GROWTH ANALYSIS IN PRE-GERMINATED SEEDLINGS OF AÇAÍ (Euterpe oleracea Mart. - Arecaceae) - CULTIVATE POWERHOLE

https://doi.org/10.56238/sevened2025.001-007

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ABSTRACT

The açaí tree (*Euterpe oleracea* Mart.) is a palm tree native to the Amazon floodplains, with growing relevance in the national and international market, which has generated greater interest in its cultivation. Currently, the extractive exploitation of açaí has been partially replaced by agricultural crops on dry land, indicating the need for studies related to the species. In a sowing area of the Municipal Department of Agriculture and Rural and Economic Development (SEMADRE) of Cametá-PA, the growth analysis of the species *E. oleracea* (pellet) was carried out of the following parameters: stem height, radicle length, wet weight, dry weight, moisture content and absolute growth rate (ATT). Four plant collections (treatments) were carried out after the 45th day of sowing in the following

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periods: five (5), ten (10), fifteen (15) and twenty-five (25) days after emergence in sowing. In each period, 30 plants/treatment (time) were randomly collected, with 10 seedlings per replication. The samples were analyzed at Campus XVIII of the State University of Pará. The seedlings, without the seeds, were measured, weighed and dried in an oven at 80°C for 24 to 36 hours, until they reached constant weight. Most of the seeds showed air emergence after 30 days, in the stage called toothpick, with height ranging between 2.5 and 7.7 cm. In the first treatment (5 days), the mean values recorded were: radicle length of 5.43 cm, stem height of 5.81 cm, wet weight of 0.43 g and dry weight of 0.09 g. The TCA was 0.004 $g.day^{-1}$, indicating the average growth velocity. Based on the stem length, adjusted by linear regression, the ideal time to transplant the seedlings in polythene bags was estimated at 75.58 days. These results contribute to optimize the management of cultivation on dry land.

Keywords: Açaí. Growth. Seeds. TCA. Cultivate.

INTRODUCTION

The *Euterpe oleracea* Mart palm tree, known as açaí tree, belonging to the Arecaceae family is native to the Amazon region, occurring spontaneously in the states of Pará, Amapá, Maranhão, Tocantins and Mato Grosso, as well as other countries in South and Central America, such as Venezuela, Colombia, Ecuador, Suriname, Guyana and Panama (NOGUEIRA; FIGUEIRÊDO; MÜLLER, 2005). It is found naturally in lowland, igapó and terra firme soils, and is predominant in lowland soils (OLIVEIRA et al., 2002).

According to Nascimento, Novembre and Cicero (2007), the açaí tree has stood out economically for the market potential of its products, represented mainly by the heart of palm and the juice extracted from the fruit, whose consumption has grown a lot in the national and international market, which has generated demand for information for the cultivation of this species (SILVA JUNIOR et al., 2011).

In 2004, Embrapa made available to rural producers the BRS-Pará cultivar, which was obtained by three cycles of phenotypic selection practiced in the collection, in the collection of germplasm and in an isolated field. In the collection, the selection was carried out in matrices from 16 sites in the states of Pará, Amapá and Maranhão, and involved thousands of plants, of which 134 were selected, because they presented desirable characteristics for fruit production (OLIVEIRA & FARIAS NETO, 2004). This cultivar has the following main characteristics: high productivity, anticipation of the start of fruit production for 3 years, one year less than the other cultivars, in addition to the size of the plant being shorter, facilitating harvesting.

More recent studies have pointed to a new cultivar, commonly called chumbinho, this variety is found in some populations in the northern part of Marajó Island and the State of Amapá (EMBRAPA, 2002), whose main characteristic is to have small fruits, which can be purple or white, which has a greater amount of pulp and higher productivity per plant, and that it has been used in the production of seedlings of several municipal secretariats that promote agriculture in the interior of the State of Pará. However, studies that provide data on the growth of this cultivar are necessary to understand how the accumulation of phytomass occurs in seedling production and the genetic variability from segregation after seed planting.

Growth analysis techniques were developed at the beginning of the twentieth century by British researchers (BLACKMAN, 1919; BRIGGS; KIDD; WEST, 1920 *apud* PEIXOTO & PEIXOTO, 2004), and is based on the sequential measurement of the accumulation of organic matter in the plant, and its determination is usually made considering the mass of dry matter or phytomass (MARAFON, 2012). However, due to the

fact that this procedure is destructive, the plants taken as a sample at each time should represent the population under study (PEIXOTO & PEIXOTO, 2004).

The extractive exploitation of *Euterpe oleracea* Mart. has been partially replaced by crops in production fields (NASCIMENTO, NOVEMBRE AND CICERO, 2007), such as the one carried out in the Municipal Secretariat of Agriculture and Rural and Economic Development (SEMADRE) of the Municipality of Cametá-PA. Thus, this work aims to analyze the variation of plant growth of the species *Euterpe oleracea* Mart, more specifically of the cultivar chumbinho, from a quantitative analysis of the following parameters: stem height, radicle length, wet weight, dry weight and absolute growth rate (ATT).

METHODOLOGY

CHARACTERIZATION OF THE STUDY AREA AND SEEDS

The present study was carried out in the nursery of the Municipal Department of Agriculture and Rural and Economic Development (SEMADRE) of the Municipality of Cametá-PA, where the sowing of açaí seeds (*Euterpe oleracea*) of the cultivar chumbinho was carried out, in sowing containing a mixture of the following substrates: black earth, limestone and poultry litter, in the proportion 3:1:1 respectively. The seeds come from municipalities on Marajó Island and the seeds were mixed according to BRASIL (2013).

Figure 1 shows the emergence phases 30, 45 and 70 (Figures 1A, 1B and 1C, respectively) days after the emergence of açaí seedlings.

Figure 1 - Pre-germinated seeds of açaí (*Euterpe oleracea*) of the cultivar chumbinho at 30, 45 and 70 days after seedling emergence.

Source: Authors, 2024.

Most seedlings emerged from the shoot after 30 days of sowing, and the beginning of the collections for evaluation of the growth parameters was carried out 45 days after sowing, where 30 plants were collected per sampling period. The sampling periods were at 45, 50, 55 and 65 days after seedling emergence.

These seeds come from the municipalities of Afuá, Chaves and Anajás, having been produced by 45 trees from each municipality, totaling 135 plants, from which 5 evaluations were made. For such evaluations, João Tomé Neto, a researcher at EMBRAPA and father of this cultivar, did not carry out any type of previous treatment with the seeds, so they were sown naturally.

The collected material was taken to the Plant Production Laboratory of the State University of Pará - University Campus of Cametá (Campus XVIII), where the following variables were evaluated: caulicle height, radicle length and shoot dry mass.

The wet matter was weighed on a 0.0001 g precision scale, then all plant tissues (except the seeds) were subjected to a temperature of 80°C in an oven of forced air circulation for a period of 24 hours until it acquired constant weight, according to the recommendations of Vieira and Carvalho (1994) and subsequently weighed to obtain a constant weight. consequently, the dry matter weight of the test material.

DATA ANALYSIS

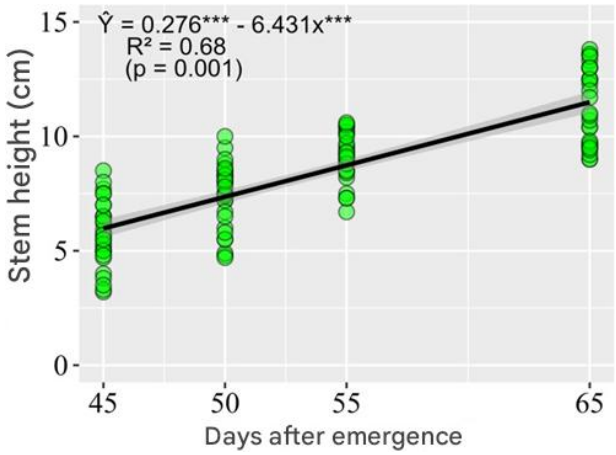
All data were evaluated for normality with the Shapiro-Wilk test and for the homogeneity of variances with the Levene test before proceeding with the analysis. The chronosequence of days was evaluated using simple linear regression, with time as the explanatory variable and the dependent variables as response variables.

RESULTS

It was verified in the first sampling that the seeds were in the development stage called stick, because the emergence of the leaves themselves had not occurred and the stems exhibited a thin and elongated shape with sizes ranging from 2.5 to 7.7cm, with an average radicle length of 5.43cm; height of the caulicle with an average of 5.81cm and dry mass with an average of 0.09g.

For the height of the caulicle, it was observed that there was a positive linear growth as a function of time (Figure 2). At 45 days after emergence, the seedlings of *E. oleracea* had an average height of 5.71cm, reaching 11.26cm in height at 65 days.

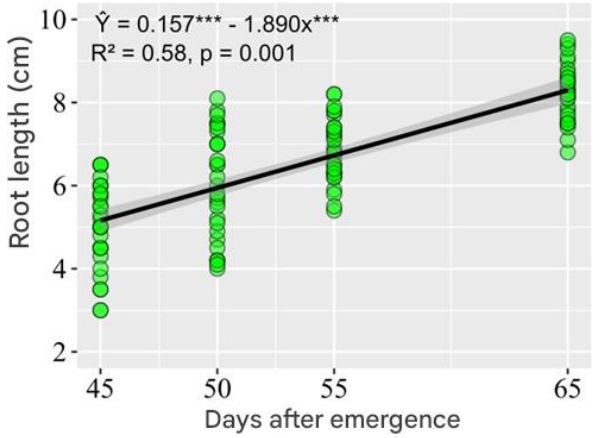
Figure 2 - Linear regression for stem height (cm) as a function of the days after seedling emergence of *Euterpe oleracea* cv. chumbinho.



Source: Authors, 2024.

Regarding root length as a function of time, a linear growth behavior was observed, where at 45 days the average root length was 5.03cm. At 65 days after emergence, the E. *oleracea* seedlings, the roots showed an average length of 8.21cm (Figure 3).

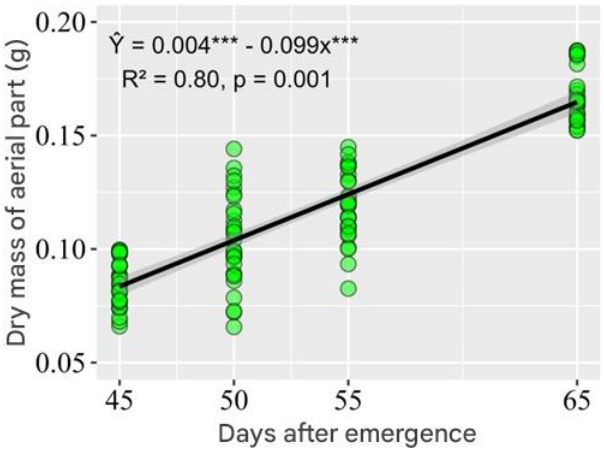
Figure 3 - Linear regression for root length (cm) as a function of the days after seedling emergence of *Euterpe oleracea* cv. chumbinho.



Source: Authors, 2024.

As the days went by, an increase in the dry mass of the aerial part was observed. In the first evaluation, at 45 days, the dry mass of the plants was equal to 0.09g. With the gradual increase, the dry mass reached 0.17g at 65 days after emergence (Figure 4), with a positive linear behavior for the shoot dry mass parameter.

Figure 4 - Results of linear regression for dry mass of the aerial part (g) as a function of the days after seedling emergence of *Euterpe oleracea* cv. chumbinho.



Source: Authors, 2024.

DISCUSSION

Regarding radicle size, Tomaz et al. (2011) highlight that pre-germination treatments in yellow açaí seeds allowed the obtaining of seedlings with a more developed root system. By analogy, it is inferred that the adoption of pre-germination treatments for açaí seeds could improve germination rates and favor initial growth, positively influencing dry mass and overall plant development, providing greater vigor to the plants.

In the last data collection, although the growth of the stem area of most seedlings was normal, a significant portion showed limited development, with caulicles measuring up to 1.3cm. This limitation may be related to the conditions of nutrient availability in the substrate, as some seeds fell in areas of the substrate richer in nutrients, while others may have remained in poorer regions, which hindered their growth.

The results indicate that, although the seeds have potential for development, unfavorable management conditions, such as sowing and lack of uniformity in the substrate, can significantly compromise seedling growth. Thus, it is recommended to apply pre-germination treatments, such as scarification and indirect control, in addition to the standardization of the substrate, in order to provide adequate conditions for nutrition and fixation of the plants.

The growth of *E. oleracea* seedlings was influenced by the substrate and nutrient distribution, resulting in variations in development. Therefore, these results show the need for optimized management to enhance seedling production and the sustainable cultivation of this cultivar.

CONCLUSION

The seedling growth analysis of *E. oleracea* cv chumbinho revealed that the absolute growth rate (ATT) was 0.004g.day^{-1}, indicating an average growth speed, and based on the stem length parameter, adjusted by linear regression, the ideal time to transplant the seedlings in polyethylene bags was estimated at 75.58 days, These results contribute to optimize the management of cultivation on dry land.

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