EFFECT OF THE STORAGE PERIOD ON THE PHYSIOLOGICAL QUALITY OF CAGAITA SEEDS *(Eugenia dysenterica DC.)*

ABSTRACT

Cagaita seeds quickly lose their germination power when stored in the natural environmental conditions of the Cerrado. Like most native Cerrado species, data on more favorable seed viability conservation conditions are still quite scarce. The experiment was carried out in the greenhouse of the Federal Institute of Education, Science and Technology of the Tocantins in the city of Gurupi - TO, between November 5, 2019, and March 7, 2020. Cagaita seeds (*Eugenia dysenterica* DC.) were used to perform it. The treatments applied to the seeds consisted of five sowing times, at intervals of three days. In general, the evaluated characteristics showed sensitivity by indicating differences between sowing times, where the highest values, root, and shoot length were obtained when the seeds were sown on 11/05/2019 (12.8 cm; 10.2 cm), respectively, and lower at sowing of 11/17/2019 (7.8 cm; 7.0 cm), respectively. The values obtained from the first emergency count allowed us to differentiate the sowing times at vigor levels, they were influenced by the sowing times. Cagaita seeds, sowing soon after fruit collection, showed higher viability and vigor.

Keywords: germination, viability, vigor, and cagaita.

INTRODUCTION

The *Eugenia dysenterica* DC. (Myrtaceae), popularly known as "Cagaita" or "Cagaiteira", is a fruit tree native to the Cerrado up to 10 meters (m) high, with trunk and tortuous branches, thick bark, and fissured. The fruits have a globose shape, bagaceous, light yellow color, mild acid, membranous epicarp, weighing between 14 to 20 g, length from 3 to 4 centimeters (cm), and diameter of 3 to 5 cm [1, 2, 3]. Cagaita is used as a honey, ornamental, and wood supplier in the tannery, food, and medicinal industry [4].

Because it is typical of the Cerrado, it is resistant to environmental stress conditions and has relatively fast germination. Its seedlings develop better in areas of the full sun [5], have a preference for substrates based on sand and clay [6], have growth in height and slow diameter [7], and have interesting characteristics in the selection of species used in environmental recovery programs. However, its seeds have recalcitrant behavior [8], which makes storage difficult. They require appropriate storage techniques because they are sensitive to desiccation and low temperatures [9].

Seed quality is determined by genetic, physical, physiological, and sanitary factors [10]. The storage aims to maintain as much as possible the physiological quality of the seeds so that they still perform well in the field after storage [11].

Cagaita seeds quickly lose their germination power when stored in the natural environmental conditions of the cerrado. Like most native cerrado species, data on more favorable seed viability conservation conditions are still quite scarce. On the other hand, these data would help to define storage conditions that can favor seed conservation over a longer period [12].

This study aimed to evaluate the effect of storage on the physiological quality of cagaita seeds.

MATERIAL AND METHODS

The experiment was carried out in the greenhouse of the Federal Institute of Education, Science and Technology of the Tocantins in the city of Gurupi - TO, between November 5, 2019, and March 7, 2020. To perform it, seeds of Cagaita (*Eugenia dysenterica* DC.) were used, taken from the fruits that were collected in the rural region of the municipality of Peixe - TO.

The treatments applied to the seeds consisted of five sowing times, at intervals of three days. The harvested fruits were stored in a bucket and kept at room temperature in the shade. For each sowing season, the fruits were separated and pulped for seed removal. In the pulping, the fruits were washed in a fine mesh sieve with running water, to facilitate the separation process of the seed from the rest of the adhered pulp. Then, the seeds were immersed in a mixture containing 5 milliliters of sodium hypochlorite diluted in 1 liter of water for 5 minutes and then placed on a paper towel for 12 hours for the removal of excess water.

For seed sowing, a black earth substrate was used, divided into 5 plastic trays, one for each treatment. Being used 100 seeds for each treatment, divided into 4 replications with 25 seeds each. All trays with substrates already soed were submitted to two irrigations per day throughout the seedling formation period.

From the installation of the experiment, the procedure of data collection and evaluation was initiated. The following characteristics were evaluated: Length of the root (RL) and shoot (SL): the seedlings were removed from the trays and with the aid of a ruler graduated in centimeters, measured from the apical yolk to the end of the apical root, and measuring from the neck to the apex of the seedling. The results were expressed in cm, according to Nakagawa recommendations (1994) [13]; root dry mass (RDM) and Shoot dry mass (SDM): seedlings were removed from substrates, cut and separated into root and shoot, then placed in paper bags properly identified according to the storage period, taken to a regulated greenhouse at a temperature of 65 ºC, where they remained until they reached constant weight. The results were expressed in grams per repetition, according to Nakagawa recommendations (1994) [13]; Number of leaves (NL): after seedling removal, the number of leaves was counted. The results were expressed in unity; First emergence count (FEC): the first emergency count was performed 15 days after sowing. The data collected were corresponding to the accumulated percentage of normal seedlings, with values recorded for each treatment; Seedling emergence (SE): The count of the number of germinated seeds started 21 days after sowing and extended to seedling emergence stabilization. The criterion used was that of normal seedlings that presented the perfect essential structures [14], and the results were expressed in percentage. The data were submitted to variance analysis and the means were compared by the Tukey test, using the Statistical Program Sisvar.

RESULTS AND DISCUSSION

In general, the evaluated characteristics showed sensitivity by indicating differences between sowing times (Table 1), where the highest values, root, and shoot length were obtained when the seeds were sown on 11/05/2019 (12.8 cm; 10.2 cm), respectively, and lower at sowing of 11/17/2019 (7.8 cm; 7.0 cm), respectively. Gomes et al. (2002) [15], state that the variable shoot length makes it possible to estimate the morphological quality of seedlings as a function of its measurement being easy and present in good contribution to the determination of quality.

Table 1 - Root length (cm), shoot length (cm), root dry mass(g), dry mass part of the air (g), number of leaves (un), first emergency count (%), and seedling emergence (%) of Cagaita, in five storage periods, IFTO - TO, 2019/2020.

Treatments	RL	SL	RDM	SDM	NL	FEC	SE
05/11/2019	12,8a	10,2a	1,8a	1,6a	2a	17a	62a
08/11/2019	9,5ab	8,8ab	0,8ab	1,1ab	2a	13ab	51ab
11/11/2019	9,3ab	8,7ab	0,8ab	1,2ab	2a	12ab	49ab
14/11/2019	9,2ab	8,6ab	0,8ab	1,1ab	2a	12ab	47ab
17/11/2019	7,8 b	7,0 b	0,4 b	0,5 b	2a	10 b	44ab
C.V (%)	6,6	3,8	4,1	3,6	1,1	8,1	18,3

CV - Coefficient of variation. Averages followed by the same letter in the column do not differ from each other by the Tukey test at 5%.

Regarding the highest values of the dry mass of the root and shoots (Table 1), they were obtained at the sowing of 11/05/2019 (1.8 g; 1.6 g), intermediate value in the sowing of 11/08/2019 (0.8 g; 1.1 g), 11/11/2019 (0.8 g; 1.2 g), 11/14/2019 (0.8 g; 1.1 g) and lower value at sowing of 11/17/2019 (0.4 g; 0.5 g). To [16] Alves et al. (2008), slow dehydration can cause damage to the structure of membranes in recalcitrant seeds, because, in addition to allowing recalcitrant seeds to stay longer with high initial water content, they allow an intense respiratory process that degrades the reserve substances and increases heat release. This process also transforms the seed into an excellent medium for the proliferation of microorganisms [11]. On the other hand, the number of leaves was not an efficient characteristic in differentiating viability and vigor, since there was no significant difference between the different sowing times.

The values obtained from the first emergency count (Table 1) allowed to differentiate the sowing times at vigor levels, i.e., they were influenced by the sowing times. The seeds were more vigorous when sowing on 05/11/2019 (17%). It was also verified that the sowing of 11/17/2019 reduced force (10 %).

The data regarding seedling emergence as a function of sowing time (Table 1) once again stood out the seeds of Cagaita sowing on 11/05/2019 (62%). Previero et al. (2021) [17], working in the same region, with germination of Cagaita seeds as a function of seed moisture, found seedling emergence ranging from 20% to 90 %.

Intermediate results were obtained in the sowing on 08/11/2019 (51 %), 11/11/2019 (49 %), 14/11/2019 (47 %), and lower at sowing on 17/11/2019 (44

%). Probably, the lack of control of seed moisture, even inside the fruits and stored under environmental conditions, affected the physiological quality of Cagaita seeds. Previero et al. (2021) [17], also found a reduction in the viability and vigor of Cagaita seeds with the reduction of seed moisture. Germination occurs in a sequence of physiological events influenced by external (environmental: light, temperature, water, and oxygen availability) and internal (inhibitors and germination promoters) factors to seeds, which can act for themselves or in interaction with the other [18-20].

CONCLUSION

Cagaita seeds, sowing soon after fruit collection, showed higher viability and vigor.

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