INFLUENCE OF DIFFERENT COIR COMPOSED MEDIA AND IRRIGATION MANAGEMENT IN SOILLESS SYSTEM ON AGRONOMIC BEHAVIOUR OF PEPPER

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INTRODUCTION

One of the most important influencing factors over the management of a soilless culture system is the physical characteristics of the substrate, in particular those providing good aeration of the root system, ease of drainage, adequate distribution of the particles size, retention capacity of readily available water, stable structure and an optimum input of nutritive solution. In order to adequately manage the input of nutrient solution in the soilless culture a regular and sufficient water supply should be guaranteed, minimizing energy costs and avoiding excessive erosion of the irrigation system units, which, together with an adequate nutritive solution supply, should determine the irrigation frequency and duration. (Baixauli and Aguilar, 2002).

In this experiment it has been assessed the agronomic behaviour and productivity of three different quality coir composed media of third year and three different irrigation regimes upon pepper culture.

Figure 1.- Early and final marketable yield. Irrigations schedules and substrates.

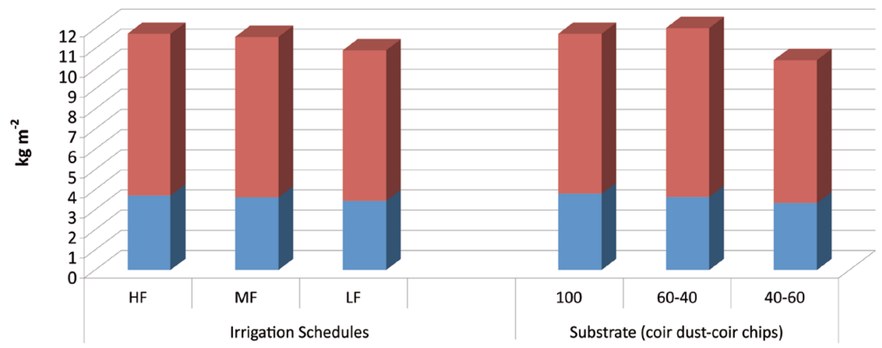
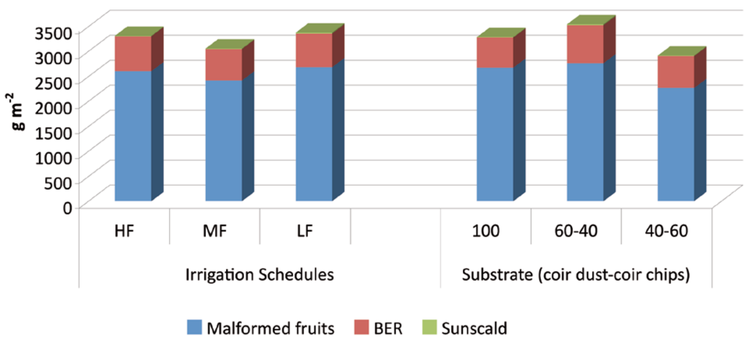


Figure 2.- Non - marketable yield.



RESULTS AND DISCUSSION

The best early (till January 31st) and final marketable yield was achieved by the high irrigation frequency, followed by the middle and the low frequency, without significant statistically differences (s.s.d.) among them. Comparing substrates the higher early and final marketable yield was obtained by the substrate of 60:40% and the 100% coir, without s.s.d. between them and wtih s.s.d. regarding the mixture of 40% coir dust and 60% coir chips.

In relation to the non-marketable yield, s.s.d were not observed between irrigation frequencies, in both early and final yield. On the other hand, for early and final non-marketable yield the lowest values were obtained with the mixture 40:60% coir dust: coir chips, with s.s.d. regarding the substrate 100% coir for both parameters and with s.s.d. for the final non-marketable yield respect the mixture of 60% coir dust and 40% of chips. For early and final non-marketable yield it was detected a s.s. interaction between the irrigation frequency and the substrate. The highest early and final malformed fruits yield was achieved by the low irrigation frequency, although without detecting s.s.d. Between substrates the highest early malformed fruits yield was reached by the substrate 100% coir and with s.s.d. between the other two substrates. In the classification of non-marketable yield affected by other physiological disorders, the presence of fruits damaged by blossom-end- rot was non-existent in early yield and low in proportion to the non-marketable final yield. The sunscald also was non-existent in early yield and it was not found any special incidence and there were not interactions between irrigation frequency and substrates.

With regard to average marketable fruit weight there were only for the final average weight s.s.d. between irrigation's frequencies, being favourable for low irrigation's frequency.

The best irrigation efficiency expressed in kg of commercial product per m 3 of nutritive solution utilized, corresponded to the low irrigation frequency and the substrate made of 60% coir and 40% chips, in both cases presenting s.s.d.

MATERIALS AND METHODS

The experiment took place in the Experimental Station of Fundacion Ruralcaja - CRM Group in Paiporta (Valencia). It was carried out under a surface area of 1000 m² of a greenhouse with polyethylene thermal cover of 800 gauges, equipped with heating system by hot water which helped to maintain a minimum temperature of 10 °C.

The work was carried out with Italian pepper crop cv. ***Italverde*** (Seminis). The material was sown on July the 5th 2007 in 104-cell polystyrene trays filled with a mixture peat based substrate. All plant material was transplanted in August the 24th. There were 6 plants in each bag of substrate, with a planting density of 2.5 plants m^{-2}. A completely statistical design with 4 replications of 12 plants in each elementary plot was performed.

Three coir composed media (coir dust: coir chips) used two years ago were compared in the following proportions (% in volume): 100: 0, 60: 40, 40: 60.

Assuming a level of water retention by the bags of 18.2 L and a possible management of the system with 25% drainage, it was determined three irrigation levels from different percentages of depletion ratio: 5 %, 10% and 20 %:

- 5% (HF) : 4-5 min
- 10% (MF) : 8-10 min
- 20% (LF) : 12-15 min

In each harvest the product was classified as marketable and non-marketable, attending different causes. Each month the average marketable fruit weight in one of the controls was determined.

The first harvest took place on October the 25th, 2007 and the experience was finished with the last harvest on July the 15th, 2008.

Figure 3.- Irrigation efficiency.

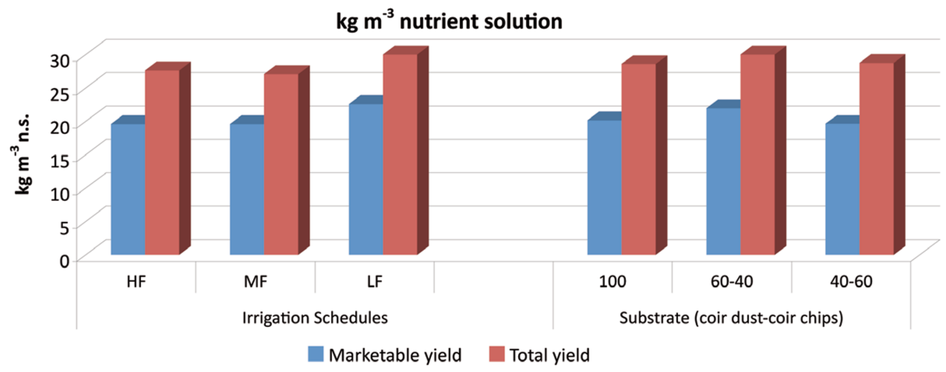
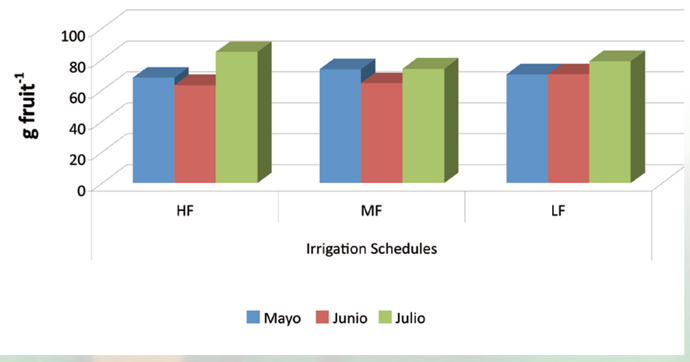


Figure 4.- Average marketable weight .



Crop development.

Transplantation.

CONCLUSIONS

The best productive results were achieved by the 100% coir substrate and with a mixture of 40% of chips.

The greatest water efficiency was reached with the low irrigation frequency and a 60% coir dust and 40% of chips mixture.