Effect of Temperature on Seed Germination of Queen Palm *Syagrus romanzoffiana* (Cham.) Glassman (Arecaceae)

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**Abstract**

The *Syagrus romanzoffiana* is a specie of the Arecaceae family, native of Brazil, frequently used in landscape architecture. Its propagation is by seeds, however, there is little information in the literature about seed germination of this ornamental palm. The objective of this work was to study the effects of temperatures on seed germination of *Syagrus romanzoffiana*. The experimental design used was entirely randomized, with six temperatures (20°C, 25°C, 30°C and 35°C, constant and 20-30°C and 25-35°C alternated), photoperiod of 12 hours, and five replications of 20 seeds each. The seeds were placed in plastic boxes with sand, counting daily germination until 43rd day. The percentage of seed germination (43rd day) and the speed germination index (SGI) were evaluated. The conclusion was that there was no germination at a constant temperature of 20°C and in the alternated temperature of 20-30°C; the higher germination percentages were verified in the constant temperatures of 30°C and 35°C that didn't differ statistically from the temperature of 25-35°C. The germination was faster at a constant temperature of 30°C.

**INTRODUCTION**

Palms are notorious for the slow and uneven seed germination (Meerow, 1991). The germination process is influenced by several factors such as temperature, seed maturity, physical dormancy and substratum, among others. In general, palms require high temperatures for the most rapid and uniform germination of their seeds (Meerow, 1991).

There is variation in the indication of the ideal temperature for seed germination for different palm species. In general, for several species, the best results can be obtained between 30°C and 35°C (Meerow, 1991), 25°C and 35°C (Broschat, 1994) and 24°C and 28°C (Lorenzi et al., 1996).

Broschat and Donselman (1986), studying seeds germination of *Dypsis lutescens* in different temperatures verified that best results were obtained in the alternated temperature of 30-35°C.

Carpenter (1988) studied the temperature limits for seed germination of four palm species (*Acoelorrafe wrightii*, *Coccothrinax argentata*, *Sabal etonia* and *Thrinax morrisii*) and observed that the temperature of 35°C promoted better germination, and concluded that 5°C to 10°C above or below 35°C, frequently delayed and reduced the germination and turned it irregular.

Aguiar et al. (2001) observed for *Rhapis excelsa* that the best results for seed germination were obtained at the constant temperature of 25°C.

The Queen Palm (*Syagrus romanzoffiana*), belonging to the Arecaceae family, is the native palm of Brazil more used in landscape (Lorenzi et al, 1996). Although its propagation is by seeds, there is as little information in the literature about the seeds germination of this species, as ther is about the temperature that can provide better germination. Therefore, the objective of this work was to study the effects of temperature on seed germination of this species.

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MATERIAL AND METHODS

This research was carried out in the Laboratório de Sementes, Departamento de Produção Vegetal, Universidade Estadual Paulista, Faculdade de Ciências Agrárias e Veterinárias, Campus de Jaboticabal, UNESP/FCAV.

The experimental design used was entirely randomized, with six temperatures (constant temperatures of 20°C, 25°C, 30°C and 35°C, and alternated temperatures of 20-30°C and 25-35°C), photoperiod of 12 hours and five replications of 20 seeds each.

The fruits were collected on April 30, 2002 (this species has many fruits on first semester), of eight plants located in the Campus of FCAV/UNESP. The fruits were collected totally ripening, distinguished by their yellow color. The medium diameter of 100 fruits were 2.9cm and the medium weight were 639gr. Seeds were presoaked in water to facilitate the removal of the mesocarp (pulp).

The seeds were placed in plastic boxes with sand (60% of humidity, placing water according to weight in each three days), according to the Rules for Analysis of Seeds (Brasil, 1992). According to the treatment, they were placed under controlled conditions of temperature.

The number of germinated seeds was accomplished every day to determine the germination percentage, calculated according to the Rules for Analysis of Seeds (Brasil, 1992) and the speed germination index (SGI), as recommended by Maguire (1962).

The germinated seeds (germinative button) were counted daily until 43rd day. The percentage of seed germination (43rd day) and the speed germination index (SGI) were evaluated. The germination percentage data were transformed in angular values (arc sen (x/100)^1/2) before statistical analysis. No transformation was need for SGI data. Variance analysis was performed and treatment averages were compared using Tukey’s test at 5% probability (Banzatto and Kronka, 1992).

RESULTS AND DISCUSSION

It was observed that there was no germination in the constant temperature of 20°C and in the alternated temperature of 20-30°C; the higher germination percentages were verified in the constant temperatures of 30°C and 35°C that didn't differ statistically of alternated temperature of 25-35°C. The germination was faster at a constant temperature of 30°C (Table 1)

Low temperature is probably a limiting factor for *Syagrus romanzoffiana* germination, because, when the seeds were placed in the temperature of 20°C, there was no germination. This result is in agreement with some authors for several species of palms (Broschat and Donselman, 1986; Meerow, 1991; Broschat, 1994).

This shows that, although most of the palm are of tropical origin, whose seeds generally germinate, naturally, in higher temperatures, cannot generalize the recommendation, having, besides, differences among constant or alternate temperature. For each species, a separate study is necessary to determine the temperature that provides the best result, whereas, as observed in Table 1, a difference of 5°C can reduce the percentage of germination of 79% (30°C) for 43% (25°C).

Literature Cited


Science. 111: 872-877.
Maguire, J.D. 1962. Speed of germination aid in selection and evaluation of seedling emergence and vigor. Crop Science, 2 (1): 176-177,

Tables

Table 1. Variance analysis (mean squares) and treatment means for germination percentage and speed germination index (SGI) for Syagrus romanzoffiana seeds. Jaboticabal, SP, 2003.

<table>
<thead>
<tr>
<th>Sources of Variation</th>
<th>DF</th>
<th>Germination (%)</th>
<th>SGI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>5</td>
<td>4365.90**</td>
<td></td>
</tr>
<tr>
<td>Residue</td>
<td>24</td>
<td>60.10</td>
<td></td>
</tr>
<tr>
<td>CV (%)</td>
<td></td>
<td>21.06</td>
<td></td>
</tr>
</tbody>
</table>

** (P<0.01) – Significant at 5% level by Tukey’s test.

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Germination (%)</th>
<th>SGI</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 °C</td>
<td>0.00 c</td>
<td>0.0000 d</td>
</tr>
<tr>
<td>25°C</td>
<td>42.89 b</td>
<td>0.3694 c</td>
</tr>
<tr>
<td>30°C</td>
<td>79.40 a</td>
<td>1.2190 a</td>
</tr>
<tr>
<td>35°C</td>
<td>76.86 a</td>
<td>0.8978 b</td>
</tr>
<tr>
<td>20-30°C</td>
<td>0.00 c</td>
<td>0.0000 d</td>
</tr>
<tr>
<td>25-35°C</td>
<td>68.20 ab</td>
<td>0.5412 c</td>
</tr>
</tbody>
</table>

381