

SUMMARY AND CONCLUSION

This study was conducted to elucidate the effect of different levels of NPK fertilizers and irrigation regime as well as their interaction on growth and chemical constituents of plant foliage as well as on the yield and quality of carrot plant roots. The widely cultivated and well known cultivar of carrot, red core chantenay was used in this work. Two field experiments were carried out at the Experimental Farm of the Faculty of Agriculture at Moshtohor, Zagazig University during the winter seasons of 1988-1989 and 1989-1990. The obtained results can be summarized as follows:

1. Irrigation at 70-80% of field capacity i.e. irrigation every 15 days by interval and applying 40 kg N + 32 kg P_2O_5 + 100 kg K_2O per faddan resulted in the highest carrot plant growth expressed as top, root and whole plant length as well as fresh and dry weight per plant during both seasons of growth.

2. Increasing quantity of supplied water up to the highest used level ($2280 \text{ m}^3/\text{Fad.}$) reflected a depressing effect on all determined photosynthetic pigments (a b and total chlorophyll and carotenoides compounds) of plant foliage. On the contrary, increasing fertilization rate up to the highest used level (60 kg N + 48 kg P_2O_5 + 150 kg $K_2O/\text{Fad.}$) increased content of such photosynthetic pigments in plant foliage.

3. Total nitrogen, phosphorus and potassium as well as total hydrolizable carbohydrates content of plant foliage were increased with increasing either irrigation water supply (up to the highest used level) or NPK fertilization rate (up to the fourth used rate) during both seasons of growth.

4. Irrigation at 70-80% of field capacity (in which the water consumption through growing season was $2280 \text{ m}^3/\text{Fad.}$) combined with the fourth fertilization level ($40 \text{ kg-N} + 32 \text{ kg-P}_2\text{O}_5 + 100 \text{ kg-K}_2\text{O}/\text{Fad.}$) reflected the highest values of root weight and total yield of whole plants/Fad. during both seasons of this work. However, increasing fertilization rate more than the fourth used one (i.e. up to the fifth or sixth used rates) tended to decrease root weight per plant and the total yield of plants/Fad.

With regard to the combined effect of quantity of water supply and NPK fertilizers level on each of root/plant ratio, root yield/Faddan and efficiency of water utilization, the treatment of lowest used water application combined with the Fifth level of NPK fertilizers may be recommended for production of carrot roots to food processing.

5. Root diameter, core and cortex thickness were positively responded to increasing either irrigation frequencies and/or fertilization rate during the two growing seasons of this work. In this respect, the highest used rate of irrigation combined with the fourth NPK fertilizers level resulted in the maximum values of such measurements of roots.

6. Increasing the irrigation frequencies i.e. irrigation six times throughout the growing season and addition of NPK fertilizers at 40 kg-N + 32 kg P_2O_5 + 100 kg- K_2O /Fad. led to the highest total nitrogen, phosphorus and potassium content of plant roots.

7. Shortening the irrigation periods i.e. irrigation every 15 days by interval had a negative effect on reducing, non-reducing and total sugars as well as the carotenoides content of roots. On the contrary, increasing rate of NPK fertilizer increased all estimated sugars and carotenoides compounds during both seasons of growth.

Generally, it could be concluded that, under similar conditions of such experiments, water addition every 15 days by interval or in other words when the soil moisture is about 70-80% of field capacity and fertilization with 40 kg-N + 32 kg- P_2O_5 + 100 kg K_2O /Fad. might be recommended for obtaining the maximum carrot plants yield with good quality for fresh consumption. However, using the treatment of the lowest quantity of water application (irrigation every four weeks) combined with the fourth or fifth level of NPK fertilizers may be advisable for carrot roots production to be used in food processing purposes.