

## RESULTS IN BREEDING OF SEMI-ORIENTAL TOBACCO IN SCIENTIFIC TOBACCO INSTITUTE-PRILEP

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### ABSTRACT

Scientific Tobacco Institute - Prilep has a rich collection of various tobacco types. This includes the semi-oriental tobaccos, with new varieties and lines with better yield and quality characteristics created in the Institute, as a result of the intensive breeding.

The aim of the paper was to present productional characteristics of the recognized varieties and prospective lines in CMS form.

It can be stated that the newly created fertile and male sterile varieties and lines are characterized by much better quantitative and qualitative characteristics compared to control variety, especially the male sterile line O - Zlatovrv CMS F<sub>9</sub>.

*Keywords: tobacco, varieties, semi-oriental tobacco, fertile, male-sterile*

### INTRODUCTION

The Scientific Tobacco Institute - Prilep - Department of genetics, selection and seed control has been working on creation and maintenance of oriental, semi-oriental and large-leaf types of tobacco for ninety years. In recent years, new perspective varieties of all types, including several semi-oriental varieties and lines have been created.

Semi-oriental tobaccos belong to the group of additional types of tobacco. They are characterized by low midrib content, good manufacturing yield and good taste in smoking. By increasing the production, especially of the newly created varieties which are characterized by better yield and quantitative traits, higher economic effect can be achieved in cigarette manufacture. Therefore, semi-oriental tobaccos should be present in higher amounts in cigarette mixtures.

The aim of the paper was to determine the productional-quantitative characteristics of semi-oriental varieties and lines and to make possibilities for inclusion of the best ranked among them in the mass production.

### MATERIAL AND METHODS

The three-year investigation included 6 semi-oriental varieties created in Tobacco Institute – Prilep (fertile: O. 9-18/2 /check variety/, line O-8 and variety Maya-36 and male sterile varieties Maya - 01 CMS F<sub>8</sub>, Maya - 02 CMS F<sub>4</sub> and O. Zlatovrv CMS F<sub>9</sub>). The trials were set up in the Experimental field of Tobacco Institute-Prilep in randomized blocks with four replicates, at 45x25 cm spacing between plants. The area of the useful plot was 3.4 m<sup>2</sup>. Qualitative assessment of cured tobacco after ironing was done according to the "Criteria for qualitative and quantitative assessment of raw tobacco". Corrected yields per stalk and hectare were calculated by the method of Rimker methods and the average price (denars/ha) was obtained when the yield per hectare was multiplied by the average price of 1 kg raw tobacco. The results were statistically processed and tested with LSD method.

### RESULTS AND DISCUSSION

According to the data in Table 1, the highest yield of 43.68 g/stalk in 2012 and 45.56 g/stalk in 2013 was obtained in the line O. Zlatovrv CMS F<sub>9</sub>, and the lowest yield of 23.30 g/stalk in 2012 and 26.32 g/stalk in 2013 was found in the check variety O. 9-18/2. The average yield per stalk ranges from 44.62 g in the line O. Zlatovrv CMS F<sub>9</sub> to 24.81 g in the check O. 9-18/2. Statistically

significant differences of 1 % compared to the control were obtained in all varieties and lines included in the trial, in both years of investigation.

Lazaroski T. (1977) reported that irrigation of semi-oriental variety Maya in the Prilep producing region increased the yield from 34.36 % to 49.72 % compared to the check, depending on the depth of soil layer.

Kocoska K . (2006), reported 35.53 g/stalk in the perspective line O. Zlatovrv in irrigated conditions, which is 22.94 % higher than the check.

**Table 1. Corrected yield, g/stalk**

Variety	Year	g/stalk	Average 2012/13	Difference		Rank
				Absolute	Relative	
O. 9-18/2 Ø	2012	23.30	24.81	/	100.00	6
	2013	26.32				
O - 8	2012	36.35 <sup>++</sup>	36.56	+11.75	147.36	5
	2013	36.77 <sup>++</sup>				
Maya-36	2012	34.94 <sup>++</sup>	37.65	+12.84	151.75	4
	2013	40.35 <sup>++</sup>				
Maya-01 CMS F <sub>8</sub>	2012	42.88 <sup>++</sup>	43.33	+18.52	176.65	2
	2013	43.77 <sup>++</sup>				
Maya-02 CMS F <sub>4</sub>	2012	42.43 <sup>++</sup>	42.21	+17.40	170.13	3
	2013	41.98 <sup>++</sup>				
O.Zlatovrv CMS F <sub>9</sub>	2012	43.68 <sup>++</sup>	44.62	+19.81	179.85	1
	2013	45.56 <sup>++</sup>				

2012, LSD 5 % <sup>+</sup> = 5.97 g/stalk  
1 % <sup>++</sup> = 8.28 g/stalk

2013, LSD 5 % <sup>+</sup> = 4.65 g/stalk  
1 % <sup>++</sup> = 6.44 g/stalk

In 2012, the highest yield per hectare was recorded in the line O. Zlatovrv CMS F<sub>9</sub> (3882 kg/ha), and the lowest in the check variety O. 9-18/2 (2071 kg/ha) (Table 2). In 2013, too, the highest yield per hectare (4050 kg/ha) was observed in O . Zlatovrv CMS F<sub>9</sub> and the lowest (2118 kg/ha) in the check variety O. 9-18/2. High statistical significance at 1 % level was achieved in all varieties and in both years of investigation.

**Table 2. Corrected yield, kg/ha**

Variety	Year	kg/ha	Average 2012/13	Difference		Rank
				Absolute	Relative	
O. 9-18/2 Ø	2012	2071	2095	/	100.00	6
	2013	2118				
O - 8	2012	3233 <sup>++</sup>	3251	+1156	155.18	5
	2013	3269 <sup>++</sup>				
Maya-36	2012	3105 <sup>++</sup>	3346	+1251	159.71	4
	2013	3587 <sup>++</sup>				
Maya-01 CMS F <sub>8</sub>	2012	3811 <sup>++</sup>	3852	+1757	183.87	2
	2013	3893 <sup>++</sup>				
Maya-02 CMS F <sub>4</sub>	2012	3772 <sup>++</sup>	3779	+1684	180.38	3
	2013	3785 <sup>++</sup>				
O.Zlatovrv CMS F <sub>9</sub>	2012	3882 <sup>++</sup>	3966	+1871	189.31	1
	2013	4050 <sup>++</sup>				

2012. LSD 5 % <sup>+</sup> = 320.89 kg/ ha  
1 % <sup>++</sup> = 444.43 kg/ ha

2013, LSD 5 % <sup>+</sup> = 235.69 kg/ ha  
1 % <sup>++</sup> = 326.42 kg/ ha

The average yield per stalk in both 2012 and 2013 ranged from 3966 kg/ha in the line O. Zlatovrv CMS F<sub>9</sub> to 2095 kg/ha in the check variety O. 9-18/2.

Dimitrieski M. (2004) reported the highest average yield per hectare in the perspective line O 88- 61/9, which varies from 2280 kg/ha (2003) to 2463 kg/ha (2002), or the average for the three years was 2371 kg /ha.

**Table 3. Average yield, denars/kg**

Variety	Year	Denars/kg	Average 2012/13	Difference		Rank
				Absolute	Relative	
O. 9-18/2 Ø	2012	64.00	56.76	/	100.00	6
	2013	49.52				
O - 8	2012	67.96	62.26	+5.50	109.69	2
	2013	56.56				
Maya-36	2012	68.29	64.22	+7.46	113.14	1
	2013	60.15				
Maya-01 CMS F <sub>8</sub>	2012	64.07	57.62	+0.86	101.52	5
	2013	51.17				
Maya-02 CMS F <sub>4</sub>	2012	64.00	58.42	+1.66	102.92	4
	2013	52.83				
O.Zlatovrv CMS F <sub>9</sub>	2012	65.80	61.35	+4.59	108.09	3
	2013	56.90				

2012, LSD 5%<sup>+</sup> = 7.31 denars./kg      2013, LSD 5%<sup>+</sup> = 7.40 denars./kg  
 1%<sup>++</sup> = 10.12 denars./kg      1%<sup>++</sup> = 10.25 denars./kg

The average price indicates the quality of tobacco raw material. According to data presented in Table 3, the highest average price per kg of dry tobacco was recorded in variety Maya -36 (68.29 denars/ kg in 2012 and 60.15 denars/kg in 2013). The average price of Maya-36 was 64.22 denars/kg, with 9.69 % higher relative difference compared to the check O. 9-18/2 (56.76 denars/kg). No statistically significant differences for this trait were observed in the investigated varieties and lines compared to the check. Lazaroski (1977) reported that in irrigated conditions, the average purchase price of the semi-oriental variety Maya in the region of Prilep increased from 15.55 % to 19.92 %, depending on the depth of irrigated soil layer.

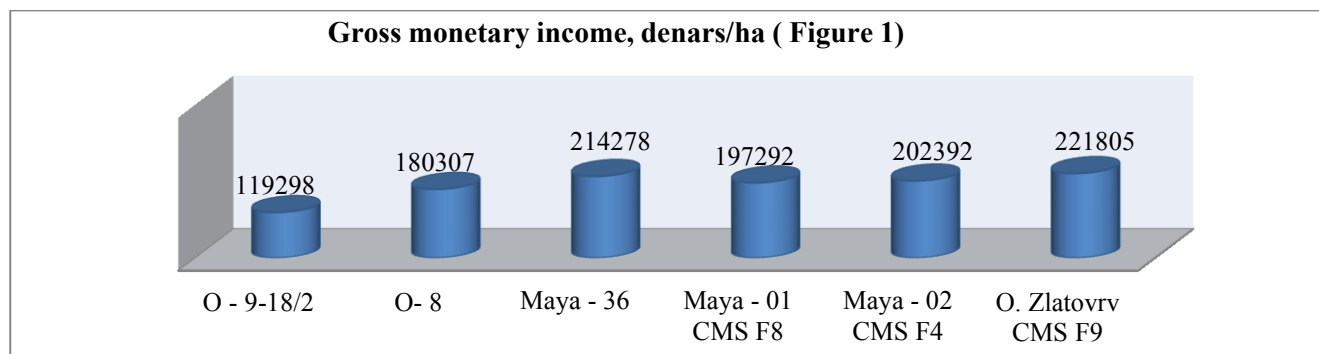
**Table 4. Gross income, denars/ha**

Variety	Year	Denars/ha	Average 2012/13	Difference		Rank
				Absolute	Relative	
O. 9-18/2 Ø	2012	132 672	119 298	/	100.00	6
	2013	105 923				
O - 8	2012	175 779 <sup>+</sup>	180 307	+61 009	155.14	5
	2013	184 835 <sup>++</sup>				
Maya-36	2012	213 019 <sup>++</sup>	214 278	+94 980	179.62	2
	2013	215 536 <sup>++</sup>				
Maya-01 CMS F <sub>8</sub>	2012	195 382 <sup>++</sup>	197 292	+77 994	165.38	4
	2013	199 202 <sup>++</sup>				
Maya-02 CMS F <sub>4</sub>	2012	204 695 <sup>++</sup>	202 392	+83 095	169.65	3
	2013	200 091 <sup>++</sup>				
O.Zlatovrv CMS F <sub>9</sub>	2012	213 142 <sup>++</sup>	221 805	+102 507	185.93	1
	2013	230 468 <sup>++</sup>				

2012, LSD 5%<sup>+</sup> = 34 198 denars/ ha      2013 5%<sup>+</sup> = 27 564 denars/ ha  
 1%<sup>++</sup> = 47 363 denars/ ha      1%<sup>++</sup> = 38 176 denars/ ha

Key factors that determine this trait are the average yield per hectare and the average price per 1 kg raw tobacco. According to the data presented in Table 4 and Figure 1, the highest gross income was achieved in line O. Zlatovrv CMS F<sub>9</sub> (221.805 denars/ha) and it is 85.93 % higher compared to the check, which had the lowest gross income of 119.298 denars / ha.

Dimitrieski (2004) pointed out to the significant influence of irrigation on the increase of gross income in all semi-oriental tobacco varieties and lines included in his three-year investigations, which was up to 36.95 % higher compared to the check.



## CONCLUSIONS

- The highest average yield per stalk (44.62 g/stalk) was observed in the line O. Zlatovrv CMS F<sub>9</sub>, with 79.85% higher relative difference compared to the check.

- The highest average yield per hectare (3966 kg/ha) was obtained in the line O. Zlatovrv CMS F<sub>9</sub>, with relative difference 89.31 % higher than the check.

- Significantly higher price and gross income per hectare were obtained in the new varieties and lines, especially in O. Zlatovrv CMS F<sub>9</sub>, which achieved an average price of 61.35 denars/ha and gross income of 221 805 denars/ha.

- The obtained results show the dominance of line O. Zlatovrv CMS F<sub>9</sub> over other varieties and lines included in the study.

- Based on the results of investigations, increased production of semi-oriental tobaccos is recommended wherever there are favorable conditions and interest for its growth.

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