

Line 1 Legacy



Advance Domino 20 (top) and Advance Domino 54 (middle) purchased from Fred DeBerard of Kremming, Colo., in 1934 and 1935 respectively, were the two paternal foundation sires of Line 1. Below is a group of Line 1-bred bulls at Debter Herefords.

by *Troy Smith*

Hungering for a bit of Hereford history? We've got a story for you. But let's warm up to it with a few white-faced facts.

According to Stacy Sanders, American Hereford Association (AHA) director of records, the AHA recorded 204,719 animals during the last two years (May 1, 2006, to April 30, 2008). Of those animals, 42,762 had either a parent or grandparent with "L1" as part of their registered name. "L1" is the prefix associated with "Line 1" cattle that were developed at U.S. Department of Agriculture's (USDA) Fort Keogh Range and Livestock Laboratory, near Miles City, Mont. So, Sanders' statistics suggest that just shy of a quarter (20.89%) of the animals recorded in the last two years had a Line 1 parent or grandparent.

It makes you wonder what would be found by looking back three or four generations. Just how many recently recorded Hereford cattle might be Line 1 descendants? Finding out would require more time than this story's deadline will allow. However, I did peek at the extended pedigrees of the top 10 sires ranked according to AHA's Baldy Maternal Profit Index. The



“L1” prefix appeared in six of the 10 sires’ ancestry.

Those Line 1 cattle have been extremely popular. We’re not climbing too far out on a limb in saying few other bloodlines have had greater effect on the Hereford breed. Inching out there a bit farther, let’s say the Line 1 cattle have had a major effect on the beef industry.

“They did have an impact on the whole industry,” says Richard Willham, Iowa State University distinguished professor of agriculture, and cattle breeding historian.

“The work with the Line 1 cattle demonstrated that linebreeding is different than just inbreeding. It is selection to increase relationship to a desired ancestor, but using only the animals with the most desirable traits. With the Line 1 cattle, more growth was very desirable,” adds Willham. “I think it’s because of them that Hereford breeders started thinking seriously about performance. And it spread to the whole industry.”

However, according to Willham, the beef industry really owes thanks to seed corn breeders for setting an example. He says it was Henry Wallace, founder of Pioneer Seed Co., who demonstrated the value of heterosis, or hybrid vigor, by crossing proprietary lines of seed corn.

“That was in 1926,” says Willham, “but within a decade, hybrid corn had blanketed the Corn Belt. It was that much better. What was so surprising was its uniformity. Some

livestock breeders saw what was happening with hybrid crops. It made them think.”

But those were the days when many cattlemen shuddered at the mention of the word “crossbreeding.” Some discussions on the topic involved shouting and flailing fists. More acceptable was the notion of developing selectively inbred lines of purebred cattle, which could be crossed with other purebred lines to achieve a measure of hybrid vigor.

Developing the Line 1

The first large-scale linebreeding program in the U.S. began in 1934 at Fort Keogh Range and Livestock Laboratory — then referred to as the “Miles City Station.” Animal scientists at various land-grant universities initiated other linebreeding research projects during this era. But few left a legacy as enduring as the work conducted at Miles City by USDA and Montana State University researchers. Of course, not all of Miles City’s linebreeding projects were successful.

According to USDA-Animal Research Service Geneticist Mike MacNeil, Miles City researchers developed 10 inbred lines of Hereford cattle. By the 1970s all but one had fallen by the wayside because of the expression of undesirable genetic traits, lack-luster performance or the normal progression of research.

“All were abandoned except the first — Line 1,” explains MacNeil. “Like the others, Line 1 was started from just



Geneticist Mike MacNeil reviews Line 1 Hereford breeding data collected since 1934.

PHOTO COURTESY USDA ARS

a few animals. Two sires used were Prince Domino-bred half-brothers — Advance Domino 20 and Advance Domino 54. All of the cows used to develop Line 1 were descendants of Colonel Perfection.”

Line 1 research provided the first demonstration of sibling and progeny testing during the late 1930s and 1940s. According to MacNeil, it laid a foundation for modern genetic research, providing for development of selection tools previously unheard of but now taken for granted.

“Research with Line 1 yielded some of the first genetic heritability estimates. Heritability of weaning weight was calculated at 0.25, using a mechanical adding machine, a pencil and a lot of paper. Today, using a computer, more sophisticated procedures and a lot more data, it’s still calculated at about 0.25,” offers MacNeil.

“What I see as really significant is the practical demonstration of progress through continued genetic selection over a long period of time. Selection has produced 13 generations of genetic improvement in Line 1 Hereford cattle. Further experiments with Line 1 have also shown the feasibility of producing what we now call ‘curve-bending cattle’ that combine low birth weight with high growth. I think that’s also been quite significant,” he adds.

Industry acceptance

MacNeil says the first opportunity for private industry to access Line 1 genetics came about 50 years ago.

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Line 1 bulls at Cooper Herefords, Willow Creek, Mont.

Initially offered through private-treaty transactions, individual animals sold for \$400 to \$450 per head. As demand developed, an auction sale was established and developed during the 1960s. It continues to this day and Line 1 breeding stock is sold no other way, except for occasional private-treaty sales to other research facilities.

In the early days, however, Line 1 cattle weren't the kind sought by seedstock breeders and commercial cattlemen. They were different in type — definitely bigger than the industry standard.

"Back then, the popular cattle were short and blocky — really close to the ground. The Miles City cattle were just the opposite," says Mark Cooper, a Hereford breeder from Willow Creek, Mont.

Cooper's father, Jack, and his uncle, Les Holden, were among the first Hereford breeders to embrace the Line 1 difference. Both operations are credited with furthering the eventual popularity of Line 1 genetics.

Cooper says another uncle, Ray Woodward, was a research project manager at the Miles City Station during the 1940s. He steered the senior Cooper and Holden toward the cattle, drawing attention to their performance.

"The cattle stood out — not only because of the way they looked but because of their performance and uniformity. But Dad said the cattle were not well accepted at first because they didn't fit the showing type. They were hard to market until the merits of performance testing became evident," Cooper explains.

"Performance balanced with practical birth weights was our emphasis, but when the showing wanted more frame, we already had it to offer. A lot of breeders turned to us, or Holden Herefords, as well as Miles City for a different kind of genetics," Cooper adds.

In the long run, Cooper says it is performance that brings most seedstock breeders and commercial cow-calf producers to their bull sales. Among them is Glen Debter, Horton, Ala., whose chance meeting with Jack Cooper and Les Holden proved fortuitous. Debter says an Auburn University staffer introduced him to performance information from Miles City in the late 1960s. Soon after, while attending a Hereford conference in Tennessee, Debter happened to meet the Montana breeders.



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— Glen Debter

"I ended up buying a big bull from them for \$5,000. I think that was the first Line 1 bull to come into the South," recalls Debter. "His first calf crop really turned our operation around. I recovered the bull's purchase price with the sale of one bull calf and one heifer calf."

Debter says he's stayed with Line 1 genetics, sourcing bulls from the Cooper and Holden herds, from Miles City and from a Line 1 population now maintained at the USDA research facility in Brooksville, Fla.

"We like the growth traits but also the females out of Line 1 bulls — their udders and temperament. They're structurally sound and show a lot of dark pigment. Our customers liked them from day one — especially their predictability. The cattle put our operation in overdrive," Debter says with a grin.

According to MacNeil, the mission at Fort Keogh has always been discovery of knowledge to benefit the livestock industry. A byproduct of that mission has been the generation of predictable breeding stock of value to private industry, across a variety of production environments.

"It all traces back to relatively few animals, but through disciplined selection, the Line 1 cattle have been a major influence in the Hereford breed," says MacNeil. "I'd really like to know how many of this year's Hereford calves are related to Line 1 cattle." **HW**



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