Effect of organic and inorganic fertilizers on yield and quality of onion

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The present work was carried out in the Desert Research Center, Maryout Research Station under calcareous soil conditions during the growingseasons of 1997-1998 and 1998-1999. The aim of this investigation study theeffect of organic and mineral fertilizers on growth, yield and its components and chemical composition of Giza 20 onion cultivar .The experiment includedtwenty 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 beforeplanting. 3- TR at rate of 10 and 20 ton per faddan added to the soil beforeplanting. (B) NPK fertilizers levels were : 1- Control (without any addition)2- NPK1 (40N: 30 P20s: 50 K20)kg/fad.3- NPK2 (60N: 45 P205: 75 K20)kg/fad.4- NPK3 (80N: 60 P20S: 100 K20)kg/fad.(C) The interaction treatments between organic manures arid chemicalfertilizers treatments.Nitrogen, Phosphorus and Potassium were added in the ”orin ofammonium sulphate (21.5%N), Calcium superphosphate (15% P20S) andPotassium sulphate (48% K20), respectively.A split plot design with four replicates was adopted. The different rates oforganic manure were arranged in the main plots while the levels of compound(N, P and K) fertilizers were distributed randomly in the sub- plotsObtained results could be illustrated as follows : 1- Vegetative growth characteristics :-I~I-Organic manure treatments exhibited, significant increase in growthparameters, during periodical samples of onion plants when comparedwith control treatment. The highest values of growth characters obtainedfrom plants received town refuse treatments (10 and 20 t/fad.) Thetreatments had no significant effect on neck diameter and bulbing ratio ofbulbs.1-2-NPK treatments exhibited significant Increase In growth parametersexcept neck diameter and bulbing ratio of bulbs when compared withcontrol treatment. The second and the third NPK treatments enhancedgrowth characters of onion plants.1-3-The interaction between organic and NPK fertilizers treatments exhibitedsignificant increase in plant length, fresh and dry weight of bulb.1~4~Alit 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 anddry weight of bulb in addition to bulb diameter when compared withcontrol 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 significanteffect on total yield, fresh and dry weight of bulb, as well as bulbdiameter.- The highest values of total yield and its components obtained from onionsreceived the second and the third NPK treatments.2-3- The interaction treatments between organic manures and NPK fertilizersshowed significant increase in total yield and fresh weight of bulbs.the highest value of total yield obtained with onions received TR at 20 tonIfad + the second or the first NPK treatments.3 . Chemical composition :-3-1- Organic manures application exhibited significant increase in NPK contentin onions. Town refuse treatment at 20 ton Ifad enhanced than otherorganic manures treatments.- Applying organic manures (OM) to onion plants significantly increasedthe percentage ofT.S.S in onion bulbs Also, heavy metals content increased in onions treated with OM but theincearses were within allowed range of metals.3-2-Applying the different levels of NPK fertilizers significantly increasedNPK contents in onion bulbs, and the NPK contents incearse withincreasing level ofNPK application.- Regarding T.S.S percentage of onion bulbs, increased with increasing NPKrates application to onion plants.-

Application of NPK at the second (NPK)2 and third (NPKh levels to onionplants increased heavy metals content in onion bulbs significantly in the firstgrowing season only. But the incearses of heavy metals content in bulbs werewithin allowed range.3-3- The interaction between OM and NPK fertilizers enhanced N,K content inonion bulbs when compared with the control treatment. TR at 20 t/fad +(NPK)3 levels surpassed than other treatments in its effect on NPK contentin onion bulbs. The increase in phosphourus content in onion bulbs was not significant when compared with the control treatment.- Heavy metals contents increased significantly in onion bulbs, but withinsafty range as a results of the interaction between organic and NPKfertilizers when compared with control treatment.6- ConclusionGenerally it could be concluded that under calcareous soil condition, Theaddition of 20 t/fad of town refuse combined with second rate of NPKfertilizers (60N+ 45 P20S+ 75K20) can be recommended for obtaining the bestvegetative growth, with highest total yield and best quality. It is worthy tomention that using town refuse as organic manures at 20t/fad rates was safefrom the heavy metals nutritional point according to the appendix mentionedand in materials and methods.