Development of four genera of orchids in open and closed environment in the Sertão Paraibano

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ABSTRACT
In this work we verified the survival among orchids in two types of environments, performing the tests with four genera Phalaenopsis, Cattleya, Cymbidium and Dendrobium. the environments that were arranged the plants, were greenhouse protected with shading, and open environment that in this case had as host plants trees of Neem (Azadirachta indica) and Juazeiro (Ziziphus joazeiro), were placed in pots and fixed at a height of approximately 1.5 meters. Climate of 20 oC of minimum and 38 oC, in the region of Sousa-PB in the District of Pereiros in a private orchid garden. The same type of substrates were used in both environments, coconut fiber, in the analysis were observed number of live stems, number of leaves, number of flowers, number of fruits, number of tillers and number of dehydrated stems. The tests verified that the genus Phalaenopsis had better development in both types of environments, however there was no significant difference between environment x genus, but the plants arranged in the experiment had good results, of survival, not being verified death of any specimen, with no loss of the material.

Keywords: Orchids, Plants, Environment.

1 INTRODUCTION

Among the ornamental flowers, orchids stand out for possessing in addition to beauty, medicinal, cosmetic and food characteristics. (WANG & LEE, 1994; GRIESBACH, 1995 apud MARAL et al., 2010; KUMARIA AND TANDON, 2001 apud AMARAL et al., 2010; VENTURA, 2007). The vast majority of orchids adapt to the aerial environment and are thus known as epiphytic plants. About 73% of the species live on epiphytism (ATWOOD, 1986), and can still be found in terrestrial or rupestrian environments when residing in rocks (GIULIETTI et al., 2009). For several authors (VAN DER PIJL and DODSON, 1966; Dressler, 1993; ARDITTI, 1992), the adaptation to different environments and different pollinators contributed to the orchids developing a great variety

of vegetative and floral structures. According to DRESSLER (1993), there is greater structural diversity in the vegetative parts, related to different adaptations to obtain resources such as water, light and nutrients (BENZING, 1990). The flowers stand out for their size, shape, diversity and combination of colors, characteristics that contribute to their popularity and appreciation by collectors (PINHEIRO et al, 2004).

Orchids, due to their characteristics that most can live on other plants, maintaining a relationship of tenantism, have a root system that have aerial roots that have the function of attaching to trunks and branches of trees, as well as absorbing moisture from rain, humidity of the air and dew of the night, as well as absorbing nutrients from waste that accumulate in the trunks (AMARAL, 2007). The root system makes it possible to store water in periods of greater availability by means of a tissue called velame. This tissue coats the roots of the plant, housing mycorrhizal fungi that help in their nutrition. Velame has an adaptation mechanism that acts as a physical barrier to dehydration and root transpiration during periods of water deficit (PAULA; Smith, 2001). Each species of orchid requires different temperatures, there are those that adapt better to tropical climates and temperate climates, given that most can develop at high temperatures (OLIVEIRA, 2017).

Orchids need temperature, luminosity and adequate rainfall to thrive. According to YAMASAKI (2016), the ideal average temperature for **Cattleya** species is 23 to 27 degrees Celsius, but in general they tolerate higher temperatures well, provided that the luminosity is reduced and the humidity of the air is higher. The ideal relative humidity for these orchids is 50-80%. There may be human interventions to improve these moisture conditions with green manure and gravel around the plant so that it can retain more moisture. However, for the **Cymbidium** species that adapts better to mild temperatures, however it is essential that there is sufficient humidity and a relatively good air circulation (OLIVEIRA, 2017).

The species of the genus **Dendrobium** can adapt to different types of climate, present a great diversity of species and hybrids from the crossing of species of this genus with species of other orchid genera. They are easy plants to decultivate, presenting a large number of flowers in the flowering period (SORGATO et al., 2015). According to Oliveira (2017), they require 30 to 40% shade, from late spring to autumn, for their growth to be healthy. As an adult, it does not need shade unless the leaves begin to show signs of sunburn. The orchids of the genus **Phalaenopsis**, are plants that develop well in temperatures ranging between 13 and 35º C. In recent years, species of this genus are among the most sought after by orchid producers due to their high commercial value, rapid growth, flowering in much of the year and the great diversity of colors, shapes and sizes (AMARAL, 2007). According to Ferreira (2018), it is considered one of the species that best adapts to the tropical climate, so it can withstand higher temperatures. In view of the above, the objective of this study was to evaluate the development of four genera of orchids in two types of environment, open environment and greenhouse.

2 METHODOLOGY

The work was carried out during the period from April to May 2019, in an orchidarium located in the Pereiros District, municipality of Sousa, PB (226 m altitude, south latitude of 6º40'13" and west longitude of 38º18'18"). During the experimental period, the region had as climatic characteristics: according to the Köppen classification, the climate is of the Bsh (hot) type, with temperatures ranging between 22º C and 32º C (minimum and maximum temperature, respectively) and average around 26° C; relative humidity of 80%; average daily luminosity in the period of 9 hours and rainfall index of 264 mm (CLIMATE DATA, 2019). The treatments consisted of the grouping of four genera of orchids to study the morphological characters of the genera Phalaenopsis, Cattleya, Cymbidium and Dendrobium, under two environmental conditions (open and protected). The plants were grown in the environments under the same conditions in pots and affixed at a height of approximately 1.5 meters in trees of Neem **(Azadirachta indica**) and Juazeiro (**Ziziphus joazeiro**), having as substrate for their development the coconut fiber from the grinding of its bark.

The design used in the experiment was completely randomized (DIC), in a factorial scheme 2 x 4 x 25 that consisted of two environments (open and greenhouse), four genera and 25 replicates (plants), where each plant was considered an experimental unit. The survey of the characters carried out in the form of individual evaluation evidenced the study of the characteristics: number of live stems (NHV), number of leaves (NF), number of flowers (NFL), number of fruits (NFR), number of tillers (NP) and number of dehydrated stems (NHD). The collected data were tabulated and submitted to analysis of variance and the means were compared by means of Tukey's test at the level of 5% probability (BANZATTO and KRONKA, 2006) through the SISVAR 9.0 software (FERREIRA, 2014).

3 RESULTS AND DISCUSSION

There was no significant interaction for the relationship between environment and orchid species ($p \leq 0.05$). Significant differences at the level of 5% probability (Tukey's test) were observed between the species for the evaluated characteristics, number of live stems (NHV), number of leaves (NF), number of flowers (NFL), number of fruits (NFR), number of tillers (NP) and number of dehydrated stems (NHD). For the (NHV) the species Phalaenopsis presented the best result (0.95), Cymbidium and Cattleya both obtained the same result (0.70), while Dendrobium obtained the lowest result with (0.60) among the others analyzed.

For (NF) the genus Phalaenopsis obtained the best development (5.50), and the others presented the lowest development index for this variable; Dendrobium obtained 2.95, Cymbidium 2.15, and Cattleya 1.40. As for (NFL) all genera submitted to analysis showed significant results Dendrobium (090), Phalaenopsis (0.85), Cymbidium (0.25), and Catlleya (0.15). In the analysis of (NFR) the genus

Phalaenopsis resulted in 1.60, being the best for this aspect, the other species of Cymbidium (0.50), Dendrobium (0.20), Cattleya (0.00). In the avliation of (NP) Cattleya, it was successful (2.05), Dendrobium with (1.05) being the second genus that did better in this aspect, and Cymbidium (0.45), Phalaenopsis (0.05), had distant results. Finally, for (NHD) the genus with the highest appearance of dehydrated stems was the genus Dendrobium (1.65), the others presented lower results Cymbidium with (0.55), Cattleya (0.15) and Phaleanopsis (0.00).

4 FINAL CONSIDERATIONS

Among the genera analyzed, the plants of the genus Phalaenopsis presented better vegetative development in both environments. And there was no significant difference in relation to environments for all genders. However, all of them adapted – although well in both environments, with no loss of vegetative material, which made it possible to carry out the research and obtain the results.

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