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Original Article

Pretability of Purple Potato, Cultivar Blue Salad, Grown in Organic Farming System in Ecopedoclimatice Conditions from Mountainous Area, Avram Iancu, Alba County

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Abstract

In Romania, in present there is a large mediatization on the concept of organic farming following the idea to eat healthier, to use products from the farm and help the sustainability of rural area. Growing a variety with purple core, Blue Salad, in organic farming system represents an element of competitiveness for organic farming located in mountainous areas because it adapts easier to these areas and has superior quality compared to local varieties because it contains anthocyanins. Ecopedoclimatice conditions from mountainous area, Avram Iancu, determined high productions of the variety Blue Salad in system of organic farming, being similar to those from the center of origin Peruvian Andes. Cultivar Blue Salad prefers an acid soil (districambosoil) and colder areas placed at a high altitude than the ordinary potato varieties. For the growing of Blue Salad variety in organic farming system have been used organic fertilizers from our own farm (fermented manure, ashes, beech leaves) which on one hand improved fertility districambosoil and on the other hand increased the production independence with the variants of fertilization. Statistical data show an increase in production depending on the variants of fertilization, on the differentiated doses of manure applied as organic support, so, compared with the control sample (22.10 t/ha) have been highlighted significant increased productions at all fertilization variants with a maximum value of 27.03 t/ha to the variant with manure 30 t/ha + ashes 20t/ha.

Keywords: ashes, Blue Salad, districambosoil, leaves, manure, organic farming, production.

1. Introduction

Vârban 2014 [1] relates that the organic farming can offer fertile and productive soils, may become a source of income for the people from rural environment because traditional agriculture from Romania is using environmentally friendly technologies.

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Applied systematic, organic fertilization to agricultural plants from the mountainous areas modifies acid soil reaction specific to the mountain area, has positive change of nutrients regime, causes an increase in humus content to these soils with low fertility [2].

Purple potato is cultived due its high content of anthocyanins [3] having a vital role in enhancing the immunity and prevention of cancer.

In this mountainous region applying the manure – ashes combination improves the acid reaction of districambosoil, maintains and enhances the districambosoils fertility [4].

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2. Material and Method

The experience was located in a mountainous area on districambosoil in 2016 year. In the experiment was researched purple potato, variety Blue Salad in organic farming using manure in different doses, ashes and leaves as fertilizers. The experiment was placed provisionally having a bifactorial character: Factor A: Blue Salad cultivar Factor B: levels of fertilization graduations: $b_1 = Control sample$ $b_2 = Manure 20t/ha$ $b_3 = Manure 30t/ha$ $b_4 = Manure 20 t/ha + Ashes 20t/ha$ $b_5 = Manure 30t/ha + Ashes 20t/ha$ $b_6 = Manure 20t/ha + leaves 20t/ha$

 $b_7 =$ Manure 30t/ha + leaves 20t/ha



Figure 1. Blue Salad cultivar, control sample

The cultivar studied is a new variety used in culture with purple core, Blue Salad. It is at the 4th consecutive year in which was cultivated in the ecopedoclimatice conditions from Apuseni Mountains obtaining productions close to the autochthonous varieties (Ostara, Desirée).

The experimental field has been positioned in a place with permanent grassland which is certified as organic since 2015 by accreditation and certification body approved by Ministry of Agriculture and Rural Development.

Potato tubers used in variants of experience stemmed from own production of the cultivar Blue Salad. Was used organic fertilizers like fermented manure and beech leaves that were administered in autumn, and ashes administered in spring before planting the potato tubers. All technology work of potato was performed manually.

Year 2016 was a favorable climatic year for potato crop, respective to the cultivar Blue Salad, have not been revealed problems caused by blight of potato (*Phytophtora infenstans*) or destruction of the crop due to the Colorado potato beetle (*Leptinotarsa decemlineata*). Were harvested and weighed tubers of the variety Blue Salad separately for each organic fertilization variant.

The soil sampling was accomplished before planting the tubers of potato followed by analyzing the agrochemical indices relevant in laboratory following the ICPA methodology (1981) [5].

For cultivation of Blue Salad variety in system of organic farming were administered only fertilizers that are permitted according to EC nr. 834/2007, European Commission Report from 28 June 2007; EC nr. 889/2008, European Commission Report from 5 September 2008, valid from December 1, 2011 [6, 7].

3. Results and discussions

In organic farming system, cultivar Blue Salad had been cultivated on districambosoil specific to the mountainous regions which has the following characteristics in compatibility potato crop requirements (Table 1).

Agrochemical indices	Districambosoil (0-25 cm) in year 2016				
	Cultivar Blue Salad				
pH _{H2O}	5.36				
Humus (%)	11.02				
Total N (%)	0.599				
Mobil P (ppm)	40				
Mobil K (ppm)	780				

Table. 1 Characteristics of districambosoil in the superior horizon (0-25 cm) in year 2016 cultivated with Blue Salad variety in ecopedological conditions from mountainous area, Avram Iancu, Alba county

The districambosoil analysed is specific to the mountainous area, has a moderate acid reaction (5.36) respectively containing a large amount of organic matter (11.02%).

The supply of districambosoil with the three primary macronutrients: nitrogen, phosphorus and potassium has the following values: very well supplied with total nitrogen (0.599%)/mobile potassium (780 ppm)

and moderately stocked with phosphorus (40 ppm).

Districambosoil is a soil with a medium fertility, suitable for agricultural plants that prefer acidic pH, preferred for potato crop.

Cultivar Blue Salad grown in organic farming under the effect of manure, ashes and leaves fertilization resulted in a high production for this types of fertilization (Table 2).

Table 2. Average production of the cultivar Blue Salad grown in organic farming in the mountainous area of the locality Avram Iancu, in year 2016

No.	Fertilization variant	Production t/ha	%	Difference t/ha	Significance of difference	Duncan test
1.	Control sample	22.10	100.0	0.00	Mt.	А
2.	Manure 20t/ha	25.36	114.8	3.26	***	В
3.	Manure 30t/ha	26.02	117.7	3.92	***	С
4.	Manure 20t/ha + Ashes 20t/ha	26.52	120.0	4.42	***	D
5.	Manure 30t/ha + Ashes 20t/ha	27.03	122.3	4.93	***	Е
6.	Manure 20t/ha + leaves 20t/ha	25.60	115.8	3.50	***	F
7.	Manure 30t/ha + leaves 20t/ha	24.85	112.4	2.75	***	G
		DL (p 5%) DL (p 1%) DL (p 0,1%)		0.16 0.24 0.38		

Statistical analysis highlights the positive effects of the organic fertilization to the average production of the Blue Salad variety in 2016 year.

Organic fertilizer variants compared with the control sample show significant differences.

Fermented manure applied in differentiated doses of 20-30 t/ha as organic support ensures the increase of humus supply in districambosoil, respectively the increase of fertility and as well as growth and development of Blue Salad variety tubers thus why production grows to 26.02 t/ha.

Fertilization variants with differentiated doses of manure in combination with ashes had significant positive effects to the production increase of these fertilization organic variants, the production reached a level of 27.03 t/ha. Fertilization variants with differentiated doses of manure in combination with leaves had positive effects on the growth and normal development of Blue Salad variety tubers, respectively on production in organic farming resulting a production of 25.60 t/ha.

In the organic farming system in conjunction with the application of fermented manure, ashes and leaves, cultivar with purple core, Blue Salad achieves normal production although an early variety that cannot capitalize entirely the nutrients from the organic fertilizers applied.

4. Conclusions

In organic farming system in year 2016 in the ecopedoclimatice conditions from the Avram Iancu

mountainous area, Alba County, variety with purple core, Blue Salad, was well acclimatized realizing high productions for this exigent crop system.

Applying organic fertilizers from farm on districambosoil has resulted in an increase of production of variety Blue Salad, that could bring considerable income after capitalization, aspect which makes this crop a viable one.

Applying manure/beech leaves and ashes ameliorate the moderate acid reaction of soil, maintaining and increasing the fertility of districambosoil from mountainous area.

The pretability of purple potato, cultivar Blue Salad, grown in organic farming in the mountainous area having the specific characteristics of Apuseni mountains, in year 2016, brings new opportunities for the local inhabitants and for organic farming sustenability.

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