Evaluation of Four Strawberry Varieties in Rockwool Hydroponic Culture

Fotis Panitsas*

Agricultural University of Athens, Agronomist at Petropoulos Farms, Greece

*Corresponding Author: Fotis Panitsas, Agricultural University of Athens, Agronomist at Petropoulos Farms, Greece.

The latin name of strawberry is *Fragaria × ananassa. Fragaria* is the name of the genus of "strawberry-like" plants. The × mark means that it is a hybrid, a mix of two other species. Strawberries are low-growing herbaceous plants with a fibrous root system and a crown from which arise basal leaves. The leaves are compound, typically with three leaflets, sawtooth-edged, and usually hairy. The flowers, generally white, rarely reddish, are borne In small clusters on slender stalks arising, like the surface-creeping stems, from the axils of the leaves. As a plantages, the root system becomes woody, and the "mother" crown sends out runners (e.g. stolons) that touch ground and root, thus enlarging the plant vegetatively. Botanically, the strawberry fruit is considered an "accessory fruit" and is not a true berry. The flesh consists of the greatly enlarged flower receptacle and is embedded with the many true fruits, or achenes, which are popularly called seeds. The real fruit of the strawberries are the achenes, which people usually think of as the little seeds around the outside of the larger red "fruit". What people think is the "fruit" is really the swollen stems between these fruit. This kind of fruit, where different ovaries grow into a single larger "fruit", is called an "aggregate fruit". Strawberries are rich in vitamin C and manganese.

Hydroponics is a method to grow plants without soil, where the roots of the plants grow into the water (NFT, NGS, floating method) or in materials (inorganic or organic). Each irrigation dose is made by dissolving fertilizers in the water. Electric conductivity as well as pH plays an important role. The strawberry cultivation ranges between 1.8 - 2.2 dS/m depending on the plant stage and 5.5 - 6.5 respectively. Depending on whether the effluent is collected, the hydroponic systems are distinguished to open when not collected and closed when the effluent is collected. Strawberry (fragaria x ananassa) is a plant with a biological cycle of one to three years. Usually in hydroponics plants are used for one year.

Four varieties of strawberries were used in this crop, which were Rociera, Camarosa, Fortuna and Charlene. The plants were transplanted on 25 October 2018 on Rockwool substrates. The estimation of Total Soluble Solids (TSS) was performed by means of an optical refractometer. The figure 1 shows the TSS (^{o}Brix) for each variety while in figure 2 the numbers are explained.
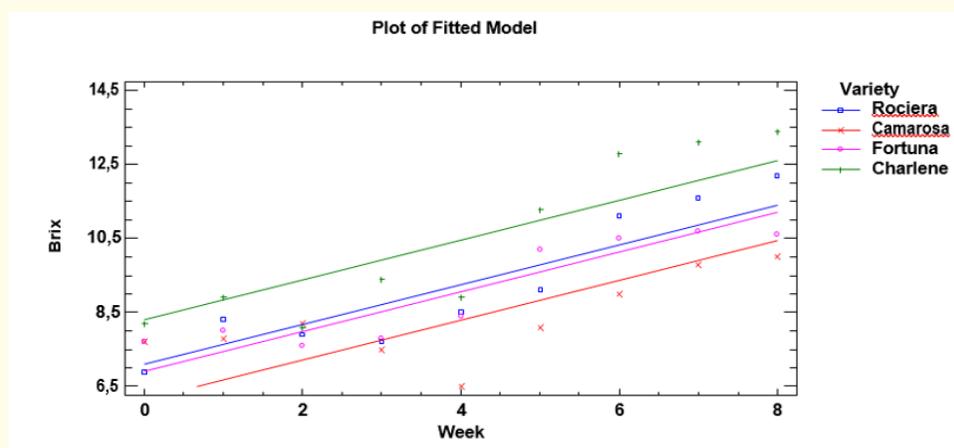

Figure 1: TSS per variation versus time.

From the above diagram it appears that the Charlene variety was the sweeter with respect to the other varieties as opposed to Camarosa which showed less °Brix. The analysis of regression resulted in the following models for each variety in relation to TSS:

- °Brix (Rociera) = 7,10722 + 0.54*Week
- °Brix (Camarosa) = 6,14056 + 0.54*Week
- °Brix (Fortuna) = 6,91 + 0.54*Week
- °Brix (Charlene) = 8.31+ 0.54*Week

The correlation coefficient of the regression equals r^2 = 79.22% while the percentage of y that remains unchanged from x equals 21.78% at a significance level $P < 0.05$.

In terms of production, each variety per acre was reduced. The graph below shows the production in kilograms per acre and per variety. Month 0 is February while month 4 June.
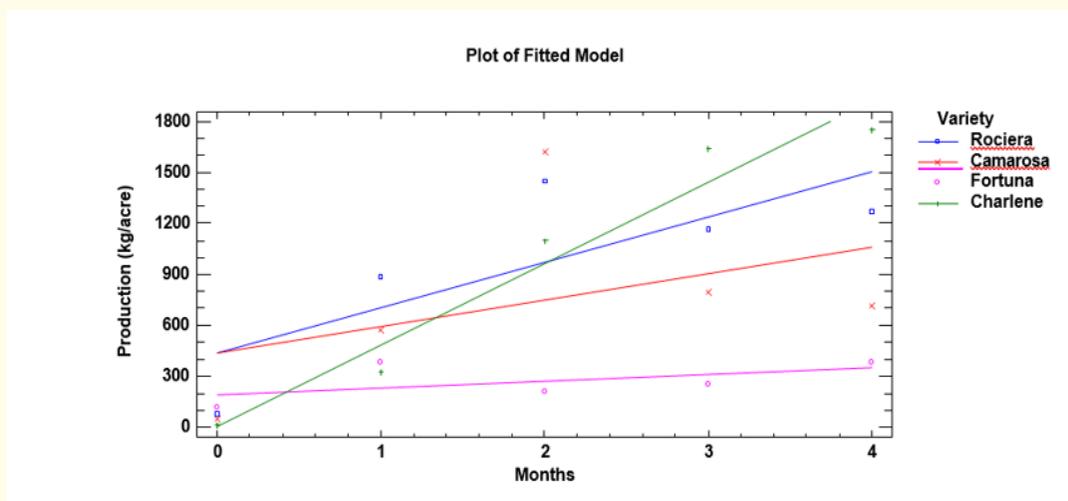

Figure 2: Production (kg/acre) of each variety as a function of time.

From the above diagram it appears that the Rociera variety was the earliest compared to the other three varieties even by Fortuna which is considered the earliest. The Charlene variety was the slowest but in April to the end of the crop it had the largest production per acre. The Fortuna variety was at a low production level because there was a serious problem with Phytophthora Cactorum. The Camarosa variety gave a modest production. Note that the nutrient solution was the same for all varieties.

The analysis of regression resulted in the following models for each variety in relation to production (kg/acre):

- Production (Rociera) = 439.6 + 266.0*Month
- Production (Camarosa) = 438.4 + 156*Month
- Production (Fortuna) = 189 + 40.5*Month
- Production (Charlene) = 8+ 478.7*Month

The correlation coefficient of the regression equals r^2 = 74.86% while the percentage of y that remains unchanged from x equals 25.14% at a significance level $P < 0.05$. With regard to the harvesting behavior of the fruits, it was found that Rociera (4 - 5 days) had the greatest conservatism following Charlene and finally Camarosa and Fortuna. The figure below (Figure 3) shows the production of each variety per month.
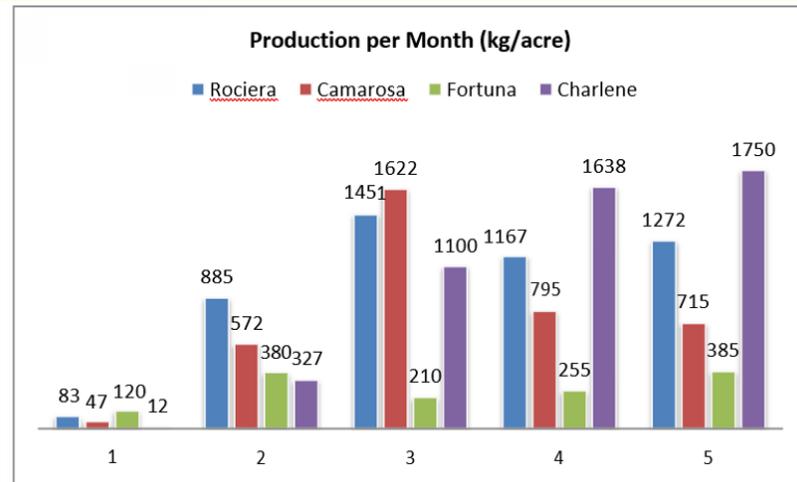
Figure 3: *The production (kg/acre) from each variety as a function of month (1: February, 5: June).*

Figure 3 shows that in February the highest yield (kg/acre) was given by the Fortuna variety. In March, Rociera, while May and June Charlene. Fortunα is therefore the earliest in contrast to Charlene, which is the latest. Charlene also produces production where other varieties reduce their production.

Volume 5 Issue 9 September 2019