

RATIO BETWEEN GREEN AND DRY MASS IN SOME VARIETIES AND LINES OF SEMI-ORIENTAL TOBACCO

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Abstract: *Water content in tobacco plant is variable and is closely related to tobacco variety, stage of development, plant organs (root, stem and leaf), climate conditions during the growing season and other factors. In 2012 and 2013 investigations were carried out on green : dry mass ratio in three semi-oriental varieties: O - 9-18/2 (check), O-110-88/3 and O Zlatovrv, and three newly created lines: O. 61-9/2, O. 9-75/7 u O-87. Seedbed and field experiments with the above varieties and lines were made in Tobacco Institute - Prilep in randomized block design with 4 replications. Standard methods were used in the investigations and some of the results were statistically analysed.*

Varieties O.110-88/3 u O Zlatovrv participate with smaller amounts of green mass to yield 1 kg dry mass (O. 110 – 88/3 with 6.090 kg green : 1 kg dry tobacco and O Zlatovrv with 6.076 kg green : 1 kg dry tobacco). The ratio between green and dry mass can be also expressed as plant productivity. In our investigations, the highest productivity among varieties was observed in lines O-87 (5.998 green : 1 kg dry tobacco) and the lowest in O-9-18/2 (7.233 green : 1 kg dry tobacco).

Key words: *semi-oriental tobacco, varieties, lines*

Introduction

Water is an environment in which all physiological processes in living cell take place and a basic element in creation of organic matter in the process of photosynthesis. In the process of curing, water is separated from tobacco leaf, which causes loss not only of water but also of a part of dry matter. Water content in leaf usually decreases from the lower to the upper insertions and it differs in various types of tobacco. Karajankov (1995) in his three-year investigation concluded that technically mature leaves of Macedonian oriental varieties (P 10-3/2, YK 7-4/2 and Djebel No.1) contain approximately 77.43 % of water. Studying the water content in different organs of the plant, the author reported that 50.08 % of the water in YK 7-4/2 is found in the leaf, 25.15 % in the stalk, 12.87 % in the root and 10.90 % in the inflorescence.

According to Boceski (2003), the loss of dry matter is 16 to 20% of its initial content. Dimitrov (1964) points out that the increase of nitrogen rates in green tobacco leaves leads to an increased amount of water. In cured tobacco, the

higher amount of water indicates low quality of tobacco leaves and vice versa .

According to Uzunovski (1985), the water amount in technically mature leaves is considerably high (75 % - 90 %) and depends on the variety, growing conditions and insertion. The amount of water in cured leaves ranges 6 - 10 % of the total leaf weight.

According to Atanassov (1972), green : dry mass ratio of the oriental tobacco type Ustina ranged 5.5 : 1 to 6.7 : 1 in lower primings, 4.8 : 1 to 5.1 : 1 in middle primings and 3.9 : 1 to 5.0 : 1 in upper primings. The same author reported that in Burley tobacco this ratio is 6.7 : 1 to 8.3 : 1 and in Virginia 5.5 : 1 to 6.7 : 1.

Green : dry tobacco ratio in the investigated varieties is mainly a varietal characteristics. According to Mitreski (2011), the average ratio in some varieties of the type Prilep in 2009 and 2010 ranged from 6.11 : 1 in variety P 66-9/7 to 6.95 : 1 in P 12-2/1. According to Ristevski (2006), green : dry tobacco ratio in Burley varieties ranged from 6389 g : 1000 g in Croatian variety Chulinec to 6230 g : 1000 g in variety B -96/85. The green : dry tobacco ratio will be presented in our research.

According to Kocoska (2012), green : dry tobacco ratio in some Semi oriental tobacco varieties the highest green/dry tobacco ratio was recorded in the check variety O-9-18/2 (6973:1000 g) and the lowest ratio in lines Maya 96 and Maya 94 (6022:1000 g)

Material and methods

Investigations were carried out in 2012 and 2013 with three tobacco varieties: O - 9-18/2 (check), O-110-88/3, O Zlatovrv and three lines: O. 61-9/2, O. 9-75/7 и O-87. Seedling from the investigated varieties was produced in traditional way, under polyethylene covered beds in Scientific Tobacco Institute - Prilep. Elite seed material of 4 g/10 m² was used for investigation. During seedling production, all necessary cultural practices and protection measures were applied simultaneously. After preparation of the soil with one autumn and two spring ploughings, investigations were set up with 4 replications designed in randomized blocks, with planting density of 50 × 25 cm.

Each plot consisted of three rows, two of which were used for harvest and one served for protection. The number of plants in the row was 21 and 17 of them were stalks for harvesting. Harvesting and stringing of the leaves were carried out manually, in 7 primings in the stage of technical maturity and curing was performed in the sun, on horizontal frames. Green and dry tobacco of each variety was measured separately during the two years of investigation and their ratio was obtained mathematically.

The obtained data were processed statistically by the method of analysis of variance and tested with LSD test .

Results and discussion

According to the results of investigations carried out in 2012 (Table 1), the average green : dry tobacco ratio ranges from 6.022 : 1 kg in line O-87 to 7.559: 1 kg in variety O. 9-18/2, the index of which is 20.33% higher than that of the check variety. In O. 110 - 88/3 this ratio was 6.065 green : 1 kg dry tobacco and in O Zlatovrv variety it ranged 6.181 kg green : 1 kg of dry tobacco . So, the investigated tobacco varieties showed no statistically significant differences in 2012 crop

Table 1. Green : dry tobacco ratio in 2012 (in kg)

Varieties / lines	Replications				Average index	
	I	II	III	IV		
O. 9-18/2 ∅	6.573 : 1	7.011 :1	8.151 : 1	8.500 :1	7.559 :1	100.00
O. 61-9/2	7.103 : 1	6.902 : 1	7.171 :1	6.979 :1	7.039 :1	93.12
O. 9-75/7	5.677 : 1	5.900 :1	7.000 : 1	7.165 : 1	6.436 :1	85.14
O. 110 - 88/3	6.578 : 1	5.814 :1	5.867 : 1	6.000 :1	6.065 :1	80.24
O-87	5.907 : 1	5.947 :1	5.840 :1	6.394 :1	6.022 :1	79.67
O Zlatovrv	6.008 : 1	5.719 :1	6.166 :1	6.829 :1	6.181 :1	81.77

2012 year.

LSD 5% 0.699 g⁺ n.s.

1% 0.968 g⁺⁺ n.s.

The data collected in 2013 (Table 2) show the lowest green: dry tobacco ratio in variety O Zlatovrv (5.970 kg: 1 kg), and the highest ratio was observed in check variety O. 9-18/2 (6.906 kg: for 1 kg). Anader varieties an lines showed no statistical differences compared to the check.

Table 2. Green : dry tobacco ratio in 2013 (in kg)

Varieties / lines	Replications				Average index	
	I	II	III	IV		
O. 9-18/2 Ø	7.218 : 1	6.495 : 1	6.846 : 1	7.063 : 1	6.906 : 1	100.00
O. 61-9/2	6.093 : 1	6.713 : 1	6.654 : 1	6.171 : 1	6.408 : 1	92.79
O. 9-75/7	5.868 : 1	5.844 : 1	6.092 : 1	6.009 : 1	5.953 : 1	86.20
O. 110 - 88/3	6.595 : 1	6.216 : 1	5.862 : 1	5.787 : 1	6.115 : 1	88.55
O-87	5.402 : 1	6.610 : 1	5.622 : 1	6.258 : 1	5.973 : 1	86.49
O Zlatovrv	5.786 : 1	6.228 : 1	6.771 : 1	5.096 : 1	5.970 : 1	86.45

2013 year.

LSD 5% 0.684 g⁺ n.s.

1% 0.961 g⁺⁺ n.s.

According to Table 3, the average green : dry tobacco ratio ranged from 5.998kg : 1 kg in O-87 to 7.233 kg : 1 kg in O. 9-18/2 Ø, with relative difference being lower for 17.07 % in O-87 and 16.00 % in O Zlatovrv, compared to the check variety. It can be concluded from the results that O-87 line and O Zlatovrv varietie participate with a lower amount of green mass to obtain 1 kg dry tobacco, but there are no statistically significant differences compared to the check. According to the data obtained, the green : dry tobacco ratio is primarily a varietal trait varieties feature, but it also depends on other factors as cultural practices, climate, soil etc.

Table 3. The ratio between green and dry tobacco (in kg)

Varieties / lines	2012/13 Year	Green: Dry	Average	Difference		Range
				Aps. (Abs.)	Rela. (%)	
O. 61-9/2	2012	7.039 : 1				
	2013	6.408 : 1	6.738	- 495	93.16	2
O. 9-75/7	2012	6.436 : 1				
	2013	5.953 : 1	6.195	- 1038	85.65	3
O. 110-88/3	2012	6.065 : 1				
	2013	6.115 : 1	6.090	- 1143	84.20	4
O-87	2012	6.022 : 1				
	2013	5.973 : 1	5.998	- 1235	82.93	6
O Zlatovrv	2012	6.181 : 1				
	2013	5.970 : 1	6.076	- 1157	84.00	5

Conclusions

As a result of the obtained data, the following conclusions can be drawn:

Green : dry tobacco ratio in 2012 ranged from 6.022 : 1 kg in line O-87 to 7.559: 1 kg in variety O. 9-18/2.

In 2013, green : dry tobacco ratio was the lowest in line O-87 again (6.115 kg: 1 kg), and the highest ratio was observed in check variety O. 9-18/2 (6.906 kg: for 1 kg)

The average green : dry tobacco ratio ranged from 5.998kg : 1 kg in O-87 to 7.233 kg : 1 kg in O. 9-18/2 Ø, with relative difference being lower for 17.07 % in O-87 and 16.00 % in O Zlatovrv, compared to the check variety.

From the two-year results it can be concluded that varieties O Zlatovrv and lines O-87 participate with smaller amount of green mass to obtain 1 kg dry tobacco,

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