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Original scientific paper

COMPARATIVE TESTING OF ORIENTAL TOBACCO VARIETIES OF THE KRUMOVGRAD ECOTYPE IN THE REGION OF NEVROKOP

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ABSTRACT

A comprehensive assessment was made on biological and economic properties of five varieties of oriental tobacco ecotype Krumovgrad in agro-environmental conditions of the experimental field in the town of G. Delchev, the Nevrokop region. According to their morphological and biological properties, all tested varieties fit the typical characteristics of the ecotype Krumovgrad. Varieties Krumovgrad 78C and 68M have a potential to achieve higher yield and quality of dry tobacco and exceed the tested varieties of the ecotype Krumovgrad. From the general assessment it can be predicted that the investigated varieties can be grown not only in the selected regions but also in other regions with similar soil and climate characteristics.

Key words: *tobacco varieties, Krumovgrad, Nevrokop, yield*

КОМПАРАТИВНО ИСПИТУВАЊЕ НА ОРИЕНТАЛСКИ ТУТУНСКИ СОРТИ ОД ЕКОТИПОТ КРУМОВГРАД ВО РЕОНОТ НА НЕВРОКОП

Извршено е детално испитување на биолошките и економските својства на пет сорти тутун од ориенталкскиот екотип Крумовград во агроеколошките услови на експерименталното поле во градот Гоце Делчев (Неврокопски реон). Според нивните морфолошки и биолошки карактеристики, сите испитувани сорти се типични за екотипот Крумовград. Сортите Крумовград 78Ц и 68м имаат потенцијал да постигнат повисок принос и квалитет на сувиот тутун во споредба со останатите испитувани сорти од овој екотип. Од општата проценка може да се предвиди дека испитуваните сорти можат да се одгледуваат не само во посочениот реон туку и во други реони со слични почвени и климатски услови.

Клучни зборови: сорти тутун. Крумовград, Неврокоп, принос

INTRODUCTION

Variety is one of the factors responsible for good quality of the received material and the level of yields and fluctuations in morphological characters is an objective component in the evaluation of genotype (variety) (Dyulgerski, 2011). The biological factor is a powerful tool for improving yield and quality of tobacco. It is also of particular importance to preserve quality characteristics of the varieties in different soil and climate conditions. At the same time we should find a favorable combination of morphological, technological, and smoking properties specific to the type of tobacco (Bojinova and , Djulgerski , 2006; Dimanov and Vitanova, 2011; Mutafchieva, 2005; Stoeva, 2006).

Market requirements for formation of large batches of high quality tobacco imposed cultivation of varieties developed for other agro-ecological regions in the Nevrokop area. Starting from 2005, oriental tobacco varieties from other

ecotypes, mainly the ecotype Krumovgrad , have been distributed and grown widely in the region of Nevrokop.

Oriental ecotype Krumovgrad is one of the most respectable and well accepted tobaccos in international markets (Yancheva and Yordanov, 1997). In recent years it has emerged as one of the most demanded tobaccos, both from Bulgarian and from major international tobacco companies. The demand for aromatic tobacco as a commodity is mainly related to the specific smoking habits of the consumers.

The aim of this study is to make a comparative assessment of morphological and commercial properties and response to diseases and pests of the Krumovgrad tobacco varieties in different conditions of their habitat range.

MATERIALS AND METHODS

The field experiment was carried out during 2008-2010 with five genotypes of the varietal group Basma, ecotype Krumovgrad (varieties Krumovgrad 988, Krumovgrad 58, Krumovgrad 90, Krumovgrad 68M and Krumovgrad 78C). A comparative study was conducted in experimental station - Gotse Delchev using randomized block design in four replications. Nevrokop-1146, which has been the most cultivated variety in the region for decades, was used as a control. The area of the experimental elementary plot was 20 m2

Experience is displayed in rotation with wheat. Technology is growing at a standard farming practices of oriental tobacco, developed and adopted by TTPI- Markovo.

The following characters are reported :
- Plant height / cm /
- Number of leaves
- Leaf size / cm /
- Length of the vegetation period from planting to flowering, in days,
- Economic indicators - yield and quality of dried tobacco

The data were statistically processed (Zapryanov and Dimova, 1995).

METEOROLOGICAL CHARACTERISTICS

The values of meteorological parameters during the study (2008, 2009, 2010) are listed in tables. They affect significantly the levels of expression of the biometric, economic and technological indicators.

Monthly average temperatures and precipitation for the Nevrokop region, 2008

Months	IV	V	VI	VII	VIII	IX
Temperature	11.6	15.3	20.2	21.9	23.0	17.4
Rainfall	39.2	20.0	95.6	45.7	41.9	68.2

Monthly average temperature and precipitation for the region Nevrokop 2009

Monts	IV	V	VI	VII	VIII	IX
Temperature	11.4	17.1	19.9	22.2	22.0	17.3
Rainfall	49.4	24.4	61.4	27.1	10.0	39.4

Monthly average temperatures and precipitation for the region Nevrokop 2010

Monts	IV	V	VI	VII	VIII	IX
Temperature	11.6	16.3	18.8	21.6	24.2	17.8
Rainfall	22.3	33.7	130.0	54.2	21.9	65.5

For the three years of investigation, the maximum rainfall was recorded in June 2010, 130 L/m^2. All other values of the average monthly temperature and rainfall were close to normal for the area.

RESULTS AND DISCUSSION

The results of accompanying indicators are compiled tables.

Table 1 presents data from biometric measurements of height, number of leaves and length of growing season. In terms of plant height measured at the end of the vegetation period, the lowest average height was observed in variety Krumovgrad 988 (92 cm), followed by Krumovgrad 68 (119.4 cm) Krumovgrad 90 (120.5 cm) and Krumovgrad 78S (122.5 cm), and the highest in the standard Nevrokop 1146 (132.8 cm) and in the variety Krumovgrad 58 (134.5 cm).

For the character average number of leaves (technically fit) for the testing period, the lowest number of leaves (22) was observed in variety Krumovgrad 988 and highest in varieties Krumovgrad 78C and 68M (42-48 leaves). In other variants the number of leaves was 24 – 32.

Table 1 Biometric measurements for the period 2008 - 2010

Variants Varieties	Plant height in cm	Number of leaves	Length ofvegetation period in days	Leaf 7 length / width	Leaf 14 length / width
Krumovgrad 988	92.0	22	58	22.2/ 14.2	18.1/ 11.1
Krumpvgrad 90	120.5	24	68	23.8/ 15.4	20.1/ 13.1
Krumovgrad 58	134.5	32	64	27.4/ 19.3	22.8/ 15.0
Krumovgrad 78C	122.5	48	74	21.7 /13.2	19.1/ 11.7
Krumovgrad 68M	119.4	42	72	21.4/ 14.5	19.9/ 12.9
Nevrokop 1146-standard	132.8	32	64	26.4/ 17.8	24.2/ 14.4

According to the data, the longest period of vegetation (from planting to full bloom in days) of was observed in varieties with increased leaf number (Krumovgrad 68M-72 days, Krumovgrad 78C-74 days. Outer leaves remain greener, because they can not fully ripen well in the area conditions. Shorter growing season was recorded for the vatiety Krumovgrad 988 - 58 days. The standard Nevrokop 1146 and variety Krumovgrad 58 have average vegetation period of 64 days.

Table 1 presents data (average values for the test period) from measurements of length and width of leaves from the lower and middle harvesting layer, which is also defined by the form of the leaves. In the lower harvesting belt (7 leaves), the largest leaves are found in Krumovgrad 58 and in standard variety Nevrokop 1146. Smaller leaves are observed in varieties Krumovgrad 68M, Krumovgrad 78C, Krumovgrad 988 and Krumovgrad 90.

The highest length / width ratio in the average harvesting layer (14 leaves) was observed in Krumovgrad 58 and in the standard Nevrokop 1146.

The black shank disease, caused by *Phytophthora parasitica var.nicotianae* is one of the economically most important diseases responsible for obtaining lower yields and quality of the test varieties.

During 2008-2010, natural and artificial infections of tobacco plants were made to study the resistance to black shank.

The data show disease susceptibility of 6.1% in variety Krumovgrad 988, followed by Krumovgrad 90 (3.8%), Krumovgrad 78C (3.5%), Krumovgrad 58 (2.3%) for 1200 observed plants . The trend was confirmed in 2009, with values increased by 2-3% when irrigation water is significantly higher due to dry periods. This favors the development of the fungus far more than rainfall water.

Standard variety Nevrokop 1146 is generally resistant to black shank, but it also accounts for 1.0% diseased plants, which determines its relative stability.

Another important disease is Tobacco Mosaic Virus (TMV) I, Smith. In the work on resistance to TMV with artificial contamination by the method of Ternovskiy, all Krumovgrad varieties were found to be susceptible and react with TMV to make systemic infection.

Table 2. Yield and percentage of classes for the period of investigation

Variants Varieties	Average yield kg / dka	% of classes		
		I	II	III
1. Krumovgrad 988	179.15	41.2	48.1	10.5
2. Krumovgrad 90	201.75	48.0	47.5	4.5
3. Krumovgrad 58	216.15	47.5	39.3	13.2
4. Krumovgrad 78C	231.50	42.4	45.6	52.0
5. Krumovgrad 68M	221.65	49.2	39.3	11.5
6. Nevrokop 1146	250.00	36.0	40.0	24.0

ANOVA table

Cause of variation	SQ	FG	S2	F
Total	758.83	23		
Blocks	6.021	3		
Varieties	752.21	5	150.4	3.76
Errors	0.599	15	0.04	

Error of the difference-0 14kg/dka

The analysis of data on economic characteristics proves that the highest yields were achieved in the standard Nevrokop 1146, variety Krumovgrad 78C and Krumovgrad, 68M, followed by Krumovgrad 58 and lower yields were obtained in Krumovgrad 988 and Krumovgrad 90.

In terms of quality expressed by the percentage of classes, the difference is very small both between varieties and compared to the standard.

CONCLUSIONS

Comprehensive assessment was made of biological and economic properties of five oriental varieties of tobacco ecotype Krumovgrad in agro-environmental conditions of the experimental field in the town of G. Delchev / region of Nevrokop /.

All varieties tested fit the typical ecotype Krumovgrad in their morphological and biological characteristics.

Varieties Krumovgrad 78C and Krumovgrad 68M showed higher productive potential yield and quality of dry tobacco and outperformed the other tested varieties of the ecotype Krumovgrad.

From the integrated assessment it can be predicted that the investigated varieties can be grown not only in regions that were selected, but also in other regions with similar soil and climate characteristics.

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