Brazilian Historical Zooarchaeology: A Summarized Iberian Contribution and a Case Study of Domesticated Bovine Cattle Introduced in Southern Region

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Abstract

Historical Zooarchaeology in Brazil still needs more comprehensive studies on the importance of animals for social, cultural, and economic development in some regions in the country since there is little information about the fauna from archaeological sites during the more than five hundred years from colonial to republican periods (from the 16th to the 19th centuries, and in recent times). Archaeofaunal remains from land sites across the country indicate a certain taxonomic and chronological dichotomy. Although most of the prehistorical sites (also known as pre-Columbian/precolonial) have indicated largely native faunal osteological and dentary elements (mostly medium and small mammals, and also reptiles, amphibians) whereas the sites of colonial and subsequent chronological periods (also known as historical sites) predominates domesticated breeds, especially those of economic importance (for butchering, dairy leather cattle) and pets, resulting from Portuguese first "official" colonizers. Through some historical archaeological sites, we present some aspects of the Iberian contribution in the adoption of domesticated animals in the country. We also mention as an example the successful introduction of the domesticated cattle breed known as "Crioulo Lageano" in the state of Santa Catarina (SC), southern Brazil. The starting point would have been from the settlement of the city of Lages, founded in 1766 by the pioneer settlers. Historical records show the Iberian origin of this bovid race according to recent investigations into its genetic heritage.

Keywords: Historical Zooarchaeology; Brazil; Iberian Contribution; Crioulo Lageano breed; Santa Catarina.

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1. Introduction

Many questions remain regarding the knowledge of human and fauna relations in Brazil, especially regarding archaeological chronologies during the period of contact between native peoples and the arrival of Portuguese settlers in the 16th century (precolonial period) and through post-colonial (monarchy: first kingdom until the independence in 1822, and regency covering 1831 to 1840), and republican (from 1889 till present time) periods, as currently known as "historical period" (Figure 1). Considering archaeofauna parameters, these historical times indicate a remarkable taxonomic and chronological dichotomy in comparison to precolonial dates.

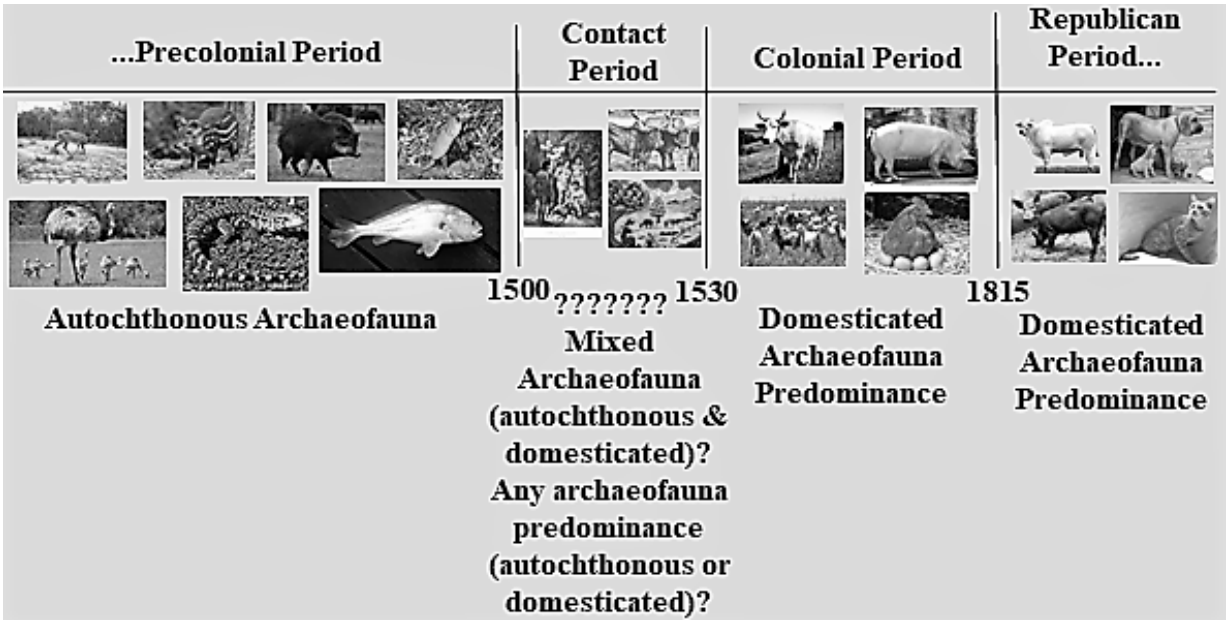

Figure 1. Different Brazilian archaeofaunas through timeline based on archaeofaunal data (Precolonial Period autochthonous archaeofauna, from the left top: Cervid, Agouti, Peccary, Armadillo, Emu, Lizard, Fish; Contact Period mixed archaeofauna, from left top: Hunter-gatherers, wild bovids, ox breeders; Colonial and Republican Periods, from left top: All domesticated animal breeds, such as cattle, pigs, goats, chicken, dogs, cats) (From the authors with introduction of modified pictures from Google Images).

In the Brazilian archaeological literature on the study of archaeofaunal remains, the interest in earlier pre-colonial chronologies is well known, as mentioned by (Jacobus 1985, Andrade Lima *et al*. 1986, Luft 1989, Lima 1988, Guérin 1993, Guérin *et al* 1993, Queiroz and Carvalho 2008, Dantas *et al* 2014, Queiroz *et al* 2014), while the researches by archaeological areas or sites with chronologies close to the period of contact, as well as the historical to date (colonial, monarchy and republican periods) remain poorly investigated and are still as big gap in the zooarchaeology of the country, except for some papers such as Nobre (2004), Peixoto & Cerqueira (2006), Santos (2010), Souza (2011). A recent contribution of Milheira *et al* (2016) which records the occurrence of archaeofaunal remains of domesticated dogs (*Canis lupus familiaris*, Linnaeus, 1758) at Rio Grande do Sul state in pre-Columbian chronologies (between 1701 e 1526 cal BP (2σ) (Beta-415598, *Canis lupus familiaris* bones and teeth), according isotopic analysis, put on the country in an important discussion about dog's domestication in the Americas. Beyond the current data from Middle

East, considered as one of the most important domestication hearts, and Europe, as a relevant dispersion center of domesticated breeds during colonization periods across the world.

Despite a certain chronological consistency and apparent dichotomous preponderance between the autochthonous fauna-pre-colonial archeological sites versus domesticated fauna-historical (colonial) archaeological sites, other anthropological conceptions about the probable relations between human and nonhuman animals must be added, as the case in the Karitiana Amazon indigenous ethnicity community and the question of domesticity on their part, particularly with respect to the domesticated dog (Vander Velden 2009).

Summarizing this historical scenario in the country, we have several questions about the probable establishment of the process of domestication in Brazilian territory before the period of European arrival and colonization or whether domesticated breeds would only have arrived in the country during and after European colonization. Further studies are necessary to clarify this situation. It is important considering the Iberian contribution, especially Lusitanian, with the introduction of domesticated animal breeds, resulting over time in significant development in the management and improvement of genetical diversity in the future, mainly for the cattle.

Closing this Iberian trajectory and its contribution to the domestic faunal composition in the country, we also present a remarkably interesting and narrative example as case study for the Brazil southern where a domesticated cattle breed (Crioulo Lageano) was introduced in the 19th century and had promoted important economic and social changes in that region.

In fact, this domesticated archaeofauna exemplify how important was the contribution by the Portuguese colonizers in the country to social transformation in distinct contexts and regions till recent times (Garcia 2000, Mariante and Cavalcante 2006).

2. State of Knowledge

Our focus is the archaeofauna samples recovered from some post-colonial, monarchy, and republican periods (17^{th} to 19^{th} centuries) where historically had an important Iberian contribution in the introduction of domesticated animals which were brought together by Portuguese settlers since the 16^{th} century, mainly for breeding, food production, transportation, as well as the slaughtering techniques and meat preparation (Gomes 2012, Costa 2013, Queiroz and Gomes 2016). Those domesticated archaeofauna resulted in significant changes in eating and social habits of Brazilian citizens in some regions of the country, as observed notably in Pelotas (Rio Grande do Sul state) after a comparative study of the faunal remains and the typology of the utensils used (Nobre 2004).

3. Zooarchaeological Information: Brief Results and Discussion

In this study we present some zooarchaeological samples recovered from four historical archaeological sites as examples of domesticated animals in São Cristóvão (Figure 2) and Laranjeiras (Figure 3) cities (Sergipe state), in the Northeast region, with chronology between

17th and 19th centuries, as well as comparison with faunas from “Meia Ponte” town, now known as Pirenópolis city (Goiás state) in the Midwest region in the 19th century (Figure 4), and even as Pelotas (Rio Grande do Sul state) in the South region of the country in the 19th century (Figure 5).

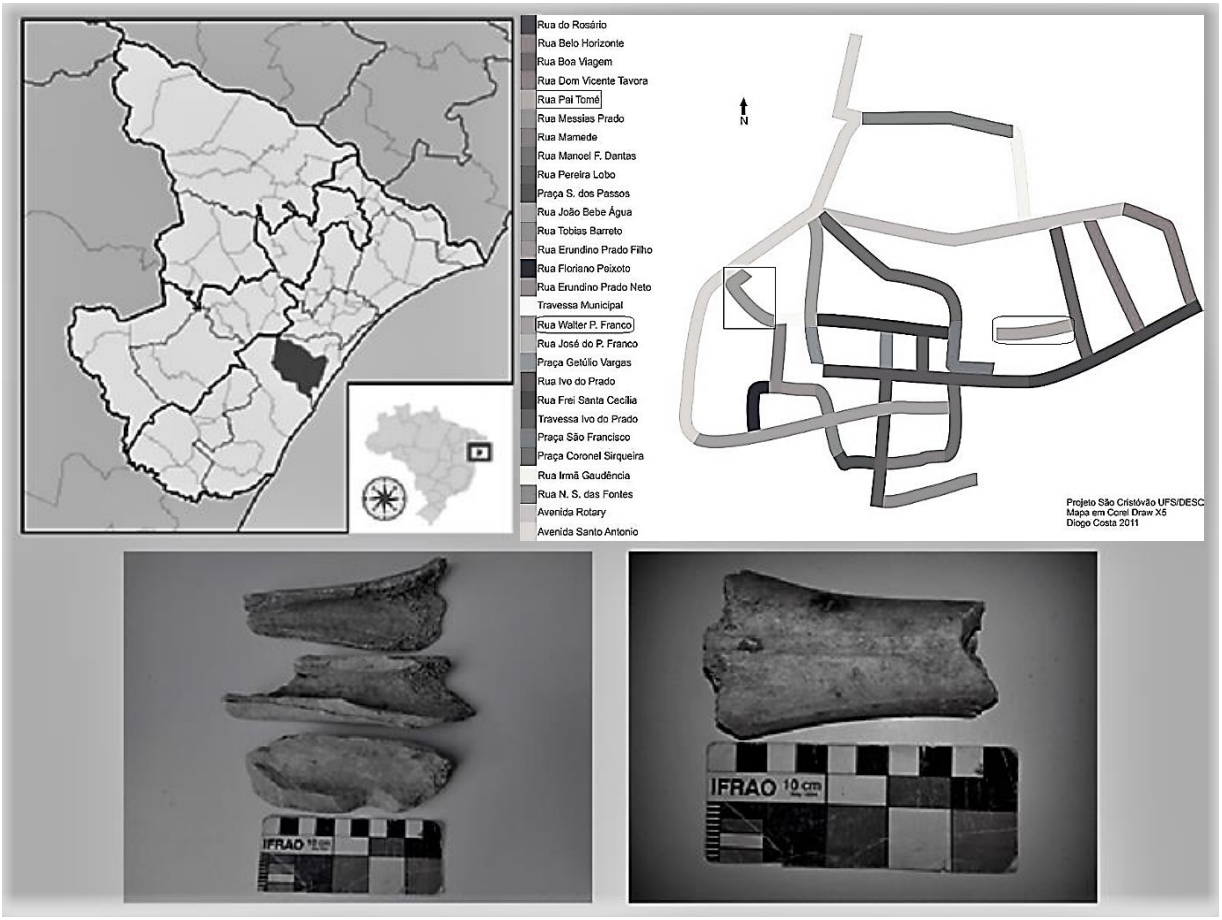

Figure 2. Location of São Cristóvão (Sergipe state) from 17th to 19th centuries, sketch of excavated area (right above) and *Bos taurus* (Linnaeus, 1758) bony samples recovered from “Rua Walter P. Franco (House 22)”, left below, and from “Rua Pai Thomé”, metacarpal bone (right below) (Modified by the authors from Costa 2013 and Google Images).

In these archaeological regions, most records concern occurrence of domesticated animals commonly found in historical sites in the country, mainly for subsistence, such as cattle, swine, caprine, ovine). Some native faunal vestiges would be also recorded, mixed with the domesticated breed remains. In this case it might indicates intrusion of these animals by natural predators or even a possible hunting activity.

As we have briefly commented, the archaeological literature in the country still assigns little importance to faunal remains from colonial and postcolonial (historical) contexts, still mentioning generic animal lists and/or assigning these records as a general term: "food remains". It is still poorly known all the process from the beginning breed introduction to the development of other domesticated varieties even their environmental and social contribution.

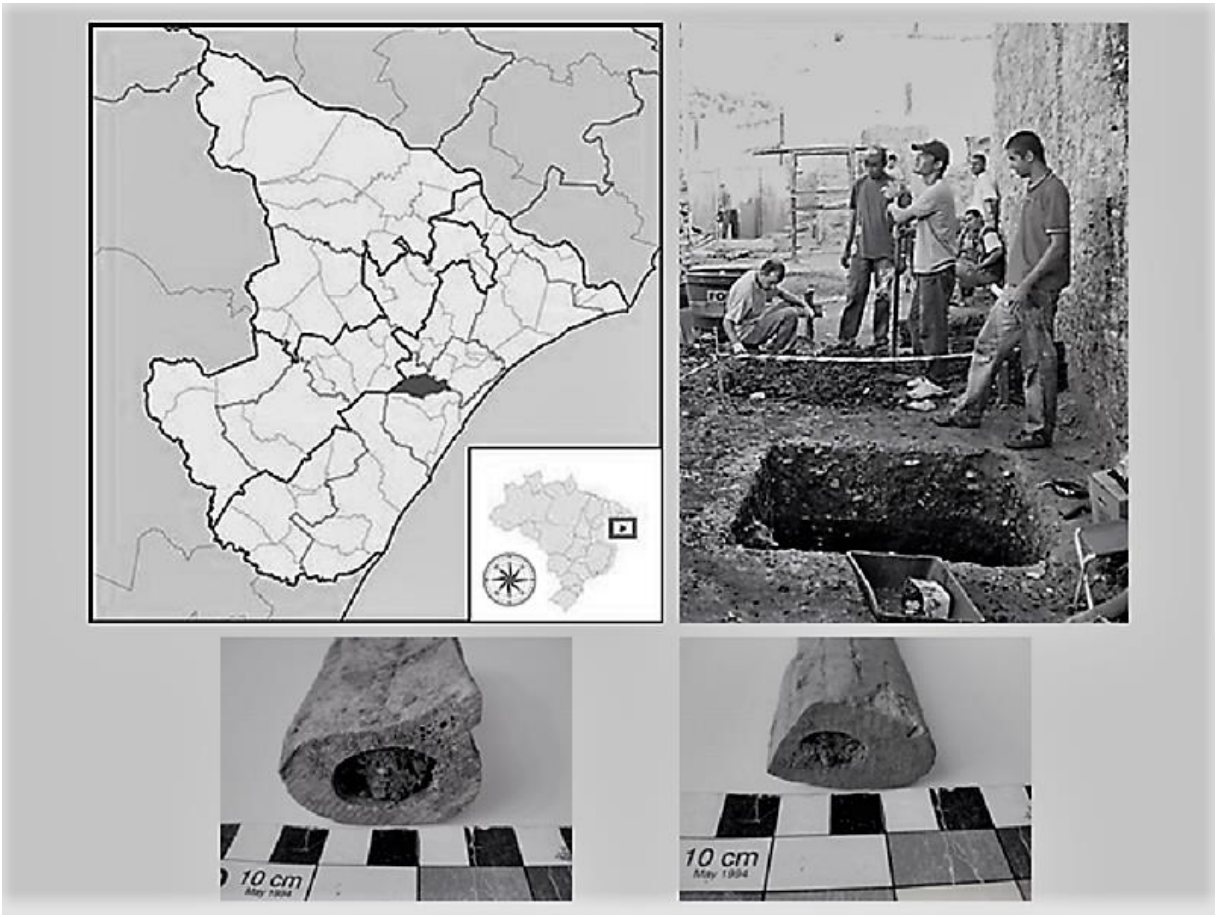

Figure 3. Location of Laranjeiras (Sergipe state) from (18th to 20th centuries), excavations inside "Panificação Barroso" (Barroso Bakery) archaeological area (right above), and *Bos taurus* (Linnaeus, 1758) radius/ulna bony samples with butchering practice (cross sawed marks) (left and right below) (Modified by the authors from Santos 2010 and Google Images).

From São Cristóvão, located at Sergipe state, from excavated area (17th to 19th centuries), some *Bos taurus* (Linnaeus, 1758) bony samples were recovered from "Rua Walter P. Franco (House 22)", with diaphysis longitudinally fractured from long bones and butchering indications (longitudinal straight cut marks), and also from "Rua Pai Thomé", we had some metacarpal bones with butchering marks (percussion and cross sawed in the diaphyses) (Costa 2013). In the case of Laranjeiras location (also Sergipe state), excavations were performed inside the ruins of "Panificação Barroso" (Barroso Bakery) archaeological area (18th to 20th centuries) where bony elements and *Bos taurus* were recovered from "Survey D", layers 40-50, with butchering practice (cross sawed marks) (Santos 2010). About the archaeofaunal remains from Pirenópolis (Goiás state) of the excavated areas 11 and 12, "food remains" bones came from the slave quarters excavated (metapodials and tibias), with in the center piece a longitudinal break in the shaft to remove the marrow and cross breaks in the diaphyseal region in left and right pieces (Souza 2011, Alves & Renne 2012). By morphology and robustness, they are *Bos taurus* bones. The most variability of archaeofauna was presented by Nobre (2004) for Pelotas location (House 8) at Rio Grande do Sul state, bony

elements of 10 vertebrates taxa, among which: rodents, turtles, fishes, and some species: *Bos taurus* (Linnaeus, 1758) (cattle), *Equus caballus* (Linnaeus, 1758) (horse), *Sus scrofa* (Linnaeus, 1758) (pig), *Canis lupus familiaris* (Linnaeus, 1758) (domestic dog), *Felis domestica*, not valid name by the International Code of Zoological Nomenclature (current standing *Felis catus*, Linnaeus, 1758) (domestic cat), *Gallus gallus* (Linnaeus, 1758) (current known as *Gallus gallus domesticus*, Linnaeus, 1758) (domestic chicken/cock), and *Anas platyrhynchos* (current standing *Anas platyrhynchos domesticus*, Linnaeus, 1758) (Linnaeus, 1758) (domestic duck, also known "mallard"), an introduced specie in Brazil (Long 1981). Nobre (2004) also mentions in the archaeological area the occurrence of fewer invertebrates, such as the *Crassostrea rhizophorae* (Guilding, 1828) (mangrove cupped oyster). According to the author, quantitatively, *Bos taurus* and *Sus scrofa* remains were the most recurrent compared to other faunal groups mentioned in the published references.

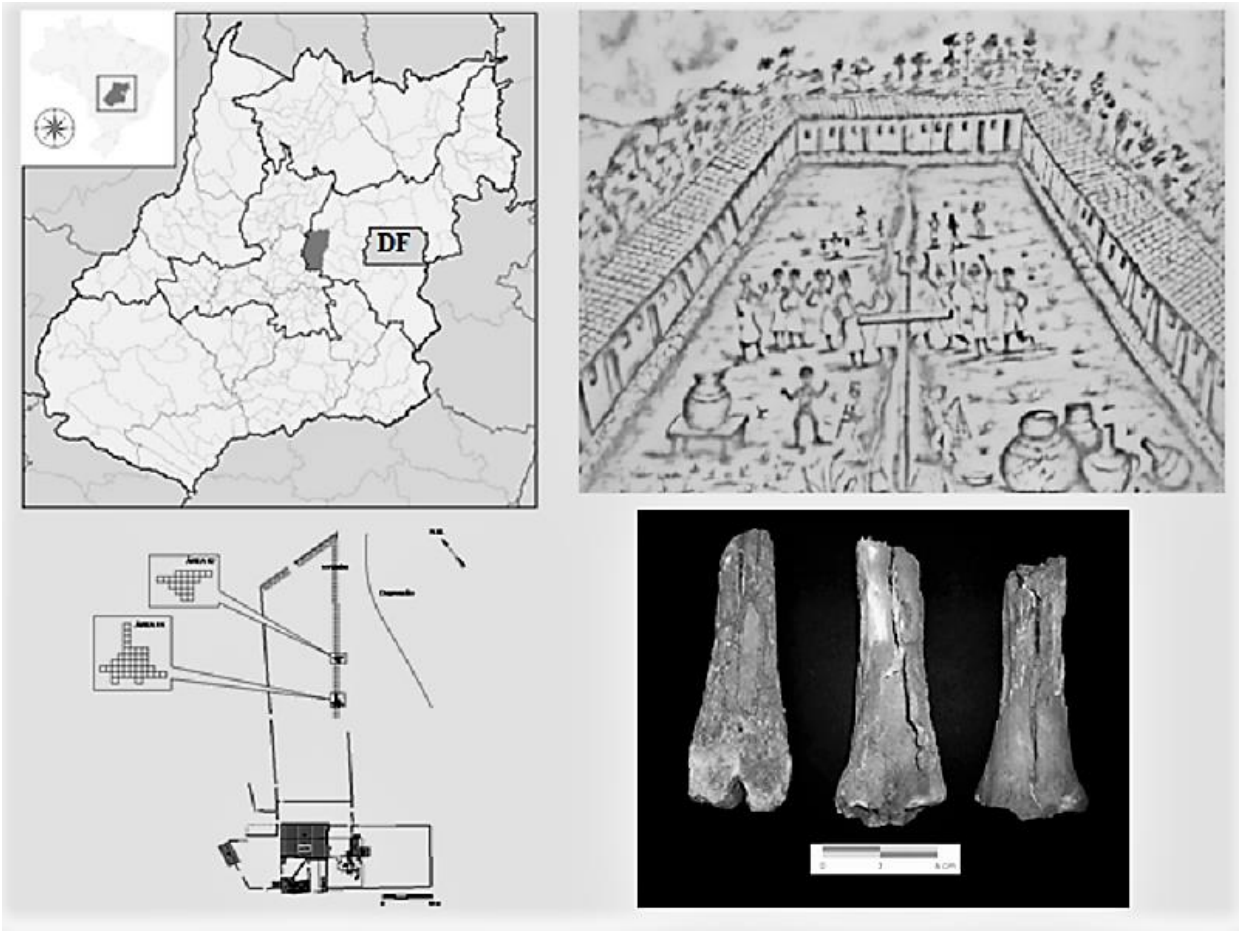

Figure 4. Location of Pirenópolis (ancient "Meia Ponte") (Goiás state) from 19th century, drawing of Antônio da Costa Ribeiro, from 1864) showing the slave quarters (senzalas) 11 and 12 from "Engenho São Joaquim" (currently "Fazenda Babilônia) (right above), plant with indication of excavated archaeological areas 11 and 12 (left below), and *Bos taurus* (Linnaeus, 1758) remains (right below) (Modified by the authors from Souza 2011, Alves & Renne 2012 and Google Images).

In summary, although there was little references on the historic contextual archaeofauna in the country, as well as taxonomic and quantitative information about the animals found in the four previous sites, the samples studied probably indicate a predominance of some

domesticated breeds, normally important for economic purposes, such as feeding, subproducts (milk, fat, leather), and transport, particularly bovines (Bos taurus, Linnaeus, 1758), swines (Sus scrofa, Linnaeus, 1758), ovines (Ovis aries, Linnaeus, 1758), caprines (Capra aegagrus hircus, Linnaeus, 1758) and equines (Equus caballus, Linnaeus, 1758).

Figure 5. Location of Pelotas (Rio Grande do Sul state), frontal and lateral facades of the Residence Counselor Maciel (House 8 site) (left below) and excavation on its courtyard with indication of gates entrance, from 19th century (Modified by the authors from Nobre 2004 and Peixoto & Cerqueira 2006).

4. A Case Study: Crioulo Lageano Breed

As important as the results of the archaeofaunal analyzes from these historical sites for understanding the relationship with humans are also the studies contained in the significant bibliography on the introduction of some domesticated breeds in the Brazilian territory, as in the case of Crioulo Lageano cattle (Figure 6) at the Santa Catarina state (Figure 7).

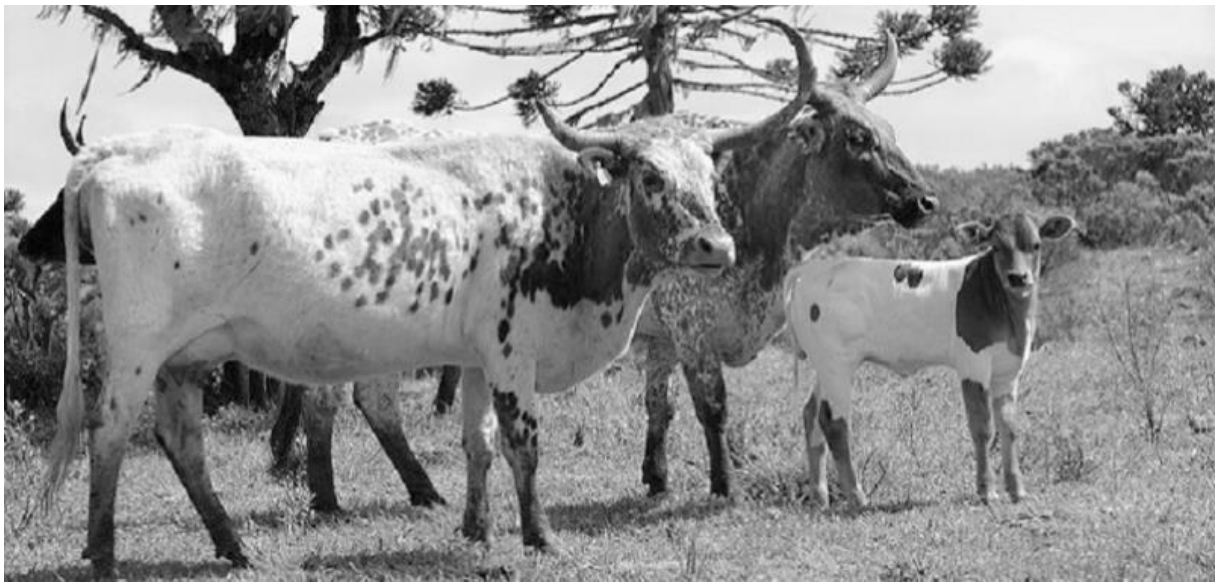

Figure 6. Crioulo Lageano Breed (Modified by the authors from Google Images).

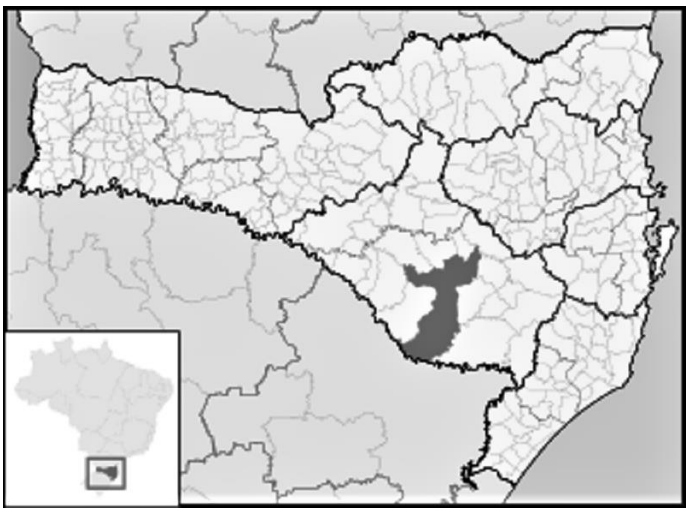

Figure 7. Location of the Lages city in Santa Catarina State (Modified by the authors from Google Images).

However, in addition to the archaeofaunal remains, it is also relevant to consider some data from the literature about the introduction of domesticated varieties in the country, mostly for bovids, a relevant contribution of zooarchaeology to the understanding of the beginnings of one of the main beef producing and exporting countries in the world in recent times. According Mariante and Cavalcante (2006), the origin of "Crioulo Lageano" breed dates back the historical economic and social roots of Brazil southern particularly. The starting point would have been from the settlement of the city of Lages, founded in 1766 by the pioneer colonizers. Historical records show the Iberian origin of the breed according to recent investigations into its genetic heritage. This bovine breed had great importance in the south of the country, both historical and economic contexts between 1869 and 1891, since Brazil was going through significant changes due to the end of slavery. Although it has low meat other varieties of cattle production, this race stands out for presenting a huge adaptation to the tropics and particularly to the various Brazilian ecosystems.

These studies are based on the written sources, as well as from the new interdisciplinary perspectives that have been innovating the studies in archaeology, as in the case of animal archaeogenetics, which has been used in research on domestication abroad. This discipline refers to applications of genetic techniques of the populations, by the analysis of the ancient DNA (aDNA) recovered in the archaeological vestiges (Figure 8). According to Ginja (2009), "DNA allows to study the genetic constitution of wild bovines and, also of pre-domesticated animals, to investigate the evolutionary origins of modern domesticated breeds" (Zeder 2006 *et al apud* Ginja 2009), or other contributions on animal ways of domestication (García 2000, Outram 2014) and genetics involved among domesticated mammals (Tapio and Grigaliūnaitė 2003).

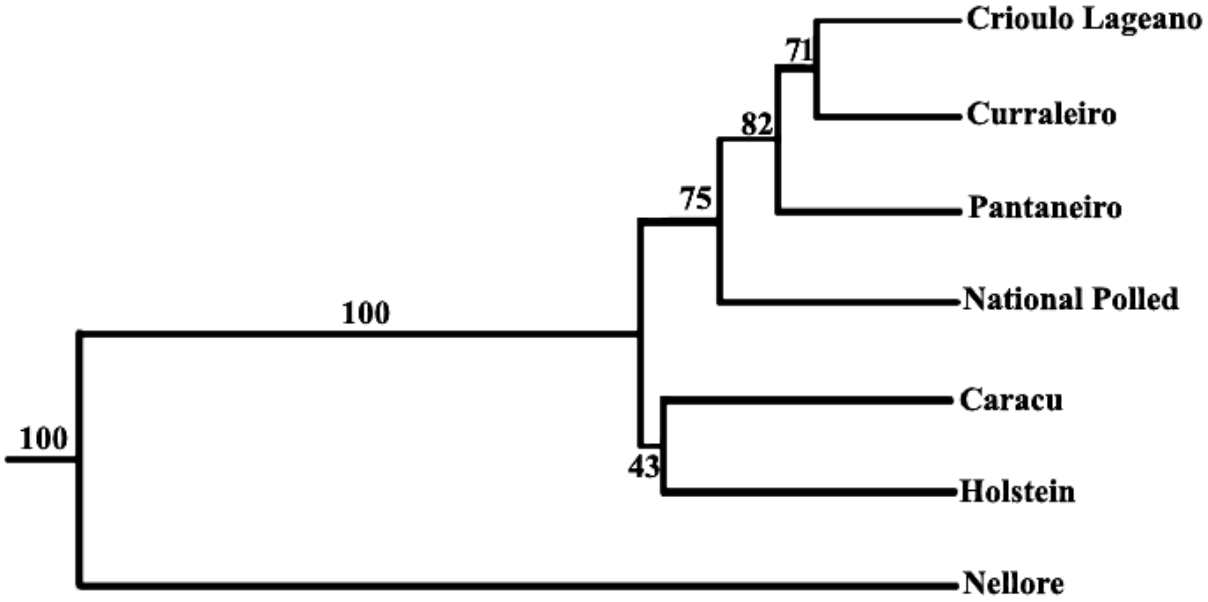

Figure 8. “Crioulo Lageano” hereditary relations through a dendrogram of the genetic distance matrix with the cladogenesis events (indicated by the numbers) for the advent of bovine breeds from the common ancestor, as indicated by the numbers in the cladogram (Source: Modified by the authors from Serrano *et al* 2004).

The process of domestication of Brazilian naturalized cattle from archaeogenetics data is closely related to the process of formation of bovine breeds in Brazilian territory from the introduction of the Portuguese and Spanish bovines genetically compatible, originating the “Crioulo Lageano” breed. Certainly, some favorable environmental aspects of the Santa Catarina plateau were important for its development. According Mariante and Cavalcante (2006), and Martins (2009), one of the main factors that allowed the adaptation of this animal and other bovine breeds to the natural environment in this region would had being the mountainous vegetation.

The integration of zooarchaeological studies with the support of archaeogenetics (Alencar 1984, Serrano et al 2004) allows a better understanding of the changes that occurred in the morphological evolution of the Iberian Peninsula bovine races, as well as the breed development process that originated cattle "Crioulo Lageano", introduced in Brazil in the 19th century. Beyound tracking its genetic origin, it is also possible to comprehend some aspects

on its importance to the economic and social development of Lages (Santa Catarina state) since the arrival in that region (Mariante and Cavalcante 2006, Serrano et al 2004, Ginja 2009, Martins 2009).

4. Final Considerations

In the four sites with zooarchaeological remains we observed different forms of treatment of sample information, which reflects a difficulty of uniformity and systematic analytical procedures for data processing in the investigation of archaeofauna from historical contexts.

We also believe this shortcoming in publications on animals recovered from historical archaeological sites (since the colonization period) is related to the greater interest of archaeological research in the country for archaeological sites whose chronologies are older and arouse interest about the origin of human occupation and adaptation in the Brazilian territory.

The limited amount of work related to the historical contextual study of animal relations within societies between the 16th and early 19th centuries indicates a clear gap in Brazilian animal archaeology. Greater attention to archaeological research from these periods would certainly contribute to greater knowledge of the economy, development of production systems and by-products of animal origin. The study of faunal remains from historical archaeological sites contributes to the knowledge of human-animal relations and especially to cultural and social processes during the colonial until republican period.

In fact, it is not possible to deny the relevant Iberian contribution in these more than five hundred years of miscellaneous influence, especially in the introduction of the varieties of domesticated animals in the South American continent, more specifically in Brazil from the colonization period.

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