

## **ECONOMIC EVALUATION OF TOBACCO VARIETIES OF TOBACCO TYPE “PRILEP”**

**EKONOMSKO OCJENIVANJE SORTE DUHANA TIPA “PRILEP”**

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### **ABSTRACT**

In general every agricultural production has a specific goal for the producer to gain certain economic benefits. The financial effect of tobacco production depends on the tobacco yield and quality.

The goal of this paper was to perform an economic evaluation of tobacco varieties of popular oriental aromatic type Prilep by analysis of dry tobacco yield and quality as well as the given average price (economic parameters) to present the gross income per unit of area (ha).

All researches were performed in the Scientific Tobacco Institute – Prilep in the period between 2009 and 2010 in field experiments with four repetitions, set by the method of random blocks system. Varieties P-23 (control), P 12-2/1, NS-72, P-66-9/7, P-79-94 and Prilep basma 82 were used in the researches. Dry tobacco yield and quality of the varieties were established in accordance with the Book of regulations for quantitative and qualitative evaluation of dry tobacco leaves of oriental aromatic tobacco types (Official Gazette of the Republic of Macedonia no.16/2007 and no.114/2010). Afterwards the yield presented in kg/ha, the average price and the gross income presented in euros were mathematically calculated.

The results show that the varieties P-66-9/7 and Prilep basma 82 have the highest level of yield and quality, which guarantees higher gross income per unit of area, when compared to other varieties (P-66-9/7 = 8183,33 €/ha; Prilep basma 82 = 8568,20 €/ha).

From the researches we can see that tobacco production is a profitable agricultural activity in the Republic of Macedonia if the variety is carefully chosen and modern agrotechnical measures are applied.

**Key words:** type Prilep, varieties, yield, average price, gross income

## SAŽETAK

Opće je poznato da svaka poljoprivredna proizvodnja ima za cilj stjecanja ekonomske koristi za proizvođača. Financijski učinak duhana ovisi o njegovoj kvaliteti i urodu.

Cilj ovog rada je dati ekonomsku ocjenu duhana aktualni sorti orijentalno-aromatičnog tipa “Prilep”, odnosno preko analize prinosa suhog duhana i dobivenih prosječnih cijena, prikazati bruto-prihod po jedinici površine (ha).

Istraživanja su vršena u Duhanskom institutu u Prilepu tijekom 2009. i 2010. godine na pokusnom polju u 4 ponavljanja metodom randomiziranih blokova. Predmetom ovih ispitivanja obuhvaćene su slijedeće sorte: P-23 (kontrola), P 12-2/1, NS-72, P-66-9/7, P-79-94 i Prilep basma 82. Prinos i kvaliteta suhog duhana navedenih sorti određeni su Pravilnikom kvalitativne i kvantitativne procjene sirovog duhana u listu za orijentalne-aromatične tipove duhana (“Sl. list” R.M. br. 16/2007 i br. 114/2010). Potom su izračunati prinos u kg/ha, prosječne cijene u €/kg i bruto-prihod u €/ha.

Rezultati su pokazali da najveće prinose i kvalitetu imaju sorte P-66-9/7 i Prilep basma 82, što garantira veći bruto-prihod po jedinici površine uspoređujući s drugim vrstama (P-66-9/7 = 8183.33 €/ha, Prilep basma 82 = 8568.20 €/ha).

Ova su istraživanja pokazala da je proizvodnja duhana isplativa poljoprivredna djelatnost u Republici Makedoniji s pravilnim, odgovarajućim izborom sorte i primjenom suvremenih agrotehničkih mjera.

Ključne riječi: tip Prilep, sorte, prinos, prosječna cijena, bruto-prihod.

## INTRODUCTION

Tobacco production in the Republic of Macedonia is an important agricultural activity and plays a significant role in the agro-industrial complex and the total economy. It is very important because the resulting tobacco material is intended for export to major world markets.

From the social aspect tobacco is very important because it employs a large number of workers in production. In the last few years in this country over 35,000 households have lived from tobacco production.

The Republic of Macedonia is a well known manufacturer of high quality aromatic tobacco of the oriental type that is used in making the best quality brands of cigarettes in the world.

In our country approximately about 25 million kilograms of tobacco, are produced of which over 95 % belong to the oriental aromatic types Prilep and Jaka and a bit of Djebel and Basmak.

According to Pesevski et al. (2011), in the total export the most common type is Prilep with 62.5 %, followed by type Jaka with 25.5 % and type Djebel with 10.4 %.

Demand and consumption of these tobacco types in the world depends on the quality of the produced material. It is well known that every agricultural production must have some economic benefits for the producers. Without economic or financial effects, no business activity can survive. The economic impact of tobacco production dictates its yield and quality.

The purpose of our research is based on the obtained output per unit area and the quality expressed by the cost per unit amount to show the gross income per hectare in tested varieties like the type Prilep.

## MATERIALS AND METHODS

The economic evaluation of tobacco was done on six varieties of the type Prilep P-23 as a control (Ø), P-12-2/1, NS-72, P-66-9/7, P-79-94 and Prilep Basma 82. These varieties were created in the Tobacco Institute - Prilep, except NS-72 which was created at the Faculty of Agriculture - Skopje. All these types are in the mass production in the Republic of Macedonia, few of them are on small area but they are still known because of their good quality. In the last years, the most common variety has been P-66-9/7 (over 90%). The varieties are typical representatives of the type Prilep that is sought after in the markets of tobacco in the world (Photos 1 to 6).



Photo 1. P-23 (Ø) (Reg. 1995)  
Slika 1. P-23 (Ø) (Priznat 1995.)



Photo 2. P 12-2/1 (Created 1934)  
Slika 2. P 12-2/1 (Stvorena 1934.)



Photo 3. NS-72 (Reg. 1984)  
Slika 3. NS-72 (Priznat 1984.)



Photo 4. P-66-9/7 (Reg. 2004)  
Slika 4. P-66-9/7 (Priznat 2004.)



Photo 5. P-79-94 (Reg. 2001)  
Slika 5. P-79-94 (Priznat 2001.)



Photo 6. P-Basma 82 (Reg. 2010)  
Slika 6. P-Basma 82 (Priz. 2010.)

The experiment was set on the experimental field of the Tobacco Institute - Prilep in 2009 and 2010 alluvial soil in 4 repetitions. During the vegetation of tobacco were applied needed for normal growth and development of the plants all the necessary agro-technical measures. Tobacco is manually planted at a distance of 40x12 cm.

For basic fertilization NPK fertilizer was used in the combination 8:22:20 in the amount of 250 kg / ha. In 2009 the field experiment was watered three times, and twice in 2010 (due to heavy rainfall) with a field rate of 250 m<sup>3</sup>/ha water. The ripe tobacco was cut, hand-strung and dried in the sun. The economic evaluation of tobacco was performed according to the yield and quality of each variety separately following the instructions for qualitative and quantitative assessment of raw tobacco leaves of oriental aromatic types of tobacco ("Official Gazette" Republic of Macedonia No. 16/2007 and No. 144/2010)

Based on the measurement and classification of dried tobacco the economic parameters were determined and calculated: yield of dry tobacco in kg/ha, the average price in €/kg and gross income in €/ha.

The results were processed statistically and tested with LSD test.

## RESULTS AND DISCUSSION

We present the test results in tables for each parameter separately.

Yield of dry tobacco:

The tobacco as an agricultural and industrial culture is grown for its leaf mass which is its agricultural yield.

According to Korubin-Aleksoska (2004.), the yield of dry tobacco in certain varieties of the type Prilep is: the P-12-2/1 1500 kg/ha, P-23 from 2000 to 2500 kg/ha, while the P-79 -94 contribute a was between 2500 and 3000 kg/ha.

Hristoski (2006), in his studies found that the influence of some agro-technical measures on the yield and quality of tobacco in 5 varieties of the type of Prilep P-12-2/1 was characterized by average yield of 2513 kg/ha, P-23 gave the yield of 2951 kg/ha, and NS-72 reached 2966 kg/ha.

Dimitrieski and Miceska (2011), pointed out that depending on the soil, the climatic conditions and applied agro-technical measures, the yield of dry tobacco in P-66-9/7 was between 2000 and 3600 kg/ha.

The results of our tests on yield per unit area are shown in Table 1.

**Table 1 Yield of dry tobacco (kg/ha)**

**Tablica 1. Prinos suhog duhana (kg/ha)**

Varieties	Year	Average yield	Differences		Average 2009/2010	Differences		Range
			Aps	Rel		Aps	Rel	
P-23Ø	2009	2426	/	100	2717	/	100	3
	2010	3008	/	100				
P-12-2/1	2009	2020	-406	83,26	2165	-552	79,68	6
	2010	2309	-699	76,76				
NS-72	2009	2400	-26	98,93	2569	-148	94,55	4
	2010	2738	-270	91,02				
P-66-9/7	2009	3266***	840	134,62	3297	580	121,35	1
	2010	3328*	320	110,64				
P-79-94	2009	2324	-102	95,80	2548	-169	93,78	5
	2010	2771	-237	92,12				
Prilep Basma 82	2009	3051**	625	125,76	3252	535	119,69	2
	2010	3452**	444	114,76				

2009	2010
LSD 0,05 = 328,8 kg/ha*	LSD 0,05 = 259,1 kg/ha*
0,01 = 454,7 kg/ha**	0,01 = 358,3 kg/ha**
0,001 = 628,4 kg/ha***	0,001 = 495,2 kg/ha***

The values in the table indicate that the highest yield in 2009 was P-66-9/7, and the lowest P-12-2/1. P-23 ranked third. Statistically, in relation to the control there are highly significant differences in P-66-9/7 and very significant in Prilep Basma 82.

We had a similar situation in 2010, when there were many significant differences in Prilep Basma 82 and significant for P-66-9/7 compared with the P-23.

The average of two years of research shows that yield per unit area was P-66-9/7 (3297 kg/ha), the control took the third place and the and last. place was P-12-2/1 (2165 kg/ha). We point out that the differences in yield of P-12-2/1 (2165kg/ha) the tested varieties are the result of their genetic potential.

#### AVERAGE PRICE OF TOBACCO

The average price is an expression of the quality of tobacco. The better quality tobacco, the higher purchase price.

Pesevski et al. (2011.), analyzing the purchasing, exporting and importing prices of tobacco, point out that the highest price stability was in the export of tobacco and processed tobacco. It grew year after year with the same intensity, almost following the growth of the US dollar. In contrast, the highest fluctuation was in the purchase of tobacco cost. The authors note that the average purchase price of aromatic oriental tobacco in Macedonia for the period 2001 - 2010 amounted to 2,18 €/kg.

In our research, the average price of dried tobacco varieties are presented in Table 2.

**Table 2 Average price of tobacco (€/kg)**

**Tablica 2. Prosječna cijena duhana (€/kg)**

Varieties	Year	Average price	Differences		Average 2009/2010	Differences		Range
			Aps	Rel		Aps	Rel	
P-23Ø	2009	2,53	/	100	2,58	/	100	2
	2010	2,62	/	100				
P-12-2/1	2009	2,09	-0,44	82,61	2,15	-0,43	83,33	6
	2010	2,20	-0,42	83,97				
NS-72	2009	2,26	-0,27	89,33	2,33	-0,25	90,31	5
	2010	2,40	-0,22	91,60				
P-66-9/7	2009	2,46	-0,07	97,23	2,48	-0,10	96,12	3
	2010	2,50	-0,12	95,42				
P-79-94	2009	2,37	-0,16	93,68	2,36	-0,22	91,47	4
	2010	2,34	-0,28	89,31				
Prilep Basma 82	2009	2,61	0,08	103,16	2,64	0,06	102,33	1
	2010	2,66	0,04	101,53				

2009

LSD 0,05 = 0,20 €/kg \*  
 0,01 = 0,27 €/kg \*\*  
 0,001 = 0,37 €/kg \*\*\*

2010

LSD 0,05 = 0,13 €/kg \*  
 0,01 = 0,18 €/kg \*\*  
 0,001 = 0,25 €/kg \*\*\*

From the data in the table it can be seen that in the two years of testing, Prilep Basma 82, followed by the control and P-66-9/7 had the highest purchase price. P-12-2/1 had the lowest purchase price per kilogram of dry tobacco which means it was of the lowest quality. Statistical analysis of the results showed no significance in P-66-9/7 and Prilep Basma 82 compared with the P-23, but there was a very high significance in 2009 in NS-72 and U-12-2/1, much significance in NA-72 and high significance in P-12-2/1 and P-79-94 in 2010 in the negative difference compared to the control.

The two-year average confirms that very good quality raw tobacco varieties are P-23 (control), P-66-9/7 and Prilep Basma 82, while lower quality are P-12-2 / 1 and NS-72.



### GROSS INCOME FROM TOBACCO

The gross income from unit area (ha) is a reflection of the amount of tobacco, its quality and price.

Dimitrieski and Miceska (2013.), note that the gross income from 1 ha of tobacco variety P-12-2/1 is 3790,62 €.

The results of two years of research on the tobacco varieties like Prilep for these economic parameters are shown in Table 3.

**Table 3 Gross income (€/ha)**

**Tablica 3. Bruto-prihod (€/ha)**

Varieties	Year	Average gross income	Differences		Average 2009/2010	Differences		Range
			Aps.	Rel.		Aps.	Rel.	
P-23Ø	2009	6127,33	/	100	7009,03	/	100	3
	2010	7890,74	/	100				
P-12-2/1	2009	4231,82	-1895,51	69,06	4660,13	-2348,91	66,49	6
	2010	5088,44	-2802,31	64,49				
NS-72	2009	5413,07	-714,25	88,34	5995,48	-1013,56	85,54	5
	2010	6577,88	-1312,86	93,36				
P-66-9/7	2009	8041,79***	1914,47	131,24	8183,33	1174,30	116,75	2
	2010	8324,87	434,13	105,50				
P-79-94	2009	5504,67	-622,66	89,84	5998,91	-1010,12	85,59	4
	2010	6493,15	-1397,59	82,29				
Prilep Basma 82	2009	7948,48***	1821,15	129,72	8568,20	1559,17	122,25	1
	2010	9187,93**	1297,19	116,44				

2009  
 LSD 0,05 = 898,08 €/ha\*  
 0,01 = 1241,97 €/ha \*\*  
 0,001 = 1716,51€/ha \*\*\*

2010  
 LSD 0,05 = 733,95 €/ha \*  
 0,01 = 1014,99 €/ha \*\*  
 0,001 = 1402,80 €/ha \*\*\*

The variety P-66-9/7 (8041,79 €/ha), was characterized by the highest gross income in the first research which showed a positive statistically highly

significant differences to the control and the lowest was shown in P-12-2/1 (4231,82 €/ha), which showed a negative highly significant differences to P-23.

In the second year, Prilep Basma 82 (€ 9187,93/ha) achieved the highest gross income, which is statistically a very significant positive difference compared to the control. The lowest income per hectare was obtained by P-12-2/1 (5088,44 €/ha), which is a highly significant negative difference to P-23 which has a gross cash income of € 7890,74 from ha. The average of two years showed that in the first place is Prilep Basma 82, in the second P-66-9/7, and the third place takes the control variety.

Besides soil and climatic conditions and farming practices applied which are important factors in the production of tobacco, we point out that the variety has a strong impact on the amount of the gross income per unit area or different genetic potential of the tested varieties dictates the yield and the quality.

## CONCLUSIONS

From two years of research on the economic evaluation of tobacco in tested varieties of the type Prilep we have brought the following conclusions:

- 1.The highest average yield of dry tobacco was achieved by the variety P-66-9/7 (3297 kg/ha), followed by Prilep Basma 82 (3252 kg/ha) and the control variety P-23 (2717 kg/ha). The lowest yield per unit area was achieved by P-12-2/1 (2165 kg/ha).
- 2.The average price per unit of tobacco in all varieties was quite high, which means that they had the raw material quality of oriental aromatic type. However, since the average price, economically an important parameter, is important for determining the gross income, Prilep Basma 82 (2,64 €/kg), stand out with the highest quality P-23 (2.58 €/kg) and P-66-9/7 (2.48 €/kg).
- 3.Gross income was the highest in varieties that had a higher yield per hectare and a better price per kilogram of dry tobacco. The largest gross income was recorded for Prilep Basma 82 (8568.20 €/ha), and the lowest for P-12-2/1 (4660.13 €/ha).
- 4.The general conclusion of our research on the subject varieties is that after deducting the total cost of tobacco production per unit area, the best financial impact producers would have from the varieties Prilep Basma 82, P-66-9/7 and P-23 that were ranked at the top three places.

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