

## 5- SUMMARY AND CONCLUSION

Tow field experiments were carried out during the two successive winter seasons of 2001–2002 and 2002-2003 at the Arabian Agricultural Development company farm in El-Kilo 74 Cairo–Alex. Desert, Road Giza governorate , to study the effect of irrigation regime, fertilization level and pruning system on vegetative growth characteristics, chemical composition of plant foliage and fruit yield and quality of tomato plant. This work included two field experiments as follows:-

### **\*First experiment:-**

This experiment was conducted to elucidate the effect of different surface drip irrigation regimes on vegetative growth, fruit yield and its components as well as chemical composition for plant foliage and fruits of tomato plants cv. Faculta 38. The results of this experiment could be summarized as follows:-

1-Changing the irrigation regime through increasing the used rates of irrigation, i.e., 12, 14 and 16 m<sup>3</sup> water / fed. daily by 4 or 8 m<sup>3</sup> water /fed daily during the second month after transplanting and 8 or 16m<sup>3</sup> water / fed daily during the last three months of growing season positively increased all the vegetative growth parameters (plant height, number of branches, fresh and dry weight / plant )compared with using

12,14,16 or 18 m<sup>3</sup> water /fed. daily as a constant rate all over the growing season.

2-Increasing the irrigation level either in case of irrigation with constant rate (12, 14,16 or 18 m<sup>3</sup> water/fed. daily) through the growing season or follow a changing rate by increasing the rate of application (12, 14 or 16 m<sup>3</sup> /fed.) 4 or 8 m<sup>3</sup> water / fed. daily during the second month and 8 or 16m<sup>3</sup> water /fed. per day during the next last three months along the growing season decreased the total nitrogen, phosphorus and potassium concentration of the plant foliage. The highest concentration for all assayed macro-nutrients was obtained as a result of using 12 m<sup>3</sup> water/fed. i.e., irrigation at 52.8 % of field capacity daily along the growing season.

3-Irrigation at rate of 14 m<sup>3</sup> /fed. daily during the first month increased to 22 m<sup>3</sup> water /fed. during the second month and 30 m<sup>3</sup> water/fed. daily during the last three months of growth with a total amount of water (3780 m<sup>3</sup> water /fed.) reflected the highest values of fruit set percentage, number and weight of fruit / plant as well as early and total yield /fed. followed by treatment in which the plant irrigated with 2940 m<sup>3</sup> water/fed. during the growing season applied as 14,18 and 22 m<sup>3</sup> water/fed. daily during the first, second and the last three months of growing season (5 months )and treatment in which the plant received 2400 m<sup>3</sup> water /fed . during the growing

season, applied as a rate  $16 \text{ m}^3$  water /fed. daily along the growing season.

- 4-The highest values in all fruit physical characters (average fruit weight, length and diameter) were obtained from the irrigation with rate of  $14 \text{ m}^3$  water /fed. daily during the first month increased to  $22 \text{ m}^3$  water/fed. during the second month and  $30 \text{ m}^3$  water/fed. daily during the last three months of growth with a total amount of water ( $3780 \text{ m}^3$  water/fed.)
- 5-Increasing the rate of irrigation either in case of irrigation with a constant level during the growth season (12, 14, 16 and  $18 \text{ m}^3$  water/fed. daily) or follow an increasing level during the second and the last three months of growth led to a significant decrease in all assayed mineral constituents of fruits (N, P, K and  $\text{NO}_3\text{-N}$ ) and organic constituents (total acidity, total sugars, vitamin C and total soluble solids).

It could be concluded that under similar conditions of the experiment irrigation with  $14 \text{ m}^3$  water /fed. daily during the first month increased to  $22 \text{ m}^3$  water /fed. daily during the second month and  $30 \text{ m}^3$  water/fed. daily during the last three months of growing season with total amount of water ( $3780 \text{ m}^3$  water /fed.) can be recommended for producing higher early and total fruit yield with good quality. However, due to the rarity of water under sandy soil conditions and no significant differences

between using 3780 and 2400 m<sup>3</sup> water /fed. So, we can advice to use 2400 m<sup>3</sup> water/fed. To obtaining higher yield with best quality.

### **\*\*Second experiment:-**

This experiment was carried out to investigate the effect of compound fertilizer level and plant pruning on vegetative growth, fruit yield and its components as well as chemical composition of plant foliage and fruits of tomato plants. This study included nine treatments, which were the combination of three fertilization levels and three methods of pruning. The results of this experiment could be summarized as follows:-

- 1-Vegetative growth aspects expressed as plant height, fresh and dry weight of plant were significantly increased as a result of increasing the amount of applied compound fertilizer .The highest values in all recorded growth parameters were obtained in case of using the highest fertilizer level (900 kg NPK/fed.) compared with the medium (600 kg /fed.) and the lowest used (300 kg/ fed) one.
- 2- Pruning the plant to leave one main stem or two significantly affected all the studied morphological characters of plant i.e., plant stem length, fresh and dry weight per plant. Plant stem length was increased with pruning the plant either by allow one or two stems to grow. Whereas, both fresh and dry

weight of plant were significantly decreased as a result of pruning.

- 3- Increasing the level of compound fertilizer (N P K) and allowing the plant to grow normally without pruning increased fresh and dry weight of plant. On the other hand, increasing the level of NPK fertilizer combined with pruning the plant to leave one or two stems per plant increased plant height compared with the check treatment
- 4- Total nitrogen, phosphorus and potassium content of plant foliage were steadily increased with increasing the level of NPK fertilization from 300 Kg/ fed. up to 900 kg NPK / fed .
- 5- There were significant increases in total nitrogen, phosphorus and potassium content of plant foliage with pruning the plant to allow one or two stem to grow compared with allowing the plant to grow normally without pruning.
- 6- The concentration of total nitrogen, phosphorus and potassium in plant foliage was significantly increased with increasing the level of compound fertilizer application up to the highest used level (900 Kg NPK / fed.) and pruning the plant to leave one stem to grow.
- 7- Fruit set percentage as well as total fruit yield and its components expressed as number and weight of fruits per plant, early and total fruit yield /fed. were significantly affected during both seasons of study with different fertilizer

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levels application. In this respect, fruit set percentage and total yield and its components were continuously increased with increasing the fertilizer level from 300 up to 900kg NPK/fed.

- 8- Fruit set percentage, total fruit yield and its components, i.e., number and weight of fruits per plant, early and total yield / fed. were significantly affected with pruning system of plant. In this regard, the highest values of fruit set percentage was noticed in case of training the plant on two stems compared with pruning the plant leaving only the main stem to grow and without pruning.
- 9- Using the highest level of NPK fertilization (900 kg NPK / fed.) and training the plant to allow two stems to grow reflected the highest increment in fruit set percentage and early fruit yield, while the highest level of NPK fertilizer combined with the unpruned treatment (control) gave the highest number and weight of fruits per plant and the highest fruit yield / fed.
- 10- All measured fruit parameters i.e., average fruit weight, fruit length, fruit diameter and dry weight of fruit were significantly affected by NPK fertilization during both seasons of study. The highest fruit parameters were noticed as a result of using the highest level of fertilization, i.e., 900

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kg NPK/fed. Compared with medium (600 kg) and lowest (300 kg) levels of fertilization.

- 11- Pruning the plant to leave one or two stems to grow significantly increased average fresh weight, fruit length and diameter as well as dry weight of fruit compared with plant left without pruning.
- 12- Application of the highest used level of NPK fertilizer (900 kg / fed. ) combined with pruning the plant on one main stem reflected the highest values for physical fruit quality i.e., average fruit weight, length , diameter and dry weight of fruit compared with other tested treatments.
- 13- Organic ( total acidity, vitamin C, total sugars and total soluble solids) and non-organic constituents(N, P, K and  $\text{NO}_3\text{-N}$ ) concentration were significantly increased with increasing the amount of fertilizers applied up to the highest used level (900 kg/fed.).
- 14- Pruning the plant to leave one or two stems to grow significantly increased all determined organic and non-organic constituents of fruit during both seasons of growth compared with the control treatment.
- 15- The highest concentration for the above mentioned organic and non-organic chemical constituents were connected with application of the highest used level of NPK mineral fertilizer

(900 kg NPK ) combined with pruning the plant to allow one main stem to grow .

It could be concluded that, under sandy soil conditions, application of the highest used level of compound fertilizers (900 kg NPK/fed.) and pruning the plant to leave two stems to grow can be recommended for obtaining higher early yield with best fruit quality while application of the same level of fertilization and leaving plants to grow without training can be recommended for obtaining higher total fruit yield.