

Traditional Use of Palms (Arecaceae) in the Atlantic Forest in Southern Santa Catarina, Brazil

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ABSTRACT

This study aimed to investigate the extraction process of palm species (Arecaceae) and their different forms of use by the population in the surroundings of the “Parque Estadual da Serra Furada” (PAESF), located in the south region of Santa Catarina state, as well as understand the perception of the interviewees about the park. The data were obtained through interviews with long-time residents of the area. The results were analyzed by content analysis. Four palm species were cited by the interviewees: *Bactris setosa* Mart., *Euterpe edulis* Mart., *Geonoma gamiova* Barb.Rodr., and *Syagrus romanzoffiana* (Cham.) Glassman. The most widespread uses of these palm species were for food and in construction. The leaves were the main part of the plant used, with emphasis to *E. edulis*. In general, the PAESF and its palms are important resources for the interviewees; however, today, knowledge remains mostly only in the memory of the residents.

Keywords: Atlantic rainforest, biodiversity, conservation unit, ethnobotany, *Euterpe edulis*.

1. INTRODUCTION

Residents in the vicinity of tropical forests are closely interrelated to the goods and services offered by these ecosystems (Cámara-Leret et al., 2014). They harbor the highest levels of biocultural diversity in the world, preserve traditional knowledge (Huntington, 2000), and are the key to management and use of ecosystem services (Reyers et al., 2013). The ecological knowledge of these populations may be directly associated with management and conservation of these environments, as proposed by ethnobiology (Posey, 1986), which features several fields, such as ethnoecology and ethnobotany (Haverroth, 1997).

Ethnoecology is a scientific field that provides a basis for understanding the relationship between humans and the biodiversity around them (Ochoa & Ladio, 2014), and has been used to indicate studies on the interactions between a local population and its natural environment (Martin, 1996). As for ethnobotanical studies, they can be considered as interrelations between plants and human beings inserted in dynamic ecosystems with natural and social components (Alcorn, 1995; Barroso et al., 2010), and are important tools for the development of functional models for use and management of natural resources (Albuquerque et al., 2009).

Ethnobotanical research conducted in the surroundings of Conservation Units can demonstrate the relationship between people and the forest and provide information on sustainable use of biodiversity and exploitation of empirical knowledge, promoting scientific knowledge (Fonseca-Krueel & Peixoto, 2004; Silva & Fisch, 2012). In addition, popular knowledge about the use of native ethnospices and their management techniques contribute to the maintenance of ecosystems and perpetuation of their actors' culture (Souza & Felfili, 2006; La Notte et al., 2017).

Palms (Arecaceae) are an excellent model group for integration between ecology and traditional knowledge to determine the importance of ecosystem services (Cámara-Leret et al., 2014). This botanical family is among the longest-lived and most abundant in tropical forests (Henderson, 2002), and is the third most important family for humanity regarding

use (FAO, 1995). Plants of this family can present traditional use in civil construction, food, popular medicine, handicraft, and afforestation, as well as cultural and religious purposes (Reitz, 1974; Elias et al., 2015; Elias & Santos, 2016; Elias et al., 2016; Laureto & Cianciaruso, 2017).

In this context, the objective of this study was to investigate the extraction process of palm species found in the "Parque Estadual da Serra Furada" (PAESF) and their different forms of use by the residents in the surroundings of this park, located in the south region of Santa Catarina state, prior to the creation of the Conservation Unit of Integral Protection. In addition, it aimed to understand the environmental perception of this population with respect to the PAESF under an ethnoconservationist approach.

2. MATERIAL AND METHODS

2.1. Study area

This study was conducted in the vicinity of the "Parque Estadual da Serra Furada" (PAESF), a Conservation Unit of Integral Protection created on June 20, 1980, with head office located in the community of Chapadão in the municipality of Orleans, south region of Santa Catarina state, Brazil (Figure 1), in June and July 2016, during 10 days of field activity.

The PAESF comprises a total area of 1330 ha located in the municipal territories of Orleans and Grão Pará. It is geographically connected to the area of the "Parque Nacional de São Joaquim". Prior to the creation of the Conservation Unit, the PAESF was inhabited and held activities of wood extraction and subsistence livestock, as well as cultivation of exotic species. Currently, the PAESF has been suffering from strong territorial pressures with regards to federal incorporation, as well as clay mining activities in its buffer zone.

Climate in the region, according to the Köppen classification, is humid mesothermal, with no defined dry season and hot summers (Cfa) in the lower parts, and mild summers (Cfb) in the higher parts (Alvares et al., 2013). Mean annual rainfall is 1500 mm (EPAGRI, 2001). Vegetation is classified as Dense Ombrophilous Montane and Upper-montane Forest (IBGE, 2012).

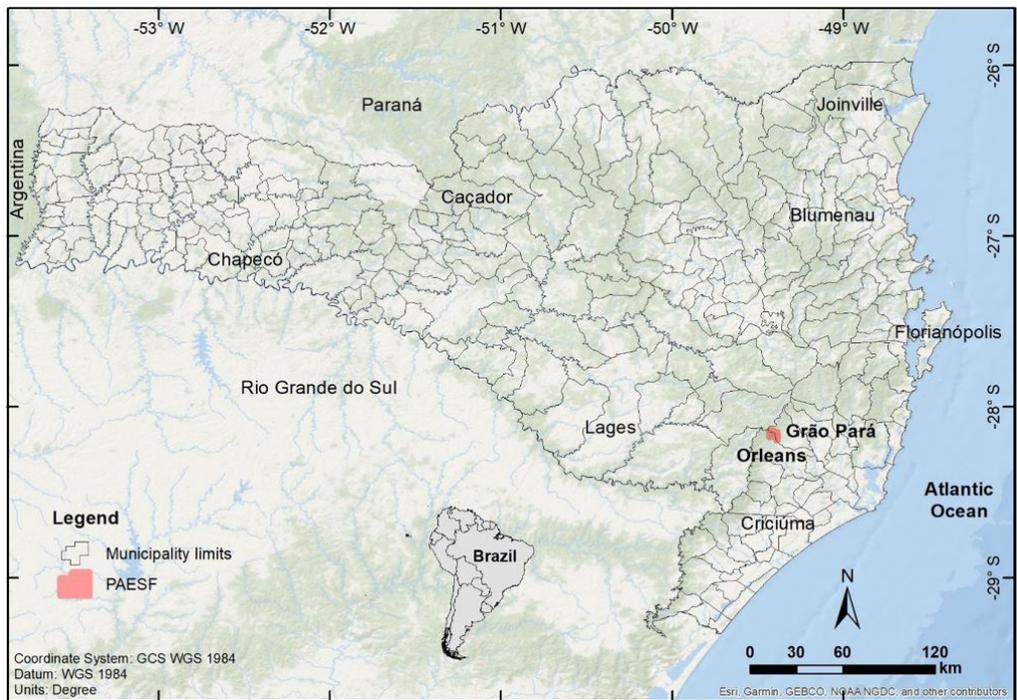


Figure 1. Localization of the “Parque Estadual da Serra Furada” (PAESF) in the municipalities of Grão Pará and Orleans, in the south region of Santa Catarina state.

2.2. Data collection

Data were obtained through narrative interviews, which are unstructured instruments that aim at the depth of specific aspects, encouraging and stimulating the individuals interviewed to tell something important of their lives (Muylaert et al., 2014).

The interviewees, considered local experts, were chosen based on a qualified informant – the head of the Conservation Unit –, who indicated the other participants. The interviewees were residents of the surroundings of the PAESF and had direct contact, at some point in their lives (former residents and employees), with the Conservation Unit. The snowball sampling technique (Bailey, 1994), which consists of intentional selection of the first informant to recruit the other qualified participants (Albuquerque et al., 2010), was applied to select the interviewees.

After informing the study objectives, the interviews were conducted voluntarily with interviewees who agreed to participate by signing an Informed Consent Form (ICF) presented at the time of interview, according to Resolution no. 466/2012

of the National Health Council (Brasil, 2012) with Certificate of Presentation for Ethical Consideration (CAAE: 56185716.7.0000.0119 - Opinion no. 1.572.998).

The study sample comprised two women and six men, aged 42 to 85 years, from four families of Polish and Italian immigrants, whose main activities are subsistence agriculture and dairy farming, who live in the community of Chapadão. The interviewees were identified as housewives, small farmers, and janitors of the Conservation Unit of the Environment Foundation of Santa Catarina (FATMA).

Data on palm species were obtained in a previous survey conducted by the authors. Five species of native occurrence in the PAESF were considered: *Bactris setosa* Mart., *Euterpe edulis* Mart., *Geonoma gamiova* Barb. Rodr., *Geonoma schottiana* Mart., *Syagrus romanzoffiana* (Cham.) Glassman.

Information on the use and exploitation of plants was obtained by means of identification of the palm species with the aid of digital photographs, high-resolution maps (for indication of sites of exploitation), a portable audio recorder, and a field diary for additional notes.

2.3. Data analysis

For the narrative interviews, content analysis was chosen because it was deemed more appropriate for the topic of research from the authors' point of view. This type of analysis consists in detecting, in the interviewee's discourse, the empirical concepts formulated, associated with the object of research, with the purpose of searching the meaning or meanings of an interview (Bardin, 1995; Campos, 2004; Gomes, 2009). Lozano (1994) considers this technique reliable, because it enables different people to reach the same conclusions by applying the same categories separately to the same sample of messages.

The palm species cited by the interviewees were classified into categories, according to the uses mentioned by the study participants, as well as regarding scientific name, popular name, and the parts of the plant with reports of use.

3. RESULTS AND DISCUSSION

Four ethnospecies were mentioned by the interviewees: coconut, straw, palm, and tucum. Five different uses (food, construction, fiber, forage, and medicine) were reported for five plant parts (stipe, leaf, fruit, inflorescence, and apical meristem) (Table 1).

Palm (*E. edulis*) was the most important ethnospecies, cited as an important resource by all study participants and mentioned for two uses of three different plant parts. Use as food was the most frequently mentioned; however, only for the palm heart (region near the apical meristem, inside the leaf sheath). Residents reported using palm heart only for their own consumption and in small amounts, but according to most of the interviewees, palm heart was also the main target of clandestine extractors, and they considered it as one

of the most exploited plants before the creation of PAESF: "[...] *they took everything without permission, felled everything with no mercy; they had a cannery, isn't that right!?*" (Interviewee 1).

In the 1960s, the state of Santa Catarina was marked by increased palm heart extraction, a period that coincided with growing selective logging of wood in the study area and introduction of tobacco farming in its surroundings (Dall'Alba, 1986). The extraction technique used spared neither young individuals, nor seed matrices (Reitz, 1974). Such activities drastically reduced the population of palms, which reached the level of risk of extinction (Dransfield et al., 2008; Galetti & Fernandez, 1998), and it is considered threatened of extinction to the present time (Martinelli & Moraes, 2013; Elias et al., 2016).

With respect to the use of the fruits, the interviewees commented only on their ecological use, because according to one of them "[...] *the little fruits weren't good for anything, only birds ate them [...]*" (Interviewee 2), unlike the populations of the Amazon, who largely use the fruits of native species of *Euterpe* as food, e.g. *E. catanga* Wallace, *E. oleracea* Mart., and *E. precatória* Mart., popularly known as acai (Smith, 2015). However, palm hearts are considered one of the most important Non-timber Forest Products (NTFP) of the Atlantic Forest (Elias & Santos, 2016) due to their use as raw material for diverse food products, such as juice, jelly, ice-cream, etc. (Bourscheid et al., 2011).

Usually, the leaves with braided pines were also used by the residents in the roofs of rustic constructions, stalls, sheds, and even in their dwellings, mainly in the beginning of colonization:

[...] *at that time, it was really windy, and a stone was placed on the palm leaves so that the wind wouldn't carry them away, otherwise, it would rain inside the houses.* (Interviewee 3)

Table 1. Palm species (Arecaceae) mentioned by the population interviewed in the surroundings of the PAESE.

Species	Ethnospecies	Use	Part of the plant used
<i>Bactris setosa</i> Mart.	Tucum	Food	Fruit
		Fiber	Leaf
<i>Euterpe edulis</i> Mart.	Palm	Food	Apical meristem
		Construction	Stipe
			Leaf
<i>Geonoma gamiova</i> Barb.Rodr.	Straw	Construction	Leaf
<i>Syagrus romanzoffiana</i> (Cham.) Glassman	Coconut	Forage	Leaf
		Medicinal	Inflorescence

Other communities in Santa Catarina state have already practiced these uses (Reitz, 1974); in addition, there are reports of their use as forage for donkeys and horses (Barroso et al., 2010).

The interviewees also reported the use of palm stipes as slats in construction (Figure 2), because they are light, straight, and resistant:

[...] it was resistant, I remember this because I helped to make it: I was going to build a shed, or something... or a stable; there was no money to buy wood and saw it, and so on... so we made the roof with slats, which were the stringers [...] (Interviewee 4).

The slats also had other uses: in the manufacturing of scaffolding, rafters, stucco, rustic water troughs, fences, material for stowage, and as firewood (Reitz, 1974).

Coconut ethnosppecies (*S. romanzoffiana*) was not mentioned to present timber use, only use as forage for animals and popular medicine. However, this ethnosppecies was widely used in civil construction in Santa Catarina state, and was mentioned by Reitz (1974) in the naval industry, mainly for stowage and salt water piers, because this is the only wood not attacked by the “busão”, a destroyer of wood in oceanic waters.

Use as forage was associated with the leaves in periods of food shortage for cattle, highlighting the importance for the sustainable use of palm:

In the old days, in winter, when the frost destroyed the pasture, people would cut the leaves with a sickle attached to a long bamboo and would make little piles here and there... sometimes, that was all they had to feed the cattle [...] (Interviewee 6).

Reitz (1974) also mentioned its use combined with racing-horse rations, emphasizing its benefit to the respiratory tract of these animals. In addition, the leaves of this species, considered sacred by the Mbyá-Guarani population, present other uses, such as palm heart as food and in the manufacturing of fans, mats, bows, and arrows (Dawson & Gacedo, 1977; Kinupp & Lorenzi, 2004).

Only one of the residents reported the use of coconut in popular medicine, mentioning use of inflorescence in the treatment of hypertension

[...] when we opened that coconut bunch, we would make tea to control blood pressure... when that bunch sprouted from the tree, fresh [...] (Interviewee 5).

Although this use has not been found in the literature, some authors have reported medicinal use of this species, with indications of use as expectorant and to treat sinusitis (Barata-Silva et al., 2005).

Tucum (*B. setosa*), a palm tree with fruits widely appreciated *in natura*, was another ethnosppecies cited by all interviewees with respect to its use as food (Lorenzi et al., 2010):

[...] we waited until it ripened, it is tasteful when sucked... we used to mix it with sugarcane liquor, too; it makes for a very tasteful drink, but it must be very ripe, really black (Interviewee 6).

This practice of composing liqueurs with pulp of tucum fruits had already been reported in Santa Catarina state by Reitz (1974). Moreover, the fruit of tucum *in natura* is regarded as an important

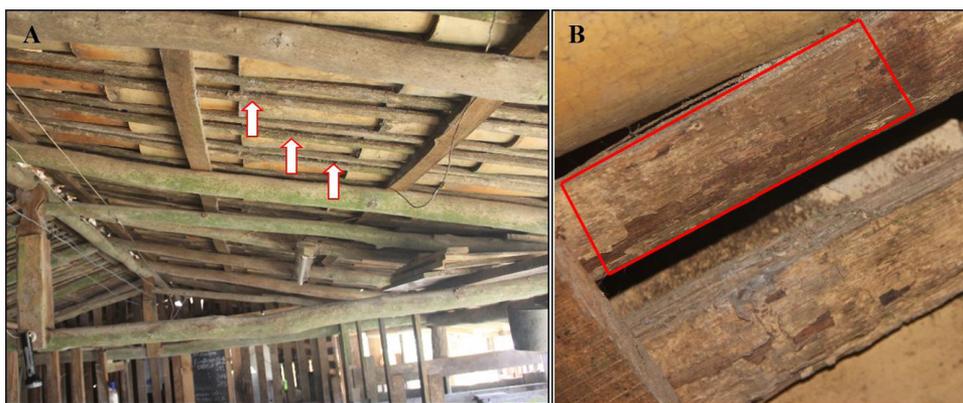


Figure 2. A – Shed roof structured with slats or stringers made of *E. edulis* stipe (shown by arrows), remnant of the Polish colonization in the Chapadão community, municipality of Orleans, south region of Santa Catarina state. B – Detail of *E. edulis* stipe, marked in red.

antioxidant (Fustinoni-Reis et al., 2016) because its bioactive compounds are mainly associated with the bark (pericarp) (Rosa et al., 2016).

The use of tucum fiber was also mentioned by the study participants:

[...] *we used to grab the leaf, pull it, and then weave it to make rope, basket, sieve... and all the finishing was made with tucum rope!* (Interviewee 7).

Coastal populations already used tucum leaves as a source of excellent textile fiber, which was used as fishing lines and in the manufacture of baskets (Medina, 1959; Monteiro & Fisch, 2005; Duarte et al., 2012). Artisanal fishermen in the “Arraial do Cabo” Marine Extractive Reserve, in Rio de Janeiro state, also used them to make casting nets because of the extreme resistance provided by the leaf sheath of this palm (Fonseca-Kruel & Peixoto, 2004). In addition, one of the interviewees stated that these fibers can be commercialized:

[...] *there was a lot of poverty at that time, so those who had a piece of land tried to do something to make money, they tore off the leaves, took off the stalks, and a little thread would come off, they then made little ropes and sell them!* (Interviewee 8)

This practice illustrates the importance of this palm for the population of the PAESF, because the uses were varied, i.e., hammocks, bowstrings, and slings (Reitz, 1974).

Also, regarding the use of leaves, the ethnospecies straw (*G. gamiova*) was referred by all interviewees as the most important plant to cover rustic constructions and were spared in all exploratory investments made in PAESF:

[...] *at that time, poverty was worse than today! So, a lot of people used straw to make the roof of their houses. Three or four straws were weaved per bundle, very well tied; then they used them to cover the houses, matting them one right next to the other, and water wouldn't come in!* (Interviewee 1)

This use had already been reported by Reitz (1974), in addition to the use of chipped petioles for manufacturing weaves, sieves, and baskets. Additionally, Ceccon-Valente & Negrelle (2013) reported the importance of this species in the area of foliar extractivism in Paraná state as NTFP, mainly the ornamental use of its leaves by flower shops, in arrangements, or dried and dyed, prepared for export to Europe (Reitz, 1974).

Only *G. schottiana*, popularly known as guaricanga or fine straw (Reitz, 1974), was not mentioned or recognized by the study participants. The non-use of this species can be attributed to its low density in the forest or even to the reduced size of its leaves (44-130 cm), as well as of its pines, which could be inefficient in covering the constructions when compared with those from *E. edulis* (120-290 cm) (Soares et al., 2014; Elias et al., 2018). Nevertheless, Reitz (1974) reported their use in rustic constructions such as huts and hovels.

As for perception about the PAESF, all interviewees were in favor of the existence of the Conservation Unit, mainly to ensure that the forest and its ecosystem services be preserved:

[...] *a great advantage was the banning of hunting and logging, otherwise we would be in a desert today! There wouldn't be any trees left! People used to sell everything, didn't they? So, our children and grandchildren would not know the woods, the birds [...] everything would be over!* (Interviewee 4)

These ecosystems generate an array of life support services, including provisory, regulatory, cultural and supportive services, which sustain long-term socioeconomic well-being and continuity of life (Bennett et al., 2009). Furthermore, forest landscapes simultaneously produce multiple services that are complexly and dynamically interrelated (Sakai et al., 2016).

4. CONCLUSION

The interviews revealed that the population currently living in the surroundings of the “Parque Estadual da Serra Furada” (PAESF) makes few uses of palm species, and that most of these uses remain only in the memory of the informants and are no longer practiced. Nevertheless, the interviewees were satisfied and agreed with the creation of the Conservation Unit, because they are aware that the local biodiversity would probably disappear without it.

Regarding the palm species cited in this study, *Euterpe edulis* stands out as the most widely used species and it is the first to arise in the discourse of the interviewees, although it has been more often remembered for the predatory use of palm heart. The other species were cited as having non-timber uses, with less pronounced exploitation processes than that of palm heart and are sometimes not harvested

because they present future use, such as palm straw, tucum fiber, and coconut leaves.

Finally, it is worth noting that the results obtained assisted with understanding the importance of the PAESF and its surroundings to the interviewees, especially the palms, considering that these ethnosppecies were closely associated with the establishment and development processes of that community.

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