

The Determining Performances of Some Onion (*Allium cepa* L.) Varieties in Absheron Conditions

Nesrin Huseynzade¹

Vegetable Scientific-Research Institute, Azerbaijan

Abstract

The study covers the performances of onion (*Allium cepa* L.) varieties introduced from Turkey. Collecting and analysing of gene pool materials focusing to onion is so important for actual seed selection and perspective forms. The main purpose of the study is collecting gene pool materials specific of onion plant (*Allium cepa* L.) according to the economic indicators, quality and yield traits and phenological observations over 12 different varieties (*Barakat, Mor Soghan, Beyaz soghan, Tekirdagh soghan, Casta, Beta Panko, Red Amposta, Betaki, Panko, Metan, Erkenci, Valenciana*) brought from different regions of Turkey. Based on the study results, there were big differences among the varieties in the Azerbaijan conditions.

Keywords: *Onion, Varieties, Biological, Phenological, Economy, Gene Pool.*

¹Department of Selection and Seed-Growing, Vegetable Scientific-Research Institute, Azerbaijan

Correspondence: h-nesli@mail.ru

Introduction

Researchers indicated that the bulbs of Iranian origin do not fully comprehend that before last century the territory of Azerbaijan entirely entered the Iranian empire and these plants (onion, garlic, grass) originated in the territory of Azerbaijan included in Iran. Today, these lands are the territory of the independent Republic of Azerbaijan and the onions are native, local and traditional plants (Aliyev and Dunyamaliyev, 1992). 72 of the onion varieties are spread in the Caucasus and there are 52 onion varieties in the flora of Azerbaijan (Ibrahimov et al., 2011). The bulb onion has been well-known in Central Asia, Iran, Pakistan, Afghanistan and India 4,000 years ago (Alekseeva, 1960).

Bulb onion is one of the most popular vegetable varieties and its growing areas are constantly getting larger. Its application diversity relates to its chemical content directly. Bulbs have indispensable amino acids and vitamins (B, B2, B6, PP, E, C). Leaves and bulbs have essential oils, sugar, polysaccharides (inulin, pectin), glycosides (spiroside), essential acids (lemon, apple), disulfide (with bactericidal activity), alkaloids, flavonoids (kvercetin), potassium salts, calcium, iron, sulphur, iodine and phosphorus. Onion also is considered as a medicinal plant and used in folk medicine (Kokorev, 2007).

Onion is the second vegetable plant after tomato in the world. In spite of its use as food and economic value, genetic research of onion is relatively scarce (Mc Callum et al., 2008). Onion is considered a biennial plant of the family of Liliaceae and is one of the important vegetable plants in the world of about 55 million tons (Teena et al., 2016). The study was conducted to determine performances of onion varieties introduced from Turkey in Absheron Region, Republic of Azerbaijan conditions.

Materials and Methods

The study was conducted with twelve varieties of onion bulbs imported from Turkey. As the onion plant is light demander and cold-resistant, the onions can be sown in autumn and spring depending on soil and climatic conditions. In Absheron, the optimal sowing time for bulbs is from February 20 to March 15. For this reason, the research was conducted in Absheron – in an open environment in 2016 and 2017.

Sowing times of onion bulbs in the field was on 14.02.2017 and 25.02.2017 respectively. Immediately after seed sowing, the so – called organic soil regulator called Lifos Leonardit was mixed with water and applied to the soil. The amount of fertilizer mentioned was 2.5 kg and the same fertilizer was mixed with 55 liters of water to this amount.

Results

Tekirdagh Soghan and Beyaz Soghan were the earliest varieties in 2016 trials. However, the fast-growing varieties were the Erkenci (23.03.17), Panko (23.03.17) and Metan (23.03.17) varieties in 2017. Varieties were grouping in two groups on ripening in the study as the late ripening varieties were Beta,

Panko (05.04.17) and Betaki (05.04.17) in 2017. The formation of 2 to 3 leaves was also the same. Formation of the onion was more frequent in the Erkenci (02.06.17). Compared to others, later form groups were Beta Panko (14.06.17) and Betaki (14.06.17) in 2017 (Table 1).

Table 1. Phenological observations in the varieties of the onion plant

Varieties	2016 (Days)				2017 (Days)			
	Mass output from sowing	Appearing of 2-3 leaves from sowing	Forming of bulb from sowing	From sowing to harvesting	Mass output from sowing	Appearing of 2-3 leaves from sowing	Forming of bulb from sowing	From sowing to harvesting
Mor soghan	41	48	113	164	29	36	105	155
Valenciana	41	48	120	164	29	36	105	155
Barakat	41	48	113	164	35	42	108	155
Beyaz soghan	35	42	103	139	29	36	105	155
Tekirdagh Soghan	35	42	103	139	31	38	106	142
Casta	38	47	116	160	33	39	106	155
Beta Panko	52	59	116	160	40	47	110	155
Panko	38	47	116	160	27	35	100	155
Red Amposta	52	59	113	160	35	42	108	155
Betaki	52	59	113	160	40	47	110	132
Metan	38	47	113	160	27	35	100	155
Erkenci	38	47	109	148	27	35	98	132
<i>Average</i>	41.8	49.4	112.3	156.5	31.8	39	105.1	150.1
<i>Median</i>	39.5	47.5	113	160	30	37	105.5	155
<i>Range</i>	35-52	42-59	103-120	139-164	27-40	35-47	98-110	132-155
<i>Standard Deviation</i>	6.5	6.1	5.1	9.2	4.8	4.5	3.9	9.2

Based on the economical values, Panko had the highest fresh and dry weight among the varieties in 2016. However, Beyaz soghan (fresh 3.9- 4.5 kg, dry 3.7 kg) had the highest weight among varieties in 2017. The lowest weight had Erkenci in 2016 but Betaki (fresh 0.75-0.8 kg, dry 0.7 kg) had in 2017 (Table 2).

Table 2. Economic values of the bulb onion (*Allium Cepa L.*) accessions

Varieties	Bulbs 2016					Bulbs 2017				
	Fresh weight (kg)		Dry weight (kg)	Weight of per bulb (gr)	Sowing area	Fresh weight (kg)		Dry weight (kg)	Weight of per bulb (gr)	Sowing area
	With stalk	No stalk				With stalk	No stalk			
Mor Soghan	3.5	2.2	2.2	88.0	2.5 m	2.5	2.0	1.80	84.0	1.5 m
Valenciana	8.0	6.3	6.3	92.0	2.5 m	4.0	3.5	3.38	95.0	1.5 m
Barakat	4.5	4.0	3.8	95.0	2.5 m	4.0	3.5	3.35	93.0	1.5 m
Beyaz soghan	5.0	4.6	4.4	100.0	2.5 m	4.5	3.9	3.70	100.0	1.5 m
Tekirdagh Soghan	3.0	2.5	2.3	60.0	2.5 m	2.0	1.5	1.40	56.0	1 m
Casta	1.5	1.2	1.2	91.0	2.5 m	2.5	2.0	1.90	74.0	1 m
Beta Panko	1.6	1.4	1.4	97.0	2.5 m	2.0	1.5	1.40	65.0	1 m
Panko	8.0	6.4	6.4	106.0	2.5 m	3.0	2.5	2.35	76.0	1 m
Red Amposta	1.5	1.0	0.8	93.0	2.5 m	3.0	2.3	2.20	79.0	1 m
Betaki	1.0	0.8	0.6	100.0	2.5 m	0.8	0.75	0.70	104.0	1 m
Metan	1.5	1.2	1.2	80.0	2.5 m	3.8	3.1	3.08	92.0	1 m
Erkenci	0.8	0.8	0.7	20.0	2.5 m	2.5	2.1	2.09	101.0	1 m
<i>Average</i>	2.6	2.7	2.6	85.2		2.9	2.4	2.3	84.9	
<i>Median</i>	2.3	1.8	1.8	92.5		2.8	2.2	2.1	88	
<i>Range</i>	0.8-8.0	0.8-6.4	0.6-6.4	20-106		0.8-4.5	0.8-3.9	0.7-3.7	56-104	
<i>Standard Deviation</i>	3.3	2.1	2.1	23.7		1.1	1.0	0.9	15.2	

While the dry matter was observed the highest in Tekirdagh Soghan in 2016, Barakat (12.1%) was measured as the highest variety in 2017 (Table 3). On the other hand, low inland ingredient was Mor Soghan (6.5%). The highest amount of nitrate was observed in Beyaz soghan in 2016 and also this variety (94mq / kg) and Red Amposta (95.3mg / kg) in 2017.

Table 3. *Quality analysis results of onion varieties*

Varieties	2016				2017			
	Dry matter (%)	Nitrate (mg/kg)	Sugar (%)	vitamin C (mg%)	Dry matter (%)	Nitrate (mg/kg)	Sugar (%)	vitamin C (mg%)
Mor Soghan	9.5	60.3	2.7	8.9	6.5	62.0	8.10	6.50
Valenciana	6.5	51	2.4	7.5	7.9	66.0	9.71	7.52
Barakat	11.5	78	2.9	9.4	12.1	76.0	8.39	9.35
Beyaz soghan	9.1	97	2.8	9.0	9.3	94.0	8.29	9.10
Tekirdagh Soghan	11.5	70	2.5	9.3	10.5	71.0	7.15	9.27
Casta	6.8	69	2.1	7.2	11.3	79.0	9.71	9.37
Beta Panko	5.5	61	2.8	8.6	8.1	74.0	8.10	7.29
Panko	7.5	77.6	2.3	8.1	9.5	85.3	8.76	7.18
Red Amposta	10.5	78	2.0	7.2	10.5	95.3	6.44	9.17
Betaki	10.8	80	2.0	7.2	10.7	79.8	6.56	7.15
Metan	10.5	70	2.1	7.4	4.9	81.5	6.75	6.70
Erkenci	6.5	71	2.4	8.1	9.2	71.5	6.84	7.37
<i>Average</i>	8.9	71.9	2.4	8.2	9.2	78.0	7.2	8.0
<i>Median</i>	9.3	70.5	2.4	8.1	9.4	77.5	8.1	7.5
<i>Range</i>	5.5-11.5	51-97	2.0-2.9	7.2-9.4	4.9-12.1	62-95.3	6.4-9.7	6.5-9.4
<i>Standard Deviation</i>	2.2	3.9	0.3	0.9	2.1	10.2	1.2	1.1

The lower nitrate was in Mor soghan (62mg / kg) in 2017 and this variety and also Valenciana in 2017. Sugar content was measured the highest in Valenciana (9.71%) and Casta (9.71%) in 2017. The lowest sugar content was Red Amposta both in 2017 (6.44%) and 2016. On the other hand, vitamin C was predominant in Barakat in 2016 but in Casta (9.37mg%) in 2017. Lower vitamin C content was found in Mor Soghan (6.50mq%) in 2017.

Conclusions

The biggest differences in the measured characteristics were observed among the onion varieties in Azerbaijan conditions in the two years of the study. It seems that Turkish origin onion varieties could adapt and grow in Absheron region and the best one will be selected based on the study after evaluation of all yield examined traits. They could be also used as gene pool for developing new varieties and also the best ones will be commercialized and produced for the region.

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