

Texas Adapted Genetic Strategies for Beef Cattle VI: Creating Breeds

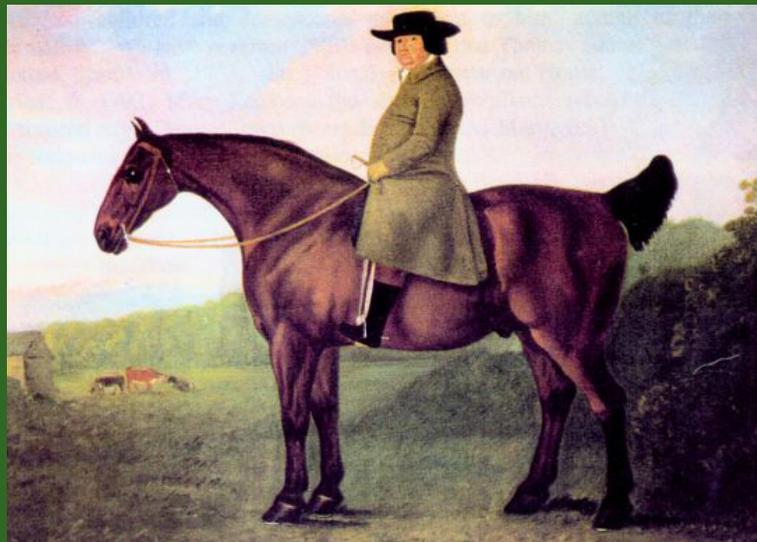


Figure 1. Robert Bakewell, circa 1775, English pioneer creator of breeds of livestock.

Stephen P. Hammack*

What is a breed? A typical dictionary definition is “a race of animals which have some distinctive qualities in common.” One textbook definition is “animals more closely related and alike in appearance than random members of the species.” In a recent scientific paper, the authors stated “we use breed and population interchangeably, due to the different definitions of breed worldwide.”

In 1999, the Food and Agriculture Organization of the United Nations adopted the following broad definition:

Either 1) a subspecific group of domestic livestock with definable and identifiable external characteristics that enable it to be separated by visual appraisal from other similarly defined groups within the same species, or 2) a group for which geographical and/or cultural separation from phenotypically similar groups has led to acceptance of its separate identity.

One definition of a breed is livestock with a registry of ancestry, sometimes called a herdbook. The United States

has had about 75 cattle breed registries for some time; new ones appear and others disappear. In some cases, the cattle in two or more registries are the same or essentially the same.

The only actions needed to start a registry are to adopt specific requirements of eligibility and start recording ancestry. Although those requirements vary considerably and may not be very stringent, having a registry could be considered to constitute a breed.

In spite of what many think, the U.S. Department of Agriculture does not “recognize” the validity of breeds. The Canadian government division of agriculture does

*Professor and Extension Beef Cattle Specialist–Emeritus, The Texas A&M University System



officially recognize breeds, but admits that “there is not a standard definition for what is a breed.”

How many breeds of cattle are there? The National Association of Animal Breeders has 123 breed codes to identify semen, not to officially recognize breeds. The Breeds of Cattle website (<http://www.ansi.okstate.edu/breeds/cattle/>) maintained by Oklahoma State University lists 268 cattle breeds worldwide, about the same number of “numerically or historically important” breeds as are listed in I. L. Mason’s *World Dictionary of Livestock Breeds*.

The definition of breed has been discussed for decades. With perhaps as accurate, concise, and useful a definition as any, O. Lloyd-Jones wrote in a 1915 paper, “What is a Breed?” in the *Journal of Heredity*: “A breed is a group of domestic animals, termed such by common consent of the breeders.” In short, a breed can be whatever you say it is.

Origin of breeds

Even before cattle were domesticated, distinctive populations developed in response to the prevailing influences of natural selection. After domestication, some cattle populations became even more distinct as cattle raisers influenced which individuals reproduced; this often involved aesthetic considerations, such as color or horns, for various cultural and religious purposes. Later, some people selected breeding stock for particular production purposes, including draft, milk, and meat, but usually with little planning or direction.

At times, individuals with desired characteristics were brought into one region from another. These individuals, usually sires, were bred to local stock, and a new population was formed. The new population was similar to the imported stock, but it also had the influence of the local animals along with that of any subsequent natural and human-directed selection.

The development of what has been termed *pedigree breeds* began in England in the mid to late 1700s, pioneered by Robert Bakewell. The advent of fenced pastures facilitated this development by allowing more selective rather than random mating.

Breed development often proceeded as explained by Jay L. Lush in *Animal Breeding Plans*:

1. A generally useful production type was identified.
2. The best individuals of that type were congregated into a breeding group (herd) or groups, often with little if any outside introduction of breeding stock.

3. Varying levels of sometimes intense inbreeding occurred, but more often linebreeding to highly favored individuals was practiced to increase the relationship to such individuals while trying to minimize inbreeding.
4. These groups became distinctive in type and inheritance.
5. If the group was desirable in some way, it attracted notice and became popular with other breeders.
6. In response to its popularity, its population increased, leading to records of ancestry in a herdbook or registry.
7. Producers formed a breed society or association to keep ancestry records, maintain breed purity, and promote the breed. The first such cattle registry began in England in 1822 for Shorthorns; the Hereford registry started in England in 1846, and the Angus, actually Aberdeen-Angus, began in Scotland in 1862.

European Breeds in the United States

Early colonists brought with them mostly non-descript cattle and a few more-distinct types. In the eastern part of what became the United States, most of the early cattle came from the British Isles. In the Southwest, the cattle came mostly from the Iberian Peninsula.

Not long after the British breeds were formed, some individuals were imported here. Most of those that might be considered a breed were Shorthorn, even though the English breed registry had not yet started. A few came as early as 1783, and significant numbers arrived around 1817. A few Herefords also entered the country in 1817, but the first meaningful numbers came in about 1840. The first few Angus arrived in 1873.



Figure 2. An 1811 painting of Comet, one of the foundation sires of Shorthorn. Image used courtesy of Beamish Museum Limited, copyright on image Beamish Museum Limited. www.beamishcollections.com/

Other breeds imported before 1900 from the British Isles included Ayrshire, Devon, Galloway, Highland, Kerry, Red Poll, and Sussex. Brought in before 1900 from Continental Europe or the English Channel Islands were Brown Swiss, Dutch Belted, Guernsey, Holstein-Friesian, and Jersey.

U.S. registries for Shorthorn, Hereford, and Angus began in 1846, 1881, and 1883, respectively. All three required that the foundation animals trace to ancestors recorded in the British registries. That is, no “upgrading” for registry was allowed, unlike many breeds established or created later in this country.

Upgrading

One way to create purebreds (or almost “pure”) is by a process called upgrading—successive “topcrosses” starting with purebred sires on other breeds, crosses, or cattle of unknown background. The first topcross results in 1/2-“blood” progeny. If that 1/2-blood is topcrossed with a purebred, the progeny is 3/4 “pure.” A third topcross results in a 7/8 blood, which is generally the minimum for registry, in associations allowing upgrading, as an officially defined Purebred. Some breed associations require 15/16 or even 31/32 to be Purebred. Some registries require that males have one more topcross than females in order to be Purebred.

Upgrading results in some residual content from the upgraded base cattle, with the amount depending on how many topcrosses are involved. As with defining a breed, the definition of Purebred is purely discretionary as determined by the breed association.

Most of the new breeds imported into the United States from Europe beginning in the late 1960s used upgrading as the primary method of establishment and development. This group includes Braunvieh, Chianina, Gelbvieh, Limousin, Maine-Anjou, Salers, Simmental, and some less numerous breeds. The earlier-imported Charolais also were developed here partly by upgrading.

Some associations distinguish between Purebred (with a prescribed level of upgrading) and “Fullblood.” If so, Fullbloods are usually considered to be: 1) individuals recorded in a foreign breed registry officially recognized by the U.S. association (often the single registry considered to be the parent of the breed) or 2) individuals tracing exclusively to such ancestors. If there is a Fullblood designation, the requirements are established by the breed association.

Combining Breeds

For many years, most livestock breeders favored creating and maintaining breed purity or “racial constancy,” increasing visible uniformity, and developing prepotent breeding stock that could reliably transmit characteristics to offspring. Some inbreeding of varying levels usually occurred in achieving these ends. Purebred influence was thought necessary to improve “common” local stock.

Crossbreeding of cattle was often viewed unfavorably until the past 50 years or so, when the industry gradually recognized the utility of favorable breed combinations and heterosis, also called hybrid vigor.

Breeders sometimes make new breed combinations when there is a perceived need for a production type that does not exist, to better suit prevailing conditions. The U.S. Gulf Coast is characterized by a harsh climate of generally persistent heat and high humidity. The first breed created in the United States by combining existing breeds—the American Brahman—was developed from a foundation better suited to those conditions than the British breeds. The Brahman was formed beginning in the early 1900s from humped cattle (*Bos indicus*, also called Zebu) native to the Indian subcontinent, mostly of the Guzerat, Gyr, Krishna Valley, and Nelore breeds. Although some of the foundation cattle came directly from India, most came indirectly from Brazil.

Shortly after development of the Brahman began, other breeders in the same region decided to create a type intermediate to European cattle (*Bos taurus*) and *Bos indicus* by combining those types. This led to the creation of what has come to be known as “American” breeds, even though the Brahman was also created in America.



Figure 3. Aristocrata, sire of Manso, which appears in the pedigrees of about 80 percent of today's Grey Brahmans. The photograph was taken in 1924 when Aristocrata was imported into the United States. Courtesy of J. D. Hudgins, Inc.



Figure 4. Monkey, considered to be the foundation sire of Santa Gertrudis. Used by permission of King Ranch.

The first of these breeds created by combining different types, not just different breeds of the same type as with creating Brahman, was the Santa Gertrudis, developed on the King Ranch in South Texas. These cattle are usually characterized as being 5/8 Shorthorn and 3/8 Brahman. However, the precise breed content of Santa Gertrudis is not known because the group of 52 bulls initially used in 1918 were 3/4 and 7/8 *Bos indicus* (the name “Brahman” was not officially adopted until 1924 when the American Brahman registry was started).

Beginning in the early 1930s, Beefmasters were formed on the Lasater Ranch in South Texas. That breed is thought to be slightly less than 1/2 Brahman and slightly more than 1/4 each of Shorthorn and Hereford but, as with Santa Gertrudis, the exact content is not known. In the mid 1940s, several breeders, most notably the Adams Ranch in Florida, created Brafords from a pool of Brahman and Hereford. After several breeders experimented for years with combining Angus and Brahman, a specific content of 5/8 Angus and 3/8 Brahman was officially established for Brangus in 1949. Other American breeds were created, some with heat-tolerant non-*Bos indicus* breeds in addition to or instead of Brahman.

The first American breeds were developed over periods of at least 20 to 30 years before a registry was established. Even after establishment, some breeds allowed registry without knowing the exact parentage, at least in the closed herd of a foundation breeder. But in most breeds created recently, a registry was established when breed formation began, with required documentation of parentage.

After new quarantine and disease-testing facilities were established in North America, many new breeds began to be imported in the late 1960s, mostly from Continental Europe. This led to various combinations

of British and Continental breeds in many commercial herds.

Some of these Continental-British combinations have recently formed registries or, most commonly, are registered in one of the parent associations, usually that of the Continental parent. Some recent combinations of British, Continental, *Bos indicus*, and/or American breeds are discussed later in this publication.

Types of Breed Combinations

Breeds may be combined in several ways for different purposes, including the creation of a new breed with a registry. Breed registries can be closed or open. In a closed registry, the individuals must trace to ancestors recorded in the registry at the time of formation or closing. Open registries allow outside stock to be brought in, including for upgrading, using procedures specified by the registry.

Four methods are used to combine breeds:

- **Formula breeds** are formed by combining two or more existing breeds to create specific breed percentages, such as prescribed in Brangus. Some allow a range of percentages. If a range is allowed, the exact breed percentage of individuals is usually noted on pedigrees.

After individuals of the defined percentage or formula are created, the registry may either be closed or allow creation from the parent breeds, but upgrading generally is not allowed.

If creation is allowed using the parent breeds, most associations define an individual as Officially Purebred when its composition is that of the associations’ particular prescribed formula, regardless of the path taken to reach that formula. If creation is allowed by starting with parent breeds, the number of early generations of intermating of individuals of the prescribed formula is often indicated on pedigrees.

Some argue that to be logically called purebred, it should take at least the first generation of progeny from intermating (that is, when the sire and dam of progeny are both of the prescribed formula). Others insist on third generation or more, but none of these levels of intermating is required by any registry.

- **Pool breeds** are formed by combining two or more existing breeds to create a new genetic pool. There is no particular intent to create specific percentages of the constituent breeds or to keep track of the percentages that result as the breed is developed. In fact, the exact breed percent-

ages often are not known. Santa Gertrudis and Beefmaster are examples of breeds created from genetic pools.

Some pool breeds establish a closed registry and some allow upgrading once the breed is established, but they usually do not allow creation anew using the base breeds.

- **Composites** were originally defined by the U. S. Meat Animal Research Center (MARC, Clay Center, Nebraska) as being populations formed by crossing two or more existing breeds in specific percentages, followed by intermating of the crosses to maintain the percentages as with formulas. In addition, the intent is to maintain maximum possible levels of heterosis or hybrid vigor in future generations. This differentiates true composites from formula and pool breeds. True composites are more an alternative to crossbreeding systems than a means of creating a breed. However, *composite breed* has generally come to be used to mean those formed, by whatever means, by combining existing breeds. Perhaps *combination breeds* would have been better applied to formulas and pools, to avoid confusion with true composites, but *composite breeds* seems to have stuck.

- **Crossbreeds** are hybrid combinations that will not be used to form a breed or a true composite. In much of agriculture, especially crops, “dead-end” or terminal crosses are the bases of commercial production. Terminal crossing also is often done by some commercial beef cattle producers. A common example in Texas is breeding a Brahman-crossbred female, such as the Brahman-Hereford or Brahman-Angus, to another breed in a terminal cross (where no progeny are kept for breeding).

Regardless of the types or breeds involved, terminal crossing requires that new replacement females always be re-created. However, crossbreeds do not have to be terminal but also can be kept for breeding in continuous crossbreeding systems (in which females are kept for replacements). If this is done, outside genetic influence (usually sires) is introduced on a regular and systematic basis.

For more information on terminal and continuous crossbreeding systems, see *Texas Adapted Genetic Strategies for Beef Cattle—IV: Breeding Systems*.

These methods of combining breeds are often confused and misunderstood. Also, there is no “best” method of forming combinations nor any “best” breed

percentages. Some people think that pools allow selection over time, without resorting to specific formulas, to result in the most adapted and useful cattle. Others think adherence to a formula increases genetic and visible uniformity. Some place major importance on maintaining heterosis without continual crossing, as in using a true composite. And still others merely implement a planned crossbreeding system, either terminal or continuous.

Purposes and intents have as much to do with combining breeds as do the methods employed. The method used to form new combinations is less important than the choice of constituent breeds to fit prevailing production conditions and market preferences.

For more information on choosing breeds, see *Texas Adapted Genetic Strategies for Beef Cattle—V: Types and Breeds—Characteristics and Uses*; and *Texas Adapted Genetic Strategies for Beef Cattle—VII: Sire Types for Commercial Herds*.

Consequences of Combining Breeds

Crossbreeds have long been thought to be inherently more variable than purebreds. But theoretically, the progeny from the first cross of two breeds should be rather uniform, at least in production characteristics if not in physical features such as color. In a study involving many cattle from several British and Continental breeds, the U.S. Meat Animal Research Center (MARC) reported that “increased genetic variation in composite populations was not observed relative to contributing purebreds.”

Some have also thought that continued crossing would eventually eliminate heterosis. The MARC study looked at the amount of heterosis lost when crossbreeds of the same composition were intermated. In theory, when first-generation (F₁) crosses are intermated, producing a second generation F₂, half of the F₁ heterosis is lost in the F₂. But if F₂ progeny are intermated, there should be no additional reduction of heterosis.

The MARC research basically confirmed this general theory of heterosis retention, at least in extended generations of intermating British and Continental crosses. That is, after the initial reduction of heterosis from the first intermating, the only additional loss in subsequent generations would be caused by whatever inbreeding might occur.

For this reason, to maximize retention of heterosis, as many animals as possible should be used in closed populations of breed combinations (including breeds formed from combinations). Researchers at the Texas

A&M Department of Animal Science are investigating if this theory also holds in *Bos taurus*-*Bos indicus* combinations; preliminary results indicate that heterosis retention may differ somewhat in these combinations.

Heterosis is covered more fully in *Texas Adapted Genetic Strategies for Beef Cattle—IV: Breeding Systems*.

Most Numerous Breeds in Texas

Following are backgrounds and U.S. registry requirements of the breeds that are most numerous in Texas. Registry associations can be accessed by an Internet search for the breed name.

Unless otherwise noted, designation as Fullblood is as discussed above under “Upgrading.” Designation as Purebred is defined by the registry association. *Open* means that the introduction of cattle from outside the registry is allowed; *closed* means that introduction from outside the registry is not allowed.

- **Angus:** Registry started in 1883, with the base animals all recorded in the founding Scottish registry.
Closed since inception, except to cattle recorded in approved foreign registries.
- **Beefmaster:** Formed on the Lasater ranch from a pool thought to be slightly less than 1/2 Brahman and slightly more than 1/4 Hereford and 1/4 Shorthorn. Registry started in 1961. Base purebreds are all from or trace to the founding Lasater herd. Also has Advancer (1/2 Beefmaster, 1/2 other registered breed).
Open registry, with upgrading allowed with three topcrosses on visually inspected base cattle and inspected topcrosses to arrive at Purebred (7/8).
- **Braford:** Registry started in 1979 with approved foundation cattle formed from pools of Brahman and Hereford. Accepted later were documented 5/8 Hereford-3/8 Brahman.
Registry now open; Purebred (5/8 Hereford-3/8 Brahman, plus or minus 5 percent) can be created by any process, including upgrading.
- **Brahman:** Formed from pools of several *Bos indicus* breeds and some upgrading. Registry started in 1924 and closed in 1939. Former separate registries for American Grey and American Red have been combined.
Opened for a few 1946 imports and later to a few individuals of *Bos indicus* breeds recorded in approved foreign registries.

- **Brangus:** Registry started in 1949 with individuals of 5/8 Angus-3/8 Brahman. Color formerly limited to black but red is allowed now. The former International Red Brangus registry merged with Brangus; registered Purebred individuals are identified as either Brangus or Red Brangus. Has registration for **Ultrablack** (registered Brangus X enrolled Angus) and **Ultrared** (registered Red Brangus X enrolled Red Angus).

Open registry allows starting with registered Angus and Brahman to create 5/8-3/8 Purebreds; also allows upgrading with Brangus on Ultrablack or Red Brangus on Ultrared to 7/8 Brangus or Red Brangus percentage, registerable as Purebred.

- **Braunvieh:** Registry started in 1984 with foundation cattle (recorded by the Swiss Braunvieh Federation) designated as Swiss Original Braunvieh (containing no American Brown Swiss influence). Has designation for **Beef Builder** (1/4 up to less than Purebred), **Braunbray** (includes some Brahman), and **Simbravieh** (includes some Brahman and Simmental).

Open registry allows upgrading to Purebred (7/8 female, 15/16 male). Fullblood designation is called Original Braunvieh.

- **Charolais:** Formed in the United States, primarily Texas, with a few Mexican imports from France beginning in the 1930s. Current registry started in 1957. Also designates Full French (French imports or from French parents imported after 1961) and American French (minimum 15/16 Full French). Has designation for Red Factor (Purebred individuals of colors other than white, light straw, or light cream) and for **Charbray** (5/8 to 13/16 Charolais, 3/8 to 3/16 *Bos indicus*).

Open registry, with upgrading to Purebred (31/32).

- **Chianina:** Registry started in 1972 with imports from Italy. Has Fullblood designation. Has registry for cattle containing Angus (**Chiangus**), Red Angus (**Red Chiangus**), Hereford (**Chiford**), or Maine Anjou (**Chimaine**).

Open registry and any percentage of Chianina may be registered, which is designated on pedigree. Most cattle in the registry currently are Chiangus of various percentages.

- **Gelbvieh:** Registry started in 1971 with imports from Germany. Has designations for Fullblood and for **Balancer** (1/4 to 3/4 Gelbvieh and 1/4 to 3/4 Angus or Red Angus with maximum 1/8 unknown or other breed), and **Southern Balancer** (at least 1/4 Gelbvieh, 1/16 to 1/2 *Bos indicus*).

Open registry with upgrading to Purebred (7/8 for female, 15/16 for male).

- **Hereford:** Registry started in 1881 with base animals all recorded in the English registry. Formerly separate registries for horned and polled have been combined.
Closed since inception, except to cattle recorded in approved foreign registries.
- **Holstein:** Registry started in 1872 with cattle from the Netherlands.
Cattle of any percentage of Holstein can be registered, with four designations based on the source (and breed percentage) as follows: North American registry ancestry (100 percent); North American (up to 99 percent); approved foreign registry ancestry (100 percent); and foreign (up to 99 percent).
- **Jersey:** Registry started in 1868 with cattle imported from the Jersey Isles and England. Includes cattle descended from the original herdbook and from parents recorded in approved foreign registries.
Has upgrading program to Purebred (31/32).
- **Limousin:** Registry started in 1968 with imports from France. Has Fullblood designation (100 percent) and for **Lim-Flex** (1/4 to 3/4 Limousin and 1/4 to 3/4 Angus or Red Angus with a maximum 1/8 of another breed or unknown breed).
Open registry with upgrading to Purebred (7/8 for female, 15/16 for male) and for lower percentages.
- **Maine-Anjou:** Registry started in 1969 with imports from France. Has designations for Fullblood and for **MaineTainers** (1/4 to 5/8 Maine Anjou, remainder other breed or breeds).
Open registry with upgrading to Purebred (7/8).
- **Red Angus:** Registry started in 1954, recording red animals out of parents registered in American Angus Association.
Has four categories: 1A—100 percent Red Angus, no disqualifying phenotypic features; 1B—87 to less than 100 percent Red Angus, no disqualifying features; II—also 87 to less than 100 percent Red Angus, but with one or more disqualifying features; III—less than 87 percent Red Angus.
Has designation for **Angus Plus** (65 to 96 percent Angus or Red Angus and minimum 4 percent Brahman).
- **Red Brangus:** The American Red Brangus registry started in 1956, recording red animals solely of purebred Angus and Brahman breeding. The former International Red Brangus registry re-

quiring 5/8 Angus-3/8 Brahman has been merged with Brangus.

It registers animals of any percentage of the two breeds, contingent upon approved visual inspection. It does not allow upgrading but does allow creation from the two parent breeds.

- **Salers:** Registry started in 1974 with imports from France. Has designations for Fullblood and **Optimizer** (1/8 to 3/4 Salers, remainder other registered breed, with 5/8 Salers designated Purebred Salers Optimizer).
Open registry with upgrading to Purebred (15/16).
- **Santa Gertrudis:** Formed on the King Ranch from a pool of about 5/8 Shorthorn-3/8 Brahman. Registry started in 1951 with the King Ranch cattle and officially designated Foundation Herds (tracing exclusively to the King Ranch).
Open registry allowing upgrading with 7/8 being Purebred; 1/4, 1/2, and 3/4 bloods are designated as **Star 5**.
- **Shorthorn:** Registry started in 1846 with the base animals all registered in the English herdbook. Has designations for **Durham Red** (1/8 to 7/8 Shorthorn, remainder Red Angus) and for **Bra-Horn** (3/8 to 7/8 Shorthorn, remainder Brahman or Brahman-influenced breed).
Registry was closed except to the English herdbook and other herdbooks tracing exclusively to the English. Opened in 1973 to other approved Shorthorn registries (including American Milking Shorthorn) not necessarily tracing exclusively to English registry. Has appendix upgrading program (**Shorthorn Plus**) to 15/16, called Purebred, with >99 percent receiving special designation. For upgrading, red-colored Maine Anjou are considered to be 3/4 Shorthorn and Lincoln Red 100 percent Shorthorn.
- **Simbrah:** Registered in the Simmental association as Purebred (specific formula of 5/8 Simmental and 3/8 Brahman) or Percentage (combinations of 1/8 to 3/4 Simmental, 1/8 to 7/8 Brahman, and not more than 3/8 other breeds).
Open registry but no upgrading program, except of Simmental parentage.
- **Simmental:** Registry started in 1968 with imports from Continental Europe. Has a Fullblood designation. Has designations for **SimAngus** (minimum 1/4, maximum 3/4 Simmental and minimum 1/4, maximum 3/4 Angus or Red Angus) and **SimAngus HT** (SimAngus with minimum 1/8 Bos indicus).

Open registry with upgrading to Purebred (7/8 female, 15/16 male).

- **Texas Longhorn:** The Texas Longhorn Breeders Association registry started in 1964 with a pool of Southwestern U.S. Criollo-type cattle (from seven long-time breeders of this type) approved by inspection for prescribed visible characteristics. Inspection ceased and registry was closed in 1975.

The International Texas Longhorn Association, formed in 1990, accepts cattle registered in the Texas Longhorn Breeders Association or Canadian Texas Longhorn Association.

Less Numerous Breeds

Breeds with smaller numbers may be found in Texas:

Akaushi	Marchigiana
Ankole Watusi	Mashona
Ayrshire	Milking Shorthorn
Belgian Blue	Murray Grey
Belted Galloway	Nelore
Blonde d'Aquitaine	Normande
British White	Norwegian Red
Brown Swiss	Parthenais
Corriente	Piedmontese
Devon	Pinzgauer
Dexter	Red Poll
Dutch Belted	Romagnola
Florida Cracker	Romosinuano
Galloway	Sahiwal
Guernsey	South Devon
Gyr	Sussex
Highland	Tarentaise
Indu-Brazil	Tuli
Irish Black	Wagyu
Irish Red	Welsh Black
Kerry	White Park
Lincoln Red	

Other Breed Combinations

Other breed combinations may be found in Texas, some with separate registries, that are not part of the most numerous and influential breeds listed above. The following may not be a complete current listing, and new combinations are likely to be created at any time:

- **American Breed:** 1/2 Brahman, 1/4 Charolais, 1/8 bison, 1/16 Hereford, 1/16 Shorthorn
- **Amerifax:** 5/8 Angus, 3/8 Beef Friesian
- **Barzona:** Pool with about 1/4 each Africander, Angus, Hereford, Santa Gertrudis
- **Beefalo:** 3/8 bison, 5/8 other breed(s)
- **Black Hereford:** Minimum 5/8 Hereford, remainder Angus
- **Bonsmara:** 5/8 Africander, 3/16 each Hereford and Shorthorn
- **Brahmousin:** 5/8 Limousin, 3/8 Brahman
- **Bralers:** 5/8 Salers, 3/8 Brahman
- **BueLingo:** Pool of primarily Dutch Belted, Belted Galloway, and Angus
- **Gelbray:** 5/8 Gelbvieh, 3/8 Brahman
- **Leachman Stabilizers:** 1/4 each Angus, Hereford, Simmental, Gelbvieh
- **RX3:** 1/2 Red Angus, 1/4 Hereford, 1/4 Red Holstein
- **Salorn:** 5/8 Salers, 3/8 Texas Longhorn
- **Santa Cruz:** 1/2 Santa Gertrudis, 1/4 Red Angus, 1/4 Gelbvieh
- **Senepol:** Pool of Red Poll and N'Dama (a humpless, West African, heat-tolerant breed)
- **South Poll:** 1/4 Red Angus, 1/4 Hereford, 1/4 Barzona, 1/4 Senepol
- **Texon:** Pool of Devon and Texas Longhorn

MARC Composites

Beginning in the late 1970s, the Meat Animal Research Center created the following Continental-British combinations maintained as true composites:

- **MARC I:** 1/4 Braunvieh, 1/4 Charolais, 1/4 Limousin, 1/8 Angus, 1/8 Hereford
- **MARC II:** 1/4 Angus, 1/4 Gelbvieh, 1/4 Hereford, 1/4 Simmental
- **MARC III:** 1/4 Angus, 1/4 Hereford, 1/4 Pinzgauer, 1/4 Red Poll

Summary

Breeds are usually formed to create cattle that are better suited to prevailing production and market conditions. Historically, breeds were sometimes introduced from other areas and often crossed on existing stock to establish the breed in the new locale. In recent times, new breeds have been created by combining existing breeds in various ways. Breeds may also be combined to realize the many benefits of heterosis. Or, some producers may simply want to form their own unique population by combining breeds.

Regardless of the motivation, many combinations have been made and more are sure to come. Some of those new combinations may be called a breed. But exactly what constitutes a “breed” will always be open to discussion.

For Further Reading

To obtain other publications in this Texas Adapted Genetics Strategies for Beef Cattle series, contact your county Extension office or see the Extension website <http://AgriLifeBookstore.org> and the Texas A&M Animal Science Extension website <http://beef.tamu.edu>.

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