Comparative study on production of some imported potato cultivars under different fertilization levels in sandy soils

Mamdouh Mohamed El-said El-Sayed Arafa

SUMMARY ANThis study included two xp riments which were carried out inea h of the summer and winte s asons of 1996 and 1997 at theCh psy Company Farm in S area, Ismaalia governorate andLa oratory of Horticulture Dep e ent at the Faculty of AgricultureMo hotohor, Zagazig University.ONCLUSSIONT EXPERIMENT:The first experiment was s g ested as an attempt to investigatethe effect of three levels of ,P and K fertilizers within sevenintr duced potato cultivars as we I their combination on vegetativeh, yield and its components, ch mical composition of both plante and tuber and suitability f r c ipsy processing after harvestingand after 3· months storage . Th ed rates of nitrogen, phosphorusotassium (NPK) fertilizers w re as follows:1-(1 OkgN + 60 kg P20S + 100 kg 2 / fad.)2-(1 5 kg N + 75kg P20S + 150 kg 2 Ifad.)3-(2 0 kg N+ 90 kg P205 + 200 kg 2 I fad.)onus i.e., Ammonium sulphate(20.5 oN), Urea (46.5 % N) and monium nitrate (33.5 % N),phos horus as calcium superphos ha e (15.5%P20S) and potassiumwas a ded in the form of potassium ul hate (48-52 %K20).The phosphorus fertilizer w dded as one bush to the soilbefor planiting, Meanwhile, nitro e and potassium fertilizer werea ded in different portions, s01fe was added as soil application in twoe ual portions (before plantin, and before ridging) and other partsw re applied with irrigation water throughout the growing seasons inequal portions starting 21 dfs up to 60 days after planting.The studied cultivars of potato were seven. i.e., Lady Rosetta,A cent, Karlena, Sponta, Mirakel, Turbo and Accord in the summerwinter seasons of 1996, seven cultivars in the summer and winter Iions of 1997 were tested bpt they were Lady Rosetta, Saturna,lena, Cycloon, Mirakel, ~urbo and Accord. Split plots in aomized complete bloks design with four replicates was used. TheculI ivars were distributed in the main plots whereas the fertilizationlev Is were randunly situated in ~e sub plots.The obtained results can b, summarized asfollows:I-p ant vegetative growth: Sifificant differences were observedamong cultivars in vegetative growth characteristies viz plantheight, number of branche and fresh and dry weights per plant.In this respect, Sponta, Cyc oon, Karlena, Turbo and Saturna. Incombination with the third d level ofNPK (200kg N + 90 kgP20S + 200 kg K20 / fad.) sassed other used combinations.2-C emical composition of pia foliage: The cvs. Saturna, Accent,Mirakel, Turbo, Cycloon d Accord in combination with thethird·,8.JtP1ied level ofNPK fertilizer showed the highest valuesof N,P ,.K. and total hydrates percentage than othercombinations.ield and its components: U’he cvs. Lady Rosetta, Saturna andTurbo in combination ~ith the second and third tested level ofNPK fertilizers gave hi~er number of tubers per plant. While,cvs. Sponta and Cycoloon in combination with the second levelof NPK fertilizer gave ~ higher average of tuber weight thanother combinations. The Icvs. Lady Rosetta, Saturna, Karlenaand Sponta in combination with the third used level ofNPKgave higher tuber weight per plant compared with etherI treatments. Moreover, cvs, LadyRosetta, Satuma and Karlenain combination with the t~ird applied level of Nl’Kfertilizer.cv,Sponta with the second ~ne and cv. Mirakel withthefirst oneshowed higher tuber yiel per faddan than all other cultivars inthe different used comb ations Concerning the marketableyield per fad. the cvs. La y Rosetta, Saturna and Karlena withthe third level of NPK 4d cv. Sponta with the second oneresulted in the highest values of marketable yield per fad., whilecvs. Mirakel and Turbo wi h first level ofNPK or cvs. Cycloonand Turbo with the used

one showed lowerunmarketable yield percen ge.4-S, e of tubers:The cv. Mirak in combination with the first testedlevel ’of NPK fertilizer d cvs. Sponta and Cycloon incombination with the seco d and third applied levels of NPKfertilzer showed higher ues of Large size tubers (> 55mm.)yield and percentage. Ho ever, cvs. Lady Rosetta, Saturna,Karlena and Accord in co bination with the third tested levelof NPK gave higher yield and percentage of medium tubers (35-55mm.). Meanwhile cv.ILady Rosetta with the first level ofINPK and .both cvs. Satufna and Turbo in combination with«35mm.) the third levellofNPK fertilizer showed the highestvalues of small size tubers land its percentage.S- ’hemical composition 0/ tu~ers be/ore storage: The cvs. Spontaand Turbo in combination rith the third applied levelofNPKfertilizer showed higher values of (N,P,K, No3 and protein),while, cvs. Accent and Turbo in combination with the third usedilevel of NPK fertilizer gav~ a higher value of total amino acidscontent Moreover, both cvs.1 Accord and Mirakel with the samelevel of NPK fertilizers showed the highest values in reducing,on reducing and total sugars content of potato tubers. However,vs. Lady Rosetta, Saturna 4d Karlena showed the lowest valuesn sugars content, that make it the most suitable for processingurpose.The cvs. dy Rosetta, Saturna and Karlenashowed higher values of co king quality characters (dry matter,colour, Taste and crispy) than other used caltivars.after storage: The cvs. Sponta andthe third applied level of NPKhawed higher values ofN d protein content of tuber. The cvs.ady Rosetta and Turbo in combination with the third level ofK showed higher values fP,K and NO], while, cvs. Accentd Mirakel with the same evel of NPK fertilizer showed aand Satuma in combination with bed system, and cv. Sponta incombination with ridging system all spaced at 30cm.showedhigher significant values than other cultivars.2- ”eld and its components: Both cvs. Mirakel and Saturna incombination with ridging system or cvs. Accent and Satuma incombination with bed system and all spaced at 30cm showedhigher values of number of tubers per plant. Moreover, cvs.Sponta planted either on ridge or on bed system and Cycloon inbed system and all of them were spaced at 30cm showed highervalues of average tuber weight.Respecting tubers yield per plant, cvs. Sponta and Cycloon inbination with ridging system and spacing at 30cm gave thehi erst tuber weight per plant. Concerning total yield per feddan, CV,Sp nta in combination with ridging method and spacing at 20 ora part, cv. Accent planted in ridging system and spaced at 20cmand both cvs. Saturna and Karlena in combination with bed systemand spacing at 20cm showed the highest values of total yield perfad than other used combinations. Regerding marketable yield,cvs. Accent and sponta in combination with ridging system andspa ed at 20 or 30cm apart andlcv. Satuma in combination with bedIsyst m and spacing at 30cm ga/ve the hgihest values of marketableyiel per fad., Meanwhile, cvs.1Karlena, Saturna, Sponta, Mirakel,Tur 0 and Accord in combin~tion with ridging system and hillspa ing at 30cm showed the lo~est values of unmarketable yieldPer ntage.3- uber size: Both cvs. Sponta and Cycloon in combination withridging or bed system and spaced at 30cm showed the highestvalues of Large size tubers percentage. While, cvs. Lady Rosettain combination with ridging or bed system, Saturna with ridgingand Karlena with bed system and all spaced at 20cm gave thehighest values of meduim ~ze tuber pecentage. Moreover, cvs.iAccent, Karlena, Turbo, saturna and Accord in combination with< either bed or ridging system and spaced at 20cm gave higherIvalues of small size tuber percentage,Generally, it may be concluded that planting the cvs. LadyRo etta, Saturna and Karlena and supplied with the highest used level,of K fertilizer (200kg N + 90kg P20 + 200kg K20 /fad.), cv.Sp nta with the second tested leivel (150 kg N + 75 kg P20s + 150 kgK2 I fad.) and cv. Mirakel with the first one (150 kg N + 60 kg P20s+1 Okg K20 I fad.) may be recommended for the highest marketableand total yields per fad. and for good quality of potatoes forpro essing (chipsy). The cultivars Lady Rosetta, Saturna and Karlenawh.ch showed the lowest values i~ sugars content and high percentagematter content of tubers, ate considered as the most suitable forpro essing specially that they showed a good storageability for thecoo ing quality when stored in cold storage at lOCOfor 90 days.It may be also concluded th,t planting cvs. Sponta and Accent inrid . g system (90cm) and spacfng at 20 or 30cm between plants andpi ting also cvs. Saturna and ~lena in bed system (l80cm) andsp cing at 20cm between plants;produced the highest marketable andtot I yield per fad.For obtaining the highest percentage of large size tubers the cvs.and Cycloon when planted on ridging or bed system andat 30cm between plants are recommended. Morover, forge ing medium tubers cv. Lady Rosetta planted on ridging or bedsys em and spaced at 20cm cvs. Saturna and

Karlena with ridgingsys em and spacing at 20cm between plants. Moreover, cvs. Accord,ena, Satuma when grown on beds or ridge and spaced at 20cmproduced the highest values of percentage of small sized tuberswhi h are recommended for using as seeds