



## Irrigation technology of artichoke crops. Case of Zarafshan Valley

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### **ABSTRACT**

In this paper, a new type of artichoke was analyzed for growability by means of surveys in the years of 2006-2008. Herein, crop irrigation and the growth, development, productivity and efficiency indicators were considered. In the course of the experiment, premeditated optimal irrigation and cultivation procedures in the implementation of irrigation technology, prosperity and so on were assessed.

**Keywords:** Irrigation furrow length, he felt the flow of water, types of tubers, green mass productivity, efficiency, productivity and profitability

### **1. INTRODUCTION**

Globally, both in Uzbekistan and in some foreign countries artichoke is grown on annual and perennial basis while gathering green mass (850-1000 centners per hectare) 280-400 quintals of crop by tubers (Abdullaev, De Fraiture, Giordano, Yakubov, & Rasulov, 2009).

From this 1 center of green measures 24.1, on tuber this is 30 supplies per unit, each unit of nutrient 80-90 gram stores consumable protein. Tubers may contain 11,7% insulin and 2% crude protein (Andrade & Stigter, 2009). At the moment, the world agriculture cultivated area of the artichoke has increased up to 2.5 million hectares. In France, cultivated area of sugar beet prolonged and has risen noticeably (500 hectares).

This tendency has expanded in countries of England, Germany, Poland, Hungary, Japan, China, as well as in the Scandinavian countries. It is obvious that only in the USA this is 130 thousand hectares (Bobojonov et al., 2013).

Artichoke plant is a valuable raw material for the pharmaceutical industry. This element includes carbohydrates, especially it is rich for insulin, with the rate of 48.31%. According to sources, the consumption of artichoke insulin leads to a reduction of the amount in the blood. As it is stated on newspaper "Pravda Vostoka" urine of patients has fallen dramatically with 16-17%.

Artichoke patients with diabetes receive insulin, artichoke consumes prepared food diet in a variety of tumor tuberslari and carbohydrate metabolism that stabilizes our body.

Select varieties of artichoke, assessment, suitable for cultivation of agricultural development of the All-Russian Crop Research Institute, Krasnoyarsk State Agricultural University, Voronezh Institute of Technology, Food Research Institute in Moscow, the Kiev Institute of Food Industry, Agricultural Research Institute of Ukrainian, Florida Institute of the University of food and agricultural Sciences (UF / IFAS) (USA), departmental Agronomy and Plant Genetics and Horticulture, University of Minnesota, Kanada- Dalhousie University in Truro, Germaniya- Versuchsanstalt FUER Integrierten Pflanzenbau Gueterfelde, Hungary Szent Istvan University, Szarvas, the CRA Experimental Institute of Horticulture, Italy, Pontecagnano, Chexiya- Institute Havlickuv Brod, Vietnam - vegetable Research potato center and Hanoi (Bobojonov et al., 2013).

Moreover, in France, the Netherlands, South Korea and countries make the technology of growing storage and processing methods of inulin technology. Besides, this element gives food, the direction of green fodder, chemical and pharmaceutical industries, pulp and paper industry as a raw material for the usage in scientific research.

## **Literature review**

In the Zarafshan Valley, study by I. Umurzoqova (1995) has underlined influence of irrigation on crop quality and quantity. The study capacity of the wet field would be limited at 75-80%, or 10 days of irrigation water productivity (5,2-7,2 kg / meter quadrat).

Also K. Toderich and I. Bekmirzaeva (2013), has also mentioned about the way of implementation in Kashkadarya and Guliston regions. Artichoke production was implemented in agro ecological places of various regions such as T. I. Anikienko (2009) and wetlands with high food crops recommended.

There are some authors in the regions who also participated in this topic investigation. For instance, Samarkand (M. M. Komilova, 2008), Tashkent (R. Mavlonova, 2013), Tashkent (Amon M. E., Akhmedov T., Khasanov X., 2013) regions artichoke planting tuberslarini founded in the autumn plowing, organic fertilizers and minerals pink early spring planting in the fall, on one or two occasions, depending on the state of soil treatment gives the best results (Abdulkarimov B. A., 2013).

A. T. Merganov (2013), artichoke productivity of biological fertilizer for 1-2 meter, "Biohumus" from 10-15 kg, "BIOMAK" biological fertilizer 10-15 kg, "biome" bioogik 4-5 kg of fertilizer in the top results.

Conducted in recent years, the options for the artichoke, Jerusalem artichoke waste in the Republic of innovative technologies (B. Yu. Xodiev. M. S. Kasimov., 2013) and the introduction of a growing interest in the introduction of production technology.

## **2. METHODOLOGY**

The aim of the research objectives of the program in the farms of Saykhunobod , Syrdarya region, in the period of 2010 – 2014. It is observed that, study followed by the experience in the field of planting, phenological observations, biometric measurements, care for the crop, harvesting. On this way, the Ministry of Agriculture and Water Resources (1991), Leningrad (St. Petersburg) Institute of Agriculture (1979), Russian Plant Research Institute (1984; 1986), Russian potato agricultural research Institute (Moscow, 1967; 1989) and plant research Institute (1999) test new varieties of agricultural crops. Following this, the way of methodological establishment of both theoretical and practical examples of the State Commission for Variety testing (1974), Methodological experience of B.A. Dospexov (1985) are observed with most used ways of improvements at all. (Khamzina, Kan, Jumayeva, Matkarimova, & Lamers, 2005).

Furthermore, sources with recommendations, guidelines, methods based on statistical analysis of the results are diffused on the article itself. Data experience WinQSB is calculated via Microsoft Excel programmes and its instruments at all.

## **3. RESULT**

In order to determine the order of the number of farmers in irrigation and artichoke “Novinka” and classified ones of K-99 samples / 3, applied 4, 6, 8 times to drink, plant growth, development and yield formation were studied.

During the study, 4 times irrigation till flourishing and experiment twice, after the flowering period, for a time and time flourishing to the final step, in the step of thriving irrigation should be 6 times, 3 times, 2 times, and after flowering times and 8 times in accordance with irrigation 4-2-2 drink (Shodiev & Zhu, 2015). Four times the height of the plant during the flowering plants in the order 2-1-1 irrigation trenches gave 205.6 centimeter , K-99/3 samples 201,4 cm, 8 times in the order 4-2-2 irrigation for the classification of “Novinka” 381,0 cm. K -99/3 represent the number of stems 365,8 cm 2,2 to 3,5 units.

Increasing the number of baskets from the increase in the number of watering the plants. Four times during plant growth in the order of 165-166 days irrigation 2-1-1; 8 watered once in the order 4-2-2 179-180 days, 10-15 days of growth period increased(Zhu & Shodiev, 2015).Experience plant up a few months the rate of 1 date of May and October to be seen as it turned out, the drought resistance of the artichoke, which is 4 times more water for irrigation is also characterized by the growth of alternatives. The new range of plant height in the first small 75.6 cm, July 1, October 1, 140.3 cm and 205.6 cm, 8 times 4-2-2 tartibdasug'orilganda 160,7; 260.6 and 381.0 cm, K-99/3 samples were, respectively, 66.4; 120.7; 201.4 and 150.1; 237.5 and 365.8 cm. October 8 vs. 4 times sug'orilganga irrigation ditches gave 175.4 cm, K-99/3, 164.4 cm in height.

The period of growth of plants and increasing the amount of irrigation and varieties for a significant period o'zgardi. Development 4 times in the order 2-1-1 at the beginning of irrigation irrigation 8 times in order to apply 4-2-2 positive influence on plant growth and stem. Saved applied at the end of the law (Pomfret, 2000).Specimen artichoke trenches and K -99/3 Class 8 times in 4-2-2 order a positive effect on plant growth and development of irrigation.

Artichoke significant impact on the number of samples of irrigation performance, “Novinka” crop gave a lot of blue tupdagi 4 times in the order 2-1-1 irrigation 1200 g, tubers 450,9 g, 8 times 4-2-2 time cultivation 2890 and 1100.8 g of K - 99/3 samples 4 times in the order 2-1-1 irrigation blue weight 1200 grams, tubers 468,9 grams, according to the order of 8 times 4-2-2 irrigation 2750.1 and 980.4 grams. In connection with the increase in the number of irrigation of tubers 3,9-5,6 million units, an increase in the average weight 23,9-25,3 grams. Tubers crop seeds, seedlings and 8.1 units to 10.6 million units, the highest figure 8 times watering seedlings 10,6-11,2 units 282,5-293,6 thousand hectares or 76.7 compared to the total number tubers -84,1%.

The demand for that in the process of growing artichoke samples waterproof 45-50% during planting, 30-35% flowering period, and 20-25% of the cooking period.

Artichoke in experimental samples, the highest green mass yield “Novinka” samples per hectare to 80 tons of green mass of 30.4 tons tubers mass 8 times in the order 4-2-2 watering options. This is version 19.2 tons of green mass and collected 9.1 tons of food due to tubers unit, or a total of 28.3 tons per hectare food production unit, 4 times in the order 2-1-1 irrigation compared to 16.7 tons, or 59 percent more units of food collected.

**Table 1.** Order and the number of yield samples and their effects on watering artichoke

Structure and sequence of irrigation	Productivity of crops						Average		
	2006		2007		2008		Blue mass	tuber	Food unit
	blue mass	Tuber	Blue mass	tuber	Blue mass	tuber			
<b>Classification of “Novinka”</b>									
4 times, 2-1-1	33,2	12,4	32,1	11,8	33,0	11,8	33,2	12,4	7,9/3,7
6 times, 3-2-1	47,1	16,9	48,3	17,1	50,7	17,1	48,7	17,4	11,6/5,2
8 times, 4-2-2	79,1	31,2	81,1	30,2	79,8	29,8	80,0	30,4	19,2/9,1
<b>S<sub>x</sub>(%) =</b>	<b>3,8</b>	<b>2,9</b>	<b>1,8</b>	<b>6,6</b>	<b>5,5</b>	<b>5,4</b>			
<b>ЭКФ<sub>05</sub> =</b>	<b>2,5</b>	<b>1,0</b>	<b>1,2</b>	<b>1,5</b>	<b>4,2</b>	<b>1,6</b>			
<b>K-99/3 sample</b>									
4 times, 2-1-1	33,1	11,8	32,0	13,8	34,5	13,1	33,2	12,9	7,9/3,8

6 times, 3-2-1	50,1	17,0	48,2	16,9	51,1	17,7	49,8	17,2	11,9/5,1
8 times, 4-2-2	77,2	26,9	76,8	27,1	74,3	27,3	76,1	27,1	18,2/8,1
$S_{\bar{x}} (\%) =$	<b>3,3</b>	<b>2,8</b>	<b>2,6</b>	<b>2,1</b>	<b>2,7</b>	<b>2,9</b>			
$\Theta K \Phi_{05} =$	<b>3,0</b>	<b>2,4</b>	<b>2,1</b>	<b>1,8</b>	<b>2,0</b>	<b>2,6</b>			

K-99/3 Sample 8 times in the order 4-2-2 irrigation weight of 76.1 tons of beets per hectare, unit of 27 tons of food collected tubers and 26.3 tons, or 14.6 tons, or 55.5% of the feeder collected. Samples 8 times, the 4-2-2 scheme irrigation to ensure maximum productivity and high cost of these options (510,1-545,6 / USD). At the same time, the harvest of green mass in the feed and tunganak unit cost per unit of feed.

Artichoke crops under irrigated agriculture in many ways to create high quality and sustainable irrigation technologies and procedures. Key elements of the technology of irrigation and irrigation furrow length and flow rate of water. Artichoke favorable for crop irrigation furrows in order to determine the water flow rate and the length of 2012-2014, took a special experience in this field (Djalalov & others, 1998).

3 artichoke variety of representations in practice the length and abundance grooves (60, 80 and 100 meters) and three flow grooves and (0.10; 0.15; 0.20 l / s) variants mutually compared. All variants of the depth of the furrows 14 cm, 70x35 cm planting scheme, irrigation 8 times, in the order of 4-2-2. Irrigation me'rlari 450-500 m<sup>3</sup> / ha. Plots 168, 224 and 280 m<sup>2</sup>, respectively. 3 The number of repetitions. Learned grade irrigation 8 times, in the order of 4-2-2 furrows length of 60 meters and a water flow rate of 0.10 l / s at a high (276 cm), stem (3.1), the number of branches (36, 35 units), the number of leaves 97.2, groove length of 80 meters and a water flow rate of 0.15 l / s at a high plant (285 cm), the number of rod 3.0, the number of branches 34.5 96.1 Symptoms leaves some kind of record. Eaters period changed versions of 175-180 days (De Melo, Denizer, & Gelb, 1996).

Experience abundance and species tall (265-266 cm), the number of stem 3.1-3.2 units, number of leaves and grass 36,5-40,7 89,3-90,1 watering plants, 8 time long 4-2-2 furrow order of 60 meters and a water flow rate of 0.10 l / s, groove length of 80 meters, the flow of water 0.15 l / s. Finally, a period of spiritual growth recorded version of 170-177 days. Standard groove 100 meters length and flow rate of 0.20 l / s version is known to significantly lower levels.

Symptoms kind of blue top bupdagi weight 1865,7-1892,3 gram, gram 1198,4-1215,2 tunganak fruit seedlings 13,7-14,0 pieces weighing a full and fair tubers type 85,6-88 7 of 8 grams of watering plants, 4-2-2 order of the mean flow velocity of 60 meters furrows of water 0.10 l / s, 80-meter length of the furrow and a flow of 0.15 l / s, the standard length of 100 meters of the furrow and water consumption of 0.20 liters / second variant was lower than the average of the above variants of the experiment.

Finally varieties planted options have also observed this law, artichoke varieties in the spring semester of the first five days of March 70 x 35 cm planting scheme, irrigation 8 times in the length of the order 4-2-2 furrows of 60-80 meters, the water flow rate of 0,10-0 15 l / sec technology varieties 1789-1892,3 g of green mass, 1179,4-1215,2 gram, compared with

the default option in tuganak or seedlings 88-152,3 grams of green mass, 241,2-333, 4 g tuber is constructed.

**Table 2.** Dependence varieties of artichoke crop irrigation technology.

№	Furrow irrigation		Harvest in the green mass harvest				Productivity on tubers				Difference on standard situation, +,-	
	Length meter	Flow rate, litre /second	2012 y	2013 y	2014 y	annual	2012 y	2013 y	2014 y	annual	Blue mass	tubers
<b>Class – “Magic”</b>												
1.	100 (сг)	0,20 (сг)	71,2	69,4	72,4	71,0	28,6	30,7	29,8	29,7	-	-
2.	-/-	0,15	70,0	71,3	70,8	70,7	32,0	30,5	31,4	31,3	-0,3	1,6
3.	-/-	0,10	68,5	70,1	68,4	69,0	29,8	31,3	31,6	30,9	-0,2	1,2
4.	80	0,20	72,0	69,9	69,6	70,5	33,4	35,1	36,2	34,9	-0,5	5,2
5.	-/-	0,15	76,1	78,0	77,6	77,2	37,1	38,9	40,7	38,9	6,2	9,2
6.	-/-	0,10	72,0	70,2	69,3	70,5	36,7	36,9	36,2	36,5	-0,5	6,8
7.	60	0,20	71,5	70,9	69,7	70,7	32,5	33,7	34,0	33,4	-0,3	3,7
8.	-/-	0,15	72,6	73,3	74,0	73,3	33,0	31,8	32,7	32,5	2,3	2,8
9.	-/-	0,10	75,2	76,8	76,3	76,1	40,0	40,2	38,3	39,5	5,1	9,8
	$S_{\bar{x}}(\%) =$		1,7	2,0	2,4	1,9	1,6	2,2				
	$\Theta K \Phi_{05} =$		2,8	3,0	2,7	2,6	2,3	1,9				
<b>Class – “Fayz baraka”</b>												
1.	100 (сг)	0,20 (сг)	70,1	69,0	69,1	69,4	25,6	24,2	23,7	24,5	-	-
2.	-/-	0,15	65,0	68,4	65,8	66,4	29,0	29,8	27,6	28,8	-3	4,3
3.	-/-	0,10	63,0	59,5	62,9	61,8	28,7	30,0	28,0	28,9	-7,6	4,4
4.	80	0,20	70,7	71,2	69,0	70,3	31,6	32,0	33,0	32,2	0,9	7,7

5.	-/-	0,15	78,0	76,8	76,5	77,1	37,0	39,0	38,3	38,1	7,7	11,6
6.	-/-	0,10	70,0	67,9	68,8	68,9	32,6	33,6	34,0	33,4	-0,5	8,9
7.	60	0,20	67,0	66,3	66,2	66,5	25,7	27,1	26,7	26,5	-2,9	2,0
8.	-/-	0,15	68,3	69,0	68,2	68,5	32,3	29,9	31,4	31,2	-0,9	6,7
9.	-/-	0,10	73,0	71,8	71,2	72,0	37,0	37,2	36,2	36,8	2,6	12,3
	$S_{\bar{x}}(\%) =$		1,9	2,1	2,5	1,8	2,0	2,3				
	$\Theta K\Phi_{05} =$		1,8	2,7	2,9	2,6	2,4	1,8				

#### 4. CONCLUSION

To sum up, terms that are related to artichoke “Zarafshan Valley” for growing high quality and abundant watering during the growth period. On this way, this element ensured to get a crop, as well as in the food industry, livestock industry for high volume production, pulp and paper and cardboard industries, and create a reserve of cheap raw materials for the pharmaceutical industry. Outcomes of the study may serve on the future development as whole.

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( Received 15 December 2016; accepted 02 January 2017 )