Group VIII

MADAGASCAR ZEBU

Origin

While the absence of fossil remains indicates that cattle were introduced into Madagascar in recent times, the early navigators, from the time of Tristan d'Acunha, who discovered the island in 1506, refer to very extensive herds of cattle which were maintained, particularly in the west and southwest, by the indigenous inhabitants. It is considered that these cattle were derived from stocks introduced from India (Lalanne, A., *Personal Communication*).

Conditions in the native home of the breed

Location, topography and soils

Madagascar, the third largest island in the world, has a superficial area of 590,000 sq. km. It is situated in the Indian Ocean between 12° S. and 26° S. and is separated from the coast of Africa by the Mozambique channel, which has an average width of 400 km.

The island is extremely mountainous with a central plateau of an average elevation of 1,200 m. above sea level, and is much dissected by streams and river valleys. The central plateau drops to the east coast in an almost perpendicular cliff which extends down nearly the entire length of the island while, in the west, it falls more gradually to the coast and is penetrated by wide valleys.

The soils of the central and eastern part of the island are derived from granitic material and, with the exception of the alluvial soils, are of low fertility. In the west the soils are well drained and deep, while on the high plateaus lateritic clay overlies a subsoil derived from crystalline rocks. In the southern part of the island sands overlie permeable calcareous material.

Madagascar is well watered with numerous rivers and streams which assist in minimizing the very considerable climatic variations

between the different parts of the island. In the east the rivers are generally short and torrential with broad, fertile alluvial valleys. Those in the west are longer and slower, with a more irregular flow, and traverse fertile alluvial plains. In the south the flow of the torrents is often lost in the sandy soil before it reaches the sea, with the result that the low rainfall coastal arid zone receives little other surface water (Lalanne, A., *Personal Communication*).

Climate

The tropical climate of Madagascar is much modified by the mountainous nature of its relief. In winter the whole island is affected by the southeast trade winds which persist south of 15° S. during the summer months, when northwesterly and variable winds influence the remainder of the island. During the day a sea breeze modifies the effect of the trade wind on both east and west coasts, but the night land wind is weaker in the east than in the west.

Precipitation varies both in amount and distribution from one part of the island to another. The rainfall on the east coast is the heaviest and most evenly distributed throughout the year. Over much of this coast there has been over 2,540 mm. a year, and Tamatave, in the northern half of the area, has had 3,124 mm. In the remainder of the island there is a distinct winter dry season, which is prolonged in the semi-arid southwest and south. The north and west of the island have the highest temperatures. Those on the east, as a consequence of the greater cloud cover, are lower, as are those of the central plateau, the altitude of which is sufficient to effect a substantial reduction.

Between December and April the island experiences violent tropical cyclones, which are capable of causing considerable damage (Kendrew, 1953).

Climatological data for seven stations in Madagascar are presented in Table 132.

Vegetation

On the east of the island there is a dense forest which is, however, in spite of the abundant rainfall, slow to regenerate itself on the granitic soils. In the west the vegetation, although including numbers of tall forest trees which flourish on the deep soils, is not dense owing to the aridity of the dry season, which inhibits seed germination. Many of the great plateaus, plains and valleys carry a luxuriant grass cover composed of quick-growing species which are able to come to full development during the short hot rainy season. The vegetation cover on the lateritic soils of the center of the island is stunted and composed

TABLE 132. – CLIMATOLOGICAL DATA OF SEVEN STATIONS IN MADAGASCAR

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
DIEGO-SUAREZ													
Mean maximum temperature, °C..	31.4	31.9	32.8	32.7	32.1	30.7	29.7	29.5	30.0	30.9	32.0	32.7	31.4
Mean minimum temperature, °C..	23.6	23.9	24.1	23.9	23.0	21.3	20.5	20.6	20.9	21.9	23.2	23.7	22.6
Maximum humidity, %	85	87	84	79	71	72	69	68	68	71	75	81	75.8
Minimum humidity, %	73	73	68	63	56	53	51	50	51	54	58	65	59.6
Mean rainfall, mm.	273	184	208	50	11	7	5	6	1	8	23	112	888
MORONDAVA													
Mean maximum temperature, °C. .	32.1	32.0	31.9	31.4	29.1	27.5	27.4	27.6	28.5	29.3	30.9	31.7	30.0
Mean minimum temperature, °C..	23.6	23.5	23.0	20.8	17.1	14.8	14.3	15.6	17.5	20.6	22.8	23.4	19.8
Maximum humidity, %	88	90	90	90	87	86	84	87	83	86	81	81	86.1
Minimum humidity, %	66	67	65	61	57	56	56	61	63	68	66	66	62.7
Mean rainfall, mm.....	208	225	77	15	8	9	2	2	8	13	17	142	726
TULEAR													
Mean maximum temperature, °C..	32.7	32.6	31.8	30.7	28.5	26.5	26.5	27.2	28.6	29.0	30.5	31.4	29.7
Mean minimum temperature, °C..	22.5	22.4	21.3	18.9	15.8	13.7	12.7	13.6	15.2	17.5	19.9	21.5	17.9
Maximum humidity, %	84	88	89	89	89	90	86	88	85	86	82	82	86.5
Minimum humidity, %	61	62	61	58	55	54	50	56	56	62	65	63	58.6
Mean rainfall, mm.	193	82	37	8	18	11	3	6	9	19	35	44	464
FORT-DAUPHIN													
Mean maximum temperature, °C...	29.3	29.4	28.4	27.6	25.5	24.2	23.6	24.0	24.8	26.2	28.1	28.9	26.7
Mean minimum temperature, °C..	21.6	22.1	21.5	20.5	18.3	16.7	15.9	16.4	16.9	18.4	20.1	21.1	19.1
Maximum humidity, %	87	88	89	88	87	85	84	86	84	85	85	85	86.1
Minimum humidity, %	72	71	73	71	70	70	68	68	69	68	68	70	69.8
Mean rainfall, mm.	193	215	219	116	103	153	93	88	50	64	83	150	1 527

TABLE 132. – CLIMATOLOGICAL DATA FOR SEVEN STATIONS IN MADAGASCAR (*continued*)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
FIANARANTSOA													
Mean maximum temperature, °C..	26.2	26.0	25.6	24.5	22.1	20.6	19.4	21.1	22.7	25.5	27.5	26.7	26.3
Mean minimum temperature, °C..	16.5	16.3	16.0	14.4	11.9	9.8	9.3	9.8	10.7	12.4	14.7	15.9	19.4
Maximum humidity, %	94	96	97	97	97	97	97	97	96	92	92	92	95.3
Minimum humidity, %	65	65	64	61	56	55	58	53	48	43	49	57	65.7
Mean rainfall, mm.	302	247	155	50	27	23	19	17	23	35	127	226	1 251
BETROKA													
Mean maximum temperature, °C..	30.5	30.2	29.7	28.8	25.6	24.3	23.8	25.4	28.1	32.2	31.7	30.2	28.4
Mean minimum temperature, °C..	18.9	19.1	18.4	16.3	12.2	10.1	10.0	11.4	13.5	15.6	17.9	18.7	15.2
Maximum humidity, %	81	82	84	82	86	87	84	77	77	73	75	79	80.7
Minimum humidity, %	51	52	49	45	39	40	37	37	41	28	33	47	41.6
Mean rainfall,.. mm.	227	143	90	27	12	16	9	6	14	42	94	211	891
TANANARIVE													
Mean maximum temperature, °C..	26.5	26.6	26.6	25.7	23.4	21.2	20.2	21.7	24.3	27.1	28.1	27.3	24.9
Mean minimum temperature, °C..	15.4	15.6	15.2	13.8	11.7	9.8	8.7	8.9	10.2	11.8	13.8	15.0	12.5
Maximum humidity, %	93	94	93	94	93	94	94	94	89	87	87	90	91.8
Minimum humidity, %	68	70	68	65	63	62	61	58	52	48	53	63	60.9
Mean rainfall, mm.	303	273	179	66	17	10	8	8	14	54	40	307	1 379

SOURCE: Lalanne, A., *Personal Communication*.

of species which become woody and of reduced feeding value as soon as they reach full development. The more arid south supports only an ephemeral grass cover, together with xerophytic trees and shrubs, including spiny species.

Among the more important pasture grasses are *Andropogon rufus*, *Heteropogon contortus*, *Aristida adscensionis*, *Imperata arundinacea*, and *Andropogon intermedius*. *Cynodon dactylon*, which appears in asso-

ciation with species of *Panicum*, *Digitaria* and *Setaria*, is pre-eminent among the grasses giving dry-season grazing in depressions, valley bottoms and river banks. Legumes are rare in Madagascan pastures (Lalanne, A., *Personal Communication*).

Management practices

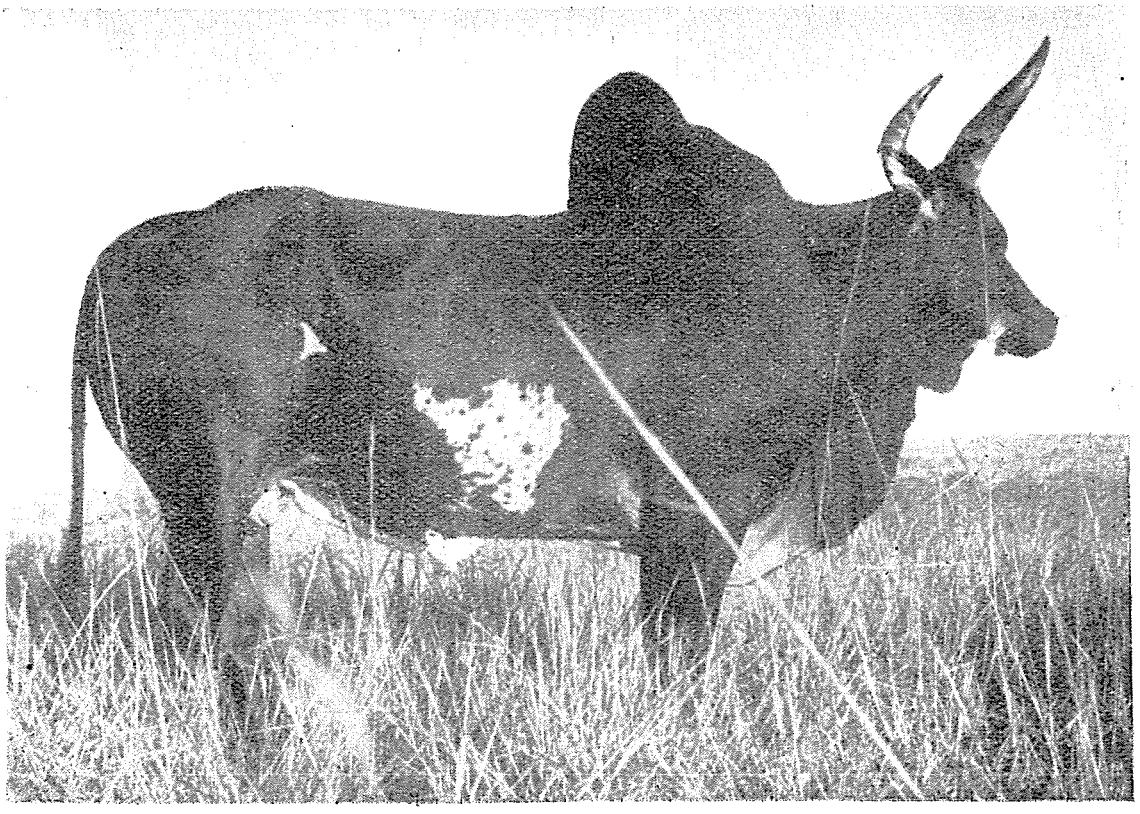
With few exceptions, the cattle subsist entirely on natural pastures. During the rains the herds are maintained on upland and other grazing away from the rivers. During the dry season they are moved down to depressions, valley bottoms and river banks where the higher soil/water status permits of a more prolonged season of plant growth. In general, the cattle remain on the dry season pastures from June or July to November or December, and on the rain season grazing grounds from November or December until the following May or June.

In the neighborhood of the larger population centers where there is a market for milk, cows are milked once daily after the calves have suckled, the quantity of milk allowed to the calf being usually insufficient for its full requirements.

Elsewhere there is little opportunity for the commercial disposal of milk or milk products and it is only where tribes, such as the Bara and the Antandroy in the south of the island, include milk in their

FIGURE 100. *Madagascar zebu bull.*

Courtesy of A. Lalanne



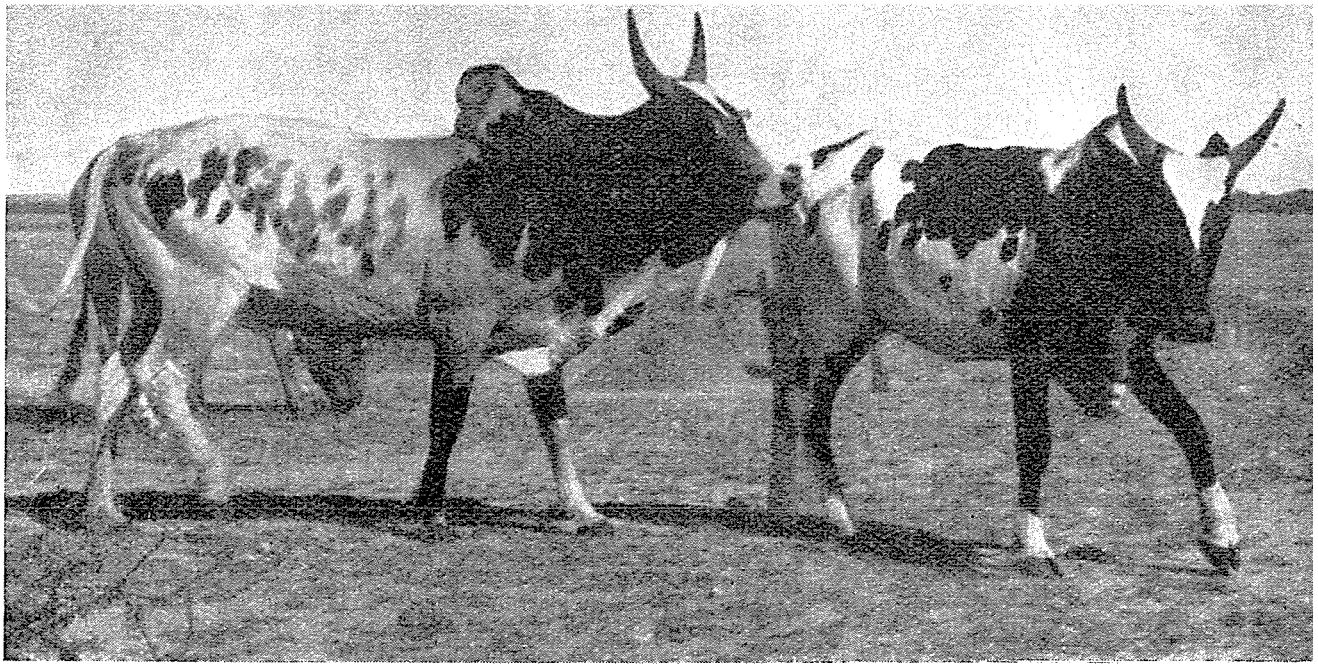


FIGURE 101. *Madagascar zebu bull and cow, southwest Madagascar.*
Courtesy of A. Lalanne

diet that milk sufficient for the small needs of the people is taken from the better yielding cows at the peak of the lactation while the remainder of the cows remain unmilked. In other areas, where milk finds no place in the diet of the people, milking is not regularly practiced (Lalanne, A., *Personal Communication*).

Physical characteristics of the breed

The Madagascar zebu (Figures 100 and 101) is a thickset animal of less than medium height. The head is short and the profile straight. The horns are lyre-, or more often, crescent-shaped and are of circular cross section. Individuals occur which are polled or the horns of which are loose and unattached to the bones of the skull. The neck is light and the dewlap, although smaller than that of many Indian zebus, is strongly developed. The hump carries a considerable amount of fatty tissue when the animal is in high condition, is cervico-thoracic in position and is placed vertically. The body is short and the hindquarters are poorly developed. The limbs are coarse and the hoofs are of adequate durability on soft ground. The udder and teats are small.

The hairy coat is soft and short and the skin is supple and fine and of light pigmentation. There is a wide range of coat coloration; black, red, fawn, yellow and white, pied with black or red on white, and gray with black points occur. Muzzle, tongue and the surround of the eyes, etc. may be black (usually with black or red coat coloration) or light-colored (with lighter coat coloration) (Lalanne, A., *Personal Communication*).

The birthweight of calves is in the range of 12 to 20 kg. Average liveweights and measurements of Madagascar zebus at different stages of growth which were obtained at the Centre de recherches zootechniques at Kianjasoa, Madagascar, are given in Table 133.

TABLE 133. – AVERAGE LIVEWEIGHTS AND MEASUREMENTS OF MADAGASCAR ZEBUS

	Male			Female			Ox
	1 year	2 years	mature	1 year	2 years	mature	mature
Liveweight, kg.	175	260	450	160	240	320	440
Height at withers, cm.	110	117	125	108	111	119	135
Depth of chest, cm.	73	85	90	70	81	95	105
Width of hips, cm.	31	35	40	33	36	43	46
Heart girth, cm.	128	150	170	130	138	163	182

SOURCE: Lalanne, A., *Personal Communication*.

Functional characteristics of the breed

The Madagascar zebu is kept primarily for meat production.

Heifers calve down for the first time at about 3 or 4 years of age. The calving interval of cows under extensive management is normally 2 years. Most cows are served by the bull in the period November to March. The average productive life of a cow extends over 4 lactations.

Bulls are first used for service at between 1 and 1.5 years of age. They are quick to service and have an active breeding life of 10 to 12 years.

Milk production is small. The average amount produced is 150 to 250 liters in a lactation extending over 6 months. The butterfat content of the milk has been given as 4.5 percent.

Superior cows have produced 2 to 3 liters of milk a day in addition to feeding a calf, and exceptional individuals, under improved management and feeding, have given up to 5 liters a day.

Madagascar zebus fatten well at pasture, which is the usual method followed in the island, but in the province of Tananarive stall fattening is also practiced.

Animals are slaughtered at 6 to 12 years of age, with a liveweight of about 350 kg. The dressing percentage is usually in the range 48 to 56. It has been reported that a typical dressed carcass contains 72 percent muscle, 5 percent fat, 20 percent bone, and 3 percent nerves

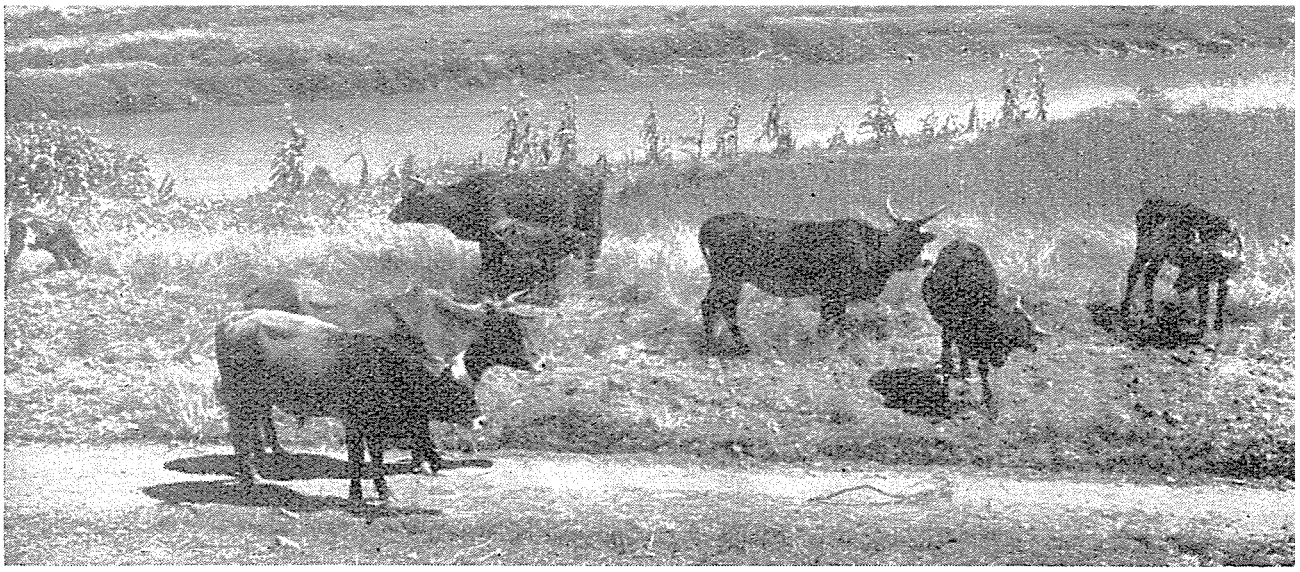


FIGURE 102. *A Rana herd to the southwest of Tananarive, Madagascar.*

Courtesy of A. Lalanne

and aponeuroses, and that the meat consists of 40 percent first-, 25 percent second-, and 35 percent third-quality cuts.

Cattle are employed widely for the preparation of land for the rice crop by trampling before the rice plants are set out. The use of oxen-drawn plows and other tillage implements is increasing rapidly. As the road system of the island improves there is a wider use of oxen as draft animals for transportation work.

The oxen are trained for work at 4 years of age, when they have achieved a liveweight of about 300 kg. They are docile and can be trained for haulage work in a few days. Two oxen harnessed to a cart are able to draw a load of 350 to 500 kg. at 4 km. an hour. The distance covered in the course of a working day is about 30 km. Haulage oxen normally work 150 or more days a year.

Employed in tillage work a team of six oxen can plow a half-hectare in a five-hour working day. It is unusual for tillage oxen to work more than 50 or 60 days in a year.

Cattle in Madagascar are not exposed to rinderpest, foot-and-mouth disease, or contagious abortion. Madagascar zebus have shown a moderate susceptibility to haemorrhagic septicaemia and streptothricosis. Herds which have not previously been exposed to tuberculosis have been found to be 80 percent susceptible, while in those which have been subjected to prolonged exposure the susceptibility has been reduced to 10 or 20 percent. This type of cattle is reported to be resistant to babesiellosis, anaplasmosis, heartwater, and mastitis. They are subject to lumpy-skin disease.

While there is some susceptibility to tick attack, there is resistance to that of lice and biting flies. Among internal parasites, *Ascaridia lombricoides* and, to a lesser extent, strongyles, have been troublesome, particularly in young cattle, among which they cause a consider-

able number of losses. Cysticercosis has been occasionally observed. Fluke infestion has not been observed in the livers of Madagascan cattle but flukes have frequently been found in the pancreatic ducts of cattle slaughtered in abattoirs on the east coast (Lalanne, A., *Personal Communication*).

Crosses with other breeds of cattle

A humpless breed, the Rana (Figure 102), has been developed from the offspring of Madagascar zebu cows and bulls of the Bordelais, Gascon, Breton and Normand breeds. These cattle are maintained for milk production within a radius of 100 km. of Tananarive. The cattle spend the day at pasture but are housed or kept in an unroofed enclosure during the night.

The Rana is a finer, less blocky, type of cattle than the Madagascar zebu. The head is long and lean and the forehead is flat or slightly concave. The neck and shoulders are fine, as are the hindquarters. The hooks are prominent and the thighs are lean and straight. The coat coloration varies; speckled fawns, yellows, black patterning on white, and gray with dark points are among the colors which may be seen in the herds.

Milk production is usually about 5 to 8 liters a day during a lactation period extending over 6 months. The highest reported individual yield has been 2,800 liters of milk in 300 days, with a maximum daily yield of 14 liters.

As a result of extensive crossing with Normand cattle the Rana is rapidly disappearing as a clearly differentiated type. In the neighborhood of the larger population centers it is at present difficult to find individuals which do not show signs of the presence of Normand cattle in their near ancestry, and it seems probable that the type will have been completely absorbed in the crossbred population in the comparatively near future.

Sources of breeding stock and information regarding the breed

There were 6,152,000 head of Madagascar zebus in the island in 1954.

Further information on the breed can be obtained from the Inspection générale de l'élevage et des industries animales, B.P. 291, Tananarive, Madagascar.