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Introduction

The main issue moving forward the automation in strawberry production as an effort to lower production costs, is the requirement of some sort of suitable plug system, as most machinery can handle plugs the easiest resulting in optimum field planting results. Before shifting all the strawberry production from bare root

into plug production, Adesva Research Center, in collaboration with Jiffy Products, has conducted a study on strawberries in plugs. The objective of the study is to compare two different technologies of strawberry Production: Bare Root and Plug. In both systems the following parameters have been analyzed:

- Number of crowns/plant
- Accumulative Production in grams/plant
- Average weight of the fruits
- Sugar content and hardness of the fruit

Materials and methods

The study was conducted at the ADESVA experimental greenhouse, located in Lepe -Huelva-Spain
The trial is designed under the following culture conditions:
Culture: strawberry
Variety: Albión, Cristal and Candonga
Photoperiod: neutral day (Albión and Cristal) and short day (Candonga)
Transplant Date: 23-08-2008, 03-09-2008, 09-09-2008, 01-10-2008, 10-10-2008

Note: The planting date of 23 August refrigerator plant was used and other planting dates were used fresh plant
Culture system: conventional soil cultivation and soilless (coconut fiber)
Plant Format: Bare root and plug
Experimental design of randomized complete block with twenty-two variants and three replications (66 plots).
Plot size: 20 plants. The scope of work of this Project was wider than this comparison, 22 populations as a whole.

The analysis carried out on bare root versus plug had a simple design: Adesva compared plant formats data only when variety, plantation date and culture system were identical. There were 5 sets of populations that meet that requirement and thus enable simple comparisons (Fig.3)



Fig.1 Plug plant



Fig.2 Bare root plant

Crop type	Variety	Format	Planting Date
Soil	Albion	Plug 58 cc	03/09/2008
		Plug 70 cc	
		Bare root	
	Candonga	Plug 52 cc	01/10/2008
		Bare root	
		Plug 52 cc	
Soilless (coconut fiber)	Candonga	Plug 52 cc	01/10/2008
		Bare root	
		Plug 52 cc	
	Candonga	Plug 52 cc	10/10/2008
		Bare root	
		Plug 52 cc	

Fig.3 Comparable thesis

Fig.4 Albion and Candonga variety . Plant in bare root



Fig.5 Albion variety bare root plant, in soilless culture system

Results

In everyone of these 5 comparison sets **there were no statistical significant difference at a confidence level 95%** between plant in "bare root" and "plug" in the following parameters: n^o crowns per plant, average weight fruit , firmness and sugar content of fruit.

However, **statistical difference was found** for production yield in 3 out of these 5 comparison sets depending on the variety chosen, date of planting and culture system used.

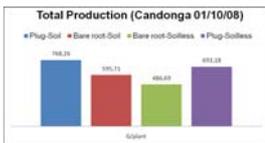


Fig. 6 Total Production. Candonga variety (01-10-08). Plug/soil, Plug/soilless, Bare root /soil and Bare root/soilless

Crop type	Variety	Planting Date	Early Production	1 st Production	2 nd Production	Total production	Number of Crowns/plant; Average weight of fruit; Sugar content and Hardness of the fruit
Soil	Albión	03/09/2008	Statistical differences Bare root > Plug	Statistical differences Bare root > Plug	Statistical differences Plug 70 cc > Bare root	Statistical differences Bare root > Plug	Not statistical differences
	Candonga	01/10/2008	Not statistical differences	Statistical differences Plug 52 cc > Bare root	Not statistical differences	Not statistical differences	Not statistical differences
	Candonga	10/10/2008	Not statistical differences	Not statistical differences	Not statistical differences	Not statistical differences	Not statistical differences
Soilless (coconut fiber)	Candonga	01/10/2008	Not statistical differences	Not statistical differences	Statistical differences Plug 52 cc > Bare root	Not statistical differences	Not statistical differences
	Candonga	10/10/2008	Not statistical differences	Not statistical differences	Not statistical differences	Not statistical differences	Not statistical differences

Fig. 7 Differences in behavior between plant in "Bare root" and "Plug"

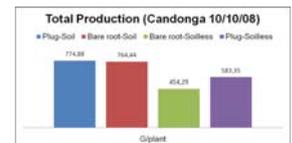


Fig. 8 Total Production. Candonga variety (10-10-08). Plug/soil, Plug/soilless, Bare root /soil and Bare root/soilless

Temporal Evolution of the Total Cumulative Production in both plant formats, Candonga variety, planted the 01-10-08 and 10-10-08, in soil and soilless culture system

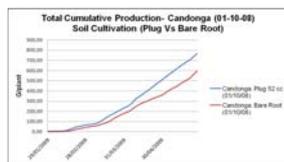


Fig.9 Soil Cultivation (01-10-08)

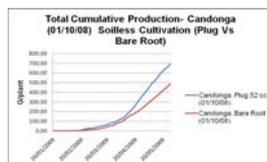


Fig.10 Soilless Cultivation (01-10-08)

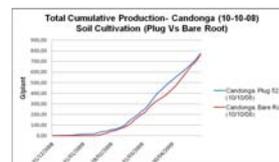


Fig.11 Soil Cultivation (10-10-08)

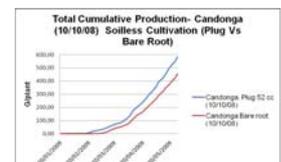


Fig.12 Soilless Cultivation (10-10-08)