

BIOMORPHOLOGICAL TRAITS IN SOME VIRGINIA TOBACCO VARIETIES AND LINES IN THE REGION OF PRILEP

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ABSTRACT

Investigations included four introduced fertile varieties and three male sterile hybrid lines, created in the Scientific Tobacco Institute in Prilep. during the growing season, analyses were made on the time of flowering, the length and width of the 5th, 10th and 15th leaf, stalk height and leaf number. In most of the above traits, male sterile hybrid lines were superior to the fertile genotypes. The best results for the above traits compared to other investigated varieties and lines were recorded in the line V-79/09 CMS F1 and the poorest results were obtained with the variety Delcrist. The results can serve as a good direction to a producer with which genotype to begin the production cycle.

Key words: tobacco, variety, Virginia, flowering, stalks, leaves

INTRODUCTION

Investigation included four introduced fertile varieties and 3 male-sterile hybrid lines, created in the Scientific Tobacco Institute - Prilep. Trials were carried out in the field of Tobacco Institute and analyses were made on the time of blooming, length and width of the 5th, 10th and 15th leaf, stalk height and leaf number. The best results for the above traits were recorded in the line V-79/09 CMS F1 and the poorest results in the variety Delcrist.

The main goal was to improve the knowledge on biomorphological properties of some varieties and lines included in the investigation and to give good direction to a producer which genotype should be first used in the production cycle.

MATERIAL AND METHODS

Investigations were carried out in 2012 and 2013 with 4 varieties and 3 lines of Virginia tobacco in the region of Prilep. The trial was set up in 4 replicate, with 90 × 50 cm row spacing, applying all necessary agricultural practices for production of this tobacco. Measuring was made on the time of blooming, length and width of the 5th, 10th and 15th leaf, number of leaves and height of the stalk with inflorescence. The obtained data were statistically processed by the analysis of variance and LSD test.

RESULTS AND DISCUSSION

According to the data presented in Table 1, variety Delcrist is the first one to begin with blooming (in 61.5 days), the first with 50% blooming (67 days) and the first to end with blooming (72 days). Line V-79/09 CMS F1 is the last to begin with blooming (69.5 days), to have 50 % blooming (75.5 days) and to end with blooming (82 days). According to Uzunoski M. (1985), tobacco blooming begins 10 days after buttonization of the terminal bud. Naumoski K. et al. (1977) report that by the end of blooming tobacco plant has already built 90 % of its mass. Ivan Pamukov (1978) reports that the improved Virginia variety Cocker 254 starts to bloom 85 days after transplanting.

**Table 1. Length of tobacco growing season
(blooming)**

Varieties	Year	Beginning of blooming, in days	Average		Absolute differences	50% blooming, in days	Average		End of blooming, in days	Average	
			2012/2013	2013 год.			2012/2013	2013		2012/2013	2013 год.
K-394 Ø	2012	67	64.0	/	72	69.5	/	77	75.0	/	
	2013	61									67
Delcrist	2012	63	61.5	-2.5	69	67.0	-1.5	75	72.0	-3.0	
	2013	60									65
T.L. 33	2012	65	64.0	0	71	69.5	0	76	74.5	-0.5	
	2013	63									68
V- 519	2012	66	65.5	+1.5	71	71.0	+1.5	77	76.5	+1.5	
	2013	65									71
V-11/11 CMS F1	2012	69	67.5	+3.5	74	73.0	+2.5	79	78.0	+3.0	
	2013	66									72
V-12/11 CMS F1	2012	69	67.0	+3.0	75	73.0	+2.5	80	79.0	+4.0	
	2013	65									71
V-79/09 CMS F1	2012	73	69.5	+5.5	78	75.5	+4.5	83	82.0	+7.0	
	2013	66									73

According to data from Table 2, the lowest average lengths of the 5th and the 15th leaf (31.3 cm and 42.1 cm respectively) were observed in variety Delcrist. The highest values for these traits were obtained in line V-79/09 CMS F1, where the length of the 5th 10th and 15th leaf was 41.9 cm, 64.0 cm and 62.2 cm, respectively. Statistical differences were significant at 5 % and 1 % compared to the check.

Table 3 shows the lowest average width of the 5th (17.5 cm) and 10th leaf (27.6 cm) in variety Delcrist. Width of the 15th leaf in this variety (25.5 cm) is the same as that of the check variety K-394. Line V-79/09 CMS F1 has the highest average width of the 5th (29.7 cm) and 15th leaf (33.8 cm) and statistically significant differences of 1% in both years of investigation. The highest average width of 40.1 cm and statistically significant differences of 1 % were recorded in line V-12/11 CMS F1.

Table 2. Length of the 5th, 10th and 15th leaf

Variety	Year	5th leaf			10th leaf			15th leaf		
		cm	Average 2012/13	Difference in cm	cm	Average 2012/13	Difference in cm	cm	Average 2012/13	Difference in cm
K-394 Ø	2012	34.0	34.4	/	52.4	52.2	/	50.6	49.8	/
	2013	34.8			52.0			49.0		
Delcrist	2012	29.2	31.3	-3.1	44.2	46.1	-6.1	40.4	42.1	-7.7
	2013	33.4			48.0			43.8		
T.L.33	2012	31.0	31.5	-2.9	48.6	50.1	-2.1	51.2	50.7	+0.9
	2013	32.0			51.6			50.2		
V-519	2012	32.4	33.8	-0.6	49.8	50.1	-2.1	52.4	51.9	+2.1
	2013	35.2			50.4			51.4		
V-11/11 CMS F1	2012	35.8	35.9	+1.5	57.2	58.0	+5.8	55.6	55.8	+6.0
	2013	36.0			58.8 ⁺⁺			56.0 ⁺		
V-12/11 CMS F1	2012	38.6 ⁺	39.7	+5.3	58.4 ⁺	59.1	+6.9	59.6 ⁺⁺	59.7	+9.9
	2013	40.8 ⁺⁺			59.8 ⁺⁺			59.8 ⁺⁺		
V-79/09 CMS F1	2012	39.4 ⁺	41.9	+7.5	62.4 ⁺⁺	64.0	+11.8	61.6 ⁺⁺	62.2	+12.4
	2013	44.4 ⁺⁺			65.6 ⁺⁺			62.8 ⁺⁺		

5th leaf 2012 2013 10th leaf 2012 2013 15th leaf 2012 2013
 LSD 5%⁺ = 4.58 cm, 2.31 cm LSD 5%⁺ = 5.76 cm, 4.16 cm LSD 5%⁺ = 6.18 cm, 5.38 cm
 1%⁺⁺ = 6.28 cm, 3.17cm 1%⁺⁺ = 7.90 cm, 5.71 cm 1%⁺⁺ = 8.45 cm, 7.38cm

Table 3. Width of the 5th, 10th and 15th leaf

Variety	Year	5th leaf			10th leaf			15th leaf		
		cm	Average 2012/13	Difference in cm	cm	Average 2012/13	Difference in cm	cm	Average 2012/13	Difference in cm
K-394 Ø	2012	17.0	18.4	/	32.6	31.9	/	25.8	25.5	/
	2013	19.8			31.2			25.2		
Delcrist	2012	16.2	17.5	-0.9	26.4	27.6	-4.3	24.4	25.5	0
	2013	18.8			28.8			26.6		
T.L.33	2012	20.8 ⁺	21.7	+3.3	32.6	33.2	+1.7	31.4 ⁺	32.4	+6.9
	2013	22.6 ⁺⁺			33.8 ⁺			33.4		
V-519	2012	18.8	19.2	+0.8	29.4	30.7	-1.2	28.0	29.4	+3.9
	2013	19.6			32.0			30.8		
V-11/11 CMS F1	2012	22.4 ⁺⁺	22.9	+4.5	35.4	36.0	+4.1	31.0	31.5	6.0
	2013	23.4 ⁺⁺			36.6 ⁺⁺			32.0		
V-12/11 CMS F1	2012	24.2 ⁺⁺	25.2	+6.8	39.2 ⁺⁺	40.1	+8.2	33.4 ⁺⁺	33.0	+7.5
	2013	26.2 ⁺⁺			41.0 ⁺⁺			32.6		
V-79/09 CMS F1	2012	27.0 ⁺⁺	29.7	+11.3	36.8	37.1	+5.2	33.8 ⁺⁺	33.8	+8.3
	2013	32.4			37.4 ⁺⁺			33.8 ⁺⁺		

5th leaf 2012 2013 10th leaf 2012 2013 15th leaf 2012 2013
 LSD 5%⁺ = 3.30 cm, 1.32 cm LSD 5%⁺ = 4.60 cm, 2.24cm LSD 5%⁺ = 5.43 cm, 3.58 cm
 1%⁺⁺ = 4.53 cm, 1.81cm 1%⁺⁺ = 6.32cm, 3.08 cm 1%⁺⁺ = 7.45 cm, 4.91cm

Data presented in Table 4 show the highest stalk (197 cm) and highest leaf number (34.7) in line V-79/09 CMS F1, with statistically significant differences of 1 % in both years of investigation. The lowest stalk height (137 cm) and leaf number (25.7) were observed in Delcrist variety.

Ristevski I. (1999) reported that the size of nutrient media can affect some traits of Virginia tobacco MV-1. The highest leaf length was observed in plants grown at 1 m² nutrient media and the lowest in plants grown at 0.24 m².

Stanimir Ralovski (1996), describing some Bulgarian varieties of Virginia tobacco, reported that stalk height in hybrid Virginia 0454 was 140-155 cm and the number of leaves was 24. In variety Virginia 0514 stalk height was 140-150 cm and leaf number was 23 -24. S.N. Hawks and W.K. Collins (1994) reported that some varieties can form 30 leaves and over. They explain this phenomenon as genetic process associated with the duration of daylight.

Table 4. Height of the stalk with inflorescence and Leaf number per stalk

Variety	Year	Stalk height with infloresc.	Average 2012/13	Absolute difference from the average	Rank	Leaf number	Average 2012/13	Absolute difference from the average	Rank
K-394 Ø	2012	162	163	/	6	31.0	30.9	/	6
	2013	164				30.8			
Delcrist	2012	135	137	-26	7	25.2	25.7	-5.2	7
	2013	140				26.2			
T.L.33	2012	162	166	+3.0	5	31.2	31.5	+0.6	5
	2013	169 ⁺				31.8			
V-519	2012	176 ⁺⁺	180	+17.0	3-4	31.8	32.2	+1.3	2
	2013	184 ⁺⁺				32.6 ⁺			
V-11/11 CMS F1	2012	179 ⁺⁺	180	+17.0	3-4	31.6	32.0	+1.1	3
	2013	180 ⁺⁺				32.4 ⁺			
V-12/11 CMS F1	2012	175 ⁺⁺	177	+14.0	2	31.6	31.9	+1.0	4
	2013	180 ⁺⁺				32.2			
V-79/09 CMS F1	2012	196 ⁺⁺	197	+34.0	1	34.6 ⁺⁺	34.7	+3.8	1
	2013	198 ⁺⁺				34.8 ⁺⁺			

Stalk height : 2012

2013

Leaf number : 2012

2013

LSD 5%⁺ = 5.57 cm
1%⁺⁺ = 7.65cm

5%⁺ = 4.27 cm
1%⁺⁺ = 5.86 cm

LSD 5%⁺ = 1.69 leaves
1%⁺⁺ = 2.32 leaves

5%⁺ = 1.47 leaves
1%⁺⁺ = 2.01 leaves

CONCLUSIONS

- The first variety that starts with blooming is Delcrist and the last one is line V-79/09 CMS F1.

- The 5th, 10th and 15th leaf length and width are the highest in line V-79/09 CMS F1 and the lowest in Delcrist variety.

- The highest stalk (197 cm) and the highest leaf number (34.7) were obtained in line V-79/09 CMS F1. The lowest values for these traits were observed in Delcrist variety.

- With regard to the investigated traits, male-sterile hybrid lines V-11/11 CMS F1, V-12/11 CMS F1 and V-79/09 CMS F1 were superior compared to the fertile genotypes.

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