

THE INFLUENCES OF THE IRRIGATION, FERTILIZATION AND VARIETIES IN OBTAINING THE ONION CROP, IN MIHAI VITEAZU AREA, CLUJ COUNTY, IN 2014

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Abstract

In Romania, the onion acreage fell by 3.8 thousands ha between 2007 and 2014 and the production increased by 20.3 thousands tonnes. In 2014 the experimental group was directly sown, using four varieties of onion, two of red onion and two of white onion. The results show that both in the irrigated and non-irrigated variant, the differences of the productions obtained from Brunswick and Stuttgard varieties and Rosie de Aries variety (blank) are negative very significant and the production obtained from Density variety is positive insignificant compared with the production obtained from the blank.

Key words: direct seeding, onion varieties, irrigation conditions

By annual onion acreage, 33 thousands ha (Indrea D. *et al*, 2012), Romania takes the first place in Europe and by the total production (296 thousands tonnes), Romania is the 6th country, after Spain, Italy, England, the Netherlands and Poland. The production of onion is very different from an year to another, firstly because of the variation of the climatic conditions. Performant farmers, who obtained good, sure and stable productions each year, harvest the same surfaces or they extend the surfaces with this species, being sure of the profit (POPANDRON N., 2012). The importance of the temperature for the onion crop is assured by the relationship between respiration and photosynthesis, because the intensification of photosynthesis leads to accumulation of an high quantity of dry substance in plant, but the intensification of the respiration causes an high consumption of previously synthesized substances (Ciofu Ruxandra, 2003; Popescu V., 2003; Apahidean Maria *et al*, 2005). Insufficient light leads to prolong the growing season, reducing the amount of plastic substances accumulated, diminish the quantity and quality of production and reduce resistance to diseases and pests. Excess light leads to inhibition of photosynthesis, to intensification of respiration process (illumination accompanied by caloric or infra red radiations) (Voican V., Lăcătuș V., 2001). Due to the particularities of drip irrigation, irrigation scheme presents some characteristics that differentiate it

from that of other methods (Luca E. *et al*, 2013). Because the onion has a superficial root system and a relatively reduced surface of absorption, the requirements for water are relatively high, needing moisture in the early growing season (Apahidean S., 2003).

MATERIAL AND METHOD

The onion crop, in 2014, was directly sown in Mihai Viteazu village, Cluj County, using four varieties of onion, two red and two white. For the organic fertilization, there was used a dilution obtained from fresh solid manure, macerated and then applied through the rows of onion. For additional fertilization foliar fertilizers were used. Basic fertilization with NPK was applied in the spring, in March, with the sowing of onion crop.

RESULTS AND DISCUSSIONS

In 2014, the production obtained from the experimental group was 55.52 t/ha, Brunswick and Stuttgard varieties having the lowest intake, with the lowest average of production, compared with Rosie de Aries and Density varieties. As it can be observed, the studied factors (irrigation, fertilization, biological material) influenced in different ways the onion production by surface unit.

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In the non-irrigated variant, the production obtained by basic+foliar fertilization is very significant higher and the production obtained by organic fertilization is insignificant lower, compared with the production obtained by basic fertilization (blank). The production obtained in

the irrigated variant, by basic+foliar fertilization is distinct significant higher and the production obtained by organic fertilization is significant lower, compared with the production obtained by basic fertilization (blank) (*table 1*).

Table 1

The influence of the factors irrigation x fertilization upon the onion production in 2014, in Mihai Viteazu area, Cluj County

Variant	Average yield (t/ha)	Relative yield (%)	± d (t/ha)	Signification
a ₁ b ₁	50.21	100.00	-	Mt
a ₁ b ₂	47.82	95.23	-2.39	-
a ₁ b ₃	60.11	119.71	9.9	***
a ₂ b ₁	57.87	100.00	-	Mt
a ₂ b ₂	54.06	93.41	-3.81	0
a ₂ b ₃	63.03	108.91	5.16	**

DL 5%=3.50; DL 1%=5.09; DL 0.1%=7.63

Legend: a₁=non-irrigated; a₂=irrigated; b₁=basic fertilization; b₂=organic fertilization; b₃=basic fertilization+foliar fertilization.

Table 2

The influence of the factors fertilization x irrigation upon the onion production in 2014, in Mihai Viteazu area, Cluj County

Variant	Average yield (t/ha)	Relative yield (%)	± d (t/ha)	Signification
b ₁ a ₁	50.21	100.00	-	Mt
b ₁ a ₂	57.87	115.25	7.66	**
b ₂ a ₁	47.82	100.00	-	Mt
b ₂ a ₂	54.06	113.04	6.24	*
b ₃ a ₁	60.11	100.00	-	Mt
b ₃ a ₂	63.03	104.85	2.92	-

DL 5%=3.82; DL 1%=6.66; DL 0.1%=15.01

Legend: b₁=basic fertilization; b₂=organic fertilization; b₃=basic fertilization+foliar fertilization; a₁=non-irrigated; a₂=irrigated.

Depending on the fertilization method, irrigation causes an increase of the production obtained, respectively distinct significant increase

for basic fertilization, significant for organic fertilization and insignificant for basic + foliar fertilization (*table 2*).

Table 3

The influence of the factors irrigation and biological material upon the onion production obtained in 2014, in Mihai Viteazu area, Cluj County

Variant	Average yield (t/ha)	Relative yield (%)	± d (t/ha)	Signification
a ₁ c ₁	66.00	100.00	-	Mt
a ₁ c ₂	37.69	57.10	-29.31	000
a ₁ c ₃	67.38	102.09	1.38	-
a ₁ c ₄	39.67	60.10	-26.33	000
a ₂ c ₁	71.36	100.00	-	Mt
a ₂ c ₂	43.74	61.29	-27.62	000
a ₂ c ₃	74.05	103.76	2.69	-
a ₂ c ₄	44.14	61.85	-27.22	000

DL 5%=4.47; DL 1%=5.98; DL 0.1%=7.89

Legend: a₁=non-irrigated, a₂=irrigated; c₁=Rosie de Aries; c₂=Brunswick; c₃=Density; c₄=Stuttgart.

The data presented in *table 3* show that in both irrigated and non-irrigated variant, the differences between the productions obtained from Brunswick and Stuttgart varieties and the productions obtained from Rosie de Aries variety (blank) are negative very significant and the production obtained from Density variety is

positive insignificant, compared with the production obtained from the blank.

Table 4 shows that the varieties positively influence the increase of production in the irrigated variant. So, for Rosie de Aries, Brunswick and Density varieties, the increase is significant for the production obtained from irrigated variant and for Stuttgart variety, this increase is insignificant.

Table 4

The influence if the factors biological material and irrigation upon the onion production obtained in 2014, in Mihai Viteazu area, Cluj County

Variant	Average yield (t/ha)	Relative yield (%)	$\pm d$ (t/ha)	Signification
c ₁ a ₁	66.00	100.00	-	Mt
c ₁ a ₂	71.36	108.12	5.36	*
c ₂ a ₁	37.69	100.00	-	Mt
c ₂ a ₂	43.74	116.05	6.05	*
c ₃ a ₁	67.38	100.00	-	Mt
c ₃ a ₂	74.05	109.89	6.67	*
c ₄ a ₁	39.67	100.00	-	Mt
c ₄ a ₂	44.14	111.26	4.47	-

DL 5%=4.56; DL 1%=6.97; DL 0.1%=13.05

Legend: c₁=Rosie de Aries; c₂=Brunswick; c₃=Density; c₄=Stuttgart; a₁=non-irrigated, a₂=irrigated.

Table 5

The influence of the factors fertilization and biological material upon the onion production obtained in 2014, in Mihai Viteazu area, Cluj County

Variant	Average yield (t/ha)	Relative yield (%)	$\pm d$ (t/ha)	Signification
b ₁ c ₁	67.88	100.00	-	Mt
b ₁ c ₂	38.62	56.89	-29.26	000
b ₁ c ₃	70.13	103.31	2.25	-
b ₁ c ₄	39.52	58.22	-28.36	000
b ₂ c ₁	65.07	100.00	-	Mt
b ₂ c ₂	37.81	58.10	-27.26	000
b ₂ c ₃	63.55	97.66	-1.52	-
b ₂ c ₄	37.32	57.35	-27.75	000
b ₃ c ₁	73.25	100.00	-	Mt
b ₃ c ₂	45.71	62.40	-27.54	000
b ₃ c ₃	78.46	107.11	5.21	-
b ₃ c ₄	48.87	66.71	-24.38	000

DL 5%=5.47; DL 1%=7.33; DL 0.1%=9.66

Legend: b₁=basic fertilization; b₂=organic fertilization; b₃=basic fertilization+foliar fertilization; c₁=Rosie de Aries; c₂=Brunswick; c₃=Density; c₄=Stuttgart.

Regardless of the fertilizer used, it is noted that the differences between the productions obtained from Brunswick and Stuttgart varieties and Rosie de Aries variety (blank) are negative very significant, and the production obtained from Density variety is positive insignificant compared to the production obtained from the blank (*table 5*).

The production obtained by organic fertilization is insignificant lower compared with

the production obtained by basic fertilization (blank) for all varieties, except Density variety, where the production is significant lower.

The production obtained by basic+foliar fertilization is significant higher than the production obtained by basic fertilization (blank) for Rosie de Aries and Brunswick varieties and it is distinct significant higher for Density and Stuttgart varieties (*table 6*).

Table 6

The influence of the factors biological material and fertilization upon the onion production, in 2014, in Mihai Viteazu area, Cluj County

Variant	Average yield (t/ha)	Relative yield (%)	$\pm d$ (t/ha)	Signification
c ₁ b ₁	67.88	100.00	-	Mt
c ₁ b ₂	65.07	95.86	-2.81	-
c ₁ b ₃	73.25	107.91	5.37	*
c ₂ b ₁	38.62	100.00	-	Mt
c ₂ b ₂	37.81	97.90	-0.81	-
c ₂ b ₃	45.71	118.35	7.09	*
c ₃ b ₁	70.13	100.00	-	Mt
c ₃ b ₂	63.55	90.61	-6.58	0
c ₃ b ₃	78.46	111.87	8.33	**
c ₄ b ₁	39.52	100.00	-	Mt
c ₄ b ₂	37.32	94.43	-2.2	-
c ₄ b ₃	48.87	123.65	9.35	**

DL 5%=5.34

DL 1%=7.27

DL 0.1%=9.85

Legend: c₁=Rosie de Aries; c₂=Brunswick; c₃=Density; c₄=Stuttgart; b₁=basic fertilization; b₂=organic fertilization; b₃=basic fertilization+foliar fertilization.

CONCLUSIONS

The production of onion is differently influenced by the studied factors. So, the productions obtained in the irrigated variants are significant higher than the productions obtained from the non-irrigated variants.

Basic+foliar fertilization leads to a significant increase of the production and organic fertilization causes an insignificant decrease of the production, in all studied variants, compared with basic fertilization (blank).

In terms of onion production obtained from the three varieties of onion, compared with the productions obtained from Rosie de Aries variety (blank), it can be stated that Density variety is suitable for cultivation in the area, the production obtained being comparable to those obtained from the blank, in all studied variants. Stuttgart and Brunswick varieties grown in the area have a significantly lower production compared to the

production obtained from Rosie de Aries variety (blank).

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