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ProEnvironment

ProEnvironment 9 (2016) 91 - 94

Original Article

The Effect of Organo-Mineral Fertilization on Districambosoil Concerning the Production Acclimatization of a Variety of Purple Potatoes under the Pedogenetical Characteristics from the Avram Iancu Mountainous Area, Alba County

DAVID Ionela*, Marilena MĂRGHITAŞ

University of Agricultural Sciences and Veterinary Medicine, Faculty of Agriculture,
3-5 Calea Mănăştur Street, 400372, Cluj-Napoca, Romania

Received 18 March 2016; received and revised form 22 May 2016; accepted 29 May 2016
Available online 28 June 2016

Abstract

Farming system where are cultivated potatoes needs a continuous supply of a new varieties. Romania in the last century as regard varieties of potatoes went on the line of yellow or white potatoes. Necessity of introducing of purple potatoes is beneficial for human health and for agriculture sustainable development in this mountainous area. The experiment aimed acclimatization a purple potatoes in conditions of pedogenetical montanious area. Districambosoil characteristics have made the purple potatoes variety, Blue Salad to acclimatize well in the mountainous area. The analysis of the main agrochemical factors of districambosoil cultivated with potatoes in Avram Iancu village, highlights the acid and the strong acid character (pH_{H2O} 4.40-5.13), with a higher humus content. Organo mineral ferlization on districambosoil characteristics from the mountainous area due to variety Blue Salad a production of from 21t/ha in the control stample to 44 t/ha to 20 t/ha version manure 20t/ ha + N80P80K80.

Keywords: districambosoil, fertilization, mountainous area, production, purple potatoes.

1. Introduction

Cropping technologies applied to plants cultivated in this area inducing mainly through mineral and organic fertilization measures, some essential modifications agrochemical soil indices [2].

Marghitas et. al. (2011) [1] found that organo-mineral fertilization, which is the most compatible with the biologic and nutrition requirements of the potato.

The experience has been realized using purple potatoes variety, Blue Salad, on districambosoil in the mountainous Avram Iancu, Alba, in the year 2015.The experiment was temporarily set and has a bifactorial character:

Factor A: Blue Salad variety

Factor B: levels of fertilization graduations:

b_1 = $N_0 P_2O_5{}_0 K_2O_0$

b_2 = manure 20t/ha + $N_{40} P_2O_5{}_{40} K_2O_{40}$

b_3 = manure 20t/ha + $N_{80} P_2O_5{}_{80} K_2O_{80}$

b_4 = manure 20t/ha + $N_{120} P_2O_5{}_{120} K_2O_{120}$

b_5 = manure 20t/ha + foliar fertilization

b_6 = manure 20t/ha + ash

Blue Salad is a semi-early variety, originally from Peru, resistant to diseases and pests.

* Corresponding author.
Tel: +40-264-596384
Fax: ++40-264-593792
e-mail: d.ionela_david@yahoo.com

Figure 1. Leaves and tubers, Blue Salad variety

Determination of the production was carried out by weighing each variation and variety, it has been reported the production of tubers per unit of surface area (ha).

Maintenance work was carried out manually, the potatoes crop was carried out on each variant weighing fertilizer production and soil sampling that were physical and chemical analyzed in laboratory under ICPA (1981) methodology.

3. Results and Discussions

In the agricultural year 2014-205 in the Bihor mountains, purple potatoes was acclimatised well using the organic mineral fertilizer (manure, ash, a complex N, P, K) in recommended doses without negative effects on the environment.

Table 1. Pedo arochemical traits of the typical Districambosoil (SRTS – 2003) in the year 2015

Horizon		Ap	Ao	A/B_{V1}	B_V	Cn
Depth (cm)		0-25	25-41	41-60	60-116	116-150
pH_{H2O}		5.13	5.09	4.84	4.30	4.40
Humus %		10.90	9.46	6.92		
N total	%	0.592	0.520	0.450		
P mobil	(ppm)	37	18	5		
K mobil	(ppm)	934	530	190		
Al mobil	me/100 gr soil	0.029	0.028	0.389	1.49	1.413
SB	me	14.88	11.88	10.64	5.32	4.05
A_H	me	7.86	10.32	11.10	10.35	9.28
V_{AH}	%	65	54	49	34	30
Granulometric analysis%	Coarse sand	6.24	12.94	20.25	14.63	13.44
	Fine sand	43.06	33.12	25.05	31.92	27.36
	Dust I	12.25	12.10	11.70	11.20	13.05
	Dust II	21.00	23.10	24.70	24.75	24.55
	Caly	17.45	18.70	18.30	17.50	21.60
	Texture	SG/31	SG/31	SS/34	SG/31	LP/43

A moderate acidic reaction (5.71) in the first 25 cm highly acid (4.48) in the horizon Bv very good total nitrogen content, phosphorus in moderately stocked, well-stocked in mobile potassium. Humus reserve is very high (> 400t/ha). Good supply of N, P, K and high humus reserve is due to the area due to long application of manure and grazing of animals. Organo-mineral fertilization determine significant changes of agrochemical indices, and creates better conditions in the bioavailability of nutrients from the soil to accumulate in plant respectively for getting productions much greater on districambosoil (Table 2).

Table 2. The effect of organo-mineral fertilization on districambosoil to the production of purple potatoes from fhe mountainous areas Avram Iancu, Alba

Nr. crt.	Fertilization variant	The average production per hectare Blue Salad variety				
		Average production t/ha	%	Difference	Significance of difference	Duncan test
1	Control stample	21.20	100.0	0.00	Mt.	A
2	Manure 20t/ha + $N_{40}P_{40}K_{40}$	29.20	137.7	8.00	***	B
3	Manure 20t/ha + $N_{80}P_{80}K_{80}$	45.47	214.5	24.27	***	C
4	Manure 20t/ha + $N_{120}P_{120}K_{120}$	45.06	212.6	23.87	***	D
5	Manure 20t/ha + Foliar fertilization	24.13	113.8	2.94	***	E
6	Manure 20t/ha + Ash 20t/ha	26.27	123.9	5.07	***	E
	DL(5%)				0.85	
	DL(1%)				1.33	
	DL(0,1%)				2.27	

Statistical analysis highlights the positive effects on differentiated organo mineral fertilization on the average production of the variety Blue Salad. Comparing with the control stample, the fertilized variants show significant differences. The organic support provided to the systematic application of manure in doses of 20t/ha, ensure a favorable agrochemical and ameliorative environment to the basic physico-chemical characteristics to the districambosoil.Complementary application of mineral fertilizers on soil and foliar so, determines the higher bioavailability of nutrients and better value of these by potato plants. Utilization of manure increase the amount of humus in the soil and the use of ash decrease the acid character of districambosoil needed to enhance the production of potato tubers.

The semi early character of Blue Salad variety, uses at it's best the nutrients from the soil or from the organo-mineral fertilizers resulting an increased production.

4. Conclusions

Districambosoil from the mountaineous area, Avram Iancu, district Alba, features a good supply of N, P, K and a large reserve of humus which is due to the long application of manure and grazing of animals.Differentiated organo mineral fertilization had positive effect on the Blue Salad production: from 21 t/ha on the control stample version to 44 t/ha on the version manure 20 t/ha + $N_{80}P_{80}K_{80.}$

Differentiated organo mineral fertilization had positive impact on the Blue Salad variety, was very well acclimatized to the pedogenetical and climatic conditions from the mountain area, Avram Iancu, district Alba.

Differentiated organo mineral fertilization is the most compatible with biological and nutritional requirements of potato because increases the bioavailability regimen of nutrients from the districambosoil.

Applying the manure and ashes improves the acid reaction of soil, maintains and enhances soil fertility in this mountainous region.

High production obtained this purple potatoes in the mountain region is a solution to sustainability through: food consumption, animal feed, using manure from farm foe, using natural-ash as soil amendment fertilizer, a source of income for people being more competitive on the market.

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