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SEEDLING PRODUCTION OF YELLOW MARACUJA IN DIFFERENT TYPES OF PROTECTED ENVIRONMENT

PRODUÇÃO DE MUDAS DE MARACUJA AMARELO EM DIFERENTES TIPOS DE AMBIENTES PROTEGIDOS

Mirian Nomura*[1], Mozart de Mattos Silveira Borges[2], Matheus Vinicius Abadia Ventura[3], Estevam Matheus Costa[3], Muriel Silva Vilarinho[2], Jeovane Nascimento Silva[3], Régila Santos Evangelista[4], Louhanny Carvalho Machado[4]

*[1]Universidade Federal de Uberlândi; * miriannomura@gmail.com*
[2]Universidade Estadual de Minas Gerais
[3]Instituto Federal Goiano
[4]Universidade Federal do Oeste da Bahia

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Abstract

The objective of this work was to evaluate the production of yellow passion fruit seedlings in protected environments composed of different photoselective screens. The work was developed at the UEMG, unit Ituiutaba and started in May and was evaluated in June 2018. The treatments consist of different types of protected environment: T1-Open Sky; T2 - Black Screen (mesh for 30% shade); T3 - White Screen (mesh for 20% shade); T4 - Blue Screen (mesh for 20% shade) and T5 - Red Screen (mesh for 20% shade). The experimental design was a randomized complete block design with four replications, ten plants per experimental plot. The analysis of the germination content, chlorophyll a and b, number of leaves, leaf length, stem diameter, and shoot height were performed. No photoselective effects were observed for the germination rate, chlorophyll a and b, the number of leaves, shoot height, leaf length and stem diameter in the yellow passion fruit crop.

Resumo

O objetivo deste trabalho foi avaliar a produção de mudas de maracujá amarelo em ambientes protegidos compostos por diferentes telas fotosseletivas. O trabalho foi desenvolvido na UEMG, unidade Ituiutaba e iniciou-se em maio e foi avaliado em junho de 2018. Os tratamentos consistem em diferentes tipos de ambiente protegido: T1-Céu aberto; T2 – Tela Preta (malha para 30% de sombra); T3 –Tela Branca (malha para 20% de sombra); T4 - Tela Azul (malha para 20% de sombra) e T5 - Tela Vermelha (malha para 20% de sombra). O delineamento experimental foi em delineamento em blocos casualizados com quatro repetições, sendo dez plantas por parcela experimental. Foram realizadas as análises do teor de germinação, clorofila a e b, número de folhas, comprimento das folhas, diâmetro do caule, altura da parte aérea. Não foram observados efeitos das telas fotosseletivas para a taxa de germinação, clorofila a e b, número de folhas, altura da parte aérea, comprimento de folha e diâmetro do caule na cultura do maracujazeiro amarelo.

INTRODUCTION

The *Passiflora* genus has a huge diversity of plant species. Within this genus, we have passion fruit, which is crops with significant economic participation in the market (MELETTI, 2011). The varieties most present in the Brazilian market today are yellow passion fruit and purple passion fruit, respectively, *(Passiflora edulis f.*

flavicarpa) and *(Passiflora edulis)* (CROCHEMORE *et al.*, 2003; FREIRE & NASCIMENTO, 2018)

The yellow passion fruit popularly known as sour passion fruit is the best known by the population. It stands out in Brazilian production, both in "in nature" production, and for companies, as a result, it is a more vigorous variety and adapted to hot days as is the case of our Brazilian climate. It is a crop more suitable for cultivation in tropical and subtropical regions (ALMEIDA et al., 2015), its fruits are considerably large and have greater acidity compared to other varieties. The fruit of the yellow passion fruit is a berry, round to oval in shape, with wide variation in size.

Plants are affected by environmental, genetic and edaphoclimatic factors, and among the environmental factors, the quality and quantity of light considerably affect the growth and development of the plant (CORRÊA et al., 2012).

Seedling production represents a very important stage in the passion fruit production process, since the establishment of planting areas with healthy and vigorous seedlings has an influence on the entire development of the crop and also the final productivity. The technology of the production of seedlings of fruit species has become more and more specialized, thus, it has been widely used today, the photo-selective screens. These screens are capable of filtering the sun's rays, changing the quality of radiation incident on plants (MATEUS et al., 2009), bringing a series of benefits to plants.

Plants can sense the quality, quantity, duration, and direction of light, and use it as a signal to optimize their growth and development in a given environment (OREN-SHAMIR et al., 2001). The quality of light is associated with the composition of its spectrum, the intensity of light corresponds to the amount of light falling on the surface of the plant, the duration or photoperiod is the length of the light period during a day, and the direction corresponds to the location of the light. the light source about the plant (MELEIRO, 2003).

There are few studies on the effect of the different photoselective screens existing on the market on the production of passion fruit seedlings, so research in this area becomes important, thus producing information for rural producers. The objective of this work was to evaluate the production of yellow passion fruit seedlings in different protected cultivation environments.

MATERIAL AND METHODS

The experiment was conducted at the Experimental Farm of the State University of Minas Gerais (UEMG), Ituiutaba unit, located at an average altitude of 423m located in the municipality of Ituiutaba - MG (18° 57' 4.23" S, 49° 31' 33.29" O). According to the Koppen classification (KÖPPEN, 1948), the climate is Aw, rainy tropical, with average annual precipitation and temperature of 24ºC and 1,470 mm.

The color, black, white, red and blue photoselective screens were used in the experiment, with the black screen having 30% shade and the remaining 20% being the last open-air treatment. The greenhouses were installed in the dimensions of 5m long by 5m wide, with the right foot of 1.80m, with the internal part totally clean of vegetation.

The experimental design was in randomized blocks, with five treatments (Table 1) and four replications, containing ten plants per experimental plots.

Table 1. Treatments used to assess the protected environment, Ituiutaba - MG, 2018.

Treatments
T1. Open sky (Witness)
T2. Black shading screen
T3. White photoselective screen
T4. Blue photoselective screen
T5. Red photoselective screen

First, yellow passion fruit seeds were sown *(Passiflora edulis f. flavicarpa),* Feltrin® Seeds, in polyethylene bags in the dimensions of 15x20cm, containing the commercial agricultural substrate of the Bioplant® brand indicated for the production of seedlings, and sowing was carried out on 05/10/2018.

Three yellow passion fruit seeds were placed per polyethylene bag, and when the plants were approximately 5 cm high, thinning was carried out at 14 DAE (days of emergence), leaving only one per container. Irrigation was performed manually with watering cans every day so that there was no damage from the impact of the water. Seedling emergence occurred in 15 DAS (days after sowing).

The protected environments consisted of four greenhouses (T2, T3, T4, and T5), built with wood, with dimensions of 5.0m long by 5.0m wide and ceiling height of 1.80m. Monitoring of seedlings was carried out daily, observing their development in both environments.

After 37 DAS, the seedlings of each plot were evaluated, evaluating the following variables: germination rate: count after 37 DAS; chlorophyll a and b: obtained from a randomly expanded leaf of 3 plants from each plot, to determine the chlorophyll content, whose measurement method is by difference in optical density between two wavelengths, with the aid of a chlorophyll meter (ChlorofiLOG); shoot length: The shoot height and leaf length were measured using a millimeter ruler, while the stem diameter with a digital caliper.

Subsequently, the data obtained were subjected to analysis of variance (Test F) and the means of treatments were compared using the Tukey test at 5% probability. The analyses were performed with the aid of the SISVAR software, version 5.6.

RESULTS AND DISCUSSION

Table 2 describes the variables: germination rate chlorophyll a and b. There was no statistically significant difference between treatments.

Table 2. Chlorophyll a and Chlorophyll b and germination rate of yellow passion fruit seedlings grown in different types of the protected environment.

Treatments	Germination rate	Chlorophyll *a*	Chlorophyll *b*
T1	8,8 a	27,00 a	6,50 a
T2	9,0 a	27,50 a	6,50 a
T3	9,5 a	28,25 a	7,00 a
T4	9,0 a	28,75 a	7,50 a
T5	9,0 a	30,25 a	7,50 a
DMS	1,595	8,78	3,72
CV (%)	7,58	13,75	23,62

Averages followed by the same letter do not differ between environments, using the Tukey test at 5% probability. DMS = minimum significant difference.

These diverge from the results found by Silva (2014), who, when evaluating the use of colored shading meshes in the production of seedlings and fruits of species of the genus *Physalis*, concluded that *Physalis peruviana* presents greater productive performance when cultivated in full sun or under white screens with 50% shading, *Physalis pubescense* have better productive performance when grown in full sun or under white and blue screens with 50% shade and *Physalis ixocarpa* has higher phytotechnical indexes when grown under red or black screen with 50% shading.

Analyzing the data in Table 3, it appears that there is no statistically significant difference between treatments for the variables number of leaves, the height of the aerial part, leaf length and stem diameter.

Table 3. The average number of leaves, plant height, leaf length and stem diameter of yellow passion fruit seedlings grown in different environments.

Treatments	Number of leaves	Height (cm)	Sheet Length (cm)	Stem diameter (mm)
T1	5,9 a	5,95 a	3,59 a	1,405 a
T2	5,6 a	6,40 a	3,95 a	1,404 a
T3	6,1 a	6,32 a	3,91 a	1,389 a
T4	5,6 a	6,26 a	3,94 a	1,354 a
T5	5,9 a	6,41 a	4,07 a	1,472 a
CV (%)	9,23	9,24	10,73	7,29

Averages followed by the same letter do not differ between environments, using the Tukey test at 5% probability.

According to Silva et al. (2015), considered that the use of rice husk as a soil cover and a red photosynthetic canvas with 50% shade is a viable mechanism in the cultivation of crisp lettuce cv. Veronica under the edaphoclimatic conditions of Boa Vista, Roraima.

According to Silva et al. (2013), when evaluating the growth of tomato seedlings with different shade screens determined that the different shade screens interfered with the microclimate and the growth characteristics of tomato plants. The 50% aluminized screen showed a lower amount of photosynthetic flux density and lower air temperature. Under such conditions, there was a greater development of the aerial part in tomato plants. In general, the photoselective screens (red and gray) do not show outstanding results, although long-term studies are needed to assess the consequence and possible benefits of decreasing the temperature and density of photosynthetic photon flow on the accumulation of biomass and productivity in tomato culture.

Under microclimatic conditions provided by a shade screen in the cultivation of cherry tomatoes published by Santiago et al. (2017), concluded that the use of the shading screen promoted microclimate changes with increased temperature, reduced air humidity, global radiation, and wind speed. The estimation equations revealed a high correlation between meteorological variables inside and outside the protected environment.

According to data from Silva (2016), when studying the growth and development of *Physalis ixocarpa* Brot. ex Hormen in different light conditions verified that the luminous environment interfered in the growth, development and the cycle of *P. ixocarpa*, and that the shaded environment is more appropriate for the cultivation of *P. ixocarpa* aiming at fruit and seed production.

According to Leite (2006) under the use of colored meshes in the production of high, medium and low demand flowers in solar radiation, it was observed that the change in the balance between the wavelengths transmitted by the tested meshes significantly influences the plant development of low (*Phalaenopsis*), medium (*Gerbera*) and high (*Gypsophila*) species in irradiance requirements grown in Cwa climate. There were differences in several parameters of plants of medium and high demand in light that seem to be due to alteration of the solar spectrum transmitted by colored scraps although the microclimate conditions did not have significant differences between treatments when 40% meshes were used under transparent plastic.

CONCLUSION

There were no effects of photoselective screens on the production of yellow passion fruit seedlings.

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