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New Tobacco Variety – "Bahlul 87", Grown in Rapıds of Sheki-Zagatala Region of Azerbaijan Republic

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ABSTRACT

The article publishes agrobiological and morphological characteristics, the demand for the variety to external environmental conditions and agricultural technology, its resistance to diseases in natural and artificial background, the percentage of disease prevalence and pest damage of the newly created tobacco variety - "Bahlul-87", and also studied the soil and climatic conditions for growing the variety, seeding rates and timing of planting seedlings. The yield indicators were analyzed by a comparative method. The tobacco variety "Bahlul-87" was obtained in the Zagatala Zonal Experimental Station of the Research Institute of Agriculture by hybridization, in dryland conditions of the Sheki-Zagatala region of the Republic of Azerbaijan.

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KEYWORDS: tobacco, variety, agrobiological and morphological characteristics, resistance to diseases and pests, quality, yield

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INTRODUCTION

Tobacco plants grown in vast areas of the world. The demand for aromatic tobacco is increasing every day. It contains 4-7% protein, 14-24% soluble carbohydrates, 1-2.5% nicotine and 12-16% ash. The quality of the extract of tobacco is determined on a 100-point scale based on the following indicators: aroma, taste, smoke density and hardness. At the time of tasting, Burley tobacco has an aroma of 90%, taste of 80%, smoke density of 90%, and hardness of 90% [2; 4]. The Virginia variety has an aroma of 60%, taste of 70%, smoke density of 70% and hardness of 70%. It has a pleasant taste and aroma. Growing tobacco satisfies farmers and increases their income due to a high yield [3; 8; 15].

The average annual temperature is +10.5°C, +12.6°C in the mountains decreases to +3°C. Relative air humidity is relatively high (70-75%) and remains so throughout the growing season of cultivated crops, which has a positive effect on their growth and development, especially tobacco grown in the Sheki-Zakatala region of the Republic of Azerbaijan. The average annual precipitation is 600-700 mm, and with increasing terrain above sea level it increases to 900 mm [4; 6]. The yield and quality of tobacco raw materials are influenced by soil and climatic conditions, agricultural technology used and tobacco variety [11]. Soils are meadow-forest, alluvial-meadow, meadow-marsh, mountain-brown, mountain-forest - brown, mountain-meadow. These soils vary in thickness, mechanical composition, skeleton and fertility. Soils where the humus content varies within 3.3% are the best for the production of high-quality skeletal tobacco [13; 17].

For normal growth of tobacco plants, sufficient moisture, nutrients in the soil, heat, light are necessary, and after the plants develop a sufficiently powerful root system, their above-ground part - leaves and stems - begins to grow intensively. Growing tobacco is similar to growing other crops. Depending on the type of tobacco, seedlings should be planted at a distance of 35-1.20 cm from each other. Immediately after planting, seedlings planted in the field are watered. If necessary, plants can be watered 3-6 times per season [1; 5; 9].

Tobacco is less demanding of fertilizers, especially nitrogen ones. When using different doses of fertilizers (NPK), the greatest height of growth is achieved against the background of mineral fertilizers mixed with manure [14; 12; 16].

Over the past ten years, the demand for premium cigarettes has increased significantly on the world market. Increasing the production of premium cigarettes to the required volumes would require enormous costs to obtain scarce aromatic raw materials [7]. Sheki-Zagatala zone is one of the main tobacco producing zones in Azerbaijan. The average tobacco yield potential is 26-35

c/ha, the number of leaves during the intensive ripening period is 27-35 cm, the length of leaves is 40-55 cm, the mass of raw materials is 85-90% [2; 10].

MATERIALS AND METHODS

The main objective of the conducted research is to ensure a stable, high-quality tobacco harvest and the creation of new varieties that are resistant to external environmental factors that meet the requirements of the current market. The Sheki-Zagatala region of the Republic of Azerbaijan has very favorable soil and climatic conditions for growing tobacco. The research work was carried out at the Zagatala Zonal Experimental Station of the Research Institute of Agriculture. During the growing season, phenological observations were carried out, agrobiological and morphological characteristics, the demand for the variety in external environmental conditions and agricultural technology, its resistance to diseases in natural and artificial backgrounds, the percentage of disease prevalence and pest damage of the newly created tobacco variety "Bahlul-87" were studied. Soil and climatic conditions for growing the variety, seeding rates and seedling planting dates were also studied. The yield indicators were analyzed comparatively.

RESULTS AND DISCUSSION

The newly created variety "Bahlul-87" is registered under number 6 in the competitive selection nursery. The variety was created in 2022 by hybridization. The main goal of creating the variety is to create high-yielding, high-quality, disease- and pest-resistant varieties that are resistant to environmental stress factors (biotic and abiotic) for the tobacco-growing regions of the republic. The start date of selection work is 2016, parental pairs are "Winner-179" × "Zagatala-67", the years of small station trials are 2016-2020, the years of competitive variety trials are 2019-2022, the years of inter-station competitive variety trials covered 2020-2022. The newly created variety "Bahlul-87", in comparison with the best regional variety "Zagatala large-leaved", was presented at the State variety testing due to its excellent quality, high productivity, weight qualities with an aromatic taste, resistance to diseases, pests, drought, lodging, and the ability to develop well on weak soils was presented. The variety is intended for the production of cigars and cigarettes. The suitability of the variety for cultivation, mechanical collection and processing was studied. It was found that the resulting crop is suitable for drying in the open air and in fire drying chambers. The variety should be cultivated using traditional cultivation technology adopted for growing tobacco in the republic. The optimal sowing period is recommended from February 1 to 15 in greenhouses, and transplanting seedlings into an open field - from April 20 to May 10. It is not recommended to grow the variety in a dense planting scheme and apply fertilizers in excess of the norm. Seed production can be organized in tobacco-growing regions of the republic. Labor costs for growing the variety amounted to 2200-2400 manats per 1.0 ha. The economic benefit obtained from using the new variety - potential income from 1.0 amounted to 5500-6000 manats. Cultivation is recommended in regions of the republic suitable for growing tobacco. The agrobiological characteristics of Bahlul 87 tobacco varieties are given in table 1 below.

Table 1. Agrobiological characteristics of the variety - "Bahlul-87"

	Indicators	Unit	variety - "Bahlul-87			Average	Standard - "Zakatala large leaf"			Average
			2020	2021	2022		2020	2021	2022	
1	Dry yield of tobacco leaves (humidity 17%)	c/ha	33.0	32.1	33.2	32.7	31.4	30.3	31.0	30.9
2	Yield of commercial varieties: I	%	89	86	85	87	85	86	83	84
	II	%	11	14	15	13	15	14	17	15
3	Thickness of the middle vein of dry tobacco	mm	0.55	0.56	0.52	0.54	0.58	0.53	0.57	0.53
4	Weight of material	$1м^2$, gr	1.87	1.99	1.64	1.83	1.72	1.69	1.91	1.77
5	Content of nicotine in leaves	%	2,1	2,4	2,0	2,2	2,9	3,1	2,7	2,9
6	Number of Shmuk	%	0.54	0.55	0.53	0.53	0.52	0.55	0.53	0.53
7	Aromatic type of raw material	Skeletal type								
8	Assessment	score	92	89	95	92	80	76	7	78
9	Hardness									

10	Yellowing	day	2.0	2.1	2.0	2.1	2.5	2.5	2.	2.4
11	Drying time of middle leaves	day	44	45	47	45	47	49	48	48
12	Number of days in greenhouses from the lower exit to ripening of sprouts	day	42	45	50	46	45	50	50	48
	Type of greenhouse	solar heating								
13 a)	Number of days in crops days until the middle tier leaves ripen	day	90	92	94	93	92	90	9	93
b)	Days until the last leaves ripen (until the technical maturity of makhorka	day	125	120	127	124	127	125	1	127
c)	Days until flowering	day	87	85	90	87	88	90	8	87
d)	Until the plant is fully flowering	day	120	125	124	123	121	125	1	123
e)	Until 50% of the seed pods ripen	day	105	107	109	107	108	106	1	108
14	Number of plant leaves	piecemeal	49	45	37	44	43	42	4	43
15 a)	Size of leaves in the middle tier: Length	cm	55	50	43	49	48	56	5	53
b)	Width	cm	30	29	22	27	27	31	3	29
16	Vegetation period (from the moment of planting seedlings in the field until seed ripening)	day	120	118	122	120	122	123	1	122
17	Full plant growth	cm	300	270	268	279	250	260	2	262
18	Seed weight from 1 plant	gr	12.7	13.6	13.5	13.4	12.1	12.9	1	12.2
19	Degree of drought resistance	score	8	8	8	8	7	7	7	7
20	Degree of lodging resistance (on a 5-point scale)	score	5	5	5	5	5	5	5	5
21	Important biological differences from other varieties	Fast-growing, high, large and numerous leaves; the plate of leaves is thick; flower basket big; early flowering and early ripening of seeds, large seed size; less formation of side shoots								

As can be seen from table 1, the height of the tobacco variety "Bahlul-87" is 280 cm; this variety is adapted to local conditions, resistant to lodging, drought, diseases and pests, is distinguished by high quality and productivity. The vegetation period in dryland conditions is 120 days. The flower group is small and dense. The weight of 1000 grains is 0.08 gr. The color of dry tobacco is yellow, orange. The yield of the 1st commercial variety is 87%, and the yield per hectare is 32.7 c/ha. This is 1.8 c/ha more than the zoned tobacco variety "Zakatala large-leaved".

The percentage of disease and pest infestation in the field during the study period is given in table 2 below.

Table 2. Disease and pest infestation, %

№	Name of the disease and pests	variety - "Bahlul-87			Standard - "Zakatala large leaf"		
		2020	2021	2022	2020	2021	2022
1	Root rot (Fuzarioz)	0.0	1.8	0.0	3.0	0.0	0.0
2	Powdery mildew	0.0	0.0	0.0	0.0	2.0	0.0
3	Tobacco mosaic	0.0	0.0	0.0	10.0	10.0	10.0
4	Downy mildew	0.0	0.0	0.0	5.6	4.0	0.0
5	Bacterial speckle	2.5	1.8	0.0	11.2	10.0	6.2
6	White mottle	0.0	0.0	0.0	0.0	3.0	0.0
7	Trips	5.0	1.5	0.0	5.6	0.0	5.0

As can be seen from table 2, the infection with powdery mildew, tobacco mosaic, false powdery mildew and white variegation was observed only in the variety "Zakatala large-leaved". It can be confidently said that the newly created variety "Bahlul-87" is more resistant to infection with diseases and pests.

Morphological characteristics of Bahlul 87 tobacco variety are given in table 3 below.

Table 3. Morphological description of the variety "Bahlul-87"

s.s.	Morphological description	Indicators
1	Seedling color	Light green
2	Characteristics of plant growth in the first phase	Late growth in the first phase
3	Plant shape	Conical
4	Flower crown shape	Relatively little branched
5	5 Leaf position on the stem	Attached to the stem
6	Leaf blade bend	Tinder-like
7	Main leaf shape	Sessile
8	Middle leaf blade shape	Elliptical oblong
9	Upper leaf blade shape	Medium large
10	Leaf surface	Wavy
11	Leaf edge	Straight wavy
12	Leaf color	Green-yellow
13	Flower crown color	Weak red
15	In addition to the above-mentioned characteristics of the variety, distinctive features from the corresponding varieties during field control	When the leaves ripen, their edges turn yellow

As can be seen from table 3, the morphological description of the variety "Bahlul-87": the color of the seedlings is light green; the characteristic of plant growth in the first phase is late growing; the shape of the plant is conical; the shape of the flower crown is relatively little branched; the position of the leaves on the stem is attached to the stem; the bend of the leaf blade is tinder-like; the shape of the main leaf is sessile, the shape of the middle leaf blade is elliptical oblong; the shape of the upper leaf blade is medium large; the surface of the leaf is wavy; the edge of the leaf is straight wavy; the color of the leaf is green-yellow; the color of the flower crown is weak red. In addition to the above characteristics of the variety, during field control it was revealed that when the leaves of the "Bahlul-87" variety ripen, their edges turn yellow.

(Fig. 1 - general view of the Bahlul-87 variety, 2-3 - experimental plot of the Zonal Experimental Station, 4 - shape of the middle leaf blade).

1

2

3

4

Demand for external environmental conditions and agricultural technology for varieties is given in table 4.

Table 4. Demand for the variety in external environmental conditions and agricultural technology

№	Indicators	New variety – "Bahlul-87"	Standard - "Zakatala large-leaved"
1	Soil type	Mountain forest, brown and brown	Mountain forest, brown and brown
2	Seed rate for sowing per 1.0 ha	20-25 gr	20-25 gr
3	Seed sowing time	from 01 to 15 February	from 01 to 15 February
4	Seedling planting period	from 20.04 to 10.05	from 20.04 to 10.05
5	Information on the study of the variety with different agricultural practices (sowing dates, planting rates) and with different predecessors	According to traditional cultivation technology adopted for growing the region; crop rotation, predecessor	mainly grain according to traditional cultivation technology adopted for growing the region; crop rotation, predecessor, mainly cereals
6	Yield, c/ha	30.1-32.7	29.0-30.9

As can be seen from table 4, the demand for the variety in external environmental conditions and agricultural technology: the variety is grown in mountain-forest, brown and brown soils in dryland conditions. Agrotechnical care is carried out according to the traditional cultivation technology adopted for growing the region, crop rotation, the predecessor is mainly grain crops. The seed rate for sowing per 1.0 ha is 20-25 gr, the sowing time of seeds is from 01 to 15 February, and the period of planting seedlings is from 20.04 to 10.05. The yield is from 30.1 to 32.7 c/ha.

CONCLUSIONS

Agrobiological characteristics of the variety "Bahlul-87": the height is 280 cm, this variety is adapted to local conditions, resistant to lodging, drought, diseases and pests, has high quality and productivity. The vegetation period in dryland conditions is 120 days. The flower group is small and dense. The weight of 1000 grains is 0.08 gr. The color of dry tobacco is yellow, orange. The yield of the 1st commercial variety is 87%, and the yield per hectare is 32.7 c/ha. This is 1.8 c/ha more than the zoned tobacco variety Zagatala large-leaved. Infection with powdery mildew, tobacco mosaic, false powdery mildew and white variegation was observed only in the variety "Zakatala large-leaved". It is safe to say that the newly created variety "Bahlul-87" is more resistant to diseases and pests.

Morphological description of the variety "Bahlul-87": seedling color - light green; plant growth characteristics in the first phase - grows late; plant shape - conical; flower crown shape - relatively little branched; leaf position on the stem - attached to the stem; leaf blade bend - tinder-like; main leaf shape - sessile; middle leaf blade shape - elliptical oblong; upper leaf blade shape - medium large; leaf surface - wavy; leaf edge - straight wavy; leaf color - green-yellow; flower crown color - faint red. In addition to the above-mentioned characteristics of the variety, field testing revealed that when the leaves of the "Bahlul-87" variety ripen, their edges turn yellow. Demand for the variety in external environmental conditions and agricultural technology: the variety is grown in mountain-forest, brown and brown soils in dryland conditions. Agrotechnical care is carried out according to traditional cultivation technology adopted for growing the region, crop rotation, the predecessor is mainly grain crops. The seed rate for sowing per 1.0 hectare is 20-25 gr, the time of sowing seeds from 01 to 15 February, and the period of planting seedlings from 20.04 to 10.05. The yield of the 1st commercial variety is 87%, and the yield per hectare is 32.7 c/ha. This is 1.8 c/ha more than the zoned tobacco variety Zagatala large-leaved.

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