

Breeds of Cattle

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Introduction

Since domestication of cattle began more than 9000 years ago, humans have attempted, through various means, to identify superior animals and retain them. The widely varying geographical areas in which cattle existed and the multiplicity of uses (meat, dairy, draught, hides, ceremonial, etc.) meant that cattle would develop in many diverse ways. It was inevitable that cattle would begin to fall into groupings which we have come to refer to as 'breeds'. The term 'breed' is a difficult one to define precisely, because it means different things to different people. Breed might be defined as a group of animals with similar physical characteristics (such as colour, horns, body type, etc.). However, there are breeds that contain wide variation in such characteristics, while members of different breeds may be quite similar. There is general agreement that the concept of a breed denotes common ancestry and yet some organizations that protect the purity of a breed choose, periodically, to allow entry of animals from exotic ancestry. Lush (1994), quoting from Lloyd-Jones (1915), makes the following observation:

A breed is a group of domestic animals, termed such by common consent of the breeders, a term which arose among breeders of livestock, created one might say for their own use, and no one is warranted in assigning to this word a scientific definition and in calling the breeders wrong when they deviated from the formulated definition. It is their word and the breeders' common usage is what we must accept as the correct definition.

Wright (1977), in his description of breed formation, describes a breed as something which arises more rapidly than normal evolutionary processes would dictate but more slowly than would be true in the laboratory. Breed development probably covers almost the entire range of rates in that spectrum. Some breeds arise almost entirely through natural forces, while others are developed by human managers in a highly directed fashion.

Bos taurus* and *Bos indicus

Worldwide, cattle fall into two reasonably distinct groups (Felius, 1985). All cattle are contained within the genus *Bos*. However, most cattle can be assigned to either the species *Bos taurus* or the species *Bos indicus*. There is no uniform opinion about whether these should be considered as separate species. They freely interbreed, so there is no reproductive barrier. However, there are obvious physical differences and, while apparently derived from a common progenitor species, they evolved quite separately for several thousand years. The most obvious physical difference between *B. indicus* and *B. taurus* cattle is that *B. indicus* (zebu) cattle generally have a very pronounced hump on their shoulders, while *B. taurus* cattle are humpless. *Bos indicus* cattle remained on the Indian subcontinent for many generations and then began to migrate along the east coast of Africa and toward South East Asia.

Bos taurus cattle evolved in more northern areas of Asia and in Europe. There were migrations of *B. taurus* cattle along western Africa and the Americas, with the explorations of the Spaniards. Although it is generally true that *B. indicus* cattle are tropically adapted and *B. taurus* cattle are adapted to temperate regions, the migration of *B. taurus* cattle along western Africa resulted in some tropically adapted *B. taurus* breeds. *Bos taurus* cattle brought to the Americas by the Spaniards were left to adapt to their environment for several hundred years. These are referred to as the Criollo cattle and several breeds arose in South and Central America, as well as the Texas Longhorn and Florida Cracker breeds in areas now contained in the USA. Some early crossing of *B. taurus* and *B. indicus* cattle in Africa resulted in a subgroup referred to as Sanga cattle. In the last century, numerous breeds have been developed which take advantage of the complementary characteristics of *B. taurus* and *B. indicus* cattle.

Classification of Breeds

Another way to subdivide cattle breeds is by utility. Artificial selection within many breeds has caused them to excel for either meat or milk production. This is especially true in Great Britain and North America, where there is a fairly clear delineation between such categories. Breeds such as the Holstein produce quantities of milk far in excess of that which could ever be consumed by a calf and have become well adapted to a highly intensive schedule of being

milked twice, or thrice, daily. Other breeds give only enough milk to sustain a calf but have highly developed muscularity, possibly from use as a draught animal, which is important for meat production.

Breeds are easy to recognize in many of the developed countries, because organizations have arisen to protect the purity of the breed and to pursue its improvement. These 'breed societies' originated in Great Britain during the early part of the 19th century (Willham, 1987) and spread to other countries, most notably the USA. Some breed societies are large businesses with millions of cattle registered, while others number their registrations with three digits and are organized by a single individual.

A difficulty associated with describing breeds of cattle is identifying the number of breeds to include. One source includes more than 1000 different breeds (Mason, 1996), although many of these are national derivatives of a breed that is imported from its native country. It would be desirable to identify all of the 'important' breeds around the world. This task is rendered nearly impossible because of the difficulty in defining 'important'. Breeds with high census numbers are likely to be considered important, but there may be breeds with low numbers which are important either historically or as a source of unique genetic material for some future use. This raises the issue of conservation of genetic material. Breeds may be conserved due to economic, scientific or cultural reasons (Committee on Managing Global Genetic Resources, 1993). It also seems likely that some breeds have acquired new names as more is learned about breeds in developing countries, and this may confuse the identification of important breeds.

Renewed interest in developing new breeds has arisen in recent years. 'Composites', 'synthetics' or 'hybrids' are labels used to signify new breeds or newly formed lines developed from crossing. The Composite Cattle Breeders International Alliance is an organization that meets annually to address the needs and issues of these cattle.

Ideally, a description of breeds in a publication would include those breeds with a well-understood origin and well-researched characteristics. Many breeds are important, at least in some parts of the world, even though they fit neither of these characteristics. The origin of many breeds has been lost due to inadequate historical records or is irrelevant due to large-scale introduction of individuals from outside the breed. There is considerable research information for some breeds, but resources for such research are limited and may not be applicable to all environments around the world.

We are left with only imperfect methods for identifying breeds to include in a publication such as this one. We have chosen the following approach. Breeds in common use in North America were included if there was research information available or if they were included in one or more of the following sources of information: Briggs and Briggs (1980), Walker (1989) or one of several popular wall posters of breed information distributed by organizations like Better Beef Business. Breeds from other parts of the world were included based upon information from the Food and Agriculture Organization of the United Nations (<http://dad.fao.org/dad-is/data/index.htm>), Rouse

(1970a, b, 1973), Felius (1985) or the Committee on Managing Global Genetic Resources (1993). Most of the breeds are included in the Breeds of Livestock Website maintained by Oklahoma State University (<http://www.ansi.okstate.edu/breeds/cattle/>).

The breeds are described in a series of tables. Table 24.1 includes several breeds that have been selected primarily for milk production. All of the breeds, including those shown in Table 24.1, are listed in Tables 24.2–24.8, by region of origin, with beef production characteristics. Where information is available, breeds are described for size, age at puberty, lean-to-fat ratio and milk production. These four traits have been used by the scientists at the US Meat Animal Research Center to characterize breeds included in the germplasm evaluation (GPE) experiment (Cundiff *et al.*, 1986, 1993, 1997). This experiment has been conducted since the late 1960s to evaluate breeds in use in North America. The descriptors, for breeds other than those in the GPE, are highly subjective. They probably reflect performance that is dependent upon the environment in which the breeds are used and may not indicate the performance levels that would be achieved if all of the breeds were managed in a uniform environment.

Table 24.9 is included to provide references for research information concerning the breeds. Numerous research papers, published in refereed journals, are included, with a list of the breeds evaluated in the project described in each paper.

The concept of a breed is likely to remain rather fluid. The number of breeds developed in North America during the last half of the 20th century is indicative of a general effort to identify combinations of germplasm for use in the varied environments in which cattle are raised. These developments are, apparently, continuing unabated. It is tempting to assume that the important breeds of today will continue to be important in the future. One has only to examine the history of breeds during the 20th century, in cattle and in other species of livestock, to see the fallacy of this assumption. Improved techniques for identification of superior genetic material, including techniques from molecular biology, will probably speed the evolutionary pace in cattle. This will mean even more rapid assembly and recombination of genetic stocks.

Table 24.1. Breeds of cattle used primarily for milk production.

Breed	Place of origin	Species of <i>Bos</i>	Distribution	Colour	Other	Size and growth	Milk production
Ayrshire	Ayr, Scotland	<i>taurus</i>	North America, Europe	Red and white		Moderate	Moderate
Braunvieh	Switzerland	<i>taurus</i>	Europe	Brown		Moderate to large	Moderate
Brown Swiss	Switzerland	<i>taurus</i>	North America, Europe	Light brown		Moderate to large	Moderate to high
Danish Red	Denmark	<i>taurus</i>	Europe	Red		Moderate to large	Moderate
Dexter	Ireland	<i>taurus</i>	North America, Europe	Black		Small	Moderate
Dutch Belted	Netherlands	<i>taurus</i>	Europe	Black and white		Moderate	Small to moderate
Flamande	France	<i>taurus</i>	Europe	Dark brown to black		Moderate to large	Moderate
Guernsey	Guernsey (Channel Islands)	<i>taurus</i>	North America, Europe	Fawn and white	Moderately high in butterfat	Moderate	Moderate
Holstein	Netherlands	<i>taurus</i>	North America, Europe	Black and white	Beef strain referred to as Beef Friesian	Moderate to large	High
Illawarra	New South Wales, Australia	<i>taurus</i>	Australia, Asia	Red, some roans or whites	Ayrshire, Devon, Milking Shorthorn hybrid	Moderate	Moderate
Javanese	Indonesia	<i>indicus</i>	Oceania	Tan		Small to moderate	Moderate

Jersey	Jersey (Channel Islands)	<i>taurus</i>	North America, Europe	Fawn	High in butterfat	Small	Low to moderate
Local Indian Dairy	Malaysia	<i>indicus</i>	Asia, Oceania	White		Small	Low to moderate
Montbéliarde	France	<i>taurus</i>	Europe	Red and white		Moderate to large	Moderate
Norwegian Red	Norway	<i>taurus</i>	Europe	Red and white		Moderate	Moderate
Red Sindhi	Pakistan	<i>indicus</i>	Asia, Africa, Australia	Red		Small	Moderate
Russian Black Pied	Russia	<i>taurus</i>	Europe, Asia	Black and white		Moderate	Moderate to high
Sahiwal	Punjab region, India	<i>indicus</i>	Asia, Africa, North America, Australia	Red		Small to moderate	Moderate to high
Shorthorn	Northumberland and Durham, England	<i>taurus</i>	North America, Europe	Dark red, white or roan		Moderate	Moderate
Xinjiang Brown	Xinjiang Uygur Region, China	<i>taurus</i>	Asia	Variable		Small to moderate	Small to moderate

Table 24.2. Breeds of cattle with origin in Asia.

Breed	Place of origin	Species of <i>Bos</i>	Distribution	Colour	Other	Size and growth	Lean-to-fat ratio	Age at puberty	Milk production (for calf)
Bengali	Bangladesh and Bengal, India	<i>indicus</i>	Asia	Light brown		Small			
Chinese Yellow Dhanni	China Pakistan	Transitional <i>indicus</i>	Asia Asia	Yellow White with black spots		Small Moderate			
Gir	Gujarat, India	<i>indicus</i>	Asia, South America, North America	Variable, red to white		Moderate			
Guzerat	India	<i>indicus</i>	Asia, South America, North America	White	Kankrej (in India)	Moderate to large			Moderate
Hissar	India	<i>indicus</i>	Asia	White		Moderate to large			
Krishna Valley	India	<i>indicus</i>	Asia	White		Moderate to large			
Mongolian	Mongolia	<i>taurus</i>	Asia	Red and white		Small			
Nellore	India	<i>indicus</i>	Asia, Africa, South America, Australia	White		Moderate to large*	Moderate*	Late*	Moderate*
Ongole	India	<i>indicus</i>	Asia	White		Moderate to large			Moderate
Red Sindhi	Pakistan	<i>indicus</i>	Asia, Africa, Australia	Red		Small			Moderate to high
Sahiwal	Punjab region, India	<i>indicus</i>	Asia, Africa, North America, Australia	Red		Small to moderate*	Moderate*	Late*	Moderate
Tharparkar	India	<i>indicus</i>	Asia	White		Small to moderate			Moderate
Wagyu	Japan	<i>taurus</i>	Asia, North America	Both black and red strains		Small			
Xinjiang Brown	Xinjiang Uygur Region, China	<i>taurus</i>	Asia	Variable		Small to moderate			

*Cundiff *et al.*, 1993.

Table 24.3. Breeds of cattle with origin in Africa.

Breed	Place of origin	Species of <i>Bos</i>	Distribution	Colour	Other	Size and growth	Lean-to-fat ratio	Age at puberty	Milk production (for calf)
Abyssinian	Ethiopia	<i>indicus</i>	Africa	Variable		Small			
Shorthorned Zebu									
Adamawa	Nigeria	<i>indicus</i>	Africa	Variable		Small			
Africander	South Africa	Sanga	Africa, Australia	Red		Moderate	Moderate	Moderate to late	
Ankole-Watusi	Egypt	<i>indicus</i>	Africa, North America	Red or black with white spots	Produce high-fat milk	Moderate	Moderate to high		
Arsi	Ethiopia	<i>indicus</i>	Africa	Variable		Small			
Bonsmara	South Africa	Hybrid	Africa, Australia	Red	Afrikaner-Hereford-Shorthorn hybrid	Moderate	Moderate		Moderate
Boran	Ethiopia	<i>indicus</i>	Africa	Red		Small to moderate	Moderate to high	Moderate to late	Moderate
Brown Atlas	Algeria	<i>taurus</i>	Africa	Brown		Small			
Butana	Sudan	<i>indicus</i>	Africa	Dark red		Small			Moderate to high
Danakil	Ethiopia	Sanga	Africa	Variable		Moderate to large			Moderate
Dinka (Nilotic)	Sudan	Sanga	Africa	White		Small to moderate			
Fogera	Ethiopia	Sanga- <i>indicus</i>	Asia	Variable		Moderate			
Kenana	Sudan	<i>indicus</i>	Africa	White		Small to moderate			
Keteku	Nigeria	Hybrid	Africa	Black and white	Zebu-Short-horn hybrid	Small			
Menufi (Baladi)	Egypt	<i>taurus</i>	Africa	Red		Small			
Muturu	Nigeria	<i>taurus</i>	Africa	Black and white		Small			
N'Dama	Guinea, West Africa	<i>taurus</i>	Africa	Fawn	Trypano-tolerant	Moderate			
Nguni	South Africa	Sanga	Africa	Variable		Small to moderate	Moderate to high		
Tuli	Zimbabwe	Sanga	Africa	Yellow		Moderate			
White Fulani	Nigeria	<i>indicus</i>	Africa	White		Small to moderate			

Table 24.4. Breeds of cattle with origin in Europe.

Breed	Place of origin	Species of <i>Bos</i>	Distribution	Colour	Other	Size and growth	Lean-to-fat ratio	Age at puberty	Milk production (for calf)
Alentejana	Portugal	<i>taurus</i>	Europe	Red		Moderate			
Aubrac	France	<i>taurus</i>	Europe	Brown		Small to moderate			
Belgian Blue	Belgium	<i>taurus</i>	North America, Europe	White or blue roan		Moderate to large	High	Moderate	Moderate to high
Blonde d'Aquitaine	Garonne, France	<i>taurus</i>	North America, Europe	Yellow		Moderate to large	Moderate to high		Low to moderate
Braunvieh	Switzerland	<i>taurus</i>	Europe	Brown		Moderate to large*	Moderate to high*	Early to moderate*	Moderate to high*
Brown Swiss	Switzerland	<i>taurus</i>	North America, Europe	Light brown		Moderate to large			
Charolais	Charolles and Nievre, France	<i>taurus</i>	North America, Europe	White		Large*	High*	Moderate to late*	Low*
Chianina	Chiana Valley, Italy	<i>taurus</i>	North America, Europe	White		Large*	High*	Moderate to late*	Low*
Danish Red	Denmark	<i>taurus</i>	Europe	Red		Moderate to large			Moderate to high
Danish Red and White	Denmark	<i>taurus</i>	Europe	Red and white		Moderate			Moderate
Dutch Belted	Netherlands	<i>taurus</i>	Europe	Black and white		Moderate			
Fighting Bull (Toro de Lidia)	Spain	<i>taurus</i>	Europe, Latin American countries	Variable	Bred for bullfighting	Small to moderate			
Flamande	France	<i>taurus</i>	Europe	Dark brown to black		Moderate to large			Moderate to large
Fleckvieh	Germany	<i>taurus</i>	Europe	Red and white		Moderate to large			
Gelbvieh	Bavaria, Germany	<i>taurus</i>	North America, Europe	Red		Moderate to large*	Moderate to high*	Early to moderate*	Moderate to high*

Table 24.4. *Continued*

Breed	Place of origin	Species of <i>Bos</i>	Distribution	Colour	Other	Size and growth	Lean-to-fat ratio	Age at puberty	Milk production (for calf)
Holstein	Netherlands	<i>taurus</i>	North America, Europe	Black and white	Beef strain as Beef Friesian	Moderate to large*	Moderate to high*	Early to moderate*	High*
Hungarian Spotted	Hungary	<i>taurus</i>	Europe	Red, white markings		Moderate			
Icelandic	Iceland	<i>taurus</i>	Iceland	Variable		Small to moderate			
Limousin	Aquitaine region of France	<i>taurus</i>	North America, Europe	Red		Moderate*	High*	Moderate to late*	Low*
Maine Anjou	Mancelle	<i>taurus</i>	North America, Europe	Red, white markings		Large*	Moderate to high*	Moderate*	Moderate*
Marchigiana	region of France	<i>taurus</i>	North America, Europe	White		Moderate to large	Moderate to high	Early to moderate	
Meuse-Rhine-Yssel	Marche, Italy	<i>taurus</i>	Europe	Red with white markings		Moderate to large			
Montbéliarde	Netherlands	<i>taurus</i>	Europe	Red and white		Moderate to large			Moderate to high
Normande	France	<i>taurus</i>	Europe	Red and white		Moderate to large			Moderate to high
Norwegian Red	Manche and Calvados, France	<i>taurus</i>	Europe, North America	Yellow to dark brown, white markings		Moderate to large	Moderate to high		
Piedmontese	Norway	<i>taurus</i>	Europe	Red and white markings		Moderate			
	North-western Italy	<i>taurus</i>	North America, Europe	White	High-frequency 'double-muscling'	Moderate*	Very high*	Early to moderate*	Low to moderate*
Pinzgauer	Pinz Valley, Austria	<i>taurus</i>	North America, Europe	Red, white markings		Moderate*	Moderate*	Early to moderate*	Moderate*
Polish Red	Poland	<i>taurus</i>	Europe	Red		Small to moderate			
Polish Red and White	Poland	<i>taurus</i>	Europe	Red and white		Moderate			

Romagnola	North-eastern Italy	<i>taurus</i>	North America, Europe	Grey	Large	High	Moderate
Rotvieh (German Red)	Germany	<i>taurus</i>	Europe	Red	Moderate		
Russian Black Pied	Russia	<i>taurus</i>	Europe, Asia	Black and white	Moderate		High
Salers	Salers District, France	<i>taurus</i>	North America, Europe	Red, some white markings	Large*	Moderate to high*	Moderate*
Simmental	Simme Valley, Switzerland	<i>taurus</i>	North America, Europe, Asia	Red with white markings	White face Large*	Moderate to high*	Moderate to high*
Swedish Red and White	Sweden	<i>taurus</i>	Europe	Red and white	Moderate		
Swedish Red Polled	Sweden	<i>taurus</i>	Europe	Red	Small		
Tarentaise	Moutiers, France	<i>taurus</i>	North America, Europe	Red	Moderate	Moderate*	Early to moderate*

*Cundiff *et al.*, 1993.

Table 24.5. Breeds of cattle with origin in the British Isles.

Breed	Place of origin	Species of <i>Bos</i>	Distribution	Colour	Other	Size and growth	Lean-to-fat ratio	Age at puberty	Milk production (for calf)
Angus	Aberdeen and Angus Counties, Scotland	<i>taurus</i>	North America, Europe	Black, also red strain	Polled	Moderate*	Low to moderate*	Moderate*	Moderate*
Ayrshire	Ayr, Scotland	<i>taurus</i>	North America, Europe	Red and white		Moderate			
Belted Galloway	Scotland	<i>taurus</i>	North America, Europe	Black with white belt	Polled	Small to moderate			
British White	England	<i>taurus</i>	Europe	White	Polled	Moderate			
Devon	Devon, England	<i>taurus</i>	North America, Europe	Red		Small to moderate*	Low to moderate*	Moderate*	Low to moderate*
Dexter	Ireland	<i>taurus</i>	North America, Europe	Black		Small			
Galloway	Galloway, Scotland	<i>taurus</i>	North America, Europe	Black	Long, curly hair; polled	Small to moderate*		Moderate*	Low to moderate*
Guernsey	Guernsey (Channel Islands)	<i>taurus</i>	North America, Europe	Fawn and white	Moderately high in butterfat	Moderate			
Hereford	Herefordshire, England	<i>taurus</i>	North America, Europe	Red, white markings	White face	Moderate*	Low to moderate*	Moderate*	Low to moderate*
Jersey	Jersey (Channel Islands)	<i>taurus</i>	North America, Europe	Fawn	High in butterfat	Small		Early	High
Lincoln Red	England	<i>taurus</i>	Europe	Red		Moderate			
Longhorn (English)	England	<i>taurus</i>	Europe	Red, grey or brindle		Moderate			

Red Angus	Scotland	<i>taurus</i>	North America, Europe	Red	Polled	Moderate	Moderate	Early to moderate	Moderate
Red Poll	Suffolk and Norfolk counties, England	<i>taurus</i>	North America, Europe	Red	Polled	Small to moderate*	Moderate*	Early to moderate*	Moderate*
Scotch Highland	Western Scotland	<i>taurus</i>	North America, Europe	Brown, black or red	Long hair	Small			
Shorthorn	Northumberland and Durham, England	<i>taurus</i>	North America, Europe	Dark red, white or roan		Moderate*	Low to moderate*	Moderate*	Moderate*
South Devon	Devon and Cornwall, England	<i>taurus</i>	North America, Europe	Red		Moderate*	Moderate*	Early to Moderate*	Moderate*
Sussex	South-east England	<i>taurus</i>	Europe, Africa	Red		Small			
Welsh Black	Wales	<i>taurus</i>	Europe	Black		Moderate			
White Park	England	<i>taurus</i>	Europe, North America	White		Moderate			

*Cundiff *et al.*, 1993.

Table 24.6. Breeds of cattle with origin in North America.

Breed	Place of origin	Species of <i>Bos</i>	Distribution	Colour	Other	Size and growth ratio	Lean-to-fat ratio	Age at puberty	Milk production (for calf)
American White Park	United States	<i>taurus</i>	North America	White		Moderate			
Amerifax	United States	<i>taurus</i>	North America	Red or black	Polled, Angus–Beef Friesian hybrid	Moderate to large			Moderate to high
Ankina	United States	<i>taurus</i>	North America	Black	Polled	Moderate to large	Moderate to high		
Barzona	Arizona, United States	Hybrid	North America	Dark red	Africander–Hereford–Angus–Santa Gertrudis hybrid	Moderate	Moderate		
Beefmaster	Texas, United States	Hybrid	North America, Africa	Red and other colours		Moderate to large	Moderate		Moderate
Braford	Florida, United States	Hybrid	North America, Australia	Red, white markings	Brahman–Hereford hybrid	Moderate	Moderate	Early to moderate	Moderate
Brah-Maine	United States	Hybrid	North America	Red with white markings	Brahman–Maine Anjou hybrid	Moderate to large	Moderate to high	Moderate	Moderate
Brahman	United States	<i>indicus</i>	North America, Africa	Grey strains, red strains	Blending of Gir, Guzerat and Nellore	Moderate to large*	Moderate*	Late*	Moderate*
Brahmousin	United States	Hybrid	North America	Red	Limousin–Brahman hybrid	Moderate	Moderate to high		
Bralers	United States	Hybrid	North America	Red	Brahman–Salers hybrid	Moderate	Moderate		Moderate
Brangus	Louisiana, United States	Hybrid	North America, Africa	Black	Angus–Brahman hybrid	Moderate*	Low to moderate*	Moderate to late*	Low to moderate*
Canadienne	Canada	<i>taurus</i>	North America	Red		Small			

Charbray	United States	Hybrid	North America, Australia	White to tan	Charolais– Brahman hybrid	Moderate to large	Moderate to high	Moderate to late	Moderate
Corriente	Northern Mexico	<i>taurus</i>	North America	Variable	Criollo cattle of northern Mexico	Small			
Florida Cracker	Florida, United States	<i>taurus</i>	North America	Variable	Criollo cattle of Florida	Small		Early	
Gelbray	United States	Hybrid	North America	Red	Gelbvieh– Brahman hybrid	Moderate to large	Moderate to high		Moderate to high
Hays Converter	Canada	<i>taurus</i>	North America	Black or red with white markings	Holstein– Hereford hybrid	Moderate to large			Moderate to high
Red Brangus	United States	Hybrid	North America	Red	Red Angus–Brahman hybrid	Moderate			
RX3	United States	<i>taurus</i>	North America	Red	Hereford– Holstein–Red	Moderate	Moderate		Moderate to high
Salorn	United States	<i>taurus</i>	North America	Red	Angus cross Salers–Texas Longhorn	Moderate	Moderate to high	Early to moderate	
Santa Cruz	Texas, United States	Hybrid	North America	Red	Santa Gertrudis– Red Angus– Gelbvieh hybrid	Moderate	Moderate to high	Early to moderate	
Santa Gertrudis	Texas, United States	Hybrid	North America, Africa	Red	Shorthorn– Brahman hybrid	Moderate*	Low to moderate*	Moderate to late*	Low to moderate*
Senepol	Virgin Islands	<i>taurus</i>	North America	Red		Small to moderate			
Simbrah	United States	Hybrid	North America	Red with white markings	Simmental– Brahman hybrid	Moderate to large			
Texas Longhorn	Mexico and southern United States	<i>taurus</i>	North America	Variable	Criollo cattle of South-western United States	Small*	Moderate*	Moderate*	Low to moderate*

*Cundiff *et al.*, 1993.

Table 24.7. Breeds of cattle with origin in Australia and Oceania.

Breed	Place of origin	Species of <i>Bos</i>	Distribution	Colour	Other	Size and growth	Lean-to-fat ratio	Age at puberty	Milk production (for calf)
Bali Cattle	Bali	<i>taurus</i>	Australia, Oceania	Grey or tan		Small			
Banteng	Java	<i>taurus</i>	Australia, Oceania	Grey or tan		Small			
Grati	Indonesia	<i>taurus</i>	Oceania	Red or black and white		Moderate			
Illawarra	New South Wales, Australia	<i>taurus</i>	Australia, Asia	Red, some roans or whites	Ayrshire–Devon–Milking Shorthorn hybrid	Moderate			
Javanese	Indonesia	<i>indicus</i>	Oceania	Tan		Small to moderate			Moderate to high
Kelantan	Malaysia	<i>indicus</i>	Oceania	Tan to brown		Small			
Local Indian Dairy	Malaysia	<i>indicus</i>	Asia, Oceania	White		Small			
Madura	Indonesia	<i>indicus</i>	Oceania	Tan		Small			
Mandalong	New South Wales, Australia	Hybrid		Yellow to brown	Charolais–Chianina–Shorthorn–British White–Brahman hybrid	Moderate to large			
Murray Grey	New South Wales, Australia	<i>taurus</i>	Australia	Grey	Polled	Moderate	Moderate to high		Moderate

Table 24.8. Breeds of cattle with origin in South America.

Breed	Place of origin	Species	Distribution	Colour	Other	Size and Growth
Caracu	Brazil	<i>taurus</i>	South America	Variable	Criollo cattle of Brazil	Moderate
Indo-Brazil	Brazil	<i>indicus</i>	South America, North America	White or grey		Moderate
Blanco Orejinegro	Colombia	<i>taurus</i>	South America	White	Criollo cattle of Colombia	Moderate

Table 24.9. References for research information concerning the breeds

Authors	Breeds
Adams <i>et al.</i> (1973)	Hereford, Simmental, Limousin, Maine Anjou, Lincoln Red, Brown Swiss, Charolais and Angus
Adams <i>et al.</i> (1977)	Hereford, Angus, Lincoln Red, Brown Swiss, Simmental, Limousin, Maine Anjou and Charolais
Alenda and Martin (1981)	Angus, Charolais and Hereford
Alenda <i>et al.</i> (1980a, b)	Angus, Charolais and Hereford
Anderson <i>et al.</i> (1978)	Angus, Chianina, Holstein, Charolais and Simmental
Bailey and Moore (1980)	Hereford, Red Poll, Angus, Charolais, Brahman
Berndtson <i>et al.</i> (1987)	Angus, Hereford
Bond <i>et al.</i> (1972)	Holstein, Jersey, Milking Shorthorn, Angus and Hereford
Brown and Dinkel (1982)	Angus, Charolais, Salers, Limousin and Polled Hereford
Brown <i>et al.</i> (1972)	Angus, Hereford
Browning <i>et al.</i> (1995)	Angus, Brahman and Tuli
Butts <i>et al.</i> (1980a, b)	Angus, Hereford and Charolais
Chapman <i>et al.</i> (1970)	Angus, Polled Hereford, Santa Gertrudis, Brahman and Shorthorn
Chapman <i>et al.</i> (1971)	Angus, Polled Hereford and Santa Gertrudis
Chapman <i>et al.</i> (1978)	Angus, Hereford, Limousin and Simmental
Charles and Johnson (1976)	Hereford, Angus, Friesian and Charolais
Cianzio <i>et al.</i> (1982)	Limousin, Maine Anjou, Simmental, Angus, Hereford, Holstein and Brown Swiss
Comerford <i>et al.</i> (1987)	Brahman, Limousin, Polled Hereford and Simmental
Coulter <i>et al.</i> (1987)	Angus, Hereford
Crockett <i>et al.</i> (1978a, b)	Angus, Brahman and Hereford
Crockett <i>et al.</i> (1979)	Brahman, Brangus, Beefmaster, Limousin, Simmental, Maine Anjou, Angus and Hereford
Crouse <i>et al.</i> (1975)	Hereford, Angus, Limousin, Charolais, Simmental, South Devon and Jersey
Cundiff (1970)	Hereford, Angus, Shorthorn and Charolais
Cundiff <i>et al.</i> (1974a, b)	Angus, Hereford and Shorthorn
Dean <i>et al.</i> (1976)	Hereford, Holstein, Angus and Charolais
Deutscher and Slyter (1978)	Angus, Hereford and Charolais
Deutscher and Whiteman (1971)	Angus, Holstein
Dhuyvetter <i>et al.</i> (1985)	Charolais, Limousin, Angus, Hereford, Simmental, Brown Swiss and Jersey

Table 24.9. *Continued*

Authors	Breeds
Dikeman and Crouse (1975)	Hereford, Limousin, Angus and Simmental
Dillard <i>et al.</i> (1980)	Angus, Charolais and Hereford
Drewry <i>et al.</i> (1979a, b)	Angus, Milking Shorthorn
Dunn <i>et al.</i> (1969)	Angus, Hereford
Fortin <i>et al.</i> (1980a, b)	Holstein, Angus
Fortin <i>et al.</i> (1981a, b)	Holstein, Angus
Gaines <i>et al.</i> (1967)	Angus, Hereford and Shorthorn
Gaines <i>et al.</i> (1970)	Angus, Hereford and Shorthorn
Garcia-de-Siles <i>et al.</i> (1977)	Hereford, Holstein
Garrett (1971)	Holstein, Hereford
Glimp <i>et al.</i> (1971)	Angus, Hereford
Gray <i>et al.</i> (1978)	Angus, Hereford
Gregory and Cundiff (1980)	Angus, Brahman, Charolais and Hereford
Gregory <i>et al.</i> (1978a, b, c, d, e)	Angus, Hereford, Red Poll, Brown Swiss, Gelbvieh, Maine Anjou and Chianina
Gregory <i>et al.</i> (1979a, b)	Angus, Hereford, Brahman, Sahiwal, Pinzgauer and Tarentaise
Hedrick <i>et al.</i> (1970)	Angus, Charolais, Holstein, Brahman, Shorthorn and Hereford
Hedrick <i>et al.</i> (1975)	Angus, Charolais, Hereford
Holloway <i>et al.</i> (1975a, b)	Hereford, Holstein
Hooven <i>et al.</i> (1972)	Angus, Hereford, Holstein Friesian, Jersey and Milking Shorthorn
Jain <i>et al.</i> (1971)	Angus, Charolais and Hereford
Jenkins <i>et al.</i> (1981)	Angus, Brahman, Holstein, Hereford and Jersey
Koch and Dikeman (1977)	Hereford, Angus, Jersey, South Devon, Limousin, Charolais and Simmental
Koch <i>et al.</i> (1976)	Hereford, Angus, Jersey, South Devon, Limousin, Charolais and Simmental
Koch <i>et al.</i> (1979)	Hereford, Angus, Red Poll, Brown Swiss, Gelbvieh, Maine Anjou and Chianina
Koch <i>et al.</i> (1981)	Angus, Hereford, Red Poll, Brown Swiss, Gelbvieh, Maine Anjou and Chianina
Koger (1980)	Zebu, Brahman, Santa Gertrudis, Beefmaster, Brangus, Braford, Barzona, Charbray, Simbrah and Bramousin
Kress <i>et al.</i> (1995)	Tarentaise, Hereford
Kroger <i>et al.</i> (1975)	Brahman, Shorthorn
Kropp <i>et al.</i> (1973a, b)	Hereford, Holstein
Lasley <i>et al.</i> (1971)	Angus, Charolais and Hereford
Lasley <i>et al.</i> (1973)	Angus, Charolais and Hereford
Laster <i>et al.</i> (1972)	Hereford, Angus, Charolais, Simmental, South Devon, Jersey and Limousin
Laster <i>et al.</i> (1973a, b)	Red Poll, Brown Swiss, Hereford, Angus, Jersey, South Devon, Limousin, Simmental and Charolais
Laster <i>et al.</i> (1976)	Hereford, Angus, Jersey, South Devon, Limousin, Charolais and Simmental
Laster <i>et al.</i> (1979)	Hereford, Angus, Red Poll, Brown Swiss, Gelbvieh, Maine Anjou and Chianina
Lemka <i>et al.</i> (1973)	Hariana, Deshi, Blanco Orejinegro and Costeno Con Cuernos
LeVan <i>et al.</i> (1979)	Angus, Charolais

Table 24.9. *Continued*

Authors	Breeds
Long (1980)	Angus, Hereford, Charolais, Jersey, Limousin, Simmental, South Devon, Brown Swiss, Chianina, Gelbvieh, Maine Anjou, Red Poll, Brahman, Pinzgauer, Sahiwal, Tarentaise, Argentine Holstein, Blonde D'Aquitaine, German Black and White, German Red and White, Marchigiana, Normandie, Piedmontese, Romagnola, Santa Gertrudis and Shorthorn
Long and Gregory (1974)	Angus, Hereford
Long and Gregory (1975a, b)	Angus, Hereford
Long <i>et al.</i> (1979a, b)	Angus, Brahman, Hereford, Holstein and Jersey
Luckett <i>et al.</i> (1975)	Angus, Brahman, Hereford and Charolais
McAllister <i>et al.</i> (1976)	Polled Hereford, Charolais, Limousin, Simmental and Angus–Holstein
McDonald and Turner (1972)	Angus, Brahman, Brangus and Hereford
Marshall <i>et al.</i> (1976)	Angus, Charolais and Polled Hereford
Melton <i>et al.</i> (1967)	Angus, Charolais and Hereford
Nadarajah <i>et al.</i> (1985)	Hereford, Angus, Shorthorn, Charolais, Simmental, Brown Swiss and Holstein
Nelsen <i>et al.</i> (1982a, b)	Angus, Brahman, Hereford, Holstein and Jersey
Northcutt <i>et al.</i> (1990)	Angus, Hereford and Brahman
Notter <i>et al.</i> (1978a, b)	Hereford, Angus, Charolais, Simmental, Limousin, Jersey, Brahman, Holstein, Maine Anjou, Chianina, Gelbvieh and South Devon
Nour <i>et al.</i> (1981)	Angus, Holstein
Ohlson <i>et al.</i> (1981)	Hereford, Simmental
O'Mary <i>et al.</i> (1979)	Angus, Charolais
Pahnish <i>et al.</i> (1969)	Charolais, Brown Swiss, Angus, Hereford and Brahman
Pahnish <i>et al.</i> (1971)	Charolais, Brown Swiss, Hereford and Angus
Peacock and Koger (1980)	Angus, Brahman and Charolais
Peacock <i>et al.</i> (1971)	Brahman, Shorthorn
Peacock <i>et al.</i> (1977)	Angus, Brahman and Charolais
Peacock <i>et al.</i> (1978)	Angus, Brahman and Charolais
Plasse <i>et al.</i> (1968)	Brahman, Shorthorn
Reynolds <i>et al.</i> (1978)	Angus, Brahman, Brangus and Africander–Angus
Reynolds <i>et al.</i> (1979)	Angus, Zebu, Brangus, Brahman and Africander–Angus
Reynolds <i>et al.</i> (1980)	Angus, Brahman, Brangus and Africander–Angus
Reynolds <i>et al.</i> (1982)	Angus, Brahman, Brangus and Africander–Angus
Rodriguez-Almeida <i>et al.</i> (1995a, b)	Angus, Charolais, Gelbvieh, Hereford, Limousin, Pinzgauer, Polled Hereford and Simmental
Rollins <i>et al.</i> (1969)	Angus, Hereford and Shorthorn
Rutledge (1975)	Hereford, Angus, Brown Swiss and Holstein
Sagebiel <i>et al.</i> (1969)	Angus, Charolais and Hereford
Sagebiel <i>et al.</i> (1973)	Angus, Charolais and Hereford
Sagebiel <i>et al.</i> (1974)	Angus, Charolais and Hereford
Sanders (1980)	Zebu, Guzerat, Nellore, Gir, Indu-Brazil, Brahman, Red Brahman and Grey Brahman
Scarth <i>et al.</i> (1973)	Angus, Hereford and Shorthorn
Smith (1976)	Hereford, Angus, Jersey, South Devon, Limousin, Charolais and Simmental
Smith and Cundiff (1976)	Angus, Hereford and Shorthorn
Smith <i>et al.</i> (1976a, b)	Angus, Hereford and Shorthorn

Table 24.9. *Continued*

Authors	Breeds
Smith <i>et al.</i> (1976c, d)	Hereford, Angus, Jersey, South Devon, Limousin, Charolais and Simmental
Stewart <i>et al.</i> (1980)	Angus, Brahman, Hereford, Holstein and Jersey
Thonney <i>et al.</i> (1981)	Holstein, Angus
Thrift <i>et al.</i> (1978)	Angus, Hereford, Charolais, Maine Anjou, Simmental and Holstein
Turner and McDonald (1969)	Angus, Brahman, Brangus, Charolais and Hereford
Turner <i>et al.</i> (1968)	Angus, Brahman, Brangus, Shorthorn, Charolais and Hereford
Urlick <i>et al.</i> (1971)	Angus, Charolais, and Hereford
Urlick <i>et al.</i> (1974)	Angus, Hereford, Charolais and Brown Swiss
Vogt <i>et al.</i> (1967)	Aberdeen-Angus, Hereford and Beef Shorthorn
Wettermann <i>et al.</i> (1982)	Brahman, Hereford and Holstein
Wiltbank <i>et al.</i> (1967)	Angus, Hereford and Shorthorn
Wiltbank <i>et al.</i> (1969)	Angus, Hereford
Wilton and Batra (1972)	Angus, Charolais, Hereford
Winer <i>et al.</i> (1981)	Hereford, Red Poll, Angus, Charolais and Brahman
Wyatt <i>et al.</i> (1977)	Hereford, Holstein and Charolais
Young <i>et al.</i> (1978a, b)	Hereford, Angus, Jersey, South Devon, Simmental, Limousin, Brahman, Charolais and Holstein
Ziegler <i>et al.</i> (1971)	Angus, Charolais, Holstein and Hereford

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