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Research Paper

SEED GERMINATION OF *Eriotheca gracilipes (*K. SCHUM.) A. ROBYNS.

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Abstract

The Brazilian Cerrado presents great number of these useful species, especially *Eriotheca gracilipes* (K. Schum.) A. Robyns. The aim of this study was to evaluate the effect of temperature on germination of *E. gracilipes* seeds. The experimental design was completely randomized with seven constant temperatures as treatments (5, 10, 15, 20, 25, 30, 35, 40 °C) and four replications. The results were submitted to analysis of variance at 5% probability by F test and polynomial regression analysis. There was no germination at temperatures of 5 °C and 40 °C, but the emission of primary roots was observed in all other temperatures used. Germination started on the fourth day after sowing at a temperature of 35 °C. At the temperature of 10 °C was slow and gradual germination, beginning in the twenty-seventh day after sowing. The point of maximum germination percentage (85.72) took place at a temperature of 27.85 °C and the minimum point of the average germination time (5.6) was observed at a temperature of 33.15 °C. The most suitable temperature for *Eriotheca gracilipes* germination is 30 °C and temperatures below 10 °C and above 40 °C are unfavorable.

Key words: Paineira, average germination time, temperature.

INTRODUCTION

Germination is the resumption of the embryo's metabolic activity with its development and the emergence of seedling to become independent seed reserve [1, 2]. This process is affected by many factors that are classified as internal (intrinsic, such as longevity, viability, genetic make-up) and external, related to environmental conditions such as humidity, temperature, light and oxygen. Temperature is one of the main factors and influences the overall germination and speed of germination, it interferes with the rate of absorption of water and in determining biochemical reactions in the germination process [3].

Germination occurs within certain limits of temperature, being the ideal temperature that occurs when maximum germination in the shortest time [1, 2]. For tropical species, the best temperature range is usually between 20 and 35 °C [4]. Above and below the maximum and minimum limits, respectively, can occur death of the embryos. The temperature of 25 °C is optimal for seed germination of most Brazilian tree species [5].

However, there are few basic information about the best conditions for the germination of Cerrado species, taking into account the varied flora found in this biome [5, 6]. Among these species with little information is *Eriotheca gracilipes* (K. Schum.) A. Robyns, the Malvaceae family, which takes place in the Atlantic Forest, Cerrado and transition to broadleaved forest semi-deciduous, in the states of Mato Grosso Sul, Goiás, Mato Grosso, Minas Gerais, São Paulo, Rio de Janeiro and Espirito Santo [7].

Eriotheca gracilipes is a semi-deciduous tree species, heliophile and characteristic of secondary formations, with light wood and little resistant, used in the manufacture of liners, crates and cellulosic and recommended folder for landscaping and reforestation [7], with its fruit serving as food for wildlife, especially parrots [8], as well as having use in folk medicine [9].

The aim of this study was to evaluate the effect of temperature on germination of *Eriotheca gracilipes* seeds.

MATERIAL AND METHODS

The fruits were collected from adult trees of *Eriotheca gracilipes* in Rondonopolis, Mato Grosso State and then the seeds were removed and the kapok of each seed was eliminated. The experiment was carried out in Ecology Laboratory, Agricultural Engineering and Animal Science of the Federal University of Mato Grosso, Rondonópolis campus, in the period June-July 2014.

The experimental design was completely randomized with eight constant temperatures as treatments (5, 10, 15, 20, 25, 30, 35 and 40 °C) and four replications. Each plot consisted of 50 seeds placed clear plastic box type gerbox having as paper substrate germitex and placed in germination chambers. The variables analyzed were percentage, germination speed index and average germination time. The results were submitted to analysis of variance to 5% probability by F test and polynomial regression analysis.

RESULTS AND DISCUSSION

The newly harvested seed of *Eriotheca gracilipes* showed 12.9% water content. The value found is close to the said other species of the same genus, *Eriotheca pubescens* (Mart. & Zucc.) Schott & Endl., with 11.1% and other species of the Malvaceae family as *Apeiba tibourbou* Aubl., 10% or *Guazuma ulmifolia* Lam., 10% [10] (Salomão et al., 2003). The seeds of some species of the Malvaceae family (eg Bombacaceae) as *Chorisia speciosa*, may have high initial moisture, but not characterized as recalcitrante [10].

The issue of primary root was observed at all temperatures used, with the exception of temperatures 5 to 40 °C (Figure 1). The root protrusion began on the fourth day after seeding at a temperature of 35 °C on the fifth day at 30 °C and on the sixth day at 25 °C. Moreover [11] found that at 25 °C germinate the seeds of the species on the fourth day.

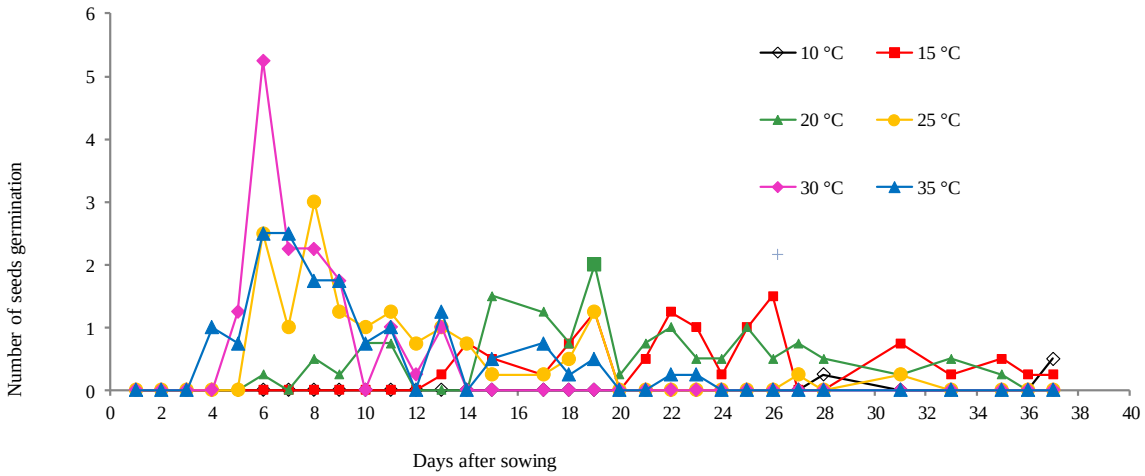

Figure 1. Daily number of germinated seeds of *Eriotheca gracilipes* at different temperatures. Cuiabá, Mato Grosso, Brazil.

The germination period was four to thirty-seven days, different results cited by [12], wherein the seed species germinated between 6 and 12 days, and [11] indicated that the period between four and ten days. The higher germination rate (80%) occurred at 35 °C. The point of maximum germination percentage (85.72) took place at a temperature of 27.85 °C and the minimum point of the average germination time (6.37) was observed at a temperature of 33.15 °C (Figure 2 and 3).

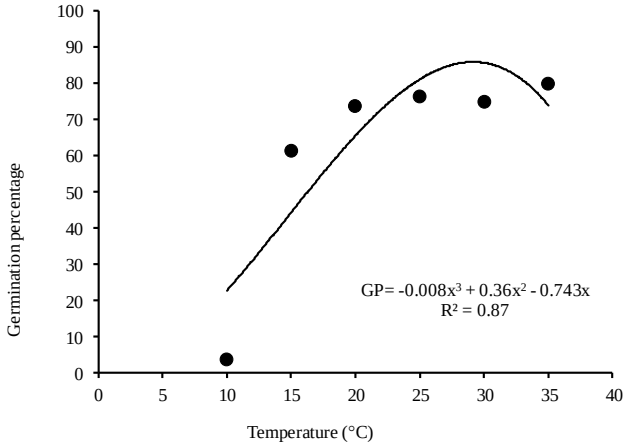

Figure 2. *Eriotheca gracilipes* germination percentage at different temperatures. Cuiabá, Mato Grosso, Brazil.

At the temperature of 10 °C was slow and gradual germination, beginning in the twenty-seventh day after sowing. Late germinating at lower temperatures was similarly observed in *Tibouchina benthamiana* seeds and *T. moricandiana* [13), *Senna macranthera* [14), *Guazuma ulmifolia* [15] and *Magonia pubescens* [16]. The breathing intensity is highest when the temperature is raised, so at lower temperatures the germination process is slower, so the gradual reduction of temperature due to the effects on the speed of imbibition and mobilization of reserves, causes sharp decrease of germination rate [2].

Lower temperatures or higher than optimal tend to slow down the germination process, exposing the seedlings for a longer period of adverse factors [17]. Optimal at lower

temperatures have the same effect tending to reduce the speed of germination and growth process [1]. Among the tested temperatures 5 to 10 °C more negatively interfere in the growth process, not allowing the germination and development, respectively.
With respect to the effect of germination, evaluated indirectly by mean time and germination speed (Figures 3 and 4), the best temperature condition was 30 °C, with the highest speed (3.03) and lower germination time (5.6 days), while other temperatures decreased vigor, increased germination time. The highest mean germination time at lower temperatures of 10, 15 and 20 °C with 31, 21 and 17 days respectively indicating how much the speed of germination is reduced by these temperatures.

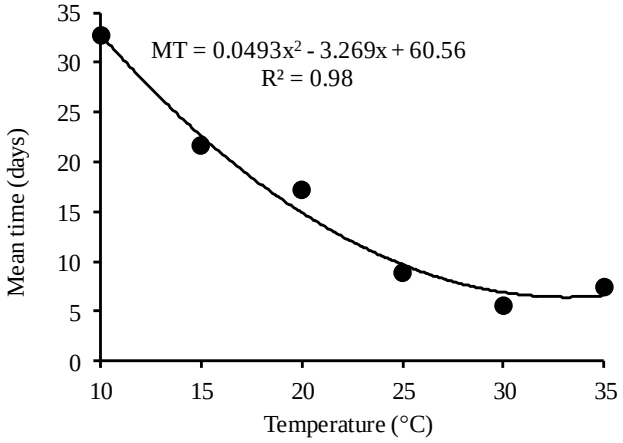

Figure 3. Mean time of *Eriotheca gracilipes* germination at different temperatures. Cuiabá, Mato Grosso, Brazil.

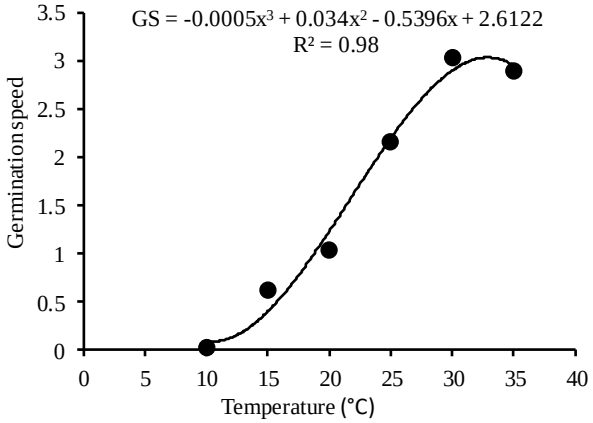

Figure 4. *Eriotheca gracilipes* germination speed at different temperatures. Cuiabá, Mato Grosso, Brazil.

For most tree species in Brazil to 25 °C followed by 30 °C is best suited for germination, and the species of the savannah would have great germination temperature around 25 °C [5]. However, considering all evaluated characteristics, the temperature of 30 °C may be the most suitable, because the seeds had higher germination speed (3.03) and lower average time (5.6 days) although the germination percentage (75%) was lower than the percentage at 35 °C (80%).

CONCLUSIONS

The most suitable temperature for *Eriotheca gracilipes* germination is 30 °C and temperatures below 10 °C and above 40 °C are unfavorable.

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