

PHENOTYPICAL CHARACTERIZATION OF PANTANEIRO CATTLE IN BRAZIL

CARACTERIZACION FENOTIPICA DEL BOVINO PANTANEIRO EN EL BRASIL

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SUMMARY

The spanish cattle breeds brought by settlers reaching the Pantanal later joined portuguese breeds and their descendants formed a local breed called Pantaneiro, Cuiabano or Tucura cattle. Through natural selection and evolutionary processes, these cattle adapted to the ecological conditions of the Pantanal (16°-22° S and 55°-58°W), a floodplain in the upper Paraguay river basin. Since the beginning of this century, these populations have been gradually substituted by Zebu cattle, placing this genetic resource in danger of extinction. The Pantanal Agricultural Research Center (CPAP-EMBRAPA) founded a conservation bank at its experimental station at the Pantanal (Nhumirim Ranch).

Literature on the subject is very scarce; some publications from the beginning of the 20th century describe the Pantaneiro cattle as small sized with short red or brown hair with lighter coloration on the back; short and thin horns, upturned and pointed to the front; white ring around the snout and a lighter circle around the eyes. However, since the end of the 19th century, interbreeding, mainly with the Franqueiro cattle (descendant from portuguese breeds, formed in Minas Gerais, Brazil) and the Zebu has occurred.

The remaining populations of Pantaneiro cattle are quite similar to those described at the beginning of this century, maintaining some phenotypical characteristics of old spanish and portuguese cattle. Pantaneiro bovine closely resembles the Criollo of Beni (Bolivia) and the Casanare (Colombia).

RESUMEN

Las primeras razas bovinas, traídas al Pantanal por los colonizadores y más tarde las portuguesas y sus descendientes, formaron una raza local: bovino Pantanero, Tucura o Cuiabano. A través de la selección natural y de los procesos evolutivos estos bovinos se adaptaron a las condiciones climáticas e hidrológicas del Pantanal (16-22°S y 55-58°O) - región inundable del río Paraguay.

Desde comienzo del siglo, la introducción de ganado Cebú, ha puesto a estos recursos genéticos en peligro de extinción. El Centro de Pesquisa Agropecuária do Pantanal (CPAP-EMBRAPA) fundó un banco de conservación en su estación experimental en el Pantanal (hacienda Nhumirim).

La literatura sobre el asunto es muy escasa;

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a comienzos del siglo 20 describen al bovino Pantanero como: tamaño reducido, piel gruesa, pelo corto, de color castaño o rojo, con tendencia a clarear en el dorso, cuernos cortos y finos, volviendo para adelante y encima, anillo blanco alrededor del hocico y un círculo más claro en torno a los ojos.

Desde el final del siglo 19 se ha cruzado con otras razas, principalmente ganado Franqueiro (descendiente de razas portuguesas, formado en Minas Gerais, Brasil) y Cebu. Las poblaciones actuales son muy semejantes a las descritas al inicio del siglo y aun con características de las razas originales españolas y portuguesas. También tiene cierta semejanza fenotípica con el criollo del Beni (Bolivia) y con el Casanare de Colombia.

INTRODUCTION

The first spanish cattle breeds brought by settlers at the Pantanal, later joined with portuguese breeds and their descendants, to form a local breed: the *Pantaneiro cattle*, *Cuiabano* or *Tucura*. Through natural selection and evolutionary processes, these cattle adapted to the ecological conditions of the Pantanal, in Brazil. However, since the beginning of this century, has been gradually substituted by Zebu cattle, placing this genetic resource in danger of extinction. The Pantanal Agricultural Research Centre (CPAP-EMBRAPA) established a conservation nucleus *in situ* at the Pantanal (Nhumirim Ranch).

The purpose of this study is to determine the phenotypical pattern of the Pantaneiro cattle, for the period in which historic data are available and to analyze the remaining populations including the Nhumirim herd.

HISTORICAL RECOVERY OF

THE PHENOTYPICAL CHARACTERISTICS OF THE PANTANEIRO CATTLE

The Pantanal is a sedimentary plain located in the Paraguay river basin (from 80 to 160 m above sea level). The total area is about 140.000 km², between 16° and 22° S and 55° and 58° W. The interaction between climatic, hydrologic, geologic and geomorphologic factors is associated with a large complexity of habitats and biodiversity. The organisms recently introduced into this environment are subjected to several extreme physical factors such as: high solar radiation; high thermic amplitude (ranging from 0°C in winter to 40°C in summer); high water level fluctuation altering the area of food availability; and biological factors such as parasites, predator and other interacting species. All these patterns in the environment (Ricklefs, 1979), mold the adaptations that are the structure and function of the organism.

Studies on european breeds in tropical environments show that an increase in temperature up to 30° or 40° C increases the respiratory and heart beat frequency and decreases the food ingestion and milk production (Güntler et al., 1987; Müller, 1979). Throughout evolution, natural selection has led to the retention of those characteristics which ensure its greater reproductive success than other organisms in the same environment. These adaptations include changes in morphology, biochemistry and behaviour, and are passed from one generation to the next (Black 1983).

From the adaptation process and

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natural selection of the european cattle populations in the ecological conditions of the Pantanal, arose a local type, according to Lisboa (1909) it is a breed characteristic of the Paraguay plain, regionally called *Pantaneiro* or *Cuiabano* and nowadays named *Tucura*, which Cotrim (1913) called generically as *Curraleiro* cattle.

Literature on the phenotypical characterization of Pantaneiro cattle is very scarce, particularly from the 17th to the 19th centuries. In the beginning of the 20th century, Lisboa (1909) described the Pantaneiro cattle as follows: small size, short red or brown hair with lighter coloration on the back; short and thin horns, upturned and pointing forward; white ring around the snout; a light circle around the eyes; the post face generally convex; long and thin tail; and a little developed hindquarter. Their thick hide, resistant to climatic variations and to mosquitoes is adapted to the water, where the animals live during most part of the year. Cotrim (1913) described the Pantaneiro cattle as *an animal of small size, representing among the Brazilian breeds, the Jersey type: small and light weight* and that present thin and short head with horns frontward and upward, generally white or clear with dark ends; the ears are small and with small amount of hair; the snout is black with a white ring around it; the face is black or dark, with the lighter coloration on front and a light circle around the eyes. The haunch is relatively long and provided with meat, with thin high tail insertion; the hide is thick, but covered with dark epidermis and the coat color is called *fusca*, i.e.,

from dark yellow on the back to black on the legs, while at the ventral area, between the legs, it is white. The hair is thin and silky and very uniform.

OTHER BREEDS INTRODUCED INTO THE PANTANAL

According to Lisboa (1909), Franqueiro was the breed which most influenced the Pantaneiro, in the beginning of 20th century; the Franqueiro itself was a crossbreed of european cattle (mainly portuguese breeds) and other Criollo formed in the states of Minas Gerais and São Paulo, as well as in Rio Grande do Sul. This breed was introduced into the State of Mato Grosso by cattle dealers from Minas Gerais. Cattle ranchers in Mato Grosso considered Franqueiro less fertile than the purebred Pantaneiro. According to Lisboa (1909), the cattle called *Brucho* in Southern Mato Grosso, mainly in the Pantanal, was the resulting from crossing Pantaneiro and Franqueiro. Vianna (1927) reported that, in Mato Grosso, the animals resulting after crossing the *portuguese* Mato Grosso cattle and the local cattle of spanish origin (from the la Plata possessions in 16th-17th centuries) was called *China* (in other Brazilian regions China means the cattle formed by crossing Zebu x Criollo). The description of this author of the Mato Grosso China is quite similar to that from Lisboa (1909) and Cotrim (1913) for the Pantaneiro cattle.

To improve the beef cattle industry, the farmers introduced some purebred animals of exotic european breeds as well as crossbred into the Pantanal in the first decades of this century. As

isolated individuals, usually without correct cares they did not leave descendants neither had influence on Pantanal herd development (Lisboa, 1909).

With the expansion of the Indian breeds in Brazil, the Zebu entered the Pantanal at a slower rate than in other regions because the ultra-extensive breeding system used was adverse. Initially the Zebu cattle were well accepted and the first crossbred descendants (Pantaneiro x Zebu) were heavy and meaty. But with the decrease of the heterosis due to upgrading to Zebu cattle, the descendants soon degenerated becoming small. Without management they became very untamed and this behaviour was incompatible with the breeding system used in the Pantanal. Thus, at that time the Zebu was completely rejected and the cattlemen in the Pantanal fields eliminated all Zebu bulls from their ranches according to Ayala and Simon (1914).

However, despite all discussions and controversies, since then the Zebu has slowly become established not only in the Pantanal but in all Brazil territory up SE region. All crossbred descendant superiority (Zebu x Pantaneiro) has been attributed only to Zebu breeds by the cattlemen. Thus, the Pantaneiro cattle is now in danger of extinction.

PHENOTYPICAL CHARACTERIZATION OF THE REMAINING POPULATIONS OF PANTANEIRO CATTLE

It is very difficult to find purebred Pantaneiro cattle populations in the Pantanal. Herds became almost completely white due to upgrading to

Zebu cattle. In the North there are still a few remaining populations of Pantaneiro cattle located in the most flooded Pantanal areas along the borders of the rivers Paraguay, Cuiabá, São Lourenço and Bento Gomes (**figure 1**) where other breeds have not survived, including the Zebu cattle. In the South, there only remains the herd of the Nhumerim Ranch in the Nhecolândia Sub-region, formed by Pantaneiro cattle that have been rescued from some remaining populations in the North since 1985.

The phenotypical characterization of the remaining populations shown in **table I** summarizes the analysis of 20 bulls and 30 cows of Pantaneiro type belonging to the three distinct herds that have been found until this moment - Porto Jofre and DI farms and one in the Pantanal of *Mimoso* - besides the Nhumerim ranch (**figure 1**). It was observed that Pantaneiro cattle are small to medium sized, based on morphometrical measurements but should be emphasized that all these measurements were taken only on domesticated animals, due to the difficulty of doing it on the untamed ones, that can be considered the majority (**table II**).

COMPARING PANTANEIRO CATTLE WITH OTHER BREEDS

OLDSpanish AND Portuguese-SE BREEDS.

According to Rouse (1977) the Spanish cattle breeds brought by settlers to America were: Retinta Andaluza and Berrenda from SW region, and Gallega and Asturiana from the N. Through the morphological characteristics of these breeds (French

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et al. 1969; Sánchez Belda 1984, 1986), the Asturiana seem to be the most similar to the Pantaneiro cattle, obviously taking the adaptive changes to tropical conditions into consideration. As the Asturiana de la Montaña and the Asturiana de los Valles present yellow to brown long hair and a white ring around the snout and the eyes (in the latter case the ring can also be dark); lighter color is also observed in the ventral area between the legs; the profile is rectilinear or sub-convex; the horns are frontward and upward, white or clear with dark tip; the ears are small with lighter hair in the internal area; present thin and high set tail. There are other breeds that have not been reported as introduced into America by settlers, but closely

resemble the Pantaneiro cattle, such as the Tudanca.

According to Athanassof (1947) the Portuguese breeds brought to Brazil during the colonization were: Alentejana, Mirandesa, Minhota, Arouquesa and Barrosa. Of these, based on the literature (French *et al.* 1969), the Arouquesa seems to be the most similar to Pantaneiro cattle, presenting morphological characteristics such as those described above.

CRIOLLO TYPES/BREEDS. The descendants of the old Spanish and Portuguese cattle spread throughout America and originated many types and breeds of Criollo adapted for the diverse ecological conditions. The Criollo breeds, which closely resemble the

Table I. Phenotypical characterization of the remaining populations of Pantaneiro Cattle. (Caracterización fenotípica de las poblaciones residuales de bovino Pantaneiro).

Characteristics	Description
Head	The females usually present light short delicate heads. The most common colors are yellow to red (Jersey-tan color). In males the head is heavy and small, mainly black, with some colored hair on the forehead. Spots are rare.
Profile	The subconvex (79%) predominates. Rectilinear profile is also observed.
Snout	Most animals (73%) present a white ring around the black snout.
Eyes	Some animals (44%) present a dark or light ring around the eyes.
Horns	Many animals (50%) present thin horns frontward and upward, generally white or clear with brown-greenish base and dark tip (60%).
Ears	Animals present small, round and horizontally attached ears, with light hair and skin in the internal area.
Body	Animals are small to medium and present a medium dorso-lumbar line almost straight.
Coat color and skin	The yellow to red (Jersey-tan) coat color predominates (79%) on the back with dark coloration on the legs, mainly in the bulls. Usually present white hair in ventral area. The hair is short, thin and silky. The hide is thick, covered with dark epidermis.
Tail	Thin and high set tail (66%).
Temper	Animals are docile and calm when are constantly managed. They become almost wild when left by themselves, in remote areas.

Pantaneiro Cattle are those formed from floodland environments.

The Criollo cattle called Yacumeño inhabits the Beni region in Bolivia, an area subject to seasonal flooding, and they are phenotypically similar to the

Pantaneiro cattle (Primo 1990). Like the Pantaneiro, these animals present thin, short and silky hair and the Jersey-tan color predominates, with lighter color on the back and especially the bulls exhibit darker coloration on

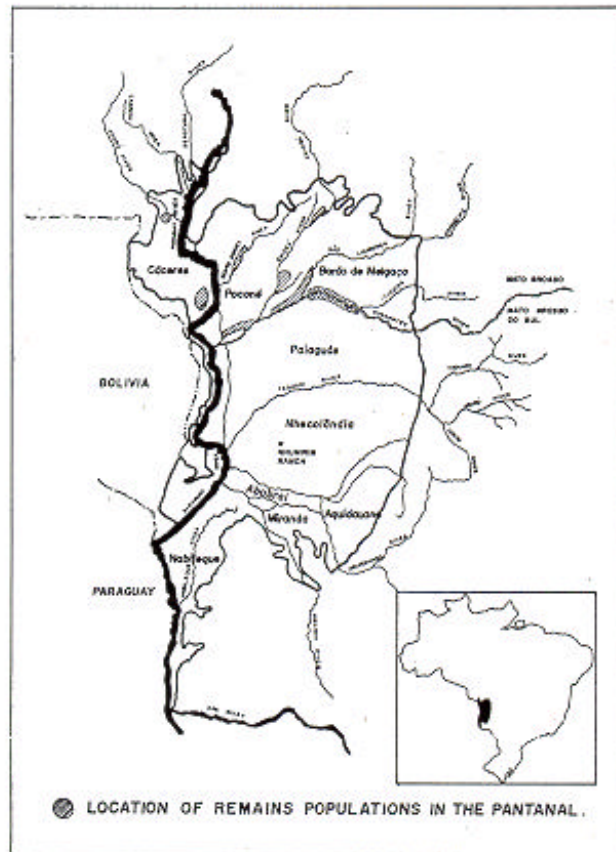


Figure 1. Localization of the remaining populations of Pantaneiro cattle in the Pantanal. (Localización de las poblaciones remanentes del bovino Pantanero en el Pantanal).

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Table II. *Morphometrical measurement average and weight of the remaining populations of Pantaneiro cattle.* (Medidas morfométricas y peso de las poblaciones residuales del bovino Pantaneiro)

Ranch	age (years)	N	sex	weight (kg)	LB cm	HW cm	HH cm	LH cm	WH cm	TP cm
Nhumirin	8-12	14	F	324	143	119	126	46	38	165
		12	M	441	152	126	132	48	37	177
DI	5-10	8	F		135	115	121	39	34	162

LB - length of body; HW - height at withers; HH - height at hindquarters;
LH - length of hindquarters; WH - width of hindquarters; TP - thoracic perimeter.

the legs; most animals show dark rings around the eyes; thin, frontward and upward horns, generally white with dark tips; small and round ears with hair in the internal borders; and thin high tail insertion (Bauer *et al.* 1989).

The Casanare cattle formed herds in the East of Colombia, mainly in the Casanare and Arauca territorial areas - flooded regions of approximately 55.000 km² (García s.d.). According to Hernández (1983) the Casanare cattle is probably the most related descendant of the cattle brought by the spanish settlers to Colombia. The animals present relatively small size and the yellow coat color predominates, dark or light, but there is a great variety of other colors. García (s.d.) reported several other morphological characteristics showing they closely resemble the Pantaneiro cattle, except for the concave profile and the bigger and more open horn shape.

CONCLUSION

Pantaneiro cattle represent many

generations of natural selection and adaptation to the ecological conditions of the Pantanal. The exceptional rusticity of the Pantaneiro, and its capacity to survive on native pastures of floodland regions, where other types of cattle would have little chance to survive, are characteristics that justify the conservation of this genetic resource.

The remaining populations of Pantaneiro cattle are quite similar to those described in the literature at the beginning of the 20th century. It should be remembered that the Pantaneiro cattle populations originated from spanish breeds later interbreeding with the descendants of Portuguese breeds, mainly Franqueiro cattle. So, all these phenotypical characterization descriptions do not necessarily represent the first generations of the Pantaneiro cattle, when only the Spanish breeds and the interactions with the environment factors predominated.

The Pantaneiro cattle present morphologic likeness with some old

spanish and portuguese breeds, mainly with Asturiana and Arouquesa. The Pantaneiro cattle closely

resembles the Criollo Yacumeno from Beni, Bolivia and the Casanare from Colombia.

REFERENCES

- Athanassof, N. 1947.** Manual do criador de bovinos. Melhoramentos, São Paulo. 549p.
- Ayala, S.C. and Simon, F. 1914.** Album graphico do estado de Matto Grosso. Corumbá, 433p.
- Bauer, B., Zamora, R. and Galdo, E. 1989.** Criollo Yacumeño. In: Reunión Internacional sobre "Conservación y Mejoramiento del Ganado Bovino Criollo", 1989, Santa Cruz de la Sierra.
- Black, J.L. 1983.** Evolutionary adaptations and their significance in animal productions. In: Peel, L.; Tribe, D.E. 1983. Domestication con-servation and use of Animal Resources. Elsevier, Amsterdam. 357p. (World Animal Science, A1).
- Cotrim, E. 1913.** A fazenda moderna; auia do criador de gado bovino no Brasil. V. Verteneuil and L. Desmet, Bruxellas. 376p.
- French, M.H., Johansson, I., Joshi, N.R. and McLaughlin, E.A. 1969.** Razas europeas de ganado bovino. FAO, Italia. 461p. vol. II. (FAO, Estudios Agropecuarios, 67).
- García, D.C. s.d.** El ganado criollo Casanare.
- Gurtler, H., Ketz, H.A., Kolb, E., Schroeder, L. and Seider, H. 1987.** Fisiología Veterinária, 4 ed. Editora Guanabara, Rio de Janeiro. p. 362-373.
- Hernández, B.G. 1983.** La raza Criolla Casanare. Bogotá. p. 39-46. (Carta Ganadera, 2).
- Lisboa M.A.R. 1909.** Oeste de São Paulo, sul de Mato Grosso: geología, indústria mineral, clima, vegetação, solo agrícola, indústria pastoral. Estrada de Ferro Noroeste do Brasil, Río de Janeiro. 172p.
- McDowell, R.E. 1974.** Bases biológicas de la producción animal en zonas tropicales. Editorial Acribia, Zaragoza, 0. 71-134.
- Muller, P.B. 1989.** Bioclimatologia aplicada aos animais domésticos, 3 ed. Editora Sulina, Porto Alegre. 262p.
- Primo, A.T. 1990.** A South American report, with special reference to Criollo cattle. In: Alderson, L. Genetic conservation of domestic livestock. CAB International, 1990. p. 85-107.
- Ricklefs, R.E. 1979.** Ecology, 2 ed. Chiron Press, New York. V.1. p. 91-103.
- Rouse, J.E. 1977.** The Criollo: Spanish cattle in the Americas. University of Oklahoma Press, Oklahoma. 303 p.
- Sánchez Belda, A. 1984.** Razas bovinas españolas. M.A.P.A, Madrid, 878p.
- Sánchez Belda, A. 1986.** Catálogo de razas autóctonas españolas. II - especie bovina. M.A.P.A, Madrid, 219p.
- Vianna, V. 1927.** Sobre o gado curraleiro. Oficinas Graphics do *Jornal do Brasil*, Rio Janeiro, 41p.