

## 5- SUMMARY AND CONCLUSION

The present work was carried out in the Desert Research Center, Maryout Research Station under calcareous soil conditions during the growing seasons of 1997-1998 and 1998-1999. The aim of this investigation study the effect of organic and mineral fertilizers on growth, yield and its components and chemical composition of Giza 20 onion cultivar. The experiment included twenty treatments resulted from the interaction of 5 organic manures rates and 4 levels of compound fertilizer (NPK) As follows.

(A) Organic manure treatments were :

- 1- Control (without any addition )
- 2- FYM at rates of 10 and 20 ton per faddan added to the soil before planting .
- 3- TR at rate of 10 and 20 ton per faddan added to the soil before planting .

(B) NPK fertilizers levels were :

- 1- Control (without any addition )
- 2- NPK<sub>1</sub> (40N: 30 P<sub>2</sub>O<sub>5</sub>: 50 K<sub>2</sub>O)kg/fad.
- 3- NPK<sub>2</sub> (60N: 45 P<sub>2</sub>O<sub>5</sub>: 75 K<sub>2</sub>O)kg/fad.
- 4- NPK<sub>3</sub> (80N: 60 P<sub>2</sub>O<sub>5</sub>: 100 K<sub>2</sub>O)kg/fad.

(C) The interaction treatments between organic manures and chemical fertilizers treatments.

Nitrogen, Phosphorus and Potassium were added in the form of ammonium sulphate (21.5%N), Calcium superphosphate (15% P<sub>2</sub>O<sub>5</sub>) and Potassium sulphate (48% K<sub>2</sub>O), respectively.

A split plot design with four replicates was adopted. The different rates of organic manure were arranged in the main plots while the levels of compound (N, P and K ) fertilizers were distributed randomly in the sub- plots

Obtained results could be illustrated as follows:

### **1 - Vegetative growth characteristics :-**

1-1-Organic manure treatments exhibited, significant increase in growth parameters, during periodical samples of onion plants when compared with control treatment. The highest values of growth characters obtained from plants received town refuse treatments (10 and 20 t/fad.) The treatments had no significant effect on neck diameter and bulbing ratio of bulbs.

1-2-NPK treatments exhibited significant increase in growth parameters except neck diameter and bulbing ratio of bulbs when compared with control treatment. The second and the third NPK treatments enhanced growth characters of onion plants.

1-3-The interaction between organic and NPK fertilizers treatments exhibited significant increase in plant length, fresh and dry weight of bulb .

1-4- Allt growth parameters, except bulbing ratio increased with age of plants.

## **2 . Yield and its components:-**

2-1- Organic manure application had a positive effect on total yield, fresh and dry weight of bulb in addition to bulb diameter when compared with control treatment. Town refuse treatments (10-20 t/fad.) followed by FYM application at 20 t/fad surpassed than the other treatments.

2-2- NPK fertilizers application at different rates had a positive significant effect on total yield, fresh and dry weight of bulb, as well as bulb diameter.

- The highest values of total yield and its components obtained from onions received the second and the third NPK treatments.

2-3- The interaction treatments between organic manures and NPK fertilizers showed significant increase in total yield and fresh weight of bulbs, the highest value of total yield obtained with onions received TR at 20 ton /fad + the second or the first NPK treatments.

## **3 . Chemical composition :-**

3-1- Organic manures application exhibited significant increase in NPK content in onions. Town refuse treatment at 20 ton /fad enhanced than other organic manures treatments.

- Applying organic manures (OM) to onion plants significantly increased the percentage of T.S.S in onion bulbs.

- Also, heavy metals content increased in onions treated with OM but the increases were within allowed range of metals.

3-2-Applying the different levels of NPK fertilizers significantly increased NPK contents in onion bulbs, and the NPK contents increase with increasing level of NPK application .

- Regarding T.S.S percentage of onion bulbs, increased with increasing NPK rates application to onion plants.
- Application of NPK at the second (NPK)<sub>2</sub> and third (NPK)<sub>3</sub> levels to onion plants increased heavy metals content in onion bulbs significantly in the first growing season only. But the increases of heavy metals content in bulbs were within allowed range.

3-3- The interaction between OM and NPK fertilizers enhanced N,K content in onion bulbs when compared with the control treatment. TR at 20 t/fad + (NPK)<sub>3</sub> levels surpassed than other treatments in its effect on NPK content in onion bulbs. The increase in phosphorus content in onion bulbs was not significant when compared with the control treatment.

- Heavy metals contents increased significantly in onion bulbs, but within safety range as a results of the interaction between organic and NPK fertilizers when compared with control treatment.

## **6- Conclusion**

Generally it could be concluded that under calcareous soil condition, The addition of 20 t/fad of town refuse combined with second rate of NPK fertilizers (60N+ 45 P<sub>2</sub>O<sub>5</sub>+ 75K<sub>2</sub>O) can be recommended for obtaining the best vegetative growth, with highest total yield and best quality. It is worthy to mention that using town refuse as organic manures at 20t/fad rates was safe from the heavy metals nutritional point according to the appendix mentioned and in materials and methods.