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Texas Adapted Genetic Strategies for Beef Cattle VI:
BREEDS—ORIGINS AND DEVELOPMENT

Stephen P. Hammack, Ph.D.[1], and Joe C. Paschal, Ph.D.[2]

WHAT IS A BREED?

A typical dictionary definition of a breed is, "a race of animals with 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."

Another definition of breed is having a registry of ancestry, sometimes called a "herdbook." The U. S. Department of Agriculture (USDA) defines "registered" (9 CFR, Part 151) as, "Cattle for which individual records of ancestry are recorded and maintained by a breed association whose purpose is the improvement of the bovine species, and for which individual registration certificates are issued and recorded by such breed association." The USDA does not recognize the validity of breeds. It has a list of breed registry associations to approve higher payments for brucellosis indemnity for registered cattle.

Some references list more than 250 breeds of cattle worldwide. Some even list up to 1,000 races/landraces ("domesticated traditional variety of a species of animal that has developed over time, through adaption to its natural environment due to isolation from other populations of the species"). For many years, the U.S. has had 60 to 70 different breed registries for cattle, and now 80 to 85 if recent combinations of breeds (discussed later under Combining Breeds) are included. New breeds appear and others disappear. In a few cases, cattle in two or more registries have been or are the same, or essentially the same. The only actions needed to start a registry are to adopt specific eligibility requirements and start recording ancestry (if required). Although those requirements vary considerably and may not be very stringent, having a registry could constitute a breed. The existence of a registry and website will be used as the means of inclusion later in this publication.

The definition of breed has long been discussed. With perhaps as accurate, concise, and useful a definition as any, in a 1915 *Journal of Heredity* paper, "*What is a Breed,*" O. Lloyd-Jones wrote: "A breed is a group of domestic animals, termed such by common consent of the breeders." Simply put: A breed can be whatever someone says it is.

ORIGIN OF BREEDS

Even before cattle were domesticated, distinct populations developed in response to 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 came some selection of breeding stock for particular production purposes, but usually with little planning or direction. Selection generally came first mostly for draft purposes and later for draft and milk. While beef always was consumed from some cattle, selection only, or primarily, for beef came last.

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

[1] Emeritus Professor and Extension Beef Cattle Specialist
[2] Professor and Extension Livestock Specialist
Texas A&M AgriLife Extension

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, which was similar to the imported stock. But it also retained some influence from the local animals along with that of any subsequent natural and human-directed selection.

The development of what has been termed pedigree breeds of cattle began in England in the mid to late-1700s, pioneered by Robert Bakewell (Fig. 1). 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 of these individual types were congregated into a breeding group (i.e., herd) or groups, often with little outside introduction of breeding stock.
3. Varying levels of sometimes intense inbreeding occurred. More often, linebreeding was done to highly favored individuals to increase the relationship while trying to minimize inbreeding.
4. These groups became distinctive in type and inheritance.
5. If the group was at all desirable, it was vastly noticed and became popular with other breeders.
6. Its numbers increased in response to its popularity, leading to records of ancestry in a herdbook or registry.
7. Producers formed a breed society or association to keep records of ancestry, maintain breed purity, and promote the breed. The first such cattle registry began in England in 1822 for Shorthorns. The Hereford registry started during 1846 in England, while the Angus (actually, Aberdeen-Angus) began in Scotland during 1862.

Most early breeds followed a path like Jay L. Lush's explanation of breed development, or at least something similar.

EUROPEAN BREEDS IN THE U.S.

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 early cattle came from the British Isles. In the Southwest, early cattle mostly came from Spain.

Not long after British breeds were formed, some individuals were imported to the U.S. Some of those

Figure 2. An 1811 painting of Comet, one of the foundation sires of Shorthorn, the first purebred breed formed in the British Isles. *(Image used courtesy of Beamish Museum Limited, copyright on image Beamish Museum Limited; www.beamishcollections.com/.)*

were Shorthorn (Fig. 2), even though the English breed registry had not yet started. A few came as early as 1783 to Virginia, and significant numbers arrived around 1817. A few Herefords also entered the country in 1817 to Kentucky, but the first meaningful numbers came in about 1840. The first few Angus arrived during 1873 in Kansas.

Other breeds imported before 1900 from the British Isles included Ayrshire, Devon, Galloway, Highland, Kerry, Red Poll, and Sussex. Other breeds that were brought in before 1900 from Continental Europe, or the English Channel Islands, include 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 foundation animals that were traced to ancestors recorded in the British registries. That is, no introduction was allowed from outside sources after introduction, unlike many breeds formed later in the U.S. Even so, breeds are not static over time. These British breeds have changed in characteristics over the last 150 to 200 years, where they were developed. Furthermore, they also have changed in the U.S. and are not the same now in Britain compared to here. The same can be said of breeds developed in the U.S., some of which have been sent to other countries.

UPGRADING

There is no specifically accepted definition of "purebred." The USDA defines purebred (CFR 151, Part 151) as, "A term applicable to animals that are the progeny of known and registered ancestors of the same recognized breed and for which at least three generations of ancestry can be traced." However, the term purebred, or "straightbred," often is applied to commercial cattle having the physical appearance of a particular breed, or where there is knowledge or evidence of

breed background. Additionally, there may be other definitions, especially from those officially adopted by some breed associations.

One way to create purebreds (or almost "pure") is by upgrading (i.e., successive "topcrosses," starting with purebred sires on females of other breeds, crosses, or even of no specific background). The first topcross results in "half-blood" progeny. If that half-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 males to have one more topcross than females in order to be officially Purebred. The definition of Purebred is purely arbitrary, as determined by the breed association. Upgrading results in some residual content from the upgraded base cattle, depending on how many topcrosses are involved.

New quarantine and disease-testing facilities were established in North America in the 1960s, allowing cattle to be imported that previously had been prohibited, primarily because of foot-and-mouth disease. This resulted in importation starting in the late 1960s of many new breeds, mostly from Continental Europe. Most of these new breeds used upgrading as the primary method of rapid establishment and development in North America. These included Braunvieh, Chianina, Gelbvieh, Limousin, Maine-Anjou, Salers, Simmental, and some less numerous breeds. The earlier-imported Charolais that came through Mexico, and later Charolais imports directly from France, also were used for upgrading in the U.S.

Some associations distinguish between Purebred (with a prescribed level of upgrading) and officially Fullblood. If so, Fullbloods usually are considered: 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. However, if there is Fullblood designation, the requirements are established solely by the breed association.

TYPES OF BREED COMBINATIONS

Breeds may be combined in several ways for different purposes, including the formation of a new breed with a registry. Breed registries can be closed or open. In a closed registry, 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 at any time, including for upgrading and using procedures specified by the registry association.

Three Methods Used to Combine Breeds:

Pool Composite Breeds are formed by combining two or more existing breeds to create a new genetic pool or population. There is no particular intent to create specific percentages of constituent breeds or keep track of resulting percentages as the breed is developed. In fact, the exact breed percentages often are not known. Some pool breeds establish a closed registry of the foundation pool and descendants of that pool, but once the breed is established most allow upgrading.

Formula Composite Breeds are formed by combining two or more existing breeds to create specific breed percentages. Some allow a range of percentages. After individuals of the defined percentage or formula are created, the registry might either be closed or open to allow new animals to be re-created from start using the parent breeds. Upgrading may or may not be allowed. 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.

Commercial Crossbreds are hybrid combinations that will **not** be used to form a composite breed. In much of agriculture, especially crops, so-called "dead-end (or terminal) crosses" are the basis of commercial production. Some commercial beef producers do terminal crossing. A common example is using a breed of sire known for a fast rate of gain and possibly carcass merit on environmentally-adapted females with superior maternal ability, often crossbreds. Generally, in this particular application, no females are kept for breeding. However, some producers may retain for breeding these or other crosses, depending on the breeding system employed. For more information on crossbreeding systems, see: *Texas Adapted Genetic Strategies for Beef Cattle IV: Breeding Systems.*

These methods of combining breeds often are confusing and misunderstood. Also, there is no best method of forming combinations, nor any best breed percentages. Some people think 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. And still, others merely implement commercial cross-breeding, which may be planned or not.

In addition to the method used for formation, purposes and intents are essential. The method used to form new combinations is **not** as important as 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.*

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 progeny. Some inbreeding of varying levels usually occurred in achieving these ends. Purebred influence was thought to be necessary to improve "common" local stock. Cross-breeding of cattle usually was viewed unfavorably until the past 50 to 60 years or so, at least outside Texas and other Gulf Coast states, as the industry gradually recognized the utility of favorable breed combinations and hybrid vigor or heterosis.

Breeders often combine breeds when there is a perceived need for a production type that does not exist to better cope with existing production conditions. For more information on the relationship of production type and conditions, see: *Texas Adapted Genetic Strategies for Beef Cattle II: Genetic—Environmental Interaction.*

The Texas Gulf Coast and South Texas are characterized by a harsh climate of generally persistent heat and high humidity near the coast. In that region, the first combination breed was developed using cattle better suited to heat and humidity than British breeds. What eventually became the American Brahman (Fig. 3) was formed beginning in the early 1900s from humped cattle (*Bos indicus*, also called Zebu) native to the Indian sub-continent, using four distinct breeds of this type. The first significant imports came directly from India; larger numbers came later indirectly from Brazil.

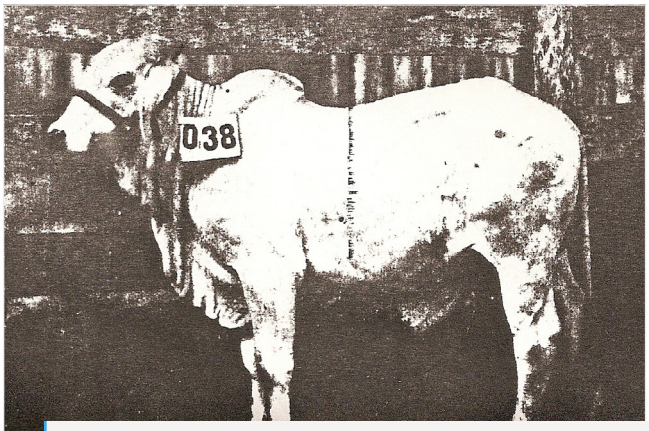

Figure 3. Aristocrata, sire of Manso, appears in the pedigrees of about 80 percent of today's Grey Brahmans. The photograph was taken in 1924 when Aristocrata was imported into the U.S. *(Courtesy of J. D. Hudgins, Inc.)*

Shortly after the development of 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 formation of what has come to be known as American breeds, even though the Brahman also was developed in America.

The first of these breeds were formed by combining different types, not just different breeds of the same type (as with Brahman), was Santa Gertrudis, which was developed on the King Ranch in South Texas (Fig. 4). This breed usually is characterized as being 5/8 Shorthorn and 3/8 Brahman. However, the specific breed content of Santa Gertrudis is not known, because 52 bulls important in formation of the composite pool were 3/4 and 7/8 *Bos indicus.* (The name "Brahman" was not officially adopted until 1924 when the American Brahman registry was started.)

Figure 4. "Monkey" is considered to be the foundation sire of Santa Gertrudis. *(Used by permission from the King Ranch.)*

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 of the founding composite pool is not known.

Commercial producers in Texas and some other Southern states had crossed Brahman and Hereford for many years. In the mid-1940s, the Adams Ranch in Florida created a composite pool of unknown percentages of Brahman and Hereford. However, it was thought to contain about one-half of each breed. These became the foundation of the original Braford.

After early work with Angus and Brahman beginning in the 1930s at the USDA research station in Jeanerette, Louisiana and experience by several breeders, a specific formula composite of 5/8 Angus and 3/8 Brahman was officially established for Brangus in 1949. Other American breeds also were formed.

The first American breeds were developed over 20 to 40 years before a registry was established. Even after establishment, for a time some breeds allowed registry without knowing exact parentage, at least from the closed herd of the foundation breeder. However, in most breeds formed recently, a registry was established when breed formation began, which required documentation of parentage.

Importation of new breeds starting in the late 1960s led to various combinations of Continental and British breeds in many commercial herds. Some of these Continental-British combinations are registered now (with unique names) in one of the parent associations, usually that of the Continental parent. Also, some recent combinations have been made of British or Continental breeds with American breeds or Brahman. Some combinations of various types are listed below under *Cattle Registered (in Parent Breed Associations).*

Consequences of Combining Breeds

Crossbreds have long been thought to be inherently more variable than purebreds. But the progeny from the first crosses of two breeds (i.e., F1) are generally relatively uniform, at least in production characteristics, if not in physical features such as color. In a study involving crosses of many cattle from several British and Continental breeds, the U.S. Meat Animal Research Center (MARC) reported, "increased genetic variation in composite populations was not observed relative to contributing purebreds."

Some also have thought that continued crossing would eliminate heterosis. The MARC study looked at the amount of heterosis lost when F1 crossbreds of the same composition were intermated to produce F2 progeny. As predicted, the study found about one-half of the original heterosis was retained. However, if F2 progeny are intermated, there should be little if any additional reduction of heterosis in subsequent generations, other than that caused by whatever inbreeding might occur. This is important to understand when combining breeds to form new breeds (i.e., such breeds retain some heterosis). Researchers at the Texas A&M University Department of Animal Science are investigating if this theory also holds in *Bos taurus-Bos indicus* combinations. Results indicate that heterosis retention may differ somewhat in these combinations compared to crossing only among *Bos taurus* breeds.

In order to maximize retention of heterosis, the effects of inbreeding can be minimized by using as many animals as possible in closed populations of breed combinations, including breeds formed from combinations. Heterosis and hybrid vigor are covered more fully in: *Texas Adapted Genetic Strategies for Beef Cattle IV: Breeding Systems.*

SUMMARY

Breeds first developed when people began favoring various types of cattle and started using desired individuals of these types for breeding. Sometimes, breeds were introduced from other areas and crossed on existing stock to establish the breed in a new locale. Characteristics of breeds generally change over time. And, in some cases, cattle with the same name can be somewhat different in characteristics across countries. Breeds often are formed to develop cattle better suited to prevailing production and market conditions. In recent times, some new breeds have been formed by combining existing breeds in various ways and for different purposes, often to better fit conditions. Breeds also may be combined to realize the many benefits of hybrid vigor/heterosis for commercial production. Or, some producers may merely want to form their own unique population by combining breeds.

Regardless of the motivation, many combinations have been and probably will be made. Some new combinations may be called a "breed," but exactly what constitutes a breed will always be open to discussion.

Breeds with Registration and Breed-Wise Genetic Evaluation (EPD)

The following section covers backgrounds and U.S. registry requirements of breeds with current breed-wise genetic evaluation (EPD). In general, these breeds have the most registrations in the U.S. Registry associations can be accessed by an internet search for the breed association.

Unless otherwise noted, designation as official "Fullblood" is as discussed above under "Upgrading." Designation as official Purebred is defined by the registry association. "Open" means introduction of cattle from outside the registry is allowed, including for upgrading. "Closed" means introduction from outside the registry is not allowed, therefore upgrading is not allowed.

- **Angus:** The American Angus Association registry started in 1883 with base animals, which were all recorded in the founding Scottish registry. It was closed since inception, except to cattle recorded in approved foreign registries.
- **Beefmaster:** The Beefmaster Breeders United registry started in 1961 with approved foundation cattle originally formed from pool of Brahman, Hereford, and Shorthorn. Base purebreds are all from or trace to the founding Lasater herd. It is an open registry that allows upgrading, with three topcrosses to arrive at Purebred (7/8). Beefmaster also has Advancer (e.g., 1/2 Beefmaster, 1/2 other

registered breed) and E6 (e.g., at least 50 percent to 100 percent Beefmaster) for creating females for commercial production.

- **Braford:** The United Braford Breeders 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 is now open. Purebred (e.g., 5/8 Hereford-3/8 Brahman, plus or minus 5 percent) can be created by any process, including upgrading. Braford Plus involves mating of a purebred Braford or F1 Braford (e.g., 1/2 Hereford, 1/2 Brahman) to registered Angus or Red Angus. Also, cattle from multi-generational breeding (offspring of registered Braford Plus to registered Braford Plus) can be registered as Braford Plus.
- **Brahman:** Formed from pools of *Bos indicus* breeds and some upgrading. The American Brahman Breeders Association registry started in 1924 and closed in 1939. It was opened for a few 1946 imports, and later to a few individuals of *Bos indicus* breeds recorded in approved foreign registries. Former separate registries for American Grey and American Red were combined.
- **Brangus:** The International Brangus Breeders Association registry started in 1949 with individuals of exactly 5/8 Angus-3/8 Brahman. Open registry also allows registered Angus and Brahman to create 5/8-3/8 purebreds. Color formerly limited to black but red is now allowed, since the former International Red Brangus registry merged with Brangus. Purebred individuals are identified as either Brangus or Red Brangus. It also has registration for Ultrablack (registered Brangus × enrolled Angus) and Ultrared (registered Red Brangus × enrolled Red Angus), which allows upgrading with Brangus on Ultrablack or Red Brangus on Ultrared to 7/8 Brangus or Red Brangus percentage, registerable as Purebred.
- **Braunvieh:** The Braunvieh Association of America registry started in 1984 with foundation cattle (recorded by the Swiss Braunvieh Federation), which were designated as Swiss Original Braunvieh (containing no American Brown Swiss influence). Open registry allows upgrading to Purebred (e.g., 7/8 female, 15/16 male). Fullblood designation is called Original Braunvieh. It has a designation for Beef Builder (1/4 up to less than Purebred Braunvieh).
- **Charolais:** Beginning in the 1930s, some cattle of French origin were brought to the U.S. from Mexico, primarily to Texas. The American-International Charolais Association registry started in 1957 by combining the American and International associations, followed in the 1960s by the Pan American and Charbray associations. It is an open registry, with upgrading to Purebred (31/32). Also, it designates Full French (i.e., French imports or from French parents imported after 1961) and American French (minimum 15/16 Full French). The Charolais can be white, light straw, or cream, but it has separate registry for Red Factor (e.g., purebred individuals of colors other than white, light straw, or light cream) and for Charbray (e.g., 5/8 to 13/16 Charolais, 3/8 to 3/16 *Bos indicus*).
- **Chianina:** The American Chianina Association registry started in 1972 with imports from Italy. It is an open registry and any percentage of Chianina may be registered, which is designated on pedigree. It also has a Fullblood designation and a registry for cattle containing Angus (Chiangus), Red Angus (Red Chiangus), Hereford (Chiford), or Maine-Anjou (Chimaine). Most cattle in the registry currently are Chiangus.
- **Gelbvieh:** Has open registry with upgrading to purebred (e.g., 7/8 for female, 15/16 for male). It also has designations for Fullblood, Balancer (e.g., 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 (e.g., at least 1/4 Gelbvieh, 1/16 to 1/2 *Bos indicus*).
- **Hereford:** The American Hereford Association registry started in 1881 from base animals, which were all recorded in the English herdbook. It has been closed since inception, except to cattle recorded in approved foreign registries. Formerly separate registries for horned and polled were combined. It has Premium Red Baldy for commercial females, ranging from 25 to 75 percent Red Angus and Hereford, with a small allowance for other breeds.
- **Holstein:** The Holstein Association USA registry started in 1885 with cattle from the Netherlands. It is an open registry. Cattle of any percentage of Holstein can be registered, with four designations based on 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:** The American Jersey Cattle Association registry started in 1868 with cattle imported from the Jersey Isles and England. It includes cattle descended from the original herdbook and from parents recorded in approved foreign registries. Its registry is open, with upgrading to Purebred (31/32).
- **Limousin:** The North American Limousin Foundation registry started in 1968 with imports from France.

It is an open registry with upgrading to Purebred (e.g., 7/8 for female, 15/16 for male) and for lower percentages. It also has a Fullblood designation (100 percent) and Lim-Flex (e.g., 1/4 to 3/4 Limousin, 1/4 to 3/4 Angus or Red Angus with a maximum 1/8 another breed or unknown breed).

- **Maine-Anjou:** The American Maine-Anjou Association registry started in 1969 with imports from France. It is an open registry with upgrading to Purebred (7/8) and has designations for Fullblood. It has Maine Angus, between 3/8 to 5/8 Maine-Anjou and between 3/8 to 5/8 registered Angus and/or registered Red Angus. It also has MaineTainers (e.g., 1/4 to 5/8 Maine Anjou, remainder other breed or breeds).
- **Murray Grey:** Murray Grey in Australia descended from 12 gray progeny of a roan Shorthorn cow bred to Angus bulls. After some cattle had been imported to the U.S, the American Murray Grey Association registry started in 1971. It is an open registry with upgrading to North American Purebred (e.g., 7/ 8 for females, 15/16 for bulls). Cattle from a registered Angus base are designated International Evaluation Purebred.
- **Red Angus:** The Red Angus Association of America registry started in 1954, recording red animals out of parents registered in the American Angus Association. It is an open registry with 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 physical features; III–less than 87 percent Red Angus. It also has Angus Plus (e.g., 65 to 96 percent Angus or Red Angus and a minimum 4 percent Brahman).
- **Red Brangus:** The American Red Brangus Association was founded in 1959. It allows registering red cattle of varying percentages of Angus and Brahman. It does not have EPD. The former International Red Brangus registry, requiring exactly 5/8 Angus-3/8 Brahman, was merged with Brangus.
- **Salers:** The American Salers Association registry started in 1974 with imports from France. It is an open registry with upgrading to Purebred (15/16). It has designation for Fullblood and Optimizer (e.g., 1/8 to 3/4 Salers, remainder of other registered breed, with 5/8 Salers designated Purebred Salers Optimizer).
- **Santa Gertrudis:** Formed on the King Ranch in South Texas from a pool of about 5/8 Shorthorn-3/8 Brahman. The Santa Gertrudis Breeders International registry started in 1951 with King Ranch cattle and officially designated Foundation Herds (tracing exclusively to the King Ranch). It is now an open registry, allowing upgrading with 7/8 being purebred; 1/4, 1/2, and 3/4 bloods are designated as "Star 5," which is designed for producing commercial females. It also has American Red, ranging from 25 percent to 75 percent Red Angus and 25 percent to 75 percent Santa Gertrudis, with a small allowance for other breeds.
- **Shorthorn:** The American Shorthorn Association registry started in 1846 with base animals that were all registered in the English herdbook. Registry was closed at that time, except to animals tracing to the English herdbook and others tracing exclusively to the English. It opened in 1973 to other approved Shorthorn registries (including American Milking Shorthorn, which are now not allowed) that do not necessarily trace exclusively to English registry. It has an appendix for upgrading (i.e., Shorthorn Plus) to Purebred (15/16) with >99 percent receiving special designation. It also has Durham Red (e.g., 1/8 to 7/8 Shorthorn, remainder Red Angus).
- **Simbrah:** Registered in the American Simmental Association as Purebred (e.g., specific formula of 5/8 Simmental and 3/8 Brahman) or Percentage (e.g., combinations of 1/8 to 3/4 Simmental, 1/8 to 7/8 Brahman, and not more than 3/8 other breeds). It is an open registry, but allows no upgrading, except of Simmental parentage.
- **Simmental:** The American Simmental Association registry started in 1968 with imports from Continental Europe. It is an open registry with upgrading to Purebred (e.g., 7/8 female, 15/16 male). It has Fullblood designation, designations for SimAngus (e.g., minimum 1/4, maximum 3/4 Simmental and minimum 1/4, maximum 3/4 Angus or Red Angus), and SimAngus HT (e.g., SimAngus with minimum 1/8 *Bos indicus*).
- **South Devon:** The North American South Devon registry started in 1972 with animals from the English herdbook. Registry is now open, with upgrading to Domestic Purebred (e.g., 15/16 or higher). Official Fullbloods are derived from originally imported Fullblood stock from England, and their offspring and animals of 31/32 blood or higher. It also has a Poundmaker (e.g., greater than 1/4 South Devon).
- **Tarentaise:** The American Tarentaise Association registry started in 1973 with imports from France. It is an open registry with upgrading to Purebred (e.g., minimum 7/8 Tarentaise for females and 15/16 for bulls). For upgrading, established beef and dairy breeds can be used. or crosses thereof as foundation females can be used. It also has Fullblood designation.

Breeds With Registration But Not Current Breed-Wide Genetic Evaluation

American Aberdeen
American British White Park
Ankole Watusi
Ayrshire
Barzona
Beefalo
Belgian Blue
Belted Galloway
Black Hereford
Blonde d'Aquitaine
Brahmousin
British White
Brown Swiss
Buelingo
Corriente
Devon
Dexter
Dutch Belted
Florida Cracker
Galloway
Guernsey
Highland
Irish Black
Irish Red
Kerry
Lincoln Red
Lowline
Marchigiana
Milking Shorthorn
Normande
Piedmontese
Pinzgauer
Red Brangus (American Registry)
Red Poll
Romagnola
Senepol
South Poll
Texas Longhorn
White Park

Cattle Registered (in Parent Breed Associations)

(Composition described above under Parent Breed Association section)

Advancer (Beefmaster)
American Red (Santa Gertrudis)
Angus Plus (Red Angus)
Balancer (Gelbvieh))
Beef Builder (Braunvieh)
Braford Plus (Braford)
Charbray (Charolais)
Chiangus (Chianina)
Chiford (Chianina)
Durham Red (Shorthorn)
E6 (Beefmaster)
Lim-Flex (Limousin)
Maine Angus (Maine-Anjou)
MaineTainer (Maine-Anjou)
Optimizer (Salers)
Poundmaker (South Devon)
Premium Red Baldy (Hereford)
Red Chiangus (Chianina)
SimAngus (Simmental)
SimAngus HT (Simmental
Shorthorn Plus (Shorthorn)
Southern Balancer (Gelbvieh)
Ultrablack (Brangus)
Ultrared (Brangus)

FOR FURTHER READING

To obtain other publications in this Texas Adapted Genetics Strategies for Beef Cattle series, and on other considerations for breeding programs, visit the Texas A&M Animal Science Extension website: *http://beef.tamu.edu*, or the AgriLife Extension website: *http://AgriLifeBookstore.org*.