Total difference				**14**				**$27,489**		**4**	**3**		**$9,824**	**$37,313**

In year four, the retained baldy heifers from years one and two calved 40 more head than the straightbred black cows, generating $62,535 more revenue.

Year 4														
Production scenario	Broodstock	Conception rate	Total progeny		Steer (s); heifer (h) split		Steer revenue		Retention rate (assume 45%)		Cull heifer revenue			Hereford advantage:
			Equation	Total	Equation	Total	Equation	**Total**	Equation	**Total**	**Culls**	Equation	**Total**	
Straightbred black operation	729 cows	90%	729 x 0.90	656										
	181 3-year-old cows	90%	181 x 0.90	162										
	182 bred heifers	90%	182 x 0.90	164										
	Total females			982	982 hd ÷ 2	491 s 491 h	491 hd x 550 lb. x $2.10	**$567,105**	491 hd x 0.45	**221**	**270**	270 hd x 500 lb. x $1.85	**$249,750**	
Black cows crossed to Hereford bulls	729 cows	90%	729 x 0.90	656										
	195 3-year-old cows	97%	195 x 0.97	189										
	182 bred heifers	97%	182 x 0.97	177										
	Total females			1022	1022 hd ÷ 2	511 s 511 h	511 hd x 570 lb. x $2.10	**$611,667**	511 hd x 0.45	**230**	**281**	281 hd x 515 lb. x $1.85	**$267,723**	
Total difference				**40**				**$44,562**		**9**	**11**		**$17,973**	**$62,535**