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Review

The palm tree *Syagrus oleracea* Mart. (Becc.): A review

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ABSTRACT

Syagrus oleracea (Mart.) Becc. is a palm tree (Arecaceae) indigenous to Central and Eastern Brazil. Its cultivation is projected as an excellent option for income diversification, based on the wide range of products that can be exploited, with an emphasis on the characteristic bitter-tasting hearts-of- palm. Due to its increasing economic importance, combined with the extractive exploitation of the species and the indiscriminate advance of deforestation in the region where the species is found, it is necessary to develop studies and technologies, including taxonomic and systematic characterization (morphological, phenotypic, molecular, chemical and reproductive), conservation of germplasm, and selection of superior genotypes, as well as to develop efficient propagation methods, in order to ensure conditions for the continuous and future development of genetic improvement efforts. Although it is a palm tree that is already cultivated, and with economic potential, this crop presents a significant deficit of technical-scientific knowledge at different points of its productive chain. Scientific studies and publications referring to the species are scarce, with a significant proportion of the literature written in Portuguese. The aim of this review is to compile the available information about the species, addressing several aspects of the plant and its potential applications, in order to increase its visibility on the part of different research groups.

1. Introduction

Brazil is home to the richest flora on the planet (Forzza et al., 2012; Myers et al., 2000) and presents a remarkable quantity of as yet undiscovered native and exotic fruit species with potential interest for agroindustry and income generation for local communities (Almeida et al., 2011). Several of these species, including different genera of the family Arecaceae, have been addressed in several studies, mainly related to the nutritional/sensorial properties (Borges et al., 2011; Nascimento et al., 2011; Silva et al., 2016; Silva et al., 2015; Vidigal et al., 2011) and oil-producing properties of the fruits (Iha et al., 2014; Moreira et al., 2013; Souza et al., 2016).

Among these genera, *Syagrus*, almost exclusive to South America and rather variable in morphological terms (Dransfield et al., 2008; Henderson et al., 1995; Noblick, 2010) stands out as the most representative in the Central region of Brazil, especially in areas of Brazilian Savannah [Cerrado] (Henderson et al., 1995). Some of its species are highly valued locally because of the various products they can provide, particularly *Syagrus oleracea* (Mart.) Becc., the only palm tree that produces bitter palm hearts among the species exploited commercially in Brazil (Nunes, 2010; Pinto et al., 2010).

Syagrus oleracea, popularly known as gueroba, is a palm tree typical of the Cerrado region, whose cultivation is projected as an excellent income diversification option for small and medium-sized growers. This species provides a wide range of useful products, such as the leaves used in animal feed (Almeida et al., 2000; Brandão et al., 2002), as well as fruits and seeds used in local cuisine or eaten fresh (Aguiar and Almeida, 2000; Diniz and Sá, 1995). However, its main product is the characteristic bitter-tasting palm heart, which has a prominent place, mainly in the Central region of Brazil (Lorenzi et al., 2004; Melo, 2000). This palm heart differs significantly from those produced by the genera *Euterpe* (Açaí and Juçara trees) and *Bactris* (Pupunha trees) (Hiane et al., 2011), which have a firmer texture and sweeter taste (Melo, 2000).

Although it is a palm tree that is already cultivated, and with economic potential, this crop presents a significant deficit of technical-scientific knowledge at different points of its productive chain. Furthermore, the present exploitation of gueroba has characteristics that are basically extractive, characterized by predatory exploitation, without control and without concern for the natural regeneration of this palm tree (Aguiar et al., 1996; Pinto, 2009), since in order to extract the palm heart, its main product, it is necessary to cut the stipe, causing the

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plant to die. Another important aspect related to this crop is the indiscriminate advancement of deforestation in the Mid-West region of Brazil, which can drastically reduce the genetic variability of the species (Dias, 2012; Nascente et al., 2000; Soares et al., 2013).

Despite the historical use of this palm tree, a limited number of studies and scientific publications are available for *Syagrus oleracea* and exclusively in Portuguese. The aim of this review is to compile the available information about the species, with an emphasis on aspects relating to the occurrence, taxonomy, molecular and phenotypic characterization, aspects of plant physiology as related to propagation, pests and diseases, chemical characterization of its fruits, ecological characterization, and potential applications.

2. Geographical distribution and taxonomy

Syagrus oleracea (Mart.) Becc., a monocotyledon species belonging to the Arecaceae family, Arecoideae subfamily, Cocoseae tribe, Attaleinae subtribe and *Syagrus* genus (Dransfield et al., 2008), is a palm tree native to Brazil, having — as the geographical distribution centers — the Eastern Region (States of Ceará, Paraíba, Pernambuco, Bahia, Minas Gerais, Espírito Santo, Rio de Janeiro, São Paulo and Paraná) and Central Region (States of Tocantins, Goiás, Distrito Federal, Mato Grosso, Mato Grosso do Sul) (Fig. 1) (Henderson et al., 1995; Lorenzi et al., 2010; Nascente et al., 2000).

Because of its extensive distribution, this palm tree has several regional names, such as guariroba, gariroba, gueiroba, gueroba, guarirova, gueirova, coqueiro-amargoso, catolé, pati-amargoso, palmito-amargoso, coco-catolé, coco-amargoso, coco babão, and jaguaroba (Henderson et al., 1995; Lorenzi et al., 2010).

The first complete morphological description of gueroba was made by Carl Friedrich Philipp von Martius, in his work titled “Historia Naturalis Palmaum” (Fig. 2) (Martius, 1826). In that publication, gueroba was mistakenly categorized within the genus *Cocos*, receiving the name *Cocos oleracea* (Mart.) (Martius, 1826). It was only in 1916 that a taxonomic revision was made, and gueroba was inserted within the genus *Syagrus*, as *Syagrus oleracea* (Mart.) Becc. (Beccari, 1916). Subsequently, in 1965, in the state of São Paulo, the species was

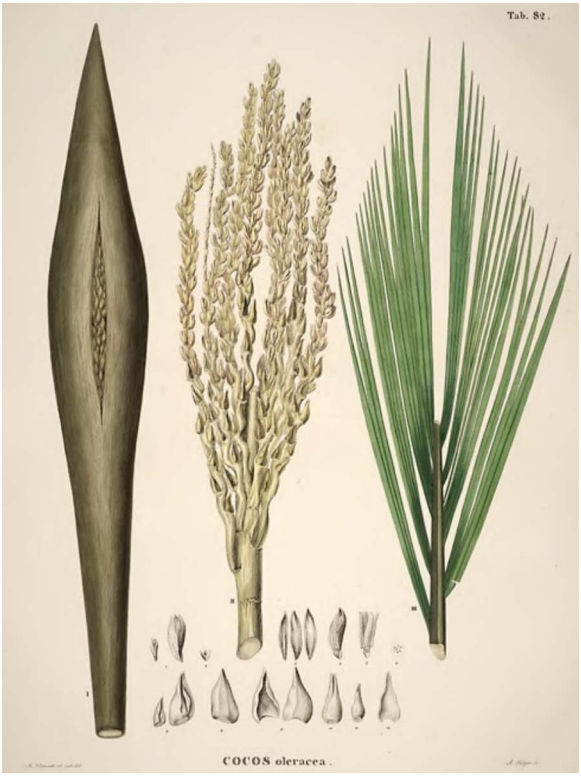

Fig. 2. Visual record of reproductive structures and leaf of *Syagrus oleracea* (Mart.) Becc., at that time known as *Cocos oleracea* (Mart.).
Source: Martius (1826).

Fig. 1. Geographical distribution of *Syagrus oleracea* (Mart.) Becc. within Brazil.
Source: Henderson et al. (1995), Lorenzi et al. (2010) and Nascente et al. (2000).