

## **ABSTRACT OF THE BRAZILIAN CATTLE BREED CURRALEIRO PÉ DURO AND ITS MAIN THREATS TO EXTINCTION: THE BREEDER IN FOCUS**

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**Abstract:** This work arises from the demand to understand the relationship of small cattle breeders and the elements that bring the Curraleiro Pé Duro bovine breed closer to extinction. The subjects of this study are cattle ranchers residing in the rural communities of Queimada de Claro and Queimadinha in the municipality of Barro Alto, in the hinterland of Bahia, Brazil. The interest of this study arose from the need to understand why, in less than a century, the main bovine breed in Brazil has declined to the point of being threatened with extinction and what is the influence of breeders in this fact. The research focuses on the investigation of new ways to increase profitability without the need for genetic improvement. In the case of an applied research, the quantitative approach was chosen, with a phenomenological aspect, of the type of field research and of case with an explanatory-inductive character. As devices for the construction and obtaining of information were used: field research and then, cattle from the eight farms studied were submitted to phenotypic measurement and comparative comparative analyses.

**Keywords:** Sustainable livestock; Alternative economy; Genetical enhancement; Brazilian cattle; Bovine management techniques.

## INTRODUCTION

This study arises from the need to understand the relationship between small cattle ranchers in the municipality of Barro Alto, in the hinterland of Bahia, Brazil, and the elements that make the Curraleiro Pé Duro cattle breed threatened with extinction.

Known for their rusticity and resistance, Brazilian naturalized or Creole cattle have high adaptability to Brazil's soil and climate issues, being a genetic inheritance of the first Iberian cattle brought by Spanish and Portuguese settlers, subjected to the process of natural selection during the four centuries

following the discovery of the Americas with the internalization of the colonizers on the continent (MAZZA, 1994).

In Brazil, the first cattle arrived in São Vicente in 1534 (PRIMO, 1992). In addition to the Lisbon-São Vicente route, herds also landed in Pernambuco and Bahia (PRIMO, 1992; MARIANTE & CAVALCANTE, 2000), with Brazil being the only country on the continent to receive, in addition to Spanish, Portuguese breeds.

The herds descended in São Vicente were destined for the southern fields, following to Goiás and the São Francisco Valley (Minas, Bahia and Pernambuco), also reaching Piauí and Ceará. Meanwhile, the cattle from the northeastern routes went to the sertão, north of Minas and west of Bahia, and in this region, surrounding the São Francisco, there was an encounter with the herds coming from São Vicente (EGITO, 2007).

The natural selection of these herds acting in extremely variable environments across the country, together with the recurrent events of the interbreeding of these breeds, have led to the development of breeds adapted to a wide range of environments with exceptional levels of phenotypic variability and better adaptation to local conditions (EGYPT et al., 2007). In the Northeast of the country, the Curraleiro or Sertanejo cattle grew, which migrated to Minas Gerais and Goiás. In the Southeast, the Junqueira and Franqueiro breeds were developed, in addition to the Caracu and Mocho Nacional breeds. In the south, the Crioulo Lageano was formed and in the Pantanal, the Pantaneiro cattle (EGITO, 2007). (FELIX, 2013).

There are two groups of cattle breeds in Brazil, the local ones, which, according to BRITTO (1998), are cattle isolated in specific regions, with unique characteristics of adaptation to the influence of the environment, and resulting from natural selection, and the exotic ones that, according to EGYPT (2007), are the set of zebu and

taurine animals imported in the last century, and which make up most of the commercial populations. These populations have a high level of productivity, but do not carry characteristics of adaptation to tropical-equatorial zones (MARIANTE, 2009).

With the increase in demand for products of animal origin, the desire for greater productivity aroused in the producers, both in relation to beef and dairy cattle, and not finding the desired levels in local breeds, there was an increase in imports of breeds considered exotic. (EGYPT, 2002) which soon proliferated, and through genetic crosses they restricted the local herds, since the producers who did not replace the entire herd with imported genetics, are keen to cross the high productivity of the exotic breeds with the resistance to tropical areas of local races.

Of the five local breeds in Brazil, four are at risk of extinction (Curraleiro, Pantaneiro, Crioulo Lageano and Mocho Nacional), with Caracu being an exception, as it was the result of genetic improvement for beef and milk, which generated acceptance by breeders.

The cattle, the focus of this study, is the Curraleiro, also called Pé-Duro, a breed that adapted to the Brazilian semi-arid region and over time migrated to the center-west of the country (CARVALHO, 2001). The name Pé-Duro comes from the fact that animals from the northeastern hinterland walk on stones, a deadly environment for soft-shelled animals (CARVALHO, 2010).

The origin of these animals is unknown, genetic mappings point to the Curraleiro as a direct descendant of the Portuguese Mirandeses breed, but CARVALHO (2001) disagrees with this mono ancestry and presents the possibility that different genetic groups, not recognized as a race, have played a fundamental role in the genetics of the Pé Duro.

Curraleiro Pé-Duro was once the main bovine breed in the country, contributing to the genetics of the Caracu, Mocho Nacional and Junqueira breeds (EGYPT 2007). by genetic improvement (PRIMO, 1992).

From this perspective, it is important to understand why, in little more than a century, the main bovine breed in Brazil has declined to the point of being threatened with extinction, and whether breeders are responsible for this.

## METHODOLOGY

As it is an applied research (RODRIGUES, 2007) that aims to investigate, prove or reject the techniques presented by the producers, this study has an explanatory-inductive character that, according to Rodrigues (2007, p.11):

It identifies determining factors for the occurrence of phenomena through the experimental method..., creating conditions to interfere in the appearance or modification of facts, in order to be able to explain what happens with correlated phenomena.” (RODRIGUES, 2007, p.11).

The selected approach was the quantitative one, which (RODRIGUES, 2007) translates the opinions and information provided by the producers into numbers, to be classified and analyzed using statistical techniques. In this context, the study also encompasses field and case research, since, according to Esteban (2010, p. 178) “it not only describes the problems, but generates, together with the community, the necessary knowledge to define the appropriate actions that are in the line of change, transformation and improvement of social reality”.

Based on the methodological path explained, the following were used as research devices: field research, to identify which cattle management practices, Curraleiro Pé Duro, were used by the breeders of the rural communities of Queimada de Claro and

Queimadinha, located in the municipality of Barro Alto, Bahia, Brazil; Then, the information collected in the field was quantified, selected and subjected to comparison-confrontation with the literary data.

## RESULTS AND DISCUSSION

Due to the SARS-CoV-2 pandemic, (LESNEY, 2020) Severe Acute Respiratory Syndrome Coronavirus 2, or severe acute respiratory syndrome coronavirus 2 (Covid-19), fieldwork with rural farmers was initially suspended and contact with them took place remotely through phone calls and text messages.

In conjunction with remote communication with family breeders, bibliographic research was carried out on the preservation of the Curraleiro Pé Duro bovine breed in Brazil. The work "Potential for the use of Brazilian local bovine breeds: Curraleiro Pé Duro and Pantaneiro" by Gisele Aparecida Felix, Ubiratan Piovezan, Raquel Juliano, Marcelo Silva and Maria Clorinda Fioravanti, published in July 2013 by ENCICLOPÉDIA BIOSFERA, was the BIOSFERA element. literary center for the reference of the study, being this one compared and confronted with other works supporting the research and with the constructed results.

After the literary alignment and following the sanitary recommendations to combat and prevent Covid-19, visits were made to rural creators from the communities of Queimada de Claro and Queimadinha, both belonging to the municipality of Barro Alto, in the state of Bahia, Brazil.

Eight properties were visited and in these, five breeds of cattle were found, being the Nelore as a breeding focused on beef and the Holstein, Gir and Girolando for milk. Curraleiro Pé-Duro was created with the aim of meeting both demands.

Initially, the phenotypic assessment was

performed, which is the verification of the phenotype of the herds studied in comparison with the descriptions found in the literature. For this measurement, six males and eighteen females were studied. According to BRITTO (1998):

Curraleiro Pé-Duro cattle are animals with a minimum height of 1.24 m and a minimum weight of 380 kg for males and 1.38 m and 300 kg for females. They have a small head, short, crown-shaped horns that are light in color at the base and dark ends. The coat can be yellow, reddish yellow or bay with dark ends. The head has a dark tone, accentuating the chamfer and around the eyes. (BRITTO, 1998).

The measurements agree with the literature, with a margin of error of two centimeters for May or less in relation to height, and fifteen kilograms for more or less for the animals' body mass.

My son chose to carry out cross-breeding tests on cattle with other breeds, as the Pé Duro is small and this is not good for beef, even though the meat is widely consumed and valued around here, the quantity is not satisfactory. (Farm Owner 7, 2021).

In mapping carried out by the breeders, a difference of twelve percent was detected in the cutting yield between Nelore and Pé Duro per male animal of, on average, forty-two months. In relation to milk production, the Holstein cow produces fifteen percent more than the Pé Duro, being analyzed the period of one year, since it was considered that during the dry season, both the Holstein and Girolando cows decrease milk production drastically while that the Pé Duro has a smoother decrease. The Gir cow also reduces production smoothly and produces twelve percent more than the Pé Duro in a year, while the Girolando overlaps the Pé Duro's milk production by nine percent. For this quantification, the heads under analysis were restricted to native pasture feeding.

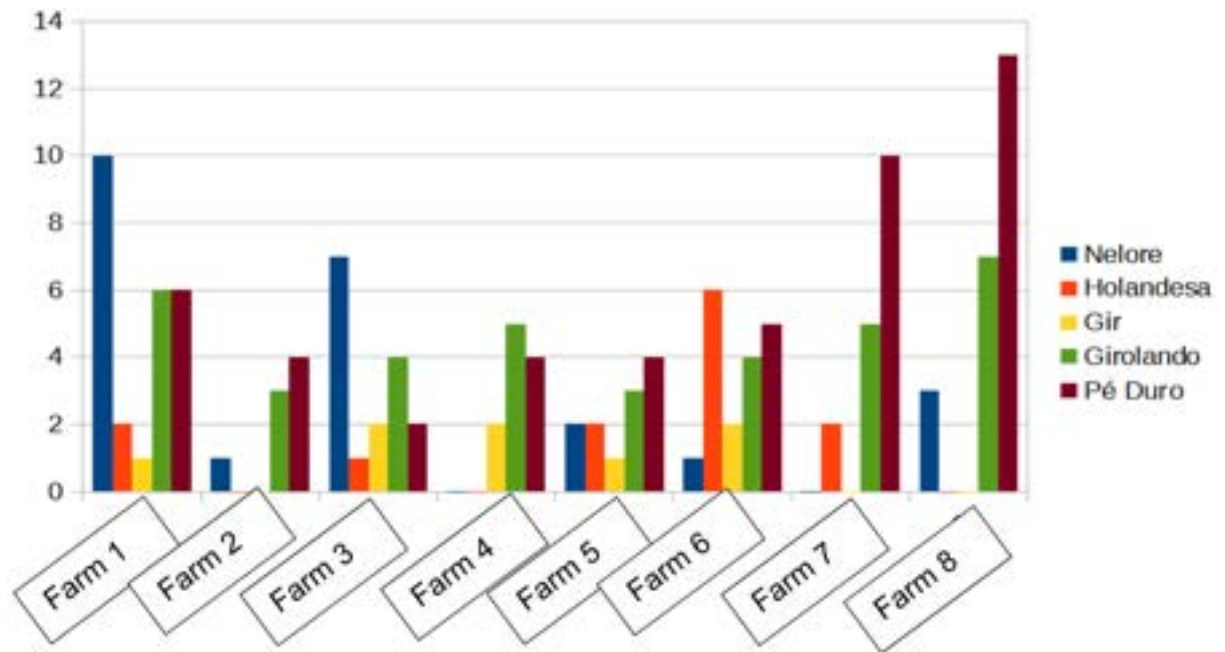
According to EGITO (2007) The milk production of the Pé Duro cow is good, and even though the animals are not large in size, they are used with advantage in beef cattle, and, for BRITO (1998) the reduced size is related to precarious conditions, especially nutritional, that these animals face throughout the process of natural selection in the Northeast region of Brazil. But PRIMO (1992) argues that the slow growth and size are in accordance with the ecological issues of the Brazilian northeastern semi-arid region.

To preserve the identity of the creators, the properties will not be named. Animals from crosses between breeds were not considered for the graph, with the exception of cases of purity range. For this study, the animal resulting from the cross of proportion 5 / 8 with 5 / 8 of the same breed was considered pure. Farms 1, 2 and 3 are located in Queimadinha, while the others are located in Queimada de Claro. Farms 6, 7 and 8 belong to the same family, the latter two being managed by people over

sixty years of age, which explains the greater presence of Curraleiro Pé Duro.

All his life it was just the Curraleiro that he had around here, but from about thirty years ago other types of ox began to appear. They produce more, but they also give more work and more costs, because they are not adapted to the semi-arid region. Girolando is resistant, but it doesn't even compare with Pé Duro... even though it doesn't produce like the others, the flavor of Pé Duro, both milk and meat, are different, tastier! not to mention that it is a docile and easy to handle cattle, in the dry season it is only necessary to release it in the middle of the mountain range and they will eat whatever they have, since these other cattle fall all weak, they cannot withstand the drought if it is not based on fee (Farm Owner 8, 2021).

The main potential of Curraleiro Pé-Duro is its easy acceptance of the extensive production system, a beneficial factor for Barro Alto breeders who are in a region with large areas of native pasture. According to



Graph 1. Distribution of cattle herds on the properties under study.

Source: The Author, 2022.

CARVALHO (2002), the pasture of native vegetation can prevent fires, and fight the rural exodus, as it reduces production costs for breeders in areas where economic activities are hampered by distance and lack of infrastructure. And, FIORAVANTI (2011), argues that the extensive system provides the balance of supply with the use of natural resources in situations of organic production, which is the case of the farms studied.

The number of Curraleiro Pé Duro has been decreasing within the properties, which also has a social and cultural impact.

Before, my husband and I had thirty heads of Pé Duro, then it was mixed with these other breeds and when we realized we had lost the breed. Both I and most of my older clients prefer Pé Duro meat and the milk is unparalleled... the jam is better, the butter is more aromatic, the curd cheese is firmer... (Açougueira local, 2022).

Attempts at genetic improvement are today the greatest threat to local breeds in Brazil. About sixty percent of the herds on the farms studied are crossbred animals. Before the zebu cattle arrived in the country, every herd in the northeastern semi-arid region was Curraleiro (PRIMO, 1992). However, the first crosses with zebu cattle generated animals with high hybrid vigor and superior performance compared to their parents, a factor that led breeders to carry out these crosses several times and, thus, bringing the Curraleiro Pé Duro cattle closer to extinction (PRIMO, 1992).

My goal is to have the entire Nelore herd. For beef cattle there is no better. It's not as sturdy as the Pé Duro, but it's worth it. Well, here would be Guzerá, which is good for beef and milk, and it still withstands the drought, but it is difficult to find to buy and live ox is very expensive... Here, there is no such semen technology, or buy the tourniquet and breed with crossover or not. (Farm Owner 4, 2022).

The advantage of Curraleiro Pé Duro is its adaptability to the hinterland, but producers, considering the cost benefit, choose Nelore for beef cattle and Gir and Girolando for dairy cattle.

Here, all my milk production was from Pé Duro, but I decided to change it a little. My father and grandfather didn't like the idea very much, but the Holstein cow produces more, of course it has a higher cost because she can't stand the drought just with pasture and needs feed, but even so, it's worth the investment. I intend to replace the Holstein by Girolando, as it is more resistant and produces much more than the Gir, which is also resistant. (Farm Owner 6, 2022).

A question is constantly raised by breeders: How to reconcile drought and productivity? Mainly the milk production that in the dry period from July to November decreases. However, the question could be different: How can we generate income in the dry season, when Pé Duro reduces production? The reflection of Lavie and Verrier's arguments made by Félix (2013) contributes to the resolution of these questions:

The appreciation of "rare breeds", in this case local cattle, is a way of encouraging breeders to keep them (LAVIE et al., 2011). According to VERRIER et al., (2005) this process is related to the value given to a food product associated with a particular race. However, LAVIE et al. (2011) describe that it can also be associated with a breed from a certain region (specific landscape), an extensive breeding system or even the use of the breed as tourist and leisure activities. This way, the way of conservation of these populations is changed, that is, instead of being considered only a genetic resource to be preserved, they become a resource for livestock production and for local development. (FELIX, 2013).

The action that goes against Felix's aforementioned reflection, of an aggregating source of value with great advantages for the collective of producers, is the Geographical

Indication (GI). According to GRIGIONI & PASCHETTA (2012), a GI of agricultural products indicates the differentiated quality resulting from the influence of local factors, such as human factors of collective empirical knowledge, environmental factors and the interaction of humans and livestock with the environment, as well as such as the unique genetics of the local herd.

There are already seals of similar origin in Brazil, such as the Seal of Indication of Origin (IP) of Queijo Canastra, in Minas Gerais, and the IP seal of Carne do Pampa Gaúcho from Campanha Meridional, which reports the history of the animal, sex, parents, location, age, management, type of food and other specificities, in addition to attesting to the fulfillment of the requirements that certify the quality of the product and its entire production process, which requires a collective organization of commitment and responsibility (MALAFAIA & BARCELLOS, 2007).

However, the union of breeders in search of income improvements cannot be interpreted as a union of herds, because:

The biggest difficulty I have today is to keep the Pé Duro breed. As everyone knows, right after the rains, when the native pasture is green, most producers send their herds to the mountains and there they stay together, because in the mountains there are no fences at all ends of the land and the work shared is more advantageous. But the point is that they are different breeds of cattle, the other breeders want Pé Duro to cross with other breeds, according to them to improve, but I want the opposite, for me it's good the way it is. (Farm Owner 8, 2022).

In the region where the municipality of Barro Alto is located, it is common for herds to spend time in distant native vegetation pastures and time on farms. This movement generates a meeting between the herds and it is in these situations that sixty-two percent of

the cows are grafted, because, as the technology of artificial insemination in animals in the region is not popular, the breeders exchange the males among themselves in order to breed as many of them as possible. of cows possible.

I always borrow some Nelore or Gir garrote, and when I need it I find it easy too. Usually when the cattle are all in the mountains, we organize for the crosses to take place there. The artificial process is expensive and has no skilled labor to do it. (Farm Owner 3, 2021).

## CONCLUSION

After completing the analysis of the research on the constant decrease of the Curraleiro Pé Duro herd in the rural communities of Queimada de Claro and Queimadonha, in the municipality of Barro Alto, Bahia, Brazil, the relationship between the desire for greater productivity and, mainly, profitability is concluded, and the reduction of Curraleiro cattle. The biggest issue being the difficulty for breeders to seek and accept other forms of economic growth other than genetic improvement.

The production system applied to Curraleiro Pé-Duro herds is characterized as extensive livestock farming of medium technological level, low production cost and little economic return. In this sense, prioritizing only conservationist aspects of local races through the maintenance of genetic variability constitutes a limited vision. Local breeds must be seen as carriers of genes that allow them to adapt to specific conditions, capable of giving rise to valuable products. (FELIX, 2013).

Due to its adaptation and proliferation in a semi-arid environment, Curraleiro Pé Duro has a better cost-benefit ratio in the Northeast region, especially in environments with low productivity natural pastures and little water (CARVALHO, 2002; EGITO, 2007). In addition to presenting lower demand for medicines and chemicals, which guarantees

this breed a profitable organic meat market (CARVALHO, 2002).

Another point to be highlighted is the cultural importance that Curraleiro has for the population, because even with the adversities, the producers want to maintain a tradition, not only culinary, but also affective and of continuous improvement with the environment.

Many paths still need to be followed so that the Curraleiro Pé Duro breed is no longer vulnerable to extinction. There is a need for precise comparative quantification between the Pé Duro and the other exotic breeds that are threatened with extinction,

considering criteria such as fecundity, dairy and beef production, adaptability, feeding and management.

It is necessary to implement public policies in the region, because in addition to a question of animal genetics, it is also a cultural thing that is invisible to the local government and is not investigated by national bodies.

Crosses between breeds also need to be investigated, as they already represent more than half of the herd of many properties and this attempt at uncontrolled genetic improvement can pose a danger to livestock in the Northeast region.

## REFERENCES

- BARROS, R. C.; SANTOS, T. S. **Indicação geográfica no Brasil: um instrumento para o desenvolvimento rural sustentável (Uma revisão)**. Revista geográfica da América Central, Heredia, v. 2, p. 1-21, 2011.
- BRASIL. **Lei n. 9.279 de 14 de maio de 1996. Regula direitos e obrigações relativos à propriedade industrial**. Diário Oficial da União, Brasília, Seção 3, p.26-27. 14 mai. 1996.
- BRASIL. **Políticas de desenvolvimento produtivo e ambiental**. 2012. Disponível em:<[http://www.planejamento.gov.br/secretarias/upload/Arquivos/spi/PPA/2012/mp\\_006\\_dimensao\\_tatico\\_prod\\_amb.pdf](http://www.planejamento.gov.br/secretarias/upload/Arquivos/spi/PPA/2012/mp_006_dimensao_tatico_prod_amb.pdf)>. Acesso em: 13 out. 2021.
- BRASIL. **Guia para solicitação de registro de Indicação Geográfica para produtos agropecuários**. 2012. Disponível em:<[http://www.agricultura.gov.br/arq\\_editor/file/Desenvolvimento\\_Sustentavel/Produ%C3%A7%C3%A3o%20Integrada/Guia\\_indicacao\\_geografica.pdf](http://www.agricultura.gov.br/arq_editor/file/Desenvolvimento_Sustentavel/Produ%C3%A7%C3%A3o%20Integrada/Guia_indicacao_geografica.pdf)>. Acesso em: 03 out. 2021.
- BRITO, C. M. C. de. **Citogenética do gado pé-duro**. Teresina: EDUFPI, p.94, 1998.
- CALDAS, A. S. **As denominações de origem como unidade de planejamento, desenvolvimento local e inclusão social**. Revista de Desenvolvimento Econômico, Salvador, v. 5, n. 8, p. 25-32, 2003.
- CANALI, G.; CONSORTIUM, E. **Common agricultural policy reform and its effects on sheep and goat market and rare breeds conservation**. Small Ruminant Research, Amsterdam, v. 62, p. 207-213, 2006.
- CARVALHO, J. H.; MONTEIRO, F. C.; GIRÃO, R. N. **Conservação do Bovino PéDuro ou Curraleiro: Situação Atual**. Documentos 58. Teresina, Embrapa MeioNorte, 2001. Disponível em:<<http://www.infoteca.cnptia.embrapa.br/handle/doc/54346>>. Acesso em 02 set. 2021.
- CARVALHO, J.H de. **Potencial econômico do bovino pé-duro**. Documentos 65. Teresina, Embrapa Meio-Norte, 2002. Disponível em:<<http://www.infoteca.cnptia.embrapa.br/handle/doc/65454>>. Acesso em 20 jun. 2021.
- CARVALHO, G. M. C.; ALMEIDA, E, M. J. O.; AZEVÊDO, D. M. M. R.; NETO, R. B. A.; LEAL, T. M.; MONTEIRO, F. C.; FROTA, M. N. L.; NETO, A. F. L. **Origem, formação e conservação do gado Pé-duro, o bovino do Nordeste brasileiro**. Documentos 208. Teresina, Embrapa Meio-Norte, 2010. 25f. Disponível em:<[http://www.cpamn.embrapa.br/publicacoes/documentos/2010/Doc%20208\\_Origem%20formacao%20e%20conservacao%20pe%20duro.pdf](http://www.cpamn.embrapa.br/publicacoes/documentos/2010/Doc%20208_Origem%20formacao%20e%20conservacao%20pe%20duro.pdf)>. Acesso em: 04 jan. 2022.
- DOMINGOS, I. T. **Cenário atual da pecuária de corte orgânica certificada na Bacia do Alto Paraguai (BAP) - Brasil**. Brasília: WWF-Brasil, p. 34, 2005.



EGITO, A. A.; MARIANTE, A. S.; ALBUQUERQUE, M. S. M. **Programa brasileiro de conservação de recursos genéticos animais**. Archivos de Zootecnia, Córdoba, v. 51, p. 39-52, 2002.

EGITO, A. A. **Diversidade genética, ancestralidade individual e miscigenação nas raças bovinas no Brasil com base em microssatélites e haplótipos de DNA mitocondrial: subsídios para a conservação**. 2007. 246p. Tese (Doutorado em Ciências Biológicas) - Departamento de Biologia Celular do Instituto de Biologia, Universidade de Brasília, Brasília.

EGITO, A. A.; PAIVA, S. R.; ALBUQUERQUE, M. S. M.; MARIANTE, A. S.; ALMEIDA, L. D.; CASTRO, S. R.; GRATTAPAGLIA, D. **Microsatellite based genetic diversity and relationships among ten Creole and commercial cattle breeds raised in Brazil**. BMC Genetics, London, v. 8, n. 83, p. 1-14, 2007.

EGITO, A. A.; FIORAVANTI, M. C. S.; GRATTAPAGLIA, D.; RAMOS, A. F.; ALBUQUERQUE, M. S. M.; MARIANTE, A. S. **Origem e diversidade genética materna de populações de bovinos da raça curraleira de diferentes regiões do Brasil**. Actas Iberoamericanas de Conservación Animal, Córdoba, v. 1, p. 110-113, 2011.

ESTEBAN, M. T. Avaliação da aprendizagem. In: OLIVEIRA, D. A.; DUARTE, A. M. C.; VIEIRA, L. M. F. **Dicionário: trabalho, profissão e condição docente**. Belo Horizonte : UFMG/Faculdade de Educação, 2010. CDROM.

FAO- Food and Agriculture Organization. **Situação mundial dos recursos genéticos animais para agricultura e alimentação – versão resumida**. Brasília: Embrapa Recursos Genéticos e Biotecnologia, p. 42, 2010.

FELIX, G. A.; PIOVEZAN, U.; JULIANO, R. S.; SILVA, M. C.; FIORAVANTI, M. C. S. **POTENCIAL DE USO DE RAÇAS BOVINAS LOCAIS BRASILEIRAS: CURRALEIRO PÉ - DURO E PANTANEIRO**. ENCICLOPÉDIA BIOSFERA, Centro Científico Conhecer - Goiânia, v.9, N.16. Disponível em:<[www.conhecer.org.br/enciclop/2013a/agrarias/potencial%20de%20uso.pdf](http://www.conhecer.org.br/enciclop/2013a/agrarias/potencial%20de%20uso.pdf)>. Acesso em: 08 mai. 2022.

FIORAVANTI, M. C. S.; SERENO, J. R. B.; NEIVA, A. C. G. R.; ABUD, L. J.; LOBO, J. R.; FRANCESCANTÔNIO, D.; CARDOSO, W. S.; SILVA, F. X.; MACHADO, J. R. L. **Reintrodução do Gado Curraleiro na Comunidade Quilombola Kalunga de Cavalcante, Goiás, Brasil: Resultados Parciais**. In: SIMPÓSIO NACIONAL CERRADO, 9.; 2008, Brasília. Anais eletrônico... [online], Brasília, SNC, 2008. Disponível em:<[www.cpac.embrapa.br/download/574/t/](http://www.cpac.embrapa.br/download/574/t/)>. Acesso em: 12 ago. 2021.

FIORAVANTI, M. C. S. **Bovino Curraleiro: Proposta para a conservação e utilização no cerrado brasileiro**. 2010. 136p. Relatório Técnico (Pós Doutorado) - Universidade de Córdoba – Espanha, Córdoba.

FIORAVANTI, M. C. S.; JULIANO, R. S.; COSTA, G. L.; ABUD, L. J.; CARDOSO, V. S.; CARPIO, M. G.; OLIVEIRA e COSTA, M. F. **Conservación del bovino Curraleiro: cuantificación del censo y caracterización de los criadores**. Animal Genetic Resources, Roma, v. 48, p. 109-116, 2011.

GADOLANDO. **Classificação para fins de Registro**. 2022. Disponível em:<<https://www.gadolando.com.br/registro-genealogico/1/102-classificacao-para-fins-de-registro>>. Acesso em: 30 jun. 2022.

GIROLANDO. **Cruzamentos**. 2022. Disponível em:<<https://www.girolando.com.br/area-tecnica/cruzamentos>>. Acesso em: 30 abr. 2022.

GRANT, R. M. **The resource-based theory of competitive Advantage: Implications for Strategy Formulation**. California Management Review, Berkeley, v.33, n.3, p.114-135, 1991.

GRIGIONI, G.; PASCHETTA, M. F. **Herramientas tecnológicas aplicadas a calidad y diferenciación de carne**. Montevideo: IICA, p.92, 2012.

GUEDES, C. A. M.; SILVA, R. **Denominações territoriais agroalimentares, políticas e gestão social: Argentina, Brasil e a experiência espanhola no contexto europeu**. In: JORNADAS INTERDISCIPLINARIAS DE ESTUDIOS AGRARIOS Y AGROINDUSTRIALES, 7., 2011, Buenos Aires. Anais... Buenos Aires: Editora da Universidad de Buenos Aires, 2011.

JULIANO, R. S.; ABREU, U. G. P.; SANTOS, S. A. **Conservação do patrimônio genético, cultural e modelo pecuário**. 2007a. Artigo em Hypertexto. Disponível em:<[http://www.infobibos.com /Artigos/2007\\_3/PatriGenetico/index.htm](http://www.infobibos.com /Artigos/2007_3/PatriGenetico/index.htm)>. Acesso em: 19 fev. 2022.

LESNEY, M. S. **SARS-CoV-2: a força de um nome**. Março de 2020. Disponível em:<portugues. medscape.com/verartigo/6504523>. Acessado em: 04 set. 2021.

MALAFAIA, G. C.; BARCELLOS, J. O. J. **Sistemas agroalimentares locais e a visão baseada em recursos: Construindo vantagens competitivas para a carne bovina gaúcha**. Revista de Economia e Agronegócio, Revista de Economia e Agronegócio Viçosa, v. 5, n. 1, p. 25-49, 2007.

MARIANTE, A. S.; EGITO, A. A. **Animal genetic resources in Brazil: result of five centuries of natural selection**. Theriogenology, Stoneham, v. 57, p. 223-235, 2002.

MARIANTE, A. S.; CAVALCANTE, N. **Animais do descobrimento: raças domésticas da história do Brasil**. Brasília: EMBRAPA, p. 228, 2000.

MARIANTE, A. S.; EGITO, A. A.; ALBUQUERQUE, M. S. M.; PAIVA, S. R.; RAMOS, A. F. **Managing genetic diversity and society needs**. Revista Brasileira de Zootecnia, Viçosa, v. 37, p. 127-136, 2008.

MARIANTE, A. S.; ALBUQUERQUE, M. S. M.; EGITO, A. A.; McMANUS, C.; LOPES, M. A.; PAIVA, S.R. **Present status of the conservation of livestock genetic resources in Brazil**. Livestock Science, Amsterdam, v. 120, p. 204-212, 2009.

MAZZA, M. C. M.; MAZZA, C. A. S.; SERENO, J. R. B.; SANTOS, S. A.; PELLEGRIN, A. O. **A etnobiologia e conservação do bovino pantaneiro**. Corumbá: EMBRAPA-CPAP; Brasília: EMBRAPA-SPI, p.61, 1994.

MOURA, M. I.; TORRES, T. F.; MONTEIRO, E. P.; NEIVA, A. C. G. R.; CARDOSO, W. S.; FIORAVANTI, M. C. S. **Evolução de um rebanho de bovinos curraleiro reintroduzido em cerrado nativo na região nordeste do estado de Goiás, Brasil**. Actas Iberoamericanas de Conservación Animal, Córdoba, v. 1, p. 123-126, 2011.

NIEDERLE, P. A. **Controvérsias sobre a noção de Indicações Geográficas enquanto instrumento de desenvolvimento territorial: a experiência do Vale dos Vinhedos em questão**. In: CONGRESSO DA SOCIEDADE BRASILEIRA DE ECONOMIA, ADMINISTRAÇÃO E SOCIOLOGIA RURAL, 47., 2009, Porto Alegre. Anais eletrônico... [online]. Porto Alegre: SOBER, 2009. Disponível em:<<http://www.sober.org.br/palestra/13/35.pdf>>. Acesso em: 03 nov. 2021.

PRIMO, A. T. **El ganado bovino Ibérico en las Americas: 500 años después**. Archivos de Zootecnia, Córdoba, v. 41, p. 421-432, 1992.

RODRIGUES, W. C. **Metodologia Científica**. Paracambi, 2007. Disponível em:<[pesquisaeducacaoufrgs.pbworks.com/file/fetch/64878127/Willian%20Costa%20Rodrigues\\_metodologia\\_cientifica.pdf](http://pesquisaeducacaoufrgs.pbworks.com/file/fetch/64878127/Willian%20Costa%20Rodrigues_metodologia_cientifica.pdf)>. Acessado em: 01 set. 2021.

SERENO, J. R. B. **Uso potencial do bovino Pantaneiro na produção de carne orgânica do pantanal – Via internet**. In: CONFERÊNCIA VIRTUAL GLOBAL SOBRE PRODUÇÃO ORGÂNICA DE BOVINOS DE CORTE, 1., 2002, Corumbá. Anais... Corumbá: Embrapa Pantanal, p.1-7.2002.

SILVA, E. V. C.; SERENO, J. R. B.; COSTA, M. J.R. P.; CUNHA, J. E. L.; VASCONCELOS, J. T. **Comportamento sexual de touros Nelore (Bos taurus indicus) e Pantaneiro (Bos taurus taurus) durante os procedimentos de teste de libido**. Revista Brasileira de Reprodução Animal. Belo Horizonte, v. 23, p. 214-216, 1998.

SILVA, M. C.; MOURA, M. I.; CARDOSO, D.; OLIVEIRA, N. A.; McMANUS, C. M.; FIORAVANTI, M. C. S.; SERENO, J. R. B. **Farmer preferences for phenotypes vary and are important issues in Curraleiro/Pé-Duro on farm (in situ) conservation in the Brazilian Savannah**. In: RURAL SUSTAINABLE DEVELOPMENT INTERNATIONAL CONGRESS, 2012, Campo Grande. Anais eletrônico... [online], Campo Grande, RSD, 2012. Disponível em:<<http://www.uems.br/rsd2012/congresspresentation.html>>. Acesso em: 09 out. 2021.

SIMIANER, H.; MARTI, S. B.; GIBSON, J.; HANOTTE, O.; REGE, J. E. O. **An approach to the optimal allocation of conservation funds to minimize loss of genetic diversity between livestock breeds**. Ecological Economics, Amsterdam, v. 45, p. 377-392, 2003.

SOMEKH, Bridget. LEWIN, Cathy (orgs). **Teoria e Métodos de Pesquisa Social**. Rio de Janeiro: Vozes, 2015.

TEODORO, A. L. **Desempenho, comportamento ingestivo e digestibilidade em novilhas da raça “Pantaneira”, sob dietas com diferentes níveis proteicos**. 2011. 81f. Dissertação (Mestrado em Zootecnia) - Faculdade de Ciências Agrárias, Universidade Federal da Grande Dourados, Dourados.

VIANA, E. **Principais raças de vacas leiteiras utilizadas no Brasil.** 2022. Disponível em:<<https://esteiogestao.com.br/principais-racas-de-vacas-leiteiras-utilizadas-no-brasil/>>. Acesso em: 30 jun. 2022.

VERRIER, E.; BOICHARD, M.T.; BERNIGAUD, R.; NAVES, M. **Conservation and value of local livestock breeds: usefulness of niche products and/or adaptation to specific environments.** Animal Genetic Resources Information, Roma, v. 36, p. 21- 31, 2005.