# CROSS BREEDING

How do Longhorns compare to Brahmans in a three-way rotational cross? Research at Berry College may reveal some interesting facts.

**By Stewart H. Fowler, Ph.D.**

*About the author: Dr. Stewart Fowler, head of the Department of Agriculture, Berry College, Mount Berry, Georgia, is an animal geneticist who believes Texas Longhorns have a strong contribution to make to the beef cattle industry.*

*Fowler was first introduced to Longhorns in 1967 while he was in charge of the purebred beef cattle operation at Louisiana State University. His interest in the breed and its genetic value has continued throughout his career, and led to the establishment of the purebred Texas Longhorn herd at Berry College in 1982 for researching a three-breed rotational cross.*

*Fowler has assisted the Texas Longhorn Breeders Association of America (TLBAA) in a variety of ways, including writing research proposals, doing presentations and advising private breeders.*

*Before going to Berry College, Fowler was on staff at six land-grant universities in teaching, research and extension capacities. His livestock experience includes international judging and packer-buying.*

*The following article was written for presentation at the 1985 TLBAA National Convention in Nashville, Tennessee.*

Four years ago, Berry College had beef cattle herds of only Angus and Simmental cattle. Now the college is in the process of building and upgrading seven purebred herds. These include, in addition to Angus and Simmental, Brahman, Brangus, Chianina, Devon and Texas Longhorn.

*Dr. Stewart Fowler.*

At Berry, herds are used as practical laboratories for students. Each breed is studied, measured and analyzed to provide information about breed characteristics and herd productivity.

No breed is present at Berry because of fad or fancy. Each breed was selected because of unique traits it can contribute to the future of the beef cattle industry.

The cattle to build most of Berry's newer herds have been donated or financed through designated gifts. Many other valuable animals were loaned as building stock for Berry's growing agriculture program. Semen has been donated from many of the top herd sires of the various breeds.

Since Berry is a small, private college, rather than a large tax-supported land grant university, support from the private sector has made such expansion and development of the college's beef cattle program possible.

These outstanding herds give the agriculture department a wide genetic base to work from in crossbreeding. Two long-range crossbreeding studies are now under way, utilizing four of the purebred breeds at Berry. Each study is a three-breed rotational cross designed to maximize hybrid vigor through systematic crossing of three genetically diverse breeds.

Each study was also designed to capitalize on the complementarity of traits from breeds with traits that should supplement each other to produce environmentally and economi-

cally superior cattle for the beef industry.

Parents with more divergent genetic backgrounds—and, thus, fewer genes in common — will produce offspring with more hybrid vigor, resulting in progeny with stronger fitness traits than their parents. These fitness traits include such qualities as high growth and fertility rates, calving ease, calf survivability, disease and parasite resistance, and longevity.

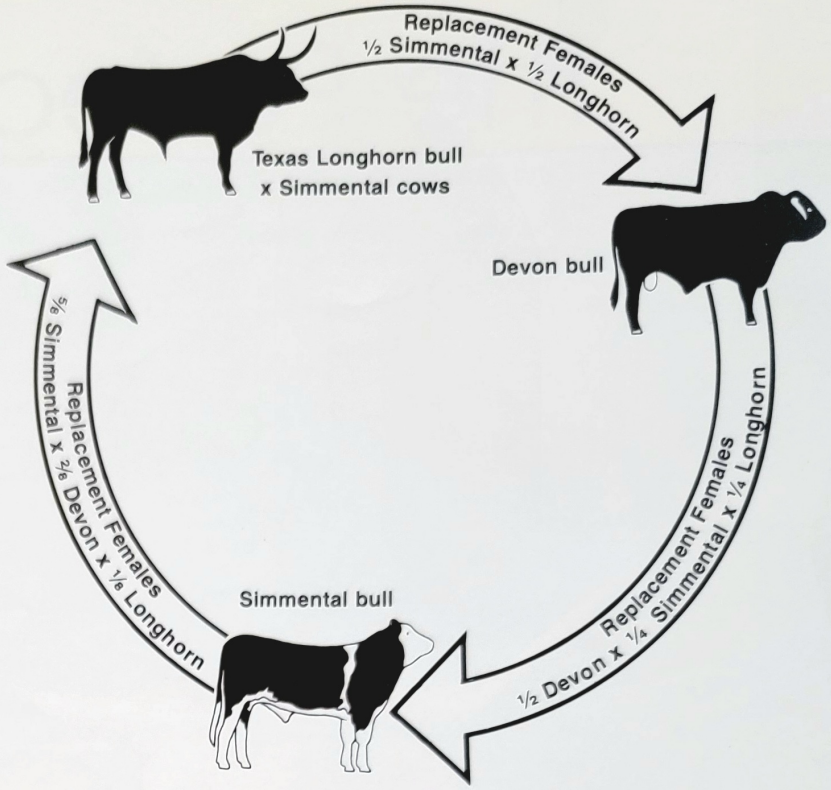
In 1982, a systematic three-breed rotational crossbreeding program was initiated which involves the Simmental, Brahman and Devon breeds. Almost maximum hybrid vigor should occur from using a continental European breed (Simmental), a *Bos indicus* breed (Brahman), and a very old English breed (Devon) noted for its genetic purity.

In the spring of 1983, a second systematic three-breed rotational crossbreeding program was initiated to incorporate the genes of the Texas Longhorn. That study duplicates the Simmental-Brahman-Devon cross; except the Texas Longhorn replaces the Brahman. A portion of Berry's Simmental herd was inseminated to four Texas Longhorn bulls with two Texas Longhorn bulls used in a post-insemination period as clean-up bulls.

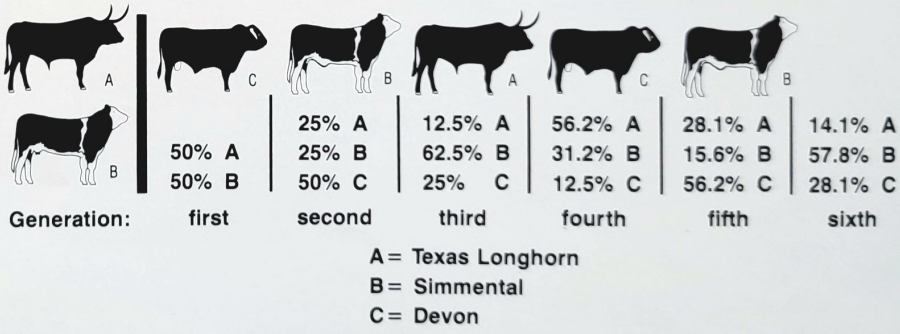
The genetic makeup of both the Texas Longhorn and the Brahman is very different from that of the continental European Simmentals and the British Devons. Since the Texas Longhorn is a nature-developed breed which gradually evolved in the Southwest, and the Brahman originated in India, they are unlikely to have many genes in common with either the Simmental or Devon.

As the F1 (first-cross) Simmental X Texas Longhorn heifers and the F1 Simmental X Brahman heifers are placed into production by mating them to Devon bulls, an interesting demonstration will become available as to the effectiveness of replacing Brahman blood with the Texas Longhorn in crossbreeding programs.

The first Devon-sired calves, out of Simmental X Brahman F1 heifers, were dropped this spring (1985), and the first Devon-sired calves out of




*Three-breed rotation results in continuous production of crossbred calves on crossbred cows and allows selection of replacement heifers from within the herd. The systematic rotation of three purebred sires is kept in a strict sequence on daughters of the previous mating.*




*The three-breed rotational cross settles down to the production of crossbred calves which possess approximately four-sevenths of their hereditary material from the breed of their immediate sire, two-sevenths from the breed of their maternal grandsire, and the remaining one-seventh from the third breed back in the sequence.*

**BIRTH AND ADJUSTED 205-DAY WEIGHTS FOR CROSSBRED CALVES BORN IN 1984 AT BERRY COLLEGE, MOUNT BERRY, GEORGIA**

| BREED CROSS | Birth Weight | | | | Adjusted 205-Day Weight | | | |
|---|---|---|---|---|---|---|---|---|
| | Males | | Females | | Males | | Females | |
| | No. | Lbs. | No. | Lbs. | No. | Lbs. | No. | Lbs. |
| Simmental X Longhorn | 5 | 58.4 | 2 | 50.0 | 5 | 500 | 2 | 460 |
| Simmental X Brahman | 6 | 82.8 | 14 | 76.5 | 6 | 487 | 14 | 451 |

*Data based on small and unequal numbers so can only indicate a possible trend and should not be considered to reveal significant differences.

Simmental X Texas Longhorns F1 heifers will arrive next spring.

Research indicates that a crossbred calf on a crossbred cow is the most desirable combination for top weaning weights. That is, extra hybrid vigor follows the use of good purebred bulls of a third breed on crossbred cows. This plan exploits hybrid vigor in both the cow and the calf. From that point, a rotation of sires of the three breeds might be used which is the plan being followed in both crossbreeding studies at Berry College.

When a set of Devon-sired replacement heifers is retained in each study, they will be mated to superior Simmental bulls. When replacement heifers are saved from these Simmental matings, the ones carrying Texas Longhorn breeding will be bred to Texas Longhorn bulls, whereas the ones carrying Brahman breeding will be bred to Brahman bulls. The female progeny for those matings will, in turn, be mated to Devon bulls.

In other words, in each of the studies, bulls of the three breeds involved will be used in strict sequence on daughters from the previous mating. A systematic rotation of bulls of three breeds soon settles down to produce crossbreds which possess approximately four-sevenths of their hereditary material from the breed of their immediate sire, two-sevenths from the breed of their maternal grandsire, and the remaining one-seventh from the third breed back in the sequence.

Such three-breed rotational crossbreeding programs permit continuous production of crossbred calves on crossbred cows and make it possible to select replacement heifers from within the herd. Furthermore, research indicates that about 87 percent of the hybrid vigor advantage in the first generation can be retained with a three-breed rotational cross.

Current plans call for expanding both crossbreeding units to at least 75 to 100 mother cows in each of the crossbreeding programs. So, the program is still in the "growing stage," with insufficient data available to draw meaningful conclusions even on the relative merit of the two types of F1 progeny (the Simmental X Brahman versus the Simmental X Texas Longhorn).

The 1986 calf crop should give some of the most meaningful data to emerge from the crossbreeding study. Equal numbers of Simmental cows are being bred in 1985 to Texas Longhorns and Brahmans with no selection being excercised as to which breed is used on a given cow. The first Simmental cow in heat was inseminated to a Texas Longhorn bull, the second to a Brahman, the third to a Texas Longhorn, the fourth to a Brahman, and so on.

To provide good representative samples of the Brahman and Texas Longhorn breed, semen from a number of bulls of each breed is being used; and the insemination period will be followed by two or more clean-up bulls of each breed. For example, in the Texas Longhorn cross, semen is being used from more than 18 different herd sires. To eliminate any "planned mating" for the given cow, the sires have been arrayed at random in "use sequence." So, a bull is predesignated for each cow as they randomly come into heat and are scheduled to be bred Texas Longhorn.

In 1984, the major portion of the Simmental herd was bred to Texas Longhorns to produce more of the Simmental X Texas Longhorn cross in 1985 to compensate for more of the Simmental X Brahman crosses being produced the previous two years. That calf crop is now "on the ground" and birth weight data are now available. It should be understood, however, that these data are based upon small and unequal numbers.

In the Simmental X Brahman cross, five males averaged 102.0 pounds and five females averaged 79.4 pounds. In contrast, the Simmental X Texas Longhorn crosses averaged 57.9 pounds for 27 males and 56 pounds for 16 females.

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These preliminary figures are the initial step in providing substantial scientifically documented data on the crossbred Texas Longhorn for use as a beef animal, on both the calf production and meat production ends. Fowler, and many others, believe the breed's future may rely on science proving the Texas Longhorn's value to the mainstream of the beef industry.