ASSESSMENT OF TOBACCO INTERVARIETAL HYBRIDS GROWN IN THE CENTRAL FOREST-STEPPE OF UKRAINE

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At the current stage of tobacco breeding, it is important to create new heterotic hybrids that can combine high productivity and commercial quality of raw materials in one genotype. Creation of such hybrids is carried out by the method of hybridization for different types of crossings of the selected initial parent forms [1, p. 43].

Scientific research has shown the superiority of F_1 hybrids over the varieties, so the creation and production of heterotic hybrids is a priority for many agricultural crops, and tobacco is no exception [2]. The main feature of F_1 hybrids is the manifestation of the heterosis effect on the productivity, individual quantitative and qualitative traits, biological properties, which is primarily due to the heterozygous state of the organism [3, p. 375].

When crossing ecologically and geographically distant varieties, the highest heterosis effect is observed [4, p. 70].

The purpose of our research was to obtain experimental hybrids that would meet the current requirements of the agricultural and tobacco industries.

In 2017 the inter-varietal hybridization of tobacco according to the scheme of simple pair mating was conducted at the Tobacco Research Station of the National Scientific Centre «Institute of Agriculture of the National Academy of Agrarian Sciences of Ukraine» and the F_1 seeds from 13 hybrid combinations were obtained. Such high-yielding varieties with optimal biometric plant parameters as Virginia 27, Ternopilskyi 14, and Hostrolyst Rubin served as the female form and were crossed with promising medium maturity group varieties Burley 38 and Burley 46, well adapted to drought and unpretentious to agrotechnical provision. The crossings were conducted in the morning until new flowers were revealed. 8–11 flowers were castrated, the others were picked. Pollination was performed with prepared pollen with immediate isolation under the parchment insulator. Seeds were harvested under browning on the inflorescence of 60–70% of seed cases from the bulk of plants.

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In 2018–2019, we conducted the assessment of experimental hybrids obtained on a basis of a complex of biometric and economically valuable features (plant height, number of leaves, leaf size, yield and quality of raw materials) in comparison with their parent forms. Only a small proportion of them were found to be worthy of attention for further breeding.

Plant height does not directly affect the yield, but determines the process of priming. The optimal height of plants of parent forms ranged from 154 to 174 cm, and in hybrid forms with the most pronounced heterosis effect – from 184 to 190 cm (table 1).

The number and size of leaves are the main biometric indices that affect the yield capacity and quality of tobacco raw materials. It was found that the number of leaves in the parent forms was from 15 to 19 psc / plant. Compared to them seven best hybrid combinations are distinguished: F_1 (Virginia 27 / Burley 38) № 35–1, F_1 (Virginia 27 / Burley 38) № 35–2, F_1 (Virginia 27 / Burley 38) № 35–5, F_1 (Ternopilskyi 14 / Burley 38) № 26–2, F_1 (Ternopilskyi 14 / Burley 38) № 26–5, F_1 (Ternopilskyi14 / Burley 38) № 27–3, F_1 (Hostrolyst Rubin / Burley 46) № 25–1, F_1 (Hostrolyst Rubin / Burley 46) № 25-2, whose number of leaves was in the range of 20–24 pcs/plant.

The length of the leaves in the parent forms varied from 37 to 44 cm. According to this feature, eight experimental hybrids were the leaders, namely: F_1 (Virginia 27 / Burley 38) № 35–1, F_1 (Virginia 27 / Burley 38) № 35–2, F_1 (Virginia 27 / Burley 38) № 35–5, F_1 (Virginia 27 / Burley 38) № 36–6, F_1 (Ternopilskyi 14 / Burley 38) № 26–2, F_1 (Ternopilskyi 14 / Burley 38) № 26–5, F_1 (Ternopilskyi 14 / Burley 38) № 27–3, F_1 (Hostrolyst Rubin / Burley 46) № 25–1, F_1 (Hostrolyst Rubin / Burley 46) № 25–2, which indices were 44–46 cm.

The width of leaves in parent forms ranged from 22 to 33 cm. According to this feature, six experimental hybrids were distinguished, such as: F_1 (Virginia 27 / Burley 38) № 35–1, F_1 (Virginia 27 / Burley 38) № 36–5, F_1 (Virginia 27 / Burley 38) № 36–6, F_1 (Ternopilskyi 14 / Burlee 38) № 26–2, F_1 (Ternopilskyi 14 / Burley 38) № 27–5, F_1 (Hostrolyst Rubin / Burley 46) № 25–2, the size of which was – 27–36 cm.

The yield of tobacco raw materials in the parent forms was in the range of 2,10–2,90 t/ha and in the nine hybrids that had the advantage over them – 2,92–3,59 t/ha.

The quality of tobacco raw materials in parent forms was 65,0–84,1%. In comparison to the original forms, such ten experimental hybrids had high quality: F_1 (Virginia 27 / Burley 38) № 35–1, F_1 (Virginia 27 / Burley 38) № 35–2, F_1 (Virginia 27 / Burley 38) № 36–2, F_1 (Virginia 27 / Burley 38) № 36–5, F_1 (Virginia 27 / Burley 38) № 36–6, F_1 (Ternopilskyi 14 / Burley 38) № 26–2, F_1 (Ternopilskyi 14 / Burley 38) № 27– 3, F_1 (Ternopilskyi 14 /

Burley 38) № 27–5, F_1 (Hostrolyst Rubin / Burley 46) № 25–1, F_1 (Hostrolyst Rubin / Burley 46) № 25–2, which indices ranged from 82,5 to 95,3%.

Table 1

Assessment of F_1 hybrids and parental under the feature complex, (average for 2018-2019)

Sample	Plant height, cm	Number of leaves, psc	Leaf size, cm		Raw material yielding ability, t/ha	Quality, %
			length	width		
♀ Virginia 27	171	16	44	26	2,90	84,1
♂ Burley 38	154	19	37	22	2,38	79,7
F_1 (Virginia 27 / Burley 38) № 35–1	186	22	46	27	3,36	95,3
F_1 (Virginia 27 / Burley 38) № 35–2	183	20	45	26	3,23	92,4
F_1 (Virginia 27/ Burley 38) № 35–3	170	18	37	22	2,86	80,5
F_1 (Virginia 27 / Burley 38) № 36–1	155	17	42	26	2,63	65,4
F_1 (Virginia 27 / Burley 38) № 36–2	164	20	41	25	3,01	86,3
F_1 (Virginia 27 / Burley 38) № 36–5	187	24	45	27	3,59	88,5
F_1 (Virginia 27 / Burley 38) № 36–6	165	17	46	29	2,87	87,5
♀ Ternopilskyi 14	168	18	43	25	2,38	72,2
♂ Burley 38	158	19	40	24	2,10	67,7
F_1 (Ternopilskyi 14 / Burley 38) № 26–2	174	23	44	27	2,92	82,5
F_1 (Ternopilskyi 14 / Burley 38) № 26–3	165	18	44	28	2,13	68,0
F_1 (Ternopilskyi 14 / Burley 38) № 26–5	145	23	39	27	2,44	72,2
F_1 (Ternopilskyi 14 / Burley 38) № 27–2	140	21	40	27	2,04	71,0
F_1 (Ternopilskyi 14 / Burley 38) № 27–3	165	19	40	28	2,11	79,5
F_1 (Ternopilskyi 14 / Burley 38) № 27–5	170	20	44	28	3,15	86,7
♀ Hostrolyst Rubin	174	15	38	26	2,73	79,8
♂ Burley 46	162	16	38	33	2,54	65,0
F_1 (Hostrolyst Rubin / Burley 46) № 25–1	171	18	39	26	2,76	85,0
F_1 (Hostrolyst Rubin / Burley 46) № 25–2	190	20	44	36	3,43	87,3
$HIP_{0,05}$	*8,37*	*0,96*	*2,08*	*1,34*	*0,14*	*3,99*

Thus, such six tobacco hybrids were distinguished under the complex of morphological and economically valuable features – F_1 (Virginia 27 / Burley 38)

№ 35–1, F_1 (Virginia 27 / Burley 38) № 35–2, F_1 (Virginia 27 / Burley 38) № 36–5, F_1 (Ternopilskyi 14 / Burley 38) № 26–2, F_1 (Ternopilskyi 14 / Burley 38) № 27–5, F_1 (Hostrolyst Rubin / Burley 46) № 25–2, which had the advantage over the female and male parent forms and are promising for further breeding.

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FUNCTIONAL DIAGNOSTICS IN MAIZE CULTIVATION

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Formulation of the problem. In recent years, there has been a tendency in Ukraine to disappear from crop fields that can maintain soil fertility at a high level. Most agrarians prefer crops of intensive type of cultivation, which leads to different types of degradation, in particular agrochemical. Producers

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