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Assessment of adaptive potential of domestic varieties of tobacco in agroclimatic conditions of central part of Forest-Steppe of Ukraine

Morgun A.[1], Morgun V.[2], Molodchana O.[3]

Research station of tobacco of NAAS, International Str., 4, Uman, Cherkasy oblast, 20300, Ukraine; e-mail: [1]avm-1955@ukr.net, [2, 3]ikknaan@ukr.net

The purpose. To study features of cultivation and efficiency of different varieties of tobacco in agroclimatic conditions of central part of Forest-Steppe of Ukraine. **Methods.** Field, laboratory, statistical. **Results.** It is established that in the given agroclimatic conditions plants of tobacco completely pass all stages of ontogenesis and form high-grade seeds. Varieties of tobacco Virginia and Temp 321 are characterized as late-ripening (vegetative period 115 – 120 days), other varieties may be characterized as middle-ripening (100-108 days). Varieties of tobacco are differed on height of plants, so they were conditionally divided into 3 groups: tall (Ternopolskii 7, Ternopolskii 14, Virginia, Trapezond), medium-height (Temp 321, Sobolchskii 33, Berlei 9, Spektr), low-height (Berlei 38, Berlei 46, Ternopolskii perspectivnyi). The greatest leafing was fixed at varieties Temp 321, Berlei 46, Sobolchskii 33, Berlei 9. As to the size of leaves they allocated varieties Ternopolskii 7, Ternopolskii 14, Ternopolskii perspectivnyi, Berlei 46 and Virginia. The highest productivity of raw material under all schemes of planting was at varieties Virginia (3,24 t/hectare) and Ternopolskii 7 (3,16 t/hectare). The least productivity in agroclimatic conditions of central part of Forest-Steppe of Ukraine was fixed for varieties Spektr and Sobolchskii 33. **Conclusions.** It is established that agroclimatic conditions of central part of Forest-Steppe of Ukraine are favorable for cultivation of the majority of domestic varieties of tobacco. In the given zone plants of tobacco completely pass all stages of ontogenesis and form high-grade seeds. The highest productivity of raw material was fixed for varieties Virginia, Ternopolskii 7, Temp 321 and Berlei 38.

Key words: *tobacco, variety, scheme of planting, area of nutrition, terms of planting, productivity.*

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Formulation of the problem. Tobacco is an extremely important branch of the agro-industrial complex of Ukraine. Its high profitability ensures the financial welfare of all tobacco-growing farms in the country. This is one of the few crops that, due to its qualitative characteristics (long-term storage period), allows agricultural enterprises to receive real money at a particular time in the face of price parity [1].

Until recently, the main regions of tobacco production were Transnistria (Ternopil, Ivano-Frankivsk, Khmelnytsky, Vinnytsia, Chernivtsi and Odessa region), the Transcarpathian valley and the Crimea. Producers of Transnistria and Transcarpathia cultivated raw tobacco of the skeletal type, Crimea - aromatic and semi-aromatic [2].

Today, we have lost unique areas for the cultivation of aromatic and semi-aromatic tobacco in the Crimea. The areas of tobascco cultivation in Transcarpathia were reduced, there was a sharp decrease in tobacco plantations in Transnistria.

The urgent need for an urgent revival of tobacco production in Ukraine requires the expansion of scientific research on ensuring the effective development of the industry in the given socio-economic conditions. Therefore introduction, study of organogenesis of tobacco plants and further selection in agroclimatic conditions of the central part of the Forest-steppe of Ukraine are relevant at present time [3].

Analysis of recent research and publications. Tobacco – as a component of the crop industry, contributes to the economic growth of the state and provides the necessary conditions for solving many social problems (mainly – employment and improvement of the economic situation of the peasants).

According to the State Statistics Service, in Ukraine 35 % of adults aged 18 to 64 are smokers regularly. The production of cigarettes in our state is entirely organized on the use of imported tobacco raw materials, which are usually of different quality [4]. Therefore, at the state level, every effort should be made to reproduce the domestic production of tobacco raw materials with quality parameters that meet international standards and ensure its effective functioning [5].

In recent years, the world has seen a sharp decline in tobacco production, which is why foreign tobacco companies operating in the Ukrainian market show increased interest in growing tobacco on Ukrainian lands. However, cigarette factories in Ukraine can only be interested in high-quality, competitive tobacco raw materials. This problem is solved by the availability of varieties and hybrids of tobacco of Ukrainian selection, which in their productivity and quality are not inferior to foreign analogues. Our state can be one of the leading European states that produces high-quality tobacco raw materials. The cultivation of tobacco in Ukraine has become traditional due to its geographical location, favorable climatic conditions, the presence of significant areas of fertile land, and skilled labor resources. However, for a positive solution to the issue of increasing the production of raw tobacco of domestic tobacco, state support is needed with the protection of its own producer [6]. The revival of tobacco production requires the expansion of scientific research to ensure the effective conduct of the industry, which today makes this problem particularly relevant. Therefore, introduction, estimation of the adaptive capacity of plants of domestic varieties of tobacco in the agro-climatic conditions of the central part of the forest-steppe of Ukraine is nowadays sound and well-considered.

Research methodology. The source material of the research was the use of six varieties of Ternopil SAES (Ternopil 7, Ternopil 14, Ternopil perspective, Temp 321, Berle 38, Berle 46) and five varieties of the Zakarpattia SAES (Virginia, Sobolsky 33, Berle 9, Trapezond, Spectrum). Phenological observations, evaluation and analysis of the source material in closed and open soil were conducted in accordance with the methodological recommendations "Method of breeding work on tobacco and mahorka" (1974).

Cultivation of tobacco seedlings is carried out in the greenhouse. The seed seed rate was 0.5 g per 1 m^2. Sowing seeds was carried out with germinated seeds (March 29th), seedlings planted in open ground on May 19. Field experiments are laid on chernozem of podzolized, heavy-grained with humus content in the arable layer of 3.2-3.3%. The planting schemes are 0.6x0.2m, 0.6x0.3m, 0.6x.35m. The plot area is 45m^2, repetition is three times. Mathematical analysis of research results was performed according to methodology. B.O. Dospekhova (1973) [7].

Research results. For the first time, the study of the raw material of tobacco (6 varieties of the Ternopil DSS and 5 varieties of the Transcarpathian DDS) was conducted for the first time at the Tobacco Research Station of the National Academy of Sciences (Uman) in 2016-2017, for the suitability for cultivation in the agro-climatic conditions of the central part of the forest-steppe of Ukraine. The assessment was carried out by conducting a comparative analysis of the data of the plant specimens of the variety according to the set of biometric parameters (plant height, number of leaves, length and width of the leaf plate) and the duration of the growing season.

The results of researches show that on the basis of "height of plants" between sorts samples there is a significant gradation. They can be divided into three groups:

- tall (Ternopil 7, Ternopil 14, Virginia, Trapezond);
- middle-aged (Temp 321, Sobolev 33, Berle 9, Spectrum);
- low-growing (Berley 38, Berley 46, Ternopil perspective).

By the number and size of leaflets between varieties of tobacco there was no such distinct difference. The number of leaves varied in the range of 22–27 pieces, the leaf length was 46–59 cm and the leaf width was 26-34 cm. The most leafy plants were characterized by tobacco varieties Temp 321, Berle 46, Sobolechsky 33, Berle 9. The size of the leaves was distinguished by Ternopil 7 , Ternopil 14, Ternopil perspective, Berley 46 and Virginia.

Biometric indices of plants of collectible varieties of tobacco, 2016 –2017

Name of the variety	Plant height, cm	Number of leaves, pcs.	Leaf size, cm		Duration of the growing season, days
			length	width	
Virginia	199	22	55	32	115
Ternopil 7	207	22	56	33	100
Ternopil 14	219	22	54	34	100
Ternopil perspective	163	22	59	33	104
Temp 321	182	26	52	34	120
Berley 38	142	23	51	33	106
Berley 46	150	26	55	32	106
Sobolchsky 33	179	26	46	26	108
Berley 9	180	27	47	30	102
Trapezond	195	25	47	31	102
Spectrum	187	25	53	32	104
LSD_{05}	9,1	1,2	2,6	1,6	5,3

Different types of tobacco and the duration of vegetation. Among the samples studied, only the varieties Virginia and Temp 321 are characterized as late-grazing with a vegetative period of 115-120 days. The remaining varieties belong to the middle-aged group (vegetation period within 100–108 days).

Collection of raw tobacco was carried out with the advent of technical maturation of leaves. At this time, they are dense, fragile, easily broken off from the stem, light by color with yellowish edges and tops. On the tobacco plant, the leaves reach tiers from the bottom to the top. Accordingly, they are harvested several times, depending on the biological characteristics of the variety.

Drying of leaves (shadow) was carried out in a closed, well-ventilated room. It was established that the yield of raw tobacco depended on the varietal characteristics of plants, and the area of their nutrition.

2. Productivity of raw materials of domestic varieties of tobacco at different feeding areas of plants, 2016-2017.

Name of the variety	The scheme of planting						Average in the variety	
	0,6 x0,2 m		0,6 x0,3 m		0,6 x0,35 m			
	from the plot, kg	t/ha	from the plot, kg	t/ha	from the plot, kg	t/ha	from the plot, kg	t/ha
Virginia	15,00	3,33	12,31	2,74	16,38	3,64	14,56	3,24
Ternopil 7	14,10	3,13	14,84	3,30	13,65	3,03	14,20	3,16
Ternopil 14	10,24	2,28	11,00	2,44	6,50	1,44	9,25	2,06
Ternopil perspective	13,20	2,93	9,80	2,18	12,13	2,70	11,71	2,60
Temp 321	16,78	3,73	10,51	2,34	13,55	3,01	13,61	3,02
Berley 38	17,25	3,83	7,90	1,76	10,37	2,30	11,84	2,63
Berley 46	11,80	2,62	14,70	3,27	4,80	1,07	10,40	2,31
Berley 9	12,00	2,67	9,40	2,09	9,00	1,00	10,13	2,25
Spectrum	10,40	2,31	5,21	1,18	6,42	1,43	7,30	1,62
Trapezond	10,20	2,27	9,93	2,21	8,85	1,97	9,66	2,15
Sobolchsky 33	8,02	1,78	10,60	2,36	8,52	1,89	9,05	2,01
Average by experiment	12,63	2,81	10,56	2,35	10,02	2,23	11,06	2,46
LSD_{05}	0,63	0,14	0,53	0,12	0,50	0,11	0,55	0,12

The highest yield of raw materials in the context of all planting patterns was characterized by varieties of Virginia, Ternopil 7. The yield of raw materials in them varied within the range of 3.03 – 3.64 tons/ha. Tobacco grades Temp 321 and Berley 38 had a high productivity for thickened planting (feed area of 0.12 m^2). The yield of their raw materials was 3.73 and 3.83 t/ha, respectively.

Low-yielding in the agro-climatic conditions of the central part of the forest-steppe Ukraine were varieties of tobacco Spectrum and Sobolchsky 33.

Conclusions

It is established that agroclimatic conditions of the central part of the Ukrainian forest-steppe are favorable for growing the majority of domestic varieties of tobacco. In this zone, tobacco plants are completely undergoing vegetative and reproductive stages of development. The highest yield of raw materials in this area was characterized by varieties Virginia Ternopil 7, Temp 321 and Berley 38.

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