RESPONSE OF SOME NEW COLD STORED DRIP-IRRIGATED STRAWBERRY CULTIVARS TO ROOT TRIMMING AND TRANSPLANT CROWN DIAMETER

By

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ABSTRACT

Heba Hanafy Mohamed Mohamed: Response of Some New Cold Stored Drip-Irrigated Strawberry Cultivars to Root Trimming and Transplant Crown Diameter. Unpublished M.Sc. Thesis, Department of Horticulture, Faculty of Agriculture, Ain Shams University, 2009.

This study was carried out at Ismailia Governorate during the two successive seasons of 2006/2007 and 2007/2008. The aim of this study was design to investigate the effect of cultivar, transplant crown diameter and root trimming on fruit yield and quality of two commercial strawberry cultivars. Frigo transplants were used. Soil type was pure sandy soil with pH 7.18. Planting date was 15th of September for both seasons. A split split design with three replicates was adopted. The main plots were assigned to the cultivars, i.e., Sweet Charlie and Festival. While the sub-plots were allocated to the crown treatments, i.e., small diameter (0.5-0.8 cm) and large diameter (0.8-1.2cm). Root trimming treatments, i.e., non trimmed (control), moderate (root trimmed to 5 cm) and severe (root trimmed to 10 cm) were distributed in the sub- sub – plots. The plot area contained 50 transplants. Bed width was 120 cm with 50 cm height; the plant distance was 25cm between plants and 30 cm between rows (four rows per bed). Results indicated that cv. Festival recorded the highest values in leaf area, crown diameter, early yield, average fruit weight and ascorbic acid content in both seasons. Sweet Charlie showed a higher increment in TSS and TSS/TA ratio in the two growing seasons. Data included also that using large crown diameter transplant had a higher significantly increment in chlorophyll, crown diameter, total carbohydrate contents in crowns and roots, yield, total soluble solids, TSS/TA ratio and ascorbic acid in both seasons. Results showed also that roots trimming for 5 cm had a higher significantly increment in leaf number , root number, secondary crown number and ascorbic acid in both seasons . Sweet Charlie transplants with large crown

diameter and root trimmed at 5 cm gave the highest values in early and total yield. Moreover, treatment of cv. Festival transplants with large crown diameter and root trimmed at 10 cm recorded the highest values in leaf area, crown diameter early and total yield, average fruit weight, total carbohydrate and ascorbic acid contents in the two tested seasons. No significant effect on fruit decay during cold storage period of strawberries after 10 days. After ten days the lowest percentages of weight loss of fruits were observed for cv. Sweet Charlie as compared with cv. Festival as well as Sweet Charlie were produced from small crown diameter without root trimming treatment in the two tested seasons.

Key words:

strawberry, cultivars, crown diameter, root trimming, yield components, fruit quality.

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I. INTRODUCTION

Strawberry (*Fragaria x ananassa* Dush) is considered as one of the most important horticultural vegetable crops for local fresh consumption, food processing and export in Egypt. A great attention has been drawn to strawberry cultivation in Egypt during the last few years. Strawberry is considered to be rich in ascorbic acid (70 mg / 100g) and niacin (0.6 mg / 100g) and contains moderate amount of iron (1mg / 100 g).

The total area planted with strawberry fresh plants was 6287 feddan in 2008/2009 season, which produced about 138314 tons with an average of 22 tons per feddan. Moreover, in the same season 4847 feddan were planted with frigo transplants which produced 72705 tons with an average of 15 tons per feddan *.

Several factors affect vegetative growth, flowering, yield and quality of strawberry plants. There are limited factors affecting yield and quality of strawberry. The used cultivar and crown diameter of transplant are considered the most important factors which should be taken in consideration for early and total strawberry production in Egypt. Root trimming is considered one of important steps which used before cultivation especially in long root transplant to decrease root length. Many strawberry growers use root trimming while data on optimal root length are not available for the best quantity and quality of strawberry fruits.

Therefore, the objective of this work was investigating the effect of cultivar, transplant crown diameter and root trimming on yield and fruit quality of strawberry promising cultivars.

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II. REVIEW OF LITERATURE

1. Effect of cultivar, crown diameter and root trimming on plant vegetative growth characteristics:

1.1. Number of leaves / plant:

Chercuite *et al.* (1991) found out that Bogotá strawberry cultivar produced more leaves per plant than the other tested cultivars**. Foley** and **Hennery (1993)** studied the vegetative characteristics of Soma clones regenerated by anther culture technique, of Saladin strawberry cultivar. They reported that three clones had significantly greater leaf number per plant, while only one had significantly fewer leaves as compared with their standard. **Michele (1993)** suggested that using large crown diameter transplants (12-14 mm) of cvs Earliglow and Honeye produced plants with greater leaf number than medium (9-11 mm) and small (6-8 mm) ones. **Abd El-Latif (1998)** found that Chandler plants significantly produced more leaves as compared with Douglas plants. **Dyankove (1998)** found that root trimming of Vista Bella apple trees reduces the vegetative growth, this effect increase with increasing intensity of trimming, but with higher productivity and fruit quality **El-Sayed (2000)** reported that increasing crown diameter affected positively number of leaves / plant in all tested cultivars. **Hafidh (2000)** suggested that no significant differences were found between control plants and those with 25% of roots pruned for stem length, number of leaves of tomatoes Rio Grand cultivar grown in plastic tunnels**. Ragab *et al.* (2000)** mentioned that a significant decrement in number of leaves per plant was obtained from Chandler compared with Camarosa**,** Ros Linda and Sweet Charlie cultivars**. Mohamed (2003)** found that there were significant differences in number of leaves among Cabitola and its strain, as well as Chandler and its strain.

1.2. Leaf area:

Baumann *et al.* (1993) concluded that varieties had similar leaf size, but differed in all yield components measured. **Foley** and **Hennery (1993)** studied the Somaclonal variations resulted from anther culture of Saladin cultivar. They stated that several lines had reduced leaf area, while, only one of them had a great leaf area compared with their original cultivar. **Strik** and **Proctor (1998)** reported that the studied strawberry genotypes differed significantly in terms of leaf area. **Ragab (2003)** observed significant increment in leaf area for Camarosa cultivar as compared with cv Sweet Charlie. **Camacaro *et al.* (2004)** confirmed that leaf area was not significantly affected by the two cultivars in the first year but in the second year of cropping, leaf area of Elsanta cultivar was greater and increased with the larger crown size as compared with cv Bolero**. Ahmed (2009)** found that the highest values of leaf area were appeared in Ventana cultivar as compared with seven cultivars and two strains in two tested seasons.

1.3. Chlorophyll reading:

There were limited studies on leaf chlorophyll content of strawberry genotypes**. Kim *et al.* (1996)** showed that high correlations were observed between chlorophyll content and each of fresh weight and leaf area. **Wang *et al.* (1998**) mentioned that the cultivar effect on chlorophyll content was highly significant. They added that chlorophyll content in Primetime cultivar was higher than those of cv Northeaster. **Mohamed (2003)** found that Capitola cultivar and its strain had the highest chlorophyll content as compared with all tested genotypes. **Anna *et al.* (2005)** reported that Elsanta cultivar was characterized by lower chlorophyll content as compared with Korona cultivar. **Guler *et al*. (2006)** reported that there were significant differences in chlorophyll content among cultivars. The highest chlorophyll reading value was recorded in Kabarla and Red Land Hope cultivars, followed by cvs Festival, Sweet Charlie and Camarosa.

1.4. Crown diameter:

Dana (1980) reported that large plant size is an indicator for high number of inflorescence. **Abd El-Latif (1998)** found that no significant differences were detected in crown diameter between Douglas and Chandler strawberry cultivars. **Bish *et al.* (2000)** stated that large stem diameter of daughter plants resulted in larger crown diameter and greater flower development after transplanting**. Mohamed (2003)** reported that Capitola and Chandler cultivars had the highest crown diameters compared with all tested genotypes. Camarosa strains, i.e, C2 and C6, gave significantly higher values of crown diameter than the original cultivar. **Camacaro *et al.* (2004)** mentioned that crown size is a useful indicator of vegetative growth and reproductive status, because large crowns had more microscopic flowers at planting in both cvs Elsanta and Bolero. **Pertuze *et al.* (2006**) recorded that no significant differences were detected for crown diameter

1.5. Number of roots:

The high number of roots may help in root structure and reflect high content of carbohydrates stored in roots which may affected positively plant growth and productivity as mentioned by **Dana (1980). Abd El-Latif (1998)** reported that no significant differences were detected in number of roots between strawberry cultivars Douglas and Chandler. **Mohamed (2003)** found that Camarosa strains, C1, C6, C7 and C10, recorded significantly the highest number of roots/plant. On the other hand, the lowest values were detected for Capitola cultivar and its strains, C2, C3 and C9. **Ragab (2003)** observed that Sweet Charlie plants showed a significant increase in number of roots as compared with Camarosa cultivar.

1.6. Number of secondary crowns:

Chercuite *et al.* (1991) reported that Bogotá strawberry cultivar had significantly more secondary crowns than Elvira cultivar. **Iigin** and