EFICIENŢA ECONOMICĂ A PRODUCERII FRUCTELOR DE ZMEUR ÎN REPUBLICA MOLDOVA

ECONOMIC EFFICIENCY OF RASPBERRY FRUITS PRODUCTION IN REPUBLIC OF MOLDOVA

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Abstract

According to research carried out during the years 2003-2006, the results on economic efficiency of raspberry fruits production established that the average productivity of raspberry plants varies depending on the variety, from 5.5 (variety 'Barnaulscaia') to 12.3 t / ha (variety 'Pathfinder') corresponding to the profitability of production ranging from 41% to 215%. Raspberry varieties, giving lower yields of 4-5 t / ha are not profitable because the recovery costs exceed the economic life of plantations. Lowest capital investment payback period have the plantations of raspberry varieties 'Pathfinder' and 'Delbard Magnific', which can be done after 9 months of the first year and after 1.4 years of economic fruiting. The largest capital investment payback period has the variety 'Barnaulscaia', which is 4.8 years of economic fruiting. Duration of the economic exploitation of intensive fruit raspberry plantations is 8-9 years of economic fruiting.

Cuvinte cheie: zmeur, soiuri, producţia fructe, eficienţa economică, Republica Moldova.
Key words: raspberry varieties, fruits production, economic efficiency, Republic of Moldova**.**

1. Introduction

The effectiveness of capital investments in berry species crop under the climatic conditions of the Country is quite high when using highly productive varieties, optimal density of the plants, the structure suitable for plantations, administration of fertilizers in favorable terms and the use of other agro-technical measures necessary for intensive culture (mulching of the soil, or the mechanical harvesting of fruits).

Using optimally productive varieties, the return on capital investments can range between 2.3-2.5 years on raspberry (Barbaroş and Barbaroş, 2003).

A raspberry plant life is 10-15 years, but depending on the climatic conditions this period may change considerably. Planting raspberry after raspberry is not recommended, the recommended return of the given culture is only after 5-6 years (Colontaevscaia, 1981).

For the production of berries a significant investment compared to other fields is required. Expenses on producing berries are very diverse and are calculated according to technological descriptions (estimate - frame), which include plantations, their care until the entrance on the harvest, care during fructification, organization of harvesting and trading (Hromenco and Vorobiev, 2013).

Growing shrubs is rewarded in particular due to the substantial revenue that the growers receive. The highest income may be obtained by cultivating raspberry, blackberry, currant and gooseberries, due to the particularly stimulative delivery prices (Mladin and Mladin, 1992).

The sum of direct and indirect costs, on the establishment of fruit plantations, calculated from 1 ha for each species, represents private capital investments, such as black currant and raspberry, depending on the planting distance of plants, varies between 87.1-101.9 thousand lei and 128.5-143.3 thousand lei (Mladinoi, 2006).

At the establishment of new plantations of berry cultures, 73% of expenses are assigned to the materials, of which 39% is the cost of planting materials and 28% for the mineral fertilizers, to the work remuneration go just 5% of expenses, of which more than half go to the technical maintenance and current repairs (Hromenco and Vorobiev, 2013).

The aim of this work was aimed at assessing the productive and economic potential of raspberry varieties studied in order to highlight the most productive and economically efficient for Republic of Moldova.

2. Material and methods

The investigations were aimed to assessing the productivity and economic efficiency of raspberry plantations for obtaining fruits, which were set up with different varieties in the experimental field at Horticulture Research Institute in the period 2003 - 2006. After the planting distance 2.5 x 0.5 m were

appreciated varieties: 'Barnauliscaia', 'Indian Summer', 'Delbard Magnific', 'Stolicinaia', 'Kirjaci', 'Pathfinder', 'President', 'Kuthbert', 'Rubin, 'Hybrid Bulgarian', 'June', Marfilk, 'Kobfuller', 'Cayuga, 'Malling Promise', 'Solnashco, Lazarevscaia', 'Balsam', 'Brigantina', 'Meteor', 'Red Wadenswil', 'Lloyd George', 'Rubin Bulgăresc', 'Paul Camerzind', 'September', 'St. Walfried', 'Taylor', 'The Latham', 'Malling Jewel'.

The variety Barnauliscaia is approved in Republic of Moldova and was taken as control.

Raspberry varieties were studied in new cultivation conditions appreciating their productivity and economic efficiency.

Research of economic efficiency of raspberry fruits production were performed according to economic and statistical methods, relative sizes and average for comparing, traditional methods recognized and used to assess economic efficiency in agriculture, in which it was established: the volume of invested capital, costs incurred, the yield and profit, the return of invested capital and profitability of production.

3. Results and discussions

Productivity and fruit quality of different raspberry varieties depends on rainfall, on the temperatures the plants are exposed to during the year, and the resistance characteristic of each variety. A lot of factors leave their fingerprints on the harvest and fruit quality as: applied technology, environmental conditions, variety, age, plantation, etc. During dry climate research has allowed us to highlight the most resistant varieties namely for the new cultivation conditions.

The research, carried out during 2002-2006 on raspberry varieties under new and dry conditions of cultivation, allowed to highlight their main qualities, including the productive potential, and the obtained results are shown in Table 1.

A variety of raspberry, besides the fact that it must meet the quality requirements of the market, must be also productive. Proceeding from the average results obtained, the most productive varieties are: 'Pathfinder' with a yield of 12.3 t / ha, 'Lloyd George' - 9.9 t / ha, 'Chirjaci' - 9.4 t / ha, 'Delbard Magnific' and 'Stolicinaia' - 9.3 t / ha as compared with the control variety 'Barnauliscaia' - 5.5 t / ha.

The average harvest of raspberry fruits obtained per hectare during the study period, reached minimum values of 3.2 t / ha for the variety 'Kuthbert' in 2003, and maximum values of 18.5 t / ha for the variety 'Pathfinder' in 2006.

Research conducted on raspberry culture were extended to basic indicators of economic efficiency as: cost of production, including capital investments and expenses on maintenance of the plantations in harvest, unit cost, profit per 1 ha or 1 t of fruit, the size of the harvest profitability of production, gross for 1 leu of capital investment, capital investment recovery period, the results of which are shown in tables 2 and 3.

The results reported in Table 2 confirms that capital investments made since the establishment of the raspberry plantation vary with variety and productivity, and amounted to 154.5 thousand lei / ha. The average of annual profit is maximum for the varieties 'Pathfinder' and 'Delbard Magnific', worth 164.2 and 105.5 thousand lei / ha, which reduced simultaneously with the decrease in the crop for the variety 'Barnaulscaia' - 31.3 thousand lei / ha, and lowest value for the variety 'President' - 3.9 thousand lei / ha.

The highest average annual profit on 1 leu of capital investment - 1.06 is for the 'Pathfinder' variety (remontant) and 0.68 lei for the variety 'Delbard Magnific' (a single fruiting type), for the control variety 'Barnaulscaia' - 0.20 lei. The lowest profit on 1 leu of investment was calculated for the variety 'President' - 0.02 lei.

The lowest capital investment payback period have the plantations of 'Pathfinder' varieties, which can be done properly after 9 months of the first year and 'Delbard Magnific' after 1.5 years of economic harvest. The largest capital investment payback period is for the variety 'Barnaulscaia', which is 4.8 years of economic harvest. Raspberry varieties, giving lower yields of 4-5 t / ha are not profitable because the recovery period may reach 39,6 years, which exceed the economic life time of fruit raspberry plantation that is only 8-9 years of economics fruiting (Figure 1).

According to the data presented in Table 3, the economic indicators established for the control variety 'Barnauliscaia' were influenced by the obtained harvest, being 5.5 t / ha and production value of 110 thousand lei, and of the very low cost of production - 40%. Production expenses incurred are the same for all varieties. The unit cost per hectare for the variety of low productivity is highest - 14 320 lei / ha, while profit per hectare and 1 tone of fruit is the lowest corresponding respectively - 31.3 and 5.7 thousand lei / 1 t of fruits.

With increasing of the raspberry fruits crop per hectare, consequently the profit increases, and the profitability of the production is rising up. The biggest profit from 1 ha of plantation was obtained for variety 'Pathfinder' with the highest productivity, which amounted to 164.2 thousand lei / ha, and the profit for 1 t fruits amounted to 13 300 lei, corresponding and the profitability reached maximum values of 201%, while the cost unit of production per hectare is the lowest - 6650 lei / ha. Raspberry varieties, giving lower yields, i.e. less than 4-5 t / ha ('President' - 4.1 t / ha) are not cost effective because the recovery costs exceed the economic life of fruit plantations.

4. Conclusions

According to research carried out it was established that:

The average productivity of raspberry plants varies depending on the variety from 5.5 (variety 'Barnaulscaia') to 12.3 t / ha (variety 'Pathfinder'), correspondingly profitability of production ranged from 40% to 201%.

The lowest capital investment payback period is for plantations of raspberry varieties 'Pathfinder' and 'Delbard Magnific', which can be done properly after 9 months of the first year and after 1.4 years of economic fruit.

The largest capital investment payback period is for the variety 'Barnaulscaia', which is 4.8 years of economic harvest.

Raspberry varieties, giving yields lower than 4-5 t / ha are not profitable because the recovery costs exceed the economic life of plantations (39,6 years).

Economic life of the raspberry fruit plantations is 8-9 years of economical harvest.

References

1. Barbaroş, M., Barbaroş, Nadejda, 2003. Eficienţa economică a producerii fructelor în plantaţiile pe rod a speciilor bacifere. Simp. Șt. Internaţional. Hortic. Silvic. şi protecţia plantelor. Chişinău, p.86-88.
2. Colontaevscaia, L. 1981. Iagodnichi Zapadnogo Cazahstana. Alma – Ata, Cainar, s.3-14.
3. Mladinoi, V. 2006. Cercetări în pomicultură. Chișinău, vol.5, p.62-69.
4. Mladin, Gh., Mladin, Paula. 1992. Cultura arbuştilor fructiferi pe spaţii restrînse. Editura Ceres, București, p.112-114.
5. Hromenco, V., Vorobiev, V. 2013. Tehnologhiceschie zatratî i economicescaia efectivnosti vîraşcivania iagodnîh culitur. Sadovodstvo i Vinogradarstvo, nr. 2, s.44-48.

Tables and figures

Table 1. Fruit production of raspberry varieties, IŞPHTA Chişinău, t / ha

Variety	2003	2004	2005	2006	Average
1. Barnaulscaia	4.2	5.5	5.1	7.1	5.5
2. Indian Summer	6.4	6.9	7.6	8.0	7.3
3. Delbard Magnific	7.3	8.7	9.5	11.4	9.3
4. Stolicinaia	9.0	8.4	9.7	10.1	9.3
5. Chirjaci	11.9	9.4	8.6	7.5	9.4
6. Pathfinder	6.9	11.2	12.7	18.5	12.3
7. President	4.8	2.7	-	5.0	4.1
8. Kuthbert	3.2	6.2	6.5	7.1	5.8
9. Rubin	5.6	7.2	8.0	8.4	7.3
10. Hybrid Bulgarian	7.7	8.6	9.4	-	8.6
11. June	3.9	2.6	2.8	5.5	3.7
12. Marfilk	7.3	7.9	-	9.3	8.2
13. Kobfuller	4.6	6.2	6.9	7.3	6.3
14. Cayuga	-	4.8	-	6.0	5.4
15. Malling Promise	8.9	9.1	7.6	9.2	8.7
16. Solnashco	7.2	6.4	8.0	10.5	8.0
17. Lazarevscaia	5.2	5.6	6.4	8.9	6.5
18. Balzam	6.6	6.2	8.2	9.6	7.7
19. Brigantina	5.0	5.2	5.6	8.0	6.0
20. Meteor	4.3	4.0	4.6	6.1	4.8
21. Red Wadenswil	5.9	6.2	7.6	8.7	7.1
22. Lloyd George	7.8	9.5	10.8	11.4	9.9
23. Rubin bulgarian	5.6	6.6	6.7	8.0	6.7
24. Paul Camerzind	3.3	6.3	7.1	8.1	6.2
25. September	4.7	5.6	6.4	7.0	5.9
26. St. Walfried	4.5	6.9	8.1	8.9	7.1
27. Taylor	5.8	7.3	7.2	8.4	7.2
28. The Latham	6.2	8.1	9.5	9.7	8.4
29. Malling Jewel	7.1	8.2	8.7	-	8.0
Average	**6.10**	**6.81**	**7.67**	**8.66**	**7.27**
Variation limit	**3.2-11.9**	**2.7-11.2**	**2.8-12.7**	**5.0-18.5**	**4.1-12.3**
LDS 05	**2.34**	**2.39**	**2.59**	**3.68**	

Table 2. The economic efficiency of capital investments in raspberry plantations in harvest depending on the variety, the years 2002- 2006

Variety	Total capital investment [lei/ha]	The average annual profit, [lei/ha]	Profit on 1 leu of capital investment, [lei]	The return on capital investments, [years]
President	154.5	3.9	0.02	39,6
Barnauliscaia (Control)	154.5	31.3	0.20	4.9
Rubin bulgarian	154.5	54.7	0.35	2.8
Delbard Magnific	154.5	105.5	0.68	1.5
Pathfinder	154.5	164.2	1.06	0.9

Table 3. Economic efficiency of raspberry fruits production by variety, planting distance, average for the years 2002 - 2006

Variety	Average production, t/ha	Production value K lei/ha	Production expenses, K lei/ha	Unit cost, K lei/ha	Profit, K lei/ha		Profitability of production,%
					for 1 ha	for 1 t of fruits	
President	4.1	82.00	78.12	19.05	3.9	1.0	5
Barnauliscaia	5.5	110.00	78.75	14.32	31.3	5.7	40
Rubin bulgăresc	6.7	134.00	79.29	11.83	54.7	8.2	69
Delbard Magnific	9.3	186.00	80.46	8.65	105.5	11.3	131
Pathfinder	12.3	246.00	81.81	6.65	164.2	13.3	201

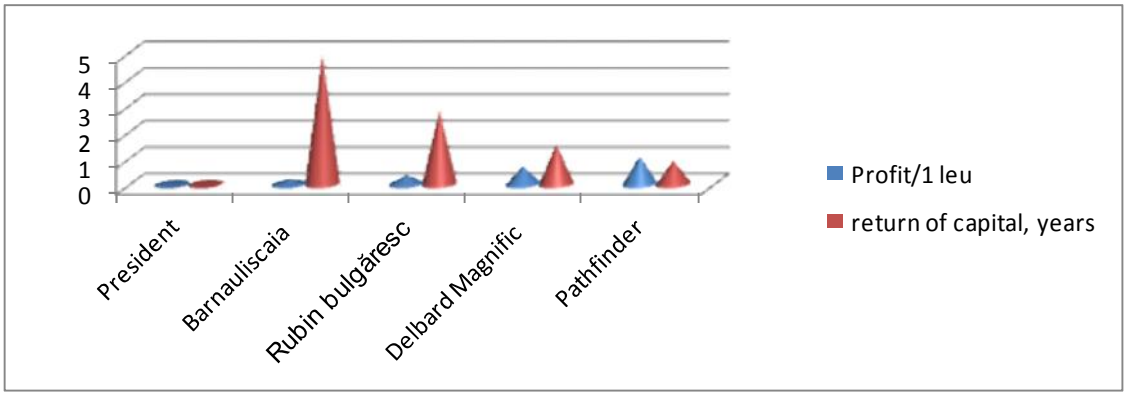

Fig. 1. Evolution of profit and return on invested capital of some raspberry varieties

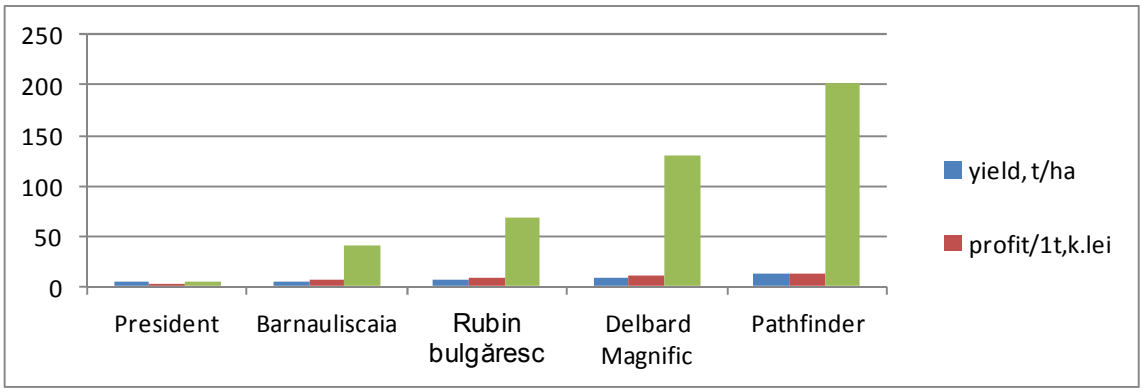

Fig. 2. Evolution of correlation between fruit harvest, profit and profitability of fruit raspberry production