

ECONOMIC EFFICIENCY OF THE ORGANIC PRODUCED GRAPES FROM VELIKA VARIETY DEPENDING ON SOIL SURFACE MAINTENANCE

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Abstract

During the period 2009 - 2011 economic analysis was made related to the biological production of table grape variety Velika becoming more popular in Bulgaria. This is an important moment in the practical orientation of farmers who decided to deal with the biological production of table grapes of this variety. Economic analysis shows that there are conditions for growing the Velika variety on such proposed technological solutions to bigger and larger areas. The increase of production and economic size of farms, which grow organic grapes, results in the provision of higher labor productivity by mechanization of the technological processes. Economies of scale are made to reduce the operating costs of growing vines. Production of large consignments of high quality is able to compete in the foreign markets. Environmental effect and production of healthy and safe food is aimed.

Keywords: economic efficiency, table grape producing, Velika variety

INTRODUCTION

During the last decade, the demand and supply for organic products has significantly increased, (Damari, 1997; Delbert, 2000; Hartwig de Haen, 1999; Richter et al., 2000; Schmid et al., 2000). A number of studies have been conducted in Europe and it can be summarized that there are three important areas which heavily impact on how the consumer perceives the food products, (Willer, 2000; Sedlo, 2000; Bazzocchi et al., 2000).

In the first place, this is the healthy food, even though this is a quite complicated concept with many conventions. Second, this is the concern about the risk of food contamination with agrochemicals. Thirdly, they are the issues and dangers of the negative influences of modern vineyards on the environment.

The market for organic products, including viticulture, marks the exceptional rates of development in the past few years (Vasileva et al., 2005). Compared to the general trend of decreasing, the harvested areas of table grapes in our country for the period 2001-2013, the areas and production of organic grapes, are growing continuously. This is also confirmed in the details from the previous 2 years presented statistically. Compared with 2011, vines plantation organically reared in 2012 have increased to about 600ha (with 41-44 %) respectively from 1455ha in 2011 to 2058ha in 2012. This is due to the increased consumer demand for healthy and safe food,

together with forced attitude towards the environment among the consumers. Essential for the sustainable development of organic grape production are questions about its efficiency. The purpose of this work is to identify the economic efficiency of the production of organic grapes from Velika variety, depending on the maintenance of the soil surface. The following major tasks are determined in this regard:

1. Detailed process maps have been developed for growing organic grapes, which show the specifics in different options.
2. A factual account of the cost of cultivation has been done of vines vineyards for each planned version and also the amount of the production of them.
3. Comparative assessment of the economic efficiency was carried out for organic table grapes by options.

MATERIALS AND METHODS

The studies were conducted in 2009-2011 in the vineyard Velika variety, which is organically grown but by different options of maintenance of the soil surface. The vineyard was planted in 2004 in the Village of Nayden Gerovo on an area of 0,45 ha. In the scheme of the experimental work are included 4 versions of maintenance of the soil surface:

V₀-Control - fertilization, combined with synthetic fertilizer (Basifertil) N: P: K 12:10:16 - 500 kg.ha⁻¹.

V₁ - mulching the soil surface with straw in quantities of 1 kg straw/1m². In the second half of June was made second strewing with the same amount of straw.

V₂ - grassed soil surface.

V₃ - application with manure. 40000 kg.ha⁻¹ well putrid cow manure was tabled.

The economic efficiency of the production of organic grapes from permanent fruity crop is established in different options by means of indicators:

- Production per unit of are (average yield)- kg/ha;
- Cost of total revenue per unit of area-BGN lv/ha;
- Cost of production (Total) in BGN lv/ha, including:
 - Material costs - BGN lv/ha
 - Labor costs - BGN lv/ha
 - Cost of price of production - BGN lv/kg;
 - Rate of (profitability) based on production costs) - %;
 - Net income (profit) per unit of area - BGN lv/ha

RESULTS AND DISCUSSION

It is very important for the practice to know what amount the economic outcome has, what amount the ultimate profit from the application of one or another technology for the growing of vines has? The applied ways of maintenance of the soil surface create real preconditions for modification of the chemical composition of the soil and generally on its fertility.

The results, presented in Tables 1 to 7 show the presence of significant changes in the values of the most important parameters that characterize the economic efficiency of the production of grapes. Definitely differences are observed in the size of the total production, which is 7.74 % higher in vines which are reared by conventional technology (V₀), compared to the other options of experience. In contrast to the option, fertilization with manure (V₃), this value is average for the period of the research. It is due to the synthetic fertilizers, which mineralize faster unlike the straw and the green manure, used in other variations in the assay. This reflects significantly to the level of the average yield. The highest average yield is received in the controlling option, and over the years, and so average during the period of the survey of the various options (from 12.23 % in Variant V₃ to 16.89 % in Variant

V₁). The level of purchased prices of production is influenced by the cost of the total revenue. The average purchasing prices hesitate per year and are directly related to the quality in the production, respectively, the degree of loading of the vines, expressed in the number of planned vine clusters. The higher growth of the average prices of biological options of grape production compensates the low yield. This has a good effect on both the general maintenance of production and the production costs (Table 5). As a result, the profitability of organic grapes in variants V₂ and V₃ is correspondingly with 13.87 and 14.78 points higher than the controlling version.

The comparative analysis shows that the level of the basic economic indicators, vary in a narrow range, and the last 2 versions (V₂ and V₃) are with slight differences between them (Table 5). In all options, the yield is high because the experiment is fulfilled with strict agro technical requirements for cultivation, which provide maximum manifestation of the biological potential of the vine and potential of the technology.

The resulting production is with average value in prices, based on tracking the prices for 4 years on the market place of Parvenetc. The value of the material costs is established on the basis of actual paid amounts for purchasing and their quantities by invoices. Labor costs are set by factual pay. They have been reduced to a minimum, due to the use of less manual labor in the various processes for mechanization in the soil treatment, which achieves sensitive economy of work. In all 4 versions of maintaining the soil surface V₀, V₁, V₂, V₃, the production costs are within the existing technological map. All this leads to a lower cost of production, which is in the range from 0.35 BGN lv in V₂ and in V₃ respectively 0.37 BGN lv in V₀ and in V₁ per kg. The difference in the cost of production of vines, grown under different methods of maintaining the soil surface, the high yield of grapes, the good selling price and reasonably low cost of production, are the factors that determine the highest profit, achieved during the 3 years of the study.

The profit per unit area in the options, fertilized with synthetic fertilizers is BGN 10980.22 lv/ha, and the rate of profitability -141.70 %. In the shade with use of manure, the profit amounts to BGN 10820.63 lv/ha, and the rate of profitability is 156.48 %. One of the reasons for this is the lower costs of manure compared to the synthetic fertilizer in control variant V₀.

In both variants, with grass and mulching with straw, the profit is BGN 9940.79 lv/ha for V₁. These values are lower with BGN 1030.43 lv/ha and BGN 1420.77 lv/ha than the control version

and with BGN 1270.18 lv/ha and BGN 870.84 lv/ha lower than the variant with manure.

Positive influence in this connection has had savings of agro technical operations in these options. In the variants with straw is carried out only 1 soil cultivation, but in the variant with grass mowing, it requires less cost of soil tillage. Under substantially equivalent conditions, the reduced maintenance of the production of organic grapes, should lead to increased economic result of its implementation. In this case, however, there should be considered a strong negative impact on the average yields. As we have already noted above, in

Variants V_1 and V_2 , they are lower, and this affects the amount of the total revenue and economic efficiency by options (Table 5). It should be noted and the fact, that the rise in the yield of the table grape production has limits in terms of production quality. In grape yield of about 20000 kg/ha is impossible to get a high percentage of grapes from class “extra”. According to the requirements of the Standard B-19, it should be considered the qualification of the grapes after harvest, as significant influence on the purchased prices of production.

Table 1
Economic efficiency in the production of grapes of the Velika variety fertilized with combined synthetic fertilizer (Basifertil) (V_0)

No	Indicators	Measure	2009	2010	2011	Average over three years
1	Average yield	kg/ha	19390	21320	22430	21040
2	Average selling price	lv/kg	0.93	0.91	0.86	0,90
3	Total value of production (Total revenue)	lv/ha	18030.27	19400.12	19280.98	19230.13
4	Production costs (Total) including	lv/ha	7780.65	8230.99	7750.05	7920.56
	Material costs	lv/ha	3960.79	3840.79	3680.79	3830.45
	Labor costs	lv/ha	3810.86	4390.20	4060.26	4090.10
5	Cost of production	lv/kg	0.40	0.38	0.34	0.37
6	Rate of return	%	131.58	135.45	158.09	141.70
7	Net income (Profit)	lv/ha	10240.62	11160.13	11530.93	10980.22

Table 2
Economic efficiency in the production of grapes of the Velika variety mulching the soil surface with straw (V_1)

No	Indicators	Measure	2009	2010	2011	Average over three years
1	Average yield	kg/ha	16340	18280	19390	18000
2	Average selling price	lv/kg	0.93	0.91	0.86	0,90
3	Total value of production (Total revenue)	lv/ha	15190.62	16630.48	16670.54	16160.88
4	Production costs (Total) including	lv/ha	6840.47	6550.61	6440.21	6610.43
	Material costs	lv/ha	3270.01	3140.01	3270.01	3220.67
	Labor costs	lv/ha	3570.46	3410.60	3170.20	3380.75
5	Cost of production	lv/kg	0.42	0.36	0.33	0.37
6	Rate of return	%	122,01	139.41	158.85	144.45
7	Net income (Profit)	lv/ha	8350.15	10070.87	10230.33	9550.45

The market for table grape is very demanding, the competition is high and that is why the farmers should turn towards the implementation of activities, which would reduce the amount of the grapes to levels that guarantee and enhance its quality. Such an opportunity is found by setting the second attempt by norming the number of clusters.

It is performed with the size of 10-12 mm of the grain, and it is providing a loan of the vines with 5, 8, 11 and 13 clusters. The obtained results from the second experiment indicates (Tables 6 and 7) that the load of vines with 8-10 clusters is achieved for over 80 % of class “extra” and after its harvest and

yield in both versions of the experiment is in within 10000-12000 kg/ha.

The production of organic grapes is highly efficient technology. It ensures a profit (net income) per unit of area in amount of BGN 6950.84 lv/ha and rate of profitability 109.64 % at load of 8-10

vine clusters. These results are achievable thanks to the qualities of Velika variety as an early ripening and large-fruited. The sales of products of table grape is practically guaranteed by the unlimited capacity of the domestic market and as well as the opportunities for export.

Table 3
Economic efficiency in the production of grapes of the Velika variety using growing grass soil surface (V₂)

No	Indicators	Measure	2009	2010	2011	Average over three years
1	Average yield	kg/ha	16620	18830	19110	18180
2	Average selling price	lv/kg	0.93	0.91	0.86	0,90
3	Total value of production (Total revenue)	lv	15450.66	17130.53	16430.46	16340.22
4	Production costs (Total) including	lv	6160.10	5990.44	7020.76	6390.43
	Material costs	lv	2830.04	2700.04	3450.30	2990.46
	Labor costs	lv	3330.06	3290.40	3570.46	3390.97
5	Cost of production	lv/kg	0.37	0,32	0.37	0.35
6	Rate of return	%	150.87	185.85	133.85	155.57
7	Net income (Profit)	lv/ha	9290.56	11140.09	9400.70	9940.79

Table 4
Economic efficiency in the production of grapes of the Velika variety using application with manure (V₃)

No	Indicators	Measure	2009	2010	2011	Average over three years
1	Average yield	kg/ha	18830	19550	20770	19710.66
2	Average selling price	lv/kg	0.93	0,91	0.86	0,90
3	Total value of production (Total revenue)	lv/ha	17510.19	17790.05	17860.22	17740.49
4	Production costs (Total) including	lv/ha	7860.71	6210.31	6670.57	6910.86
	Material costs	lv/ha	3960.31	2610.31	2610.31	3060.31
	Labor costs	lv/ha	3900.40	3600.00	4060.26	3850.55
5	Cost of production	lv/kg	0.45	0.32	0.32	0.35
6	Rate of return	%	122.59	186.33	167.57	156.48
7	Net income (Profit)	lv/ha	9640.48	11570.74	11180.65	10820.63

Table 5
Comparative economic efficiency of production of grapes of the Velika variety, average 2009-2011.

Variants	Indicators				
	Cost of production (lv/kg)	Rate of return (%)	Net income (lv/ha)	Production costs (lv/ha)	Total production (lv/ha)
V ₀	0.37	141.70	10980.22	7920.56	19230.13
V ₁	0.37	144.45	9550.45	6610.43	16160.88
V ₂	0.35	155.57	9940.79	6390.43	16340.22
V ₃	0.35	156.48	10820.63	6910.86	17740.49

Table 6
Economic performance of loading the vines with 8 clusters per plant (V₃)

No	Indicators	Measure	2011	2012	Average over two years
1	Average yield	kg/ha	10990	9160.9	10070.95
2	Average selling price	lv/kg	1.24	1.40	1.32
3	Total value of production (Total revenue)	lv/ha	13620.76	12830.66	13300.49
4	Production costs (Total) including	lv/ha	6860.57	5810.76	6340.65
	Material costs	lv/ha	2610.31	2010.31	2310.31
	Labor costs	lv/ha	4250.26	3800.45	4020.85
5	Cost of production	lv/kg	0.62	0.63	0.62
6	Rate of return	%	98.49	120.65	109.64
7	Net income (Profit)	lv/ha	6760.19	7010.9	6950.84

Table 7
Economic performance of loading the vines with 8 clusters per plant (V₀)

No	Indicators	Measure	2011	2012	Average over two years
1	Average yield	kg/ha	12270	11020	11640.51
2	Average selling price	lv/kg	1.24	1.40	1.32
3	Total value of production (Total revenue)	lv/ha	17170.80	15420.80	16300.30
4	Production costs (Total) including	lv/ha	7590.05	6880.59	7230.82
	Material costs	lv/ha	3280.79	2860.59	3070.69
	Labor costs	lv/ha	4300.26	4020.00	4160.13
5	Cost of production	lv/kg	0.62	0.62	0.62
6	Rate of return	%	126.30	124.05	125.18
7	Net income (Profit)	lv/ha	9580.75	8540.21	9060.48

CONCLUSIONS

The results of the economic analysis show that there are conditions for growing the Velika variety on such proposed technological solutions to bigger and larger areas. The increase of production and economic size of farms, which grows organic grapes, results in the provision of:

1. Higher labor productivity by mechanization of the technological processes.
2. Economies of scale by reducing the operating costs of growing vines.
3. Production of large consignments of high quality production, able to compete in the foreign markets.
4. Environmental effect and production of healthy and safe food.

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