Group III

N'DAMA

Origin

It is believed that the N'Dama type had its origin in cattle which accompanied Berber migrants from southern Morocco. The Fouta Djallon plateau in French Guinea is regarded as being its point of origin in West Africa, from which it has spread to the surrounding areas, where it has interbred with both the zebu cattle of the sub-saharan savannahs and the small shorthorned cattle of the coastal areas. The area occupied by the N'Dama showed its greatest increase in the periods following the rinderpest epizootics of 1890-1891 and 1918 when these cattle replaced herds of other types in Senegal and in the French Sudan which had been decimated by the disease (Doutressoulle, 1947).

While there is a certain amount of variation in the conformation of cattle from different parts of the area, there does not appear to have been a sufficient degree of differentiation to justify their consideration as discrete breeds. The type has, therefore, been discussed under a single heading as the " N'Dama " (which can be translated as " small cattle ") including, as well as the cattle of Fouta Djallon, the Bambara and Borgou subtypes which have been described by Doutressoulle (1947).

Conditions in the native home of the breed

Location, topography and soils

N'Dama cattle are found in the southern part of the *soudanaise* and the northern part of the *guinéenne* climatic zones (Doutressoulle, 1947) in a belt of country approximately parallel to the equator and stretching from the Atlantic coast in Senegal and Guinea to the Borgou district in northern Dahomey. The northern and southern limits are, very approximately, at latitudes 14° N. and 8° N. The northern limit of the N'Dama approximates very closely to that of the tsetse area and, consequently, to the southern limit of the zebu cattle of the more open country to the north.

The true N'Dama is found in the Fouta Djallon plateau in French Guinea. From there it has spread northwestwards to southern Senegal, northeastwards to the River Senegal in the French Sudan, eastwards to the French Sudan south of the Niger and the northern part of the Ivory Coast where the Bambara type has developed, and further east to the Northern Territory of Ghana, the Borgou area in Dahomey and Sierra Leone.

Much of the French Sudan is a great peneplain of a mean altitude of about 200 to 600 meters intersected by valleys and alluvial plains which are inundated for part of the year. The plateaus are very largely covered by a lateritic shield. Only in the Fouta Djallon plateau does the elevation rise above 1,200 meters.

Climate

The climate of the area in which N'Dama cattle are found is characterized by a division of the year between a dry season and a rainy season dependent upon the movement of the intertropical convergence between the northerly dry continental air mass (harmatten) which is centered over the Sahara and the southwest monsoon of moist air coming inland from the Atlantic.

In January the convergence is at its farthest south and the whole of the area is dry, while in July it has moved north and the monsoon covers the whole region. Most of the rain occurs in a belt about 300 miles wide and about 100 miles south of the convergence and generally falls in heavy thunderstorms, although there may, on occasion, be cloud and prolonged rain for 24 hours or more. Heavy rainstorms occur which are of short duration, but are preceded by violent winds which can cause considerable damage.

In general, the dry season lasts approximately from late October or November to February or March. The air is dry and midday temperatures are high, especially in April and May when daily maxima may exceed 43° C., but the nights are cool. The sky, although cloudless, is often obscured by a haze caused by fine dust particles, which greatly reduces visibility.

The rains are preceded by a period during which there are severe dust storms. Rainstorms begin in April and May and continue until October or November. The highest precipitation is in late August and early September. During the rainy months storms usually occur on 10 to 15 days in each month. The humidity is high, but temperatures are lower than in April and May (Kendrew, 1953).

While there is no great variation in the mean annual temperature through the area, precipitation increases from north to south. A division of the area is often made into *a*) the *soudanaise* zone in the

drier north where the dry season lasts from early November to late March or early April and the mean annual temperature is about 26° C., and *b*) the *guinéenne* zone where the annual rainfall varies between 1,050 mm. and 4,000 mm. and where the dry season extends between November and April, while the mean temperature varies between a minimum of 22° to 25° C. and a maximum of 28° to 34° C. Humidity in the *guinéenne* zone varies between 50 percent in the dry season and a maximum of 98 percent in the rains (Doutressoulle, 1947).

Climatological data for stations in the N'Dama area are given in Tables 41 and 42.

TABLE 41. – CLIMATOLOGICAL DATA FOR BOUAKÉ, IVORY COAST (8–YEAR MEANS)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Mean temperature, °C.	24.4	26.9	28.6	28.4	27.2	26.4	25.0	24.5	24.9	25.5	25.7	24.4	26.0
Mean rainfall, mm.	0.8	16.3	36.7	84.9	136.8	143.6	285.1	381.0	263.3	136.3	54.2	5.2	1 544.2

SOURCE: Service de l'élevage de la Côte-d'Ivoire, *Personal Communication.*

TABLE 42. – CLIMATOLOGICAL DATA FOR BAMAKO AND SÉGOU IN THE FRENCH SUDAN

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Mean temperature, Bamako, °C. ..	25.0	27.7	30.6	32.2	31.7	28.9	26.7	26.1	26.1	27.8	27.2	25.0	28.3
Mean rainfall, Bamako, mm.	0	0	2	15	74	135	279	348	206	43	15	0	1 117
Mean rainfall, Ségou, mm.	0	0	0	15	30	90	175	230	125	15	0	0	680

SOURCE: Bamako: Kendrew, 1953.
Ségou: Service de l'élevage du Soudan, *Personal Communication.*

Vegetation

In the *soudanaise* zone there is a close cover of non-thorny trees and bushes under which tall annual grasses spring up during the rains. The rainfall is sufficient for the production of crops and the largely sedentary human population grows considerable areas of rice, cotton and other crops.

Further south, in the *guinéenne* zone, the tree cover is thicker and the annual grasses are to some degree replaced by tall perennials. The vegetation is very subject to fire during the dry season.

On the plateaus there are large areas of open grassland, while forest occurs along the rivers (Doutressoulle, 1947).

Management practices

In the French Sudan and the Ivory Coast the herds are sedentary and are (in the Sudan) usually owned by Bambara villagers who employ Peul herdsmen to supervise their cattle. As well as natural pastures near the villages the cattle are herded on the millet and maize fields after the harvest so that they may consume the residues of the crops.

In much of the area the herds make seasonal movements, which may be very short, as in northern Dahomey, or, as in the Borgou area, may extend over two or three days' march. The cattle are usually brought down from the plateaus and hills where they pass the rains, to river banks and depressions which, flooded during the rains, give green grazing when exposed during the dry season (Doutressoulle, 1947). (*Cf.* the *toich* system of the Nilotic stock owners of the Republic of the Sudan.)

The average composition of herds in the Kayes (Sudan) area has been given as 55 cows, 3 bulls, 18 young cattle between 1 and 4 years, 22.5 calves and 1.5 oxen. In the Kita (Sudan) area the average herd consisted of 447 cows, with 3 bulls, 16 young stock, 30 calves and 4 oxen (Service de l'élevage du Soudan, *Personal Communication*).

In northern Sierra Leone the cattle are maintained under a pastoral and nomadic system utilizing grazing as and where it becomes available. In this area there is usually a shortage of grazing in the dry season. Cattle owners often give their stock a lick containing, as well as salt, various other substances, including, leaves, roots and bark.

Physical characteristics of the breed

Doutressoulle (1947) has described three varieties of this type of cattle: the true N'Dama of the Fouta Djallon plateau; the Bambara or Méré of the southern part of the French Sudan (which is the product of crossbreeding between the N'Dama and the Peul zebu); and the Borgou of northern Dahomey and the neighboring territories, showing signs of the influence of the M'Bororo zebus to the north, as well as that of the West African Shorthorns of the coastal area.

The N'Dama (Figures 41 and 42) are small, humpless cattle, sturdy and thickset, and with long lyre-shaped horns. The head is short

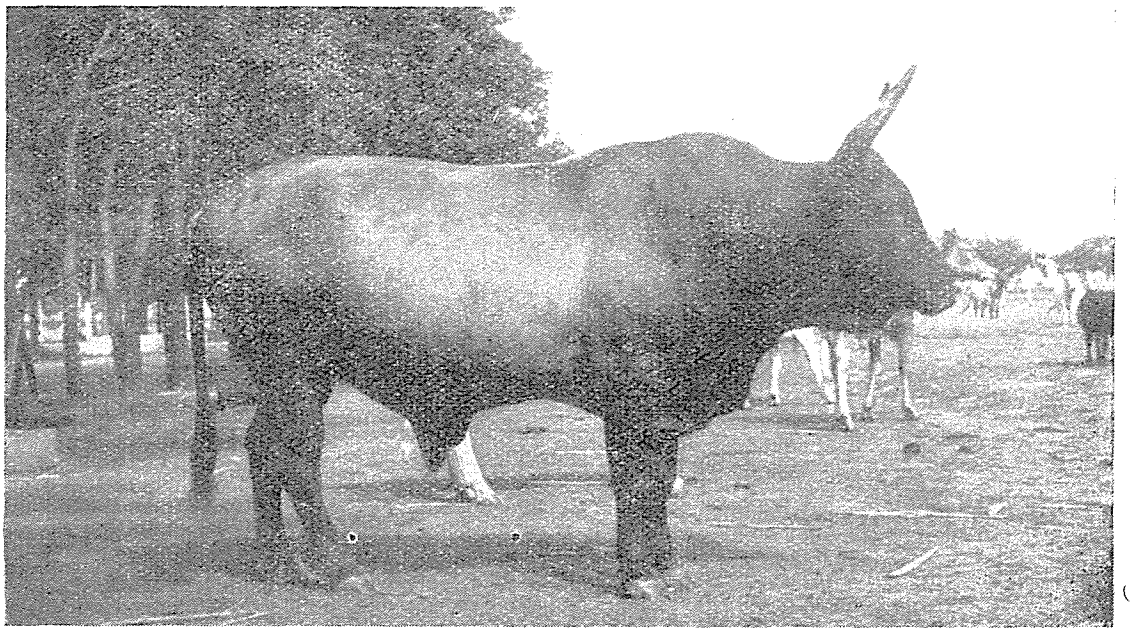
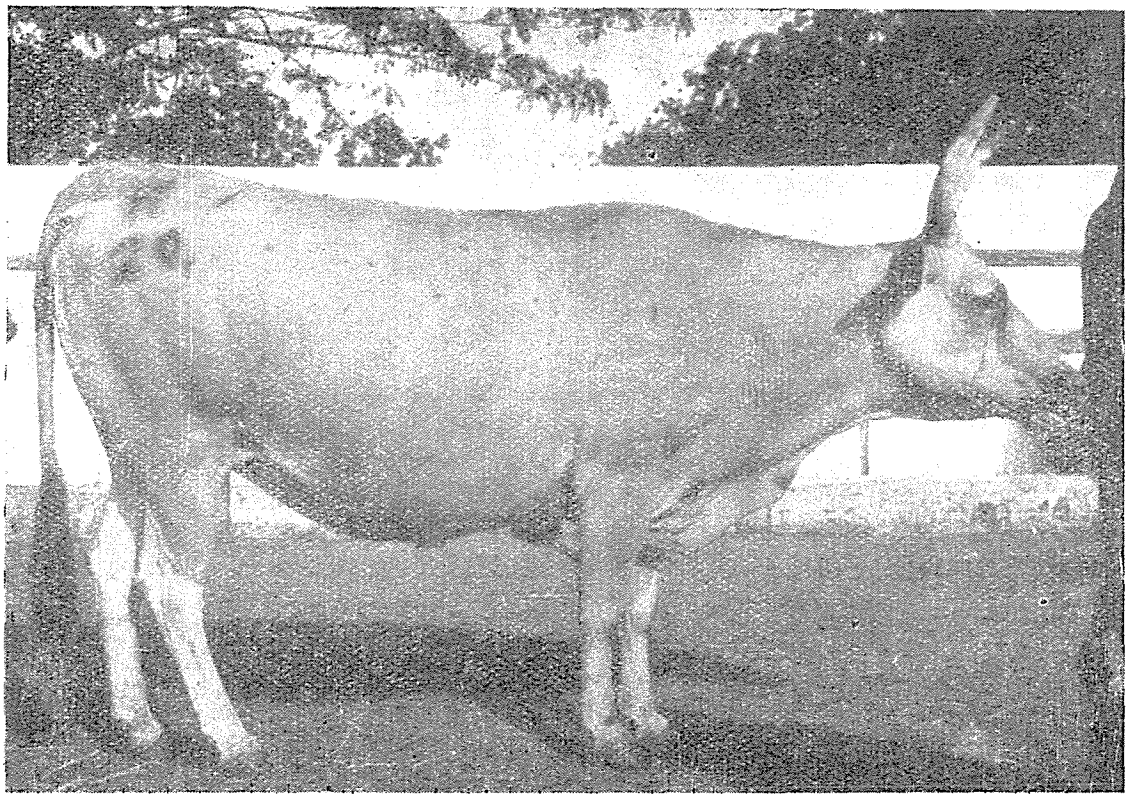


FIGURE 41. *N'Dama bull, Ghana.*

FIGURE 42. *N'Dama cow, Ghana.*

Courtesy of G. M. Gates



and broad with a straight profile. The orbital arches are not accentuated and the forehead is flat. The horns are about 20 cm. or more in circumference at the base and are of circular cross section. The usual length is from 45 to 50 cm. (Service de l'élevage du Soudan, *Personal Communication*). The horns grow from the flat poll in an outward and slightly backward direction, then turn forwards and upwards before inclining inwards and slightly backwards at the sharply pointed extremities. The color of the horns is generally white with dark extremities, except in cattle of the Bambara subtype with brown coat coloration, the horns of which are wholly dark in color (Doutressoulle, 1947).

The neck is of medium length and deep and strong in the male. The topline from the withers to the tail setting is flat and well muscled and is approximately straight with a slight tendency to rise to the hindquarters. The rump is of moderate length and slight slope with adequate breadth posteriorly. The sacrum is not prominent. The tail is long with a well-developed switch. The ribs are well sprung and the musculature of the shoulders, back, and hindquarters is well developed and rounded. The dewlap and umbilical fold are not accentuated. The limbs are short and fine and the hoofs are reported to be sufficiently durable when the cattle are employed in draft work.

The pigmentation of the skin, which is of medium thickness, can vary from black to light brown. The muzzle and surrounds of the eyes are usually light in color but may be dark. The hairy coat is soft and short.

In the Fouta Djallon area the coat coloration is generally yellow or fawn with darker extremities but very dark coloration, approximating to full black, can be seen as well as pied with black or fawn on a white ground and, rarely, full white. The skin is generally of light pigmentation, but black may occur in an appreciable portion of animals. The typical coloration in the Bambara cattle varies from wheaten yellow to red in the north of the subtype area to brown in the south with pale pigmentation of the muzzle, tongue, etc., except where the coat coloration is dark. In the Borgou cattle, the coloration is basically white, with superimposed patterning with gray, black or fawn on the flanks, leaving the topline and underline white (Doutressoulle, 1947).

The height at withers of bulls varies from 95 to 100 cm., and that of oxen from 110 to 120 cm. The liveweight of cows is between 210 and 280 kg., while oxen in exceptionally good condition may reach 330 kg.

In Senegal a large and a small variety of the N'Dama have been distinguished. The average liveweight and height at withers of 14 oxen and 33 cows of the larger variety were: oxen 293 kg. and 112.9 cm.,

cows 237 kg. and 111.9 cm. Similar measurements were made on the smaller variety: average liveweights of oxen and cows were 232 and 210 kg. respectively, while the average height at withers was 108.1 and 101.1 cm. respectively. The range in height at withers of animals of the larger type was 105 to 118 cm. Among the smaller type the range in height at withers was, for cows, 95 or less to 105 cm. and for bulls 100 to 112 cm. (Larret *et al.*, 1948).

The average birthweight of calves has been reported as follows: Sudan, males 16 kg., females 14 kg.; Ivory Coast 14 to 21 kg.; Sierra Leone (Teko Stock Farm), 13.5 to 18 kg.

Average liveweights and measurements of N'Dama cattle in the French Sudan, the Ivory Coast, and Sierra Leone are given in Tables 43, 44, and 45.

TABLE 43. – AVERAGE LIVEWEIGHTS AND MEASUREMENTS OF N'DAMA (BAMBARA) CATTLE IN THE FRENCH SUDAN

	Mature male	Mature female	Mature ox
Liveweight, kg.	300	230	260
Length from shoulder point to pinbone, cm.	123	120	140
Height at withers, cm.	110	104	118
Width of hips, cm.	40	41	47
Heart girth, cm.	150	142	183

SOURCE: Service de l'élevage du Soudan, *Personal Communication.*

TABLE 44. – AVERAGE LIVEWEIGHTS AND MEASUREMENTS OF N'DAMA CATTLE AT MUSAIA STOCK FARM, SIERRA LEONE

	Male			Female			Ox
	1 year	2 years	mature	1 year	2 years	mature	mature
Liveweight, kg.	136	220	363	138	151	238	319
Length from shoulder point to pinbone, cm.	91	102	114	84	91	104	107
Height at withers, cm.	96	107	110	96	102	106	114
Width of hips, cm.	28	33	42	28	30	38	77
Heart girth, cm.	116	140	165	119	125	147	164

SOURCE: Director of Agriculture, Sierra Leone, *Personal Communication.*

TABLE 45. – AVERAGE LIVEWEIGHTS AND MEASUREMENTS OF N'DAMA CATTLE AT MIRANKRO, IVORY COAST

	Male			Female		
	1 year	2 years	mature	1 year	2 years	mature
Liveweight, kg.	84	300	419	81	234	353
Length from shoulder point to iliac wing, cm.	75	77	85	63	81	84
Height at withers, cm.	104	106	115	94	109	112
Width of hips, cm.	39	39	49	27	36	40
Heart girth, cm.	142	156	173	122	143	164

SOURCE: Service de l'élevage de la Côte-d'Ivoire. *Personal Communication.*

Functional characteristics of the breed

N'Dama heifers are reported to calve for the first time at from 3 years (Sudan, Ivory Coast) to 3 ½ years (Sierra Leone) of age. The average interval between subsequent calves in the French Sudan has been reported to be 16 months. Cows continue to breed for 10 to 12 years.

Young bulls are first used at between 2 ½ and 3 ½ years and are reported to be quick to service.

When the nutritional status of the cattle is kept level calvings occur throughout the year, but under the local system of management the majority of calvings occur soon after the termination of the rains.

TABLE 46. – AVERAGE MILK PRODUCTION OF N'DAMA COWS AT MUSAIA STOCK FARM, SIERRA LEONE, 1944-1950

Year	Average number milked	Average milk per cow per lactation, lb.	Average length of lactation, days
1944	26	390	152
1945	16	722	203
1946	18	1 077	337
1947	18	1 108	294
1948	21	1 225	285
1949	19	1 381	263
1950	18	1 151	237

SOURCE: Colonial Office, 1953.

FIGURE 43. *N'Dama draft oxen, Ghana.*

Courtesy of G. M. Gates

Milk yield is generally small. A report from the French Sudan has given 350 to 450 liters in 5 to 6 months as the average annual lactation yield. The butterfat content of the milk is reported to be high. Doutressoulle (1947) reports that daily yields of 2 to 3 liters are obtained from Borgou cows. Average milk yields of N'Dama cows at Musaia Stock Farm in Sierra Leone are given in Table 46.

N'Dama cattle give a good beef carcass. Average oxen killed during the rains are reported to yield from 45 to 50 percent of usable meat, while the best may kill out at 54 or 55 percent. The meat is of good quality and close-grained but lacks intermuscular fat (Doutressoulle, 1947).

The oxen are used for draft work, both for haulage and tillage (Figure 43). They are little suited for work which is either prolonged or requires violent effort and are best utilized in large teams which are worked only in the cool hours of the morning (Doutressoulle, 1947).

N'Dama cattle are reported to be, at least to some extent, resistant to trypanosomiasis and can be kept in tsetse bush country where other cattle types, such as, for instance, the zebus of the subsaharan savannahs, are unable to thrive. N'Damas are also reputed to be resistant to piroplasmosis but are susceptible to rinderpest, haemorraghic septicaemia, and bovine tuberculosis.

No resistance to tick infestation has been reported.

Performance in other areas

Herds of N'Dama cattle have been established in Nigeria with the aim of testing their resistance to trypanosomiasis, improving the small native shorthorned humpless cattle, and introducing cattle into tsetse-infested country. The original herd at Ilorin, 200 miles north of Lagos was founded with cattle which were imported from the Gambia in 1935. Later importations were made in 1939 and 1947 from French Guinea. The latter group of 73 cows and 20 bulls was established in orchard bush country in Oyo Province. Climatic conditions are similar to those in the Ivory Coast. Climatic data for the area are given in Table 47.

At Oyo the cattle have been maintained on grazing and hay with, in the November-April dry season, supplementary feeding of hay, sweet potatoes, and cassava as well as a concentrate mixture including Guinea corn or maize, cotton seed, palm kernel meal, locust beans

TABLE 47. – FIVE-YEAR CLIMATOLOGICAL MEANS FOR THE ILORIN-OYO AREA IN NIGERIA

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Mean temperature, °C.	25.6	27.5	28.9	29.2	26.9	25.6	24.7	24.4	25.0	26.1	25.8	25.6	26.3
Mean relative humidity, % .	79.0	75.6	76.8	80.6	80.4	86.0	85.8	87.2	89.2	87.8	81.2	85.0	82.
Mean rainfall, mm.	0	6.4	35.3	95.5	132.1	183.6	100.1	150.6	201.2	229.4	11.9	2.0	1 148.1

SOURCE: Ryall, T. E., *Personal Communication.*

TABLE 48. – AVERAGE LIVEWEIGHTS AND MEASUREMENTS OF N'DAMA CATTLE AT ILORIN, NIGERIA

	Male			Female		
	1 year	2 years	mature	1 year	2 years	mature
Liveweight, kg.	116 (29)	192 (13)	287 (4)	113 (14)	184 (13)	245 (25)
Length from shoulder point to pinbone, cm.	96 (3)	—	135 (5)	94 (4)	102 (4)	124 (5)
Height at withers, cm. ...	91 (3)	—	107 (5)	89 (4)	94 (4)	104 (5)
Depth of chest, cm.	51 (3)	—	69 (5)	51 (4)	53 (3)	64 (5)
Width of hips, cm.	28 (3)	—	38 (5)	25 (4)	30 (4)	41 (5)
Heart girth, cm.	117 (3)	—	155 (5)	114 (4)	127 (4)	155 (5)

Numbers sampled in brackets.
SOURCE: Ryall, T. E., *Personal Communication.*

and pigeon peas. During the night the cattle were kept in open-fenced enclosures. Calves were suckled until they were weaned at between 6 and 9 months of age.

The average birthweight of 43 bull calves was 15.3 kg. and that of 31 heifer calves was 14.8 kg.

Average liveweights and body measurements of cattle at the Ilorin Farm are shown in Table 48.

Heifers have calved for the first time at about 3 ½ years and calves have been born at all seasons of the year. Young bulls have been first used for service at about 3 years of age and have continued in breeding work up to their 10th or 12th year. Bulls are reported to have been rather shy to service.

Milk yields of 504 lb. in 209 days and 272 lb. in 189 days have been recorded. The cattle at Ilorin and Oyo have fattened satisfactorily on grazing.

Oxen used for draft work (carting and tillage) have been worked for approximately 200 six-hour working days in a year. At haulage work a pair has pulled a load of about 7 ½ hundredweight over about two and one-half miles in an hour.

N'Dama cattle at Ilorin and Oyo have been found to be resistant to trypanosomiasis but susceptible to rinderpest and to foot-and-mouth disease and haemorragic septicaemia. Calves have been found infested with roundworms. A moderate susceptibility to ticks and lice has been reported (Ryall, T.E., *Personal Communication*).

N'Dama cattle have been introduced into Léopoldville Province in the Belgian Congo, where they are maintained, with few exceptions, in herds under European management. The climate is equatorial or semi-equatorial with annual rainfall varying from 800 mm. or less with a six-month dry season near the coast, to 2,000 mm. with a dry season confined to June and July in the north and northeast. The savannah vegetation of the cattle-breeding areas includes open grasslands, grasslands with scrub and scattered trees and open forest.

The cattle are maintained on plantations, missions and farms primarily for the supply of meat to the local population. Management is extensive, the cattle being pastured on natural savannah grazing during the day and enclosed in kraals at night, except in the smaller herds which are often pastured in fenced paddocks. Ticks are controlled by spraying or dipping with an acaricide.

The N'Dama has been found to be an excellent cattle type for beef production on relatively poor savannah grazing in this area and oxen are reported to reach an average liveweight of 350 kg. on maturity (Merckx, 1956).

N'Dama cattle were exported from Senegal in 1825 and later, to the islands of Martinique and Guadeloupe in the West Indies. Be-

tween 1870 and 1914 imports, also of Senegal cattle, were made into the Virgin Islands. These have been crossed with cattle of the British Red Poll breed and the progeny have been reported to have been successful both for meat and milk production.

Crosses with other breeds of cattle

As well as crosses between N'Damas and the zebus of the north and the West African Shorthorns of the coastal area, Doutressoulle (1947) mentions the following crosses with exotic breeds:

1. *Charollais.* Two bulls were imported into the French Sudan in 1927. The first generation (F_1) animals showed a considerable degree of variation. When the F_1 females were put to a Charollais bull the $^3/_4$ Charollais offspring were more uniform. Two $^3/_4$ Charollais bulls which were used for breeding weighed 500 kg. and 525 kg. respectively. The milk production of $^3/_4$ Charollais females was 5 to 6 liters daily. Average liveweights and measurements of $^1/_2$ Charollais and $^3/_4$ Charollais cattle are given in Tables 49 and 50.

TABLE 49. – AVERAGE LIVEWEIGHTS AND MEASUREMENTS OF FIRST CROSS $^1/_2$ CHAROLLAIS – $^1/_2$ N'DAMA CATTLE

	Male			Female		
	2 teeth	4 teeth	6 teeth	2 teeth	4 teeth	6 teeth
Liveweight, kg.	195	250	300	200	250	320
Height at withers, cm.	115	116	119	119	119	123
Heart girth, cm.	141	150	154	151	160	167

SOURCE: Doutressoulle, 1947.

TABLE 50. – AVERAGE LIVEWEIGHTS AND MEASUREMENTS OF $^3/_4$ CHAROLLAIS – $^1/_4$ N'DAMA CATTLE

	Male			Female		
	2 teeth	4 teeth	6 teeth	2 teeth	4 teeth	6 teeth
Liveweight, kg.	—	—	—	150	350	375
Height at withers, cm.	112	112	127	117	120	124
Heart girth, cm.	151	170	180	150	160	168

SOURCE: Doutressoulle, 1947.

2. *Normande.* A Normande bull was imported in 1927 into the French Sudan. The first generation (F_1) N'Dama (Bambara) x Normande offspring were less successful than those from the Charollais bulls. The average liveweight of mature F_1 females was 275 to 300 kg.

Sources of breeding stock and information regarding the breed

Doutressoulle (1947) estimated that there were 1,300,000 cattle of taurine type in French West Africa. It is probable that the greater part of these were N'Damas. A report from Sierra Leone estimated that there were, in that colony, 58,000 cattle, all of which were thought to be N'Dama. Doutressoulle (1948) estimated that there were 300,000 cattle of the N'Dama and derived types in the French Sudan.

Further information regarding N'Dama cattle can be obtained from:

Service de l'élevage et des industries animales, Abidjan, Ivory Coast, French West Africa.

Service de l'élevage et des industries animales, Bamako, French Sudan, French West Africa.

Service de l'élevage et des industries animales, Senegal, French West Africa.

Service de l'élevage et des industries animales, French Guinea, French West Africa.

The Director of Agriculture, Western Region, Ibaden, Nigeria.

The Director of Agriculture, Department of Agriculture, Sierra Leone.

WEST AFRICAN SHORTHORNED CATTLE

Origin

Doutressoulle (1947) is of the opinion that the shorthorned West African humpless cattle, as well as the N'Dama, had their origin in herds brought south by Berber tribesmen from southern Morocco. He mentions, however, the opinions of Pierre (1906), that the present cattle population of the coastal region was descended from Iberian cattle introduced by the early Portuguese navigators, and of Pecaud (1912), that they were derived from the indigenous Somba cattle.

Cattle of this type have been referred to as West African Shorthorn, "Race des Lagunes," "Somba," Nigerian Dwarf Shorthorn

or " Muturu," " Bakosi," and Dwarf Shorthorn (Mason, 1951*a*; Doutressoulle, 1947; Colonial Office, 1953).

It is considered that the local point of origin of the type was the mountainous region of Attacora in northern Dahomey where the Somba cattle are now found (Doutressoulle, 1947).

Doutressoulle (1947) distinguishes a subtype, the Baoulé, in the central Ivory Coast in the Bouaké area and showing the effect of crossing with the N'Dama to the north.

The Somba cattle were not affected by the rinderpest epizootic of 1892 and so were able to colonize areas in the neighborhood of the Attacora mountains which had been destocked by the disease. A considerable amount of crossing with other types such as, for instance, the Borgou, took place in these areas.

Conditions in the native home of the breed

Location, topography and soils

Doutressoulle (1947) gives the southern parts of the Ivory Coast, Togoland, and Dahomey in addition to the Attacora mountains in northern Dahomey as the habitat of the West African shorthorned cattle as well as the Baoulé area in the central Ivory Coast. Mason (1951*a*) also reports West African Shorthorns in the Gambia (where they are dying out), in the coastal areas of Ghana, between the Niger and Benue rivers and the sea in Nigeria as well as in isolated hilly areas along the eastern border (the " Muturu " subtype) and, from a 50-year-old account, in the coastal regions of Liberia.

The land near the coast of much of the area is low and sandy with, in many places, lagoons open to the sea or closed from it by sandbars. Inland the altitude increases to 70 or 100 meters and, further north in the Bouaké area, to 338 meters, and lateritic soils appear as well as sands and loams.

Climate

The climate is controlled by the seasonal northward and southward movement of the intertropical convergence. In January, when the convergence is at its furthest south, the area is to some extent subject to the dry northerly harmattan wind which, however, is sometimes replaced by southwesterly winds.

During the greater part of the year the coastal areas are covered by the monsoon. August and September, however, as a result of an inversion of temperature in the mass of monsoon air, have little rain. The mean annual temperature is about 27° C. and neither the diurnal

nor the seasonal variation exceeds 7° C. Rainfall may exceed 4,445 mm. in the year, most of which falls between April and November.

Over much of the coast there are two rainfall maxima; almost two thirds of the rain falls in April, May and June and there is a second maximum in September. The Sierra Leone and Liberian coasts have, however, a single maximum in August.

Further inland the dry season is of longer duration and the seasonal temperature range is rather higher.

There is a narrow area on the Ghana, Togoland and Dahomey coasts which, with about 760 mm. per annum, has a considerably lower rainfall (Kendrew, 1953).

Climatological data for stations in Togoland (Sokodé in the Somba area and Lomé on the coast), Bouaké in the Baoulé area, and Abidjan in the coastal savannah area are given in Tables 51, 52, 53, and 54.

TABLE 51. – CLIMATOLOGICAL DATA FOR LOMÉ IN THE TOGO COASTAL AREA

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Mean temperature, °C.	26.5	27.5	28.1	27.8	27.2	26.1	25.1	24.5	25.2	26.2	26.9	26.7	28.6
Mean rainfall, mm.	10	32	48	24	139	189	60	14	40	79	33	13	602

Temperature: Data for a single year
Rainfall: 1888-1947 inclusive.
SOURCE: Politzer, J., *Personal Communication.*

TABLE 52. – CLIMATOLOGICAL DATA FOR SOKODÉ IN THE SOMBA AREA, TOGO

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Mean temperature, °C.	25.9	27.8	28.4	28.1	26.6	24.9	24.5	24.5	24.6	26.0	26.0	26.3	26.1
Mean relative humidity, % ..	28	49	53	61	76	80	82	83	82	71	60	37	63.5
Mean rainfall, mm.	0	26	20	139	197	152	278	340	242	45	26	0	1 465

SOURCE: Amégée, P., *Personal Communication.*

Vegetation

Much of the area, especially near watercourses, is dense tropical closed forest, but in some areas by the coast and on the inland plateaus there is savannah grassland where the more important grass genera include *Imperata*, *Rottboellia*, *Digitaria*, *Andropogon*, *Cymbopogon* and

TABLE 53. – 8-YEAR CLIMATOLOGICAL MEANS FOR BOUAKÉ IN THE BAOULÉ AREA

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Mean temperature, °C.	27.3	28.5	28.9	28.6	27.4	26.1	24.9	24.6	25.1	26.0	26.5	27.0	26.6
Mean relative humidity, % ..	55	61	65	69	75	77	79	80	80	78	75	65	71.6
Mean rainfall, mm.	10	37	104	147	135	152	80	117	208	133	38	25	1 186

SOURCE: Service de l'élevage de la Côte-d'Ivoire. *Personal Communication.*

TABLE 54. – 8-YEAR CLIMATOLOGICAL MEANS FOR ABIDJAN, IVORY COAST

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Mean temperature, °C	27.5	28.3	28.7	28.6	27.7	26.3	25.4	24.9	25.4	26.5	27.2	27.4	26.9
Mean relative humidity, % ...	79	80	77	78	81	83	80	81	82	82	81	81	80.4
Mean rainfall, mm.....	40	53	100	124	360	496	213	54	71	168	201	78	1 958

SOURCE: Service de l'élevage de la Côte-d'Ivoire, *Personal Communication.*

Paspalum. During the short dry season the savannahs are much subject to fires. The greater part of the area provides an environment favorable to the tsetse fly.

Much of the forest is now devoted to both plantation crops, including cocoa, kola, and citrus, and to food crops such as plantains, cocoyams, maize and cassava, and considerable areas are under forest regeneration fallow (Commonwealth Bureau of Pastures and Field Crops, 1951).

Management practices

In much of the area cattle are maintained solely for social and ritual purposes, animals being exchanged in the bride wealth and slaughtered on ceremonial occasions. In the coastal and forest areas the cattle are generally left at liberty in the forest during the day, grazing along paths and clearings and obtaining much of their requirements from plants other than grasses. During the night they may be confined in an open enclosure for security, but nowhere in the area is any form of stabling employed by native stockowners.

In the Baoulé and Somba areas (central Ivory Coast and northern Dahomey) herdsmen of the nomadic or semi-nomadic Peul tribes are employed by the sedentary cultivators to take their cattle to graze during the day. In these areas cows may be milked on their return from grazing in the evening.

Movements to grazing are daily and local; there are no prolonged seasonal movements of the herds.

Physical characteristics of the breed

The West African Shorthorns (Figures 44 and 45) are small, thickset animals. The head is short and broad. The profile is straight. The orbital arches are well marked, lending a degree of concavity to the wide forehead. The poll is broad and straight and the short horns, of circular cross section in the male and oval in the female, spring from it in a sideways and upwards direction, curving forward at the extremities. Polled animals are of frequent occurrence, as are those with horns which are unattached to the bony core.

The head is carried low on the short and, in the bull, powerful neck. The topline is approximately straight from the withers to the tail-setting and the back is broad and well muscled. The barrel is well rounded but tends to lack depth behind the shoulder. The hindquarters are of medium length and slight slope and the sacrum is not accentuated. The tail is long with a well-developed switch. The dewlap and umbilical fold are little accentuated. The limbs are short and fine of bone.

The skin is tight and its pigmentation is dark, as is that of the muzzle and surround of the eye. The coat coloration varies considerably. Black and, less frequently, various shades of brown occur both as whole colors and in combination with white. Grays and duns are less common.

TABLE 55. – AVERAGE LIVEWEIGHTS AND MEASUREMENTS OF WEST AFRICAN SHORTHORNED CATTLE IN TOGO (*Race des Lagunes*)

	Male			Female		
	1 year	2 years	mature	1 year	2 years	mature
Liveweight, kg.	45	66	192	38	63	150
Height at withers, cm.	66	70	92	63	79	94
Width of hips, cm.	17	15	29	17	23	30
Heart girth, cm.	63	78	134	95	95	143

SOURCE: Service de l'élevage de la Côte-d'Ivoire, *Personal Communication*.

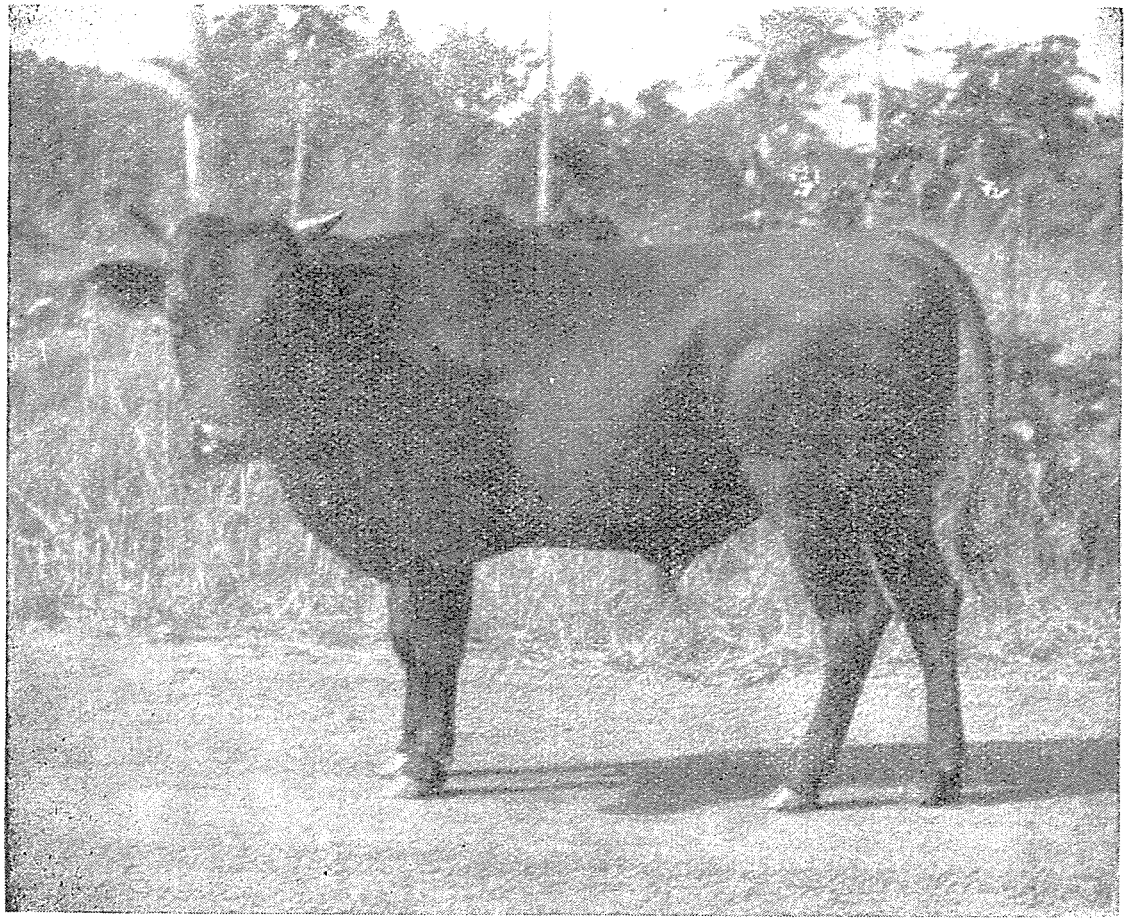


FIGURE 44. *West African Shorthorn bull.*

FIGURE 45. *West African Shorthorn cow.*

Courtesy of G. M. Gates

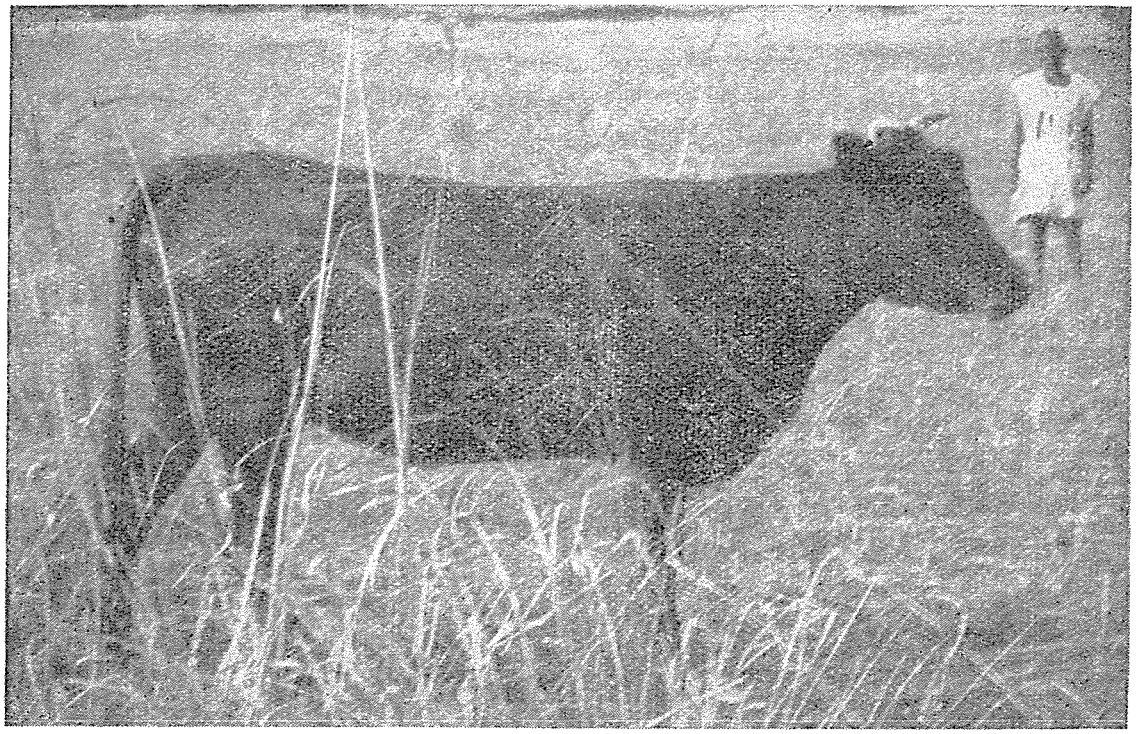


TABLE 56. – AVERAGE LIVEWEIGHTS AND MEASUREMENTS OF WEST AFRICAN SHORTHORNED CATTLE IN THE IVORY COAST (BAOULÉ)

	Male			Female		
	1 year	2 years	mature	1 year	2 years	mature
Liveweight, kg.	104	137	200	98	197	289
Height at withers, cm.	85	87	106	57	98	106
Width of hips, cm.	23	24	25	21	32	42
Heart girth, cm.	111	123	136	109	135	169

SOURCE: Service de l'élevage de la Côte-d'Ivoire, *Personal Communication.*

TABLE 57. – AVERAGE LIVEWEIGHTS AND MEASUREMENTS OF WEST AFRICAN SHORTHORNED CATTLE IN NIGERIA (MUTURU)

	Male			Female			Ox
	1 year	2 years	mature	1 year	2 years	mature	mature
Liveweight, lb.	168	246	451	143	227	350	—
Length from shoulder point to pinbone, cm.	71	81	86	69	81	84	86
Height at withers, cm.	86	99	104	86	94	96	107
Depth of chest, cm.	43	48	56	41	46	53	56
Width of hips, cm.	23	30	36	25	28	36	38
Heart girth, cm.	112	135	152	109	127	135	155

SOURCE: Gates, G. M., *Personal Communication.*

TABLE 58. – AVERAGE MEASUREMENTS OF WEST AFRICAN SHORTHORNED CATTLE IN THE SOKODA AREA, TOGO (SOMBA)

	Male			Female			Ox
	1 year	2 years	mature	1 year	2 years	mature	mature
Height at withers, cm.	91	99	116	90	110	114	115
Depth of chest, cm.	37	40	47	40	46	51	54
Width of hips, cm.	20	22	28	24	28	23	32
Heart girth, cm.	110	127	137	123	119	156	139

Means derived from measurements of 60 animals.
SOURCE: Amégée, P., *Personal Communication.*

The average birthweights of calves have been reported as: 25 kg. (100 calves in Togo coastal area) (Politzer, J., *Personal Communication*); and 22.7 kg. (*present* Ghana, 1952).

Average measurements of West African Shorthorns from various stations are given in Tables 55, 56, 57, and 58.

Functional characteristics of the breed

The age at first calving of cows of the West African Shorthorn type has been reported as follows: *a*) *Race des Lagunes*, 3 years (Ivory Coast) to 4 years (Togo); *b*) Muturu (Nigeria), 2 ½ to 3 years; *c*) Baoulé (Ivory Coast), 2 ½ to 3 years; *d*) Somba (Togo), 3 ½ years.

The average interval between subsequent calvings has been 12 to 14 months (Somba) or 24 months (*Race des Lagunes*). Where the nutritional status of the cattle was kept approximately level throughout the year there was no calving season, but elsewhere the majority of heats occurred in March, April and May. Cows have been observed to have a productive life of between 4 and 7 lactations.

Young bulls have been capable of service at about 2 years of age and have had a breeding life of up to 12 or 14 years.

Milk yield is low: 1 ½ to 2 liters a day have been recorded and a report from Nigeria suggested that 28 gallons (127 liters) was an average lactation yield. Lactation continued for 4 to 6 months. A butterfat percentage figure of 3.3 percent was reported from Togo.

West African shorthorned cattle give a beef carcass of good quality. Animals of the *Race des Lagunes* have given about 55 percent of useful meat when killed at between 4 and 6 years of age. Oxen of the Baoulé subtype have been killed at about 4 years of age with an average liveweight of 200 to 300 kg.

West African shorthorned cattle are not generally used for work. At government stations in Nigeria where they have been so utilized it has been found that their working capacity has been small and their stamina limited.

Cattle of this type appear to acquire a natural immunity to trypanosomiasis. This is known as premunition, whereby the trypanosomes occur in the blood in a state of balance with the host, but the immunity can be broken down if the animal is weakened by other disease, malnutrition, overwork, etc. and the normal symptoms of the condition appear. Resistance to piroplasmosis has also been reported. Susceptibility to rinderpest, foot-and-mouth disease, haemorrhagic septicaemia, contagious abortion, tuberculosis and pleuro-pneumonia has been reported from various territories.

Ticks are prevalent throughout the area. Infection of calves with roundworms has been reported from a number of stations.

Sources of breeding stock and information regarding the breed

There are reported to be, very approximately, about 100,000 Muturu cattle in Nigeria. No reports have been obtained as to numbers in other territories.

Further information on the West African shorthorned cattle can be obtained from:

Service de l'élevage et des industries animales, Abidjan, Ivory Coast, French West Africa.

Service de l'élevage et des industries animales. Lomé, Togo, French West Africa.

The Principal Veterinary Officer, Enugu, Nigeria.

The Director of Veterinary Services, Ibaden, Nigeria.

The Director of Agriculture, Enugu, Nigeria.

The Director of Agriculture, Ibaden, Nigeria.