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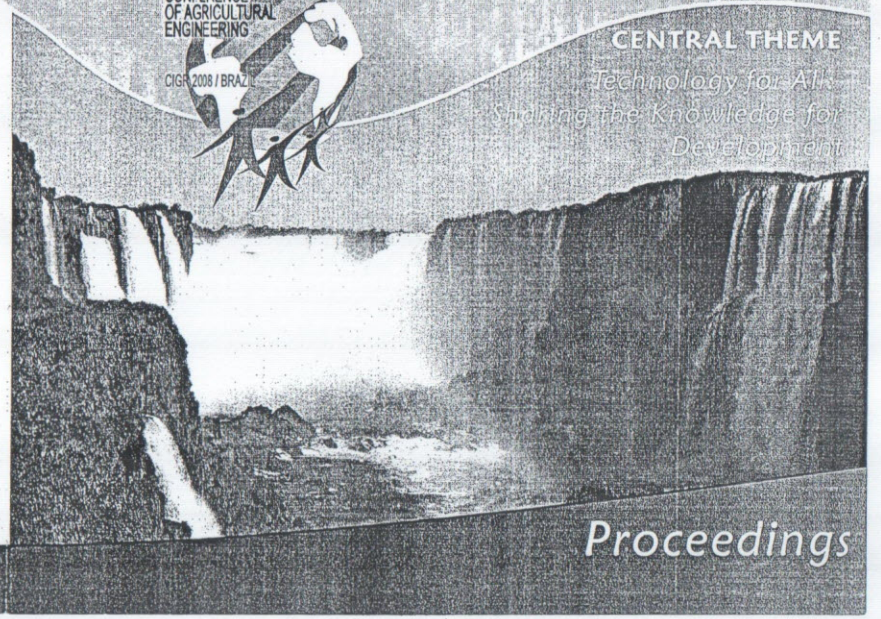

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PROTECTED ENVIRONMENTS ON THE DEVELOPMENT OF PASSION FRUIT AND PAPAYA SEEDLINGS IN THE SOUTHERN PANTANAL MATOGROSSENSE

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ABSTRACT: The definition of the best system for seedlings production of passion fruit and papaya depending on the type of environment, containers and substrates composition. This results in useful information that can benefit producers in Pantanal region. Therefore trials was conducted on the development of passion fruit seedlings of the yellow group and the group of papaya Sunrise Solo in protected environments in the State University of Mato Grosso do Sul, State University of Aquidauana, in the months of September till November 2006. For the conducted trials were applied four protected environments, two types of containers and three different substrate compositions. The fresh mass and dried of air part and of root system were evaluated. For papaya seedlings the best environment was the one contained aluminum net and for passion fruit the best environments had been the ones that contained monofilament and aluminium net. Seedlings of both cultures grown at polyethylene container showed the best development. From the studied substrates studied, the ones that showed the best results were substrates S1 (soil +organic compost + vermiculite, 1:1:1 v / v) and substrate S3 (soil + organic compost + vermiculite + dust saw, 1: 1:1 / 2:1 / 2 v / v).
KEYWORDS: greenhouse, orchards, substrates, containers.

INTRODUCTION: The seedlings development on shaded nurseries for a certain period before the transplant the field is a common practice used in the cultivation of passion fruit (MELETTI, 1994, APUD BY ZANELLA, 2006).

On seedlings development substrate has an important role (NEGREIROS et al., 2003) therefore has the aim of providing appropriate conditions for germination and root system according RAMOS et al. (2002, cited by JÚNIOR Wagner et al., 2006) and, as already SILVA et al. (2001) mentioned substrates must show, among many features, easy availability of acquisition and transport, absence of pathogens, wealth of nutrients, appropriate pH, good texture and structure, ensuring that the plant receives all necessary nutrients, partly or during its cycle.

OLIVEIRA et al. (1993) working with passion fruit, evaluated seedlings developing in different substrates and trays, and concluded that the seeds that were grown in a larger amount of substrate had better germination.

And in research conducted with different substrates and containers, in the formation of seedlings of papaya, MENDONÇA et al. (2002), concluded that the substrates containing cattle manure, charcoal, soil and sand, in proportion 2:1:1:1 volume were the best alternative for the development of seedlings.

This study aimed to evaluate the effects of environment, containers and substrate composition on fresh mass and dried weight on shoot and root of seedlings of passion fruit and papaya in the region of Aquidauana / MS.

METHODOLOGY: The experiment was conducted in the experimental area of the State University of Mato Grosso do Sul in Aquidauana-MS, from September till November 2006, and consisted on the production of seedlings of the group yellow sour passion fruit (Passiflora edulis Sims. F. flavicarpa Deg), and seedlings of papaya, cultivar "Sunrise Solo," in protected environments.

Four protected environments were used A1 (plastic greenhouse covered with a polyethylene film of low light density diffuser, 150 microns thick); A2 (net nursery with black monofilament, 50% of shade); A3 (nursery with aluminum net for 50% of shadow) and A4 (nursery at ambient with straw coverage of native coconut).

There were used two types of containers R1 (polyethylene bags, 15 x 25 cm) and R2 (polystyrene trays, containing 72 cells).

There were used three substrates composition S1 (soil + organic compost + vermiculite, in the volumetric proportion of 1:1:1 v / v), S2 (soil + organic compost+ dust saw, in the proportion of 1:1 volumetric: 1 v / v) and S3 (soil +organic compost + vermiculite + dust saw, in the volumetric proportion of 1:1:1 / 2:1 / 2 v / v).

Fresh mass and dried in grams were measured on shoot and root system at 50 DAS. The daily maximum and minimum temperatures were collected as well temperatures at 09h 00min, 12h 00min and 15h 00min of each production environment.

It was used in experimental design in sub divided plots (split-split-plot), with fifteen repetitions. The main plots were environment place, the subplots were containers (S) and sub plots were the compositions of substrates.

The analyses were performed by the computer program ESTAT (UNESP / FCAVJ, 1994). The interactions were not evaluated.

RESULTS AND DISCUSSION: At Table 1 it is possible to verify that the environments A1 and A2 were the best environments for seedling production of passion fruit. For the papaya, Table 2, the environment with aluminum net (environment A2) presented the best development for seedlings, except for the dry weight of the root system. These environments have in their constitution, shading nets at the top and on both sides, being an obstruction to strong winds and the entry of pathogens.

Comparing the containers types used through Tables 1 and 2, you can see that the polyethylene bags showed higher fresh mass and dried weight that polystyreney trays, both for the passion fruit and for the papaya, providing better seedlings development (VERDIAL et al ., 2000).

Still, according to Table 1, it can be observed for all biomass passion fruits parameters for passion fruit that the substrate S1 showed higher values, while for papaya (Table 2) the substrates S1 and S3 stood out for leaf parameters and the substrate S1 to the root.

Table 3 presents the maximum and minimum temperatures and also temperatures at 09h 00min, 12h 00min and 15h 00min of each production environment. The environments A2 and A3, even not differing statistically environments of 1 and 4 regarding the temperatures collected were the environments that presented the best development seedlings. These environments by presenting net on sideline provided barriers to strong winds.

Irrigation was performed during morning periods and late afternoon, and then plants were throughout the period of greatest heat stress showing high of evaporation and transpiration rates. This process resulted in plants with less accumulation of biomass in the environment A1. The environment A2 provided better development of parameters for papaya biomass, where similar results were found by ARAUJO et al. (2006).

Table 1 - Fresh mass (LFM) and dried (LDM) leaves, fresh mass (RFM) and dried (RDM) roots of passion fruit, in grams.

LFM		LDM		RFM		RDM	
			Environments				
A2	4.239 A	A2	0.705 A	A2	1.016 A	A3	0.139 A
A3	3.930 A	A3	0.645 A	A3	0.910 A	A2	0.138 A
A1	2.474 B	A4	0.402 B	A1	0.676 B	A1	0.109 B
A4	2.291 B	A1	0.392 B	A4	0.514 B	A4	0.083 C
CV (%)	41.09		39.29		59.46		55.13
			Containers				
R1	5.825 A	R1	0.928 A	R1	1.157 A	R1	0.174 A
R2	0.642 B	R2	0.144 B	R2	0.402 B	R2	0.060 B
CV (%)	41.40		40.96		50.87		46.87
			Substrates				
S1	4.182 A	S1	0.705 A	S1	1.080 A	S1	0.163 A
S3	3.700 B	S3	0.628 B	S3	0.930 B	S3	0.137 B
S2	1.817 C	S2	0.274 C	S2	0.329 C	S2	0.051 C
CV (%)	37.54		33.75		40.95		42.46

The different letters in the same column indicate significant differences.

Table 1 - Fresh mass (LFM) and dried (LDM) leaves, fresh mass (RFM) and dried (RDM) roots of papaya, in grams.

LFM		LDM		RFM		RDM	
			Environments				
A3	5.622 A	A3	0.658 A	A3	2.553 A	A2	0.181 A
A2	4.168 B	A2	0.543 B	A2	2.123 B	A3	0.175 A
A4	3.137 C	A1	0.418 C	A1	1.609 C	A1	0.149 B
A1	2.943 C	A4	0.389 C	A4	1.003 D	A4	0.078 C
CV (%)	33.21	CV (%)	32.02	CV (%)	47.20	CV (%)	38.01
			Containers				
R1	7.441 A	R1	0.921 A	R1	3.130 A	R1	0.244 A
R2	0.494 B	R2	0.083 B	R2	0.514 B	R2	0.047 B
CV (%)	34.22	CV (%)	32.94	CV (%)	49.32	CV (%)	39.57
			Substrates				
S1	5.028 A	S1	0.662 A	S1	2.562 A	S1	0.206 A
S3	4.886 A	S3	0.614 A	S3	2.282 B	S3	0.178 B
S2	1.988 B	S2	0.230 B	S2	0.622 C	S2	0.053 C
CV (%)	38.13	CV (%)	34.18	CV (%)	47.58	CV (%)	39.60

The different letters in the same column indicate significant differences.

Tabela 3. Temperature (°C) at 09h 00min, 12h 00min and 15h 00min, temperature maximum (Tmax) and minimum (Tmin) average in environments (A).

A	09h 00 min	A	12h 00 min	A	15h 00 min	A	Tmax	A	Tmin
4	29.8 A	4	33.2 A	1	32.3 A	1	37.1 A	4	21.7 A
1	29.5 A	1	33.1 A	4	32.2 A	4	36.8 A	2	21.5 A
3	29.2 A	2	32.5 A	3	32.0 A	2	35.8 A	1	21.3 A
2	29.2 A	3	32.4 A	2	31.5 A	3	35.7 A	3	21.0 A
CV (%)	10.4		11.5		15.9		10.3		12.0

The different letters in the same column indicate significant differences.

CONCLUSION: For papaya seedlings the best environment was the one that contained the term reflecting net (aluminum net) and for passion fruit the best environments containing the monofilament net and aluminum net.

Polyethylene bag was the container which made the better development for passion fruit and papaya.

Based on the substrates studied, those who had the best results were the substrates S1 (soil + organic compost + vermiculite, in the volumetric proportion of 1:1:1 v / v) (soil + organic compost + vermiculite, in the volumetric proportion of 1:1:1 v / v)and substrate S3 (soil +organic compost + vermiculite + dust saw , in the volumetric proportion of 1:1:1 / 2:1 / 2 v / v), where for all the parameters for passion fruit biomass highlighted the substrate S3, while for the papaya, the S1 and S3 substrates were superior to the shoots and substrate S1 to the roots.

REFERENCES:

ARAUJO, J. G. et al. Effect of container of culture and environment on the development of seedlings of papaya cv. Sunrise soil. **Revista Brasileira de Fruticultura**, Jaboticabal - SP, v. 28, n. 3, p. 526-529, Dezembro 2006.

MELETTI, L. M. M. Passion fruit: seedling quality is essential. **O Agronômico**, Campinas, v. 46, n.1/3, p. 9-12, 1994.

MENDONÇA, V.; NETO, S. E. A.; RAMOS, J. D.; PIO, R.; GONTIJO, T. C. A. Different substrates and containers in the papaya seedlings formation 'sunrise solo'. **Revista Brasileira de Fruticultura**, Jaboticabal, v. 25, n. 1, 2003. Disponible in: http://www.scielo.br/scielo. Access in: 26 set. 2006

NEGREIROS, J. R. S.; ÁLVARES, V. S.; BRAGA, L. R.; BRUCKNER, C. H. Different substrates in the yellow passion fruit seedlings formation. **Revista Ceres**, Viçosa, v. 51, n. 294, p. 243-249, 2003.

OLIVEIRA, R. P.; SCIVITTARO, W. B.; VASCONCELLOS, L. A. B. C. Passion fruit seedlings evaluation in function of substrate and kind container. **Scientia agrícola,** Piracicaba, v. 50, n. 2, p. 261-266, 1993. Disponible in: http**//:** www.scielo.com.br Access in: 25/12/2005.

RAMOS, J. D.; CHALFUN, N. N. J.; PASQUAL, M.; RUFINI, J. C. M. Orchards plants seedlings production for seed. **Informe Agropecuário**, Belo Horizonte, v. 23, n. 216, p. 64-72, 2002.

SILVA, R. P. da; PEIXOTO, J. R.; JUNQUEIRA, N. T. V. Influence of kind substrates in the passion fruit seedlings development (Passiflora edulis Sims f. flavicarpa Deg). **Revista Brasileira de Fruticultura**, Jaboticabal, v. 23, n. 2, p. 377-381, 2001.

WAGNER JÚNIOR, A. et al. (Ed). Influence of substrate in the yellow passion fruit germination and initial development (*Passiflora edulis* Sims f. *flavicarpa* Deg). **Ciência e Agrotecnologia**, Lavras – MG, v. 30, n. 4, jul-ago, 2006.

UNIVERSIDADE ESTADUAL PAULISTA "JÚLIO DEMESQUITA FILHO". Departamento de Ciências Exatas. **ESTAT**. Versão 2.0. Jaboticabal: FCAV/UNESP, 1994.

VERDIAL, M. F., LIMA, M. S.; TESSARIOLI NETO, J. et al. Methods of yellow passion fruit seedlings formation. **Scientia Agrícola,** v. 57, n.4, p.795-798, 2000.

ZANELLA, F.; SONCELA, R. e LIMA, A. L. S. Yellow passion fruit seedlings formation with shadow levels in Ji-Paraná/RO. In.: **Ciência e Agrotecnologia.** Lavras – MG, v. 30, n 5, p. 880-884, Set./Out./2006. Disponible in: http://www.editora.ufla.br/revista/30_5/art09.pdf. Access in 28/Jan./2007.