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PROFITABILITY OF POLESIE RASPBERRY PRODUCTION¹

OPLACALNOŚĆ PRODUKCJI MALIN ODMIANY POLESIE

Key words: raspberries yield, costs, gross margin

Słowa kluczowe: plon malin, koszty, nadwyżka bezpośrednia

JEL codes: Q1, Q14

Abstract. The purpose of the study was to determine the profitability of production of Polesie raspberries in the period of 2016-2017. Data concerning raspberry cultivation came from a farm located in the Łuków Commune. The profitability of cultivation was determined on the basis of standard gross margin (SGM). In the analyzed farm, greater yield of raspberry fruits was obtained in 2016 than in 2017, which was reflected in the financial result. The value of the Standard Gross Margin was, respectively, PLN 11,675 per ha in 2016 and PLN 5,875 per ha in 2017. The obtained financial result indicates that raspberry production in the analyzed farm in 2016-2017 was profitable.

Introduction

Poland is the leader in the global production of raspberries. The greatest share in the surface area of cultivation of this plant in the world is found in Russia – 25.1%, followed by Poland – 18.7%, as well as Chile – 14.0%, Serbia – 13.4% and the USA – 6.6% [Paszko et al. 2016]. In Poland, raspberry production has for many years demonstrated growth trends, and since the beginning of the 1990s, the area of cultivation has increased by almost 3 times, amounting in 2016 to 29282 ha, with raspberries being grown in the Lublin Province on a surface of 20782 ha. For many years, the Lublin region has maintained its position of the national leader in production of berries, particularly raspberries [GUS 2017b]. In 2016, raspberry production in the Lublin Province constituted 82.8% of the total national production of fruits of this plant [US 2017]. The area of one plantation ranged from 0.4 ha up to 10 ha. These were predominantly field cultivations established in individual farms. Varieties bearing fruit on new shoots were mainly grown, the so-called fall varieties - fruits are harvested from August until the first ground frosts [Król 2012]. From among the fall varieties, the most popular and well-regarded by producers are such varieties as: Polesie, Polana and Polka, which are fertile varieties and their fruits are large, tasty and aromatic. An advantage of these varieties is the extended harvest period, occurring in fall, when no other fresh berries are sold any more. Furthermore, the fruits are suitable for mechanical harvesting, endure transport well, and – apart from their dessert qualities – are also a valuable raw material in the processing industry [Stępka 2012]. In Poland, most raspberries are managed through processing and used for frozen food and concentrate production [Król 2012, Baranowska, Zarzecka 2014, GUS 2017a]. A large quantity of raspberries is also exported, mainly to Belgium, the Netherlands and Germany [Hodór 2017].

However, raspberry cultivation in Poland involves a big production risk resulting from the variability of selling prices of fruit and means of production [Paszko 2006]. In the opinion of

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Dariusz Paszko et al. [2016], there are economic fluctuations on the raspberry market that are characterized by significantly longer periods of high prices (4-5 years) and shorter periods of low prices (no more than 2-3 years). In the opinion of the author, the causes for the large cyclical fluctuations are complex and result from a variety of factors. One of them may be the production level of frozen food products and concentrate, as well as the inventory balance in processing plants.

That is why, in raspberry production, it is important to conduct a detailed analysis of the market and its needs as well as the issues of economic account. The purpose of the study was to determine the profitability of production of Polesie raspberries in two subsequent years of cultivation on the basis of Standard Gross Margin (SGM).

Material and research methodology

The data come from a farm, where the Polesie fall variety of raspberries was grown in the period of 2016-2017. The farm is situated in the village of Kownatki in the Łuków Commune in the Lublin Province. The plantation, with a total area of 1.0 ha, was established on soil of class IVa and IVb. The Polesie variety was entered into the National Register (KR) in 2006. The variety grower is the Fruit Experiment Station of the Horticulture Institute in Brzezna (Sadowniczy Zakład Doświadczalny Instytutu Ogrodnictwa). Shrubs of this variety may be grown without supports, are characterized by balanced growth, and are resistant to diseases. The fruit ripening usually starts in the third decade of July and lasts until the beginning of October. Fruits are large, heart-shaped, dark red, and tasty. They are appreciated in the processing industry, but they also may be used for direct consumption (dessert fruit) [www.brzezna.pl].

In fall, fertilization was applied using phosphorus 100 kg/ha P_2O_5 and potassium 150 kg/ha K_2O . In spring, nitrogen fertilization in the quantity of 100 kg N/ha (divided doses), as well as magnesium fertilization 120 kg/ha MgO. During the vegetation period, plants had foliar preparations applied: Bormax in a dose of 1 l/ha, and Rosasol 19-19-19 (+5.8) + micro-ingredients in a dose of 4 kg/ha. The plantation was protected against weeds using the following preparations: Devrinol 450 SC at a dose of 4 l/ha, Stomp Aqua 455 CS at a dose of 3 l/ha, and Fusilade Forte 150 EC at a dose of 1 l/ha. To protect the plantation against diseases, the following were applied: Switch 62.5 WG at a dose of 0.8 kg/ha, Signum 33 WG at a dose of 1.8 kg/ha, Mythos 300 SC at a dose of 2.5 l/ha, as well as Polyversum WP at a dose of 0.2 kg/ha. Pests were eliminated using the following insecticides: Mospilan 20 SP at a dose of 0.2 kg/ha, Safran 018 EC at a dose of 0.5 l/ha, Sekil 20 SP at a dose of 0.2 kg/ha.

Raspberries were harvested manually in the phase of full technological maturity of fruits, from the third decade of July to the first decade of October. In 2016, one hectare yielded 7859 kg of fruits. On the other hand, in 2017, the yield was lower and amounted to 6294 kg/ha. The direct costs included the costs of saplings, of mineral and foliar fertilizers, plant pesticides, costs of manual harvest of raspberries, as well as other crop-specific costs (insurance costs, costs of crop-specific services, hiring for crop-specific works). Direct costs were calculated on the basis of actual consumption of means of production [Muzalewski 2008]. The value of raspberry crops was calculated on the basis of the product of the harvested yield and the selling prices of fruits. The profitability of growing 1 ha of raspberries was defined using the category of Standard Gross Margin (SGM), constituting the difference between the market value of the yield and direct costs covering consumption of materials and crop-specific costs [Augustyńska-Grzymek et al. 2009].

Research findings

The profitability of raspberry production is determined by: size of harvested yields, selling price of fruit and incurred costs [Paszko 2006]. In the analyzed farm, a bigger raspberry yield was obtained in 2016 than in 2017, which was reflected in the financial result (tab. 1 and 2).

The size and quality of yields of raspberries were influenced by weather conditions. The vegetation season of 2016 was characterized by temperature and humidity conditions favorable for the growth and development of raspberry shrubs [GUS 2016]. On the other hand, in 2017, the agrometeorological conditions were unfavorable for obtaining high yields of good quality; they fostered the occurrence of diseases and pests, as well as hindered correct protection of the plantation against pests. The spring ground frosts contributed to the reduction in yields, particularly of fall raspberry varieties [GUS 2017a].

In the opinion of D. Paszko et al. [2017], a good alternative to horticultural farms wanting to improve the effectiveness of production and the farm's competitiveness may be growing raspberries under covers. However, the authors emphasize that the production technology is very capital-intensive, requires knowledge, experience and external professional consulting.

Table 1. Economic effect of growing 1 ha of Polesie raspberries in 2016

Tabela 1. Efekt ekonomiczny uprawy 1 ha malin odmiany Polesie w 2016 roku

Specification/Wyszczególnienie	Value/Wartość [PLN]	Costs structure/Struktura kosztów [%]
Direct costs/Koszty bezpośrednie:		
Purchased saplings/Sadzonki z zakupu	1 400	5.5
Mineral fertilizers/Nawozy mineralne	2 200	8.6
Foliar fertilizers/Nawozy dolistne	215	0.8
Pesticides/Środki ochrony roślin	2 180	8.5
Manual harvest of raspberries/Zbiór ręczny malin	8 830	34.6
Other crop-specific costs/Inne koszty specjalistyczne	10 750	42.0
Total direct costs per 1 ha/Ogółem koszty bezpośrednie na 1 ha	25 575	100.0
Value of raspberry yield/Wartość plonu malin	37 250	-
Gross margin/Nadwyżka bezpośrednia	11 675	-

Source: own study

Źródło: opracowanie własne

Table 2. Economic effect of growing 1 ha of Polesie raspberries in 2017

Tabela 2. Efekt ekonomiczny uprawy 1 ha malin odmiany Polesie w 2017 roku

Specification/Wyszczególnienie	Value/Wartość [PLN]	Costs structure/Struktura kosztów [%]
Direct costs/Koszty bezpośrednie:		
Purchased saplings/Sadzonki z zakupu	1 400	6.7
Mineral fertilizers/Nawozy mineralne	2 135	10.3
Foliar fertilizers/Nawozy dolistne	215	1.0
Pesticides/Środki ochrony roślin	2 145	10.3
Manual harvest of raspberries/Zbiór ręczny malin	8 560	41.1
Other crop-specific costs/Inne koszty specjalistyczne	6 350	30.6
Total direct costs per 1 ha/Ogółem koszty bezpośrednie na 1 ha	20 805	100.0
Value of raspberry yield/Wartość plonu malin	26 680	-
Gross margin/Nadwyżka bezpośrednia	5 875	-

Source: own study

Źródło: opracowanie własne

When analyzing direct costs, it was observed that crop-specific costs were relatively the largest item in the total costs and amounted in 2016 to PLN 10750 per ha (tab. 1) and in 2017 to PLN 6350 per ha (tab. 2). The differences in incurred costs were caused by adverse weather conditions in 2017, shorter vegetation period, as well as smaller number of agrotechnical treatments performed on the raspberry plantation. A significant spot within the structure of direct costs was also taken by costs of hiring workforce for manual harvest of fruits, which amounted to, respectively: PLN 8830 per ha in 2016 and PLN 8560 per ha in 2017 (tab. 1 and 2). In the opinion of Zbigniew Kowalczyk [2006], labor costs in Polish horticultural farms are very high, on average three times higher than in farms conducting typical agricultural production. This is associated with the cultivation size (the average acreage amounts to 0.8 ha) with low degree of mechanization of works, mainly related to maintenance of the plantation, harvest, as well as preparation for sale and the sale of fruit itself. The indicator of work mechanization in raspberry production usually does not exceed 10%; for comparison, in gooseberry production, it amounts to 54%. In the opinion of the author, from among all horticultural cultivations, raspberry production is characterized by the largest labor input (on average, 1978 manhours/ha). Furthermore, production technologies used in horticultural farms differ in the type of activities performed and practices, as well as in the degree of their mechanization, which, in turn, affects labor-intensity of production.

The cost of buying plant pesticides and mineral fertilizers in the analyzed farm in the period of 2016-2017 reached a similar level (tab. 1 and 2). In the opinion of Paweł Krawiec [2012a], a favorable practice for plantations of raspberry bushes repeatedly bearing fruit is covering the raspberry rows with non-woven crop cover. This procedure limits the development of diseases, especially fungal diseases, positively affects plant growth and size of yields. In the opinion of the author, a practice favorable for raspberry plantations is also fertigation, namely integration of plantation fertilization with irrigation. Fertigation causes even delivery of nutrients directly to the root zone and quicker response of plants to fertilization. Furthermore, this procedure limits the use of machines and fuel consumption [Krawiec 2012b].

In the analyzed farm, the value of Polesie raspberry yield amounted to: PLN 37250 per ha in 2016 and PLN 26680 per ha in 2017. The obtained gross margin indicates that raspberry production in the period of 2016-2017 was profitable.

Conclusions

Raspberry fruits are a valuable source of nutritional and treatment substances. They are suitable for direct consumption and are also a very good raw material for the processing industry. Polish raspberry fruits enjoy the interest of buyers in the countries of the EU and all over the world. Currently, we can observe their consistent production growth and increased international turnover of this fruit. However, raspberry is a plant difficult to grow, and its production profitability depends on many economic and climatic factors, as well as on individual decisions made by each producer. In the opinion of Mariusz Hamulczuk and Stanisław Stańko [2011], the specific character of gardening production results in the fact that some time passes between the decision to start a given production and the appearance of fruit on the market. Therefore, production is planned on the basis of the current situation (it is a naive behavior model) or the past and current situation (adaptive behavior model), or on the basis of the past and current situation as well as expectations for the future (rational behavior model). Furthermore, the shaping of prices of agricultural raw materials is a result of not only the demand and supply relations in a particular country, but also the impact of the situation on the key world markets. Therefore, the analysis of market needs, as well as optimization of costs related to the production of raspberries should be carried out systematically.

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Streszczenie

Celem artykułu jest określenie opłacalności produkcji malin odmiany Polesie w latach 2016-2017. Dane dotyczące uprawy malin pochodziły z gospodarstwa rolnego położonego w gminie Łuków. Opłacalność uprawy określono na podstawie Standardowej Nadwyżki Bezpośredniej (SGM – Standard Gross Margin). W analizowanym gospodarstwie większy plon owoców malin uzyskano w 2016 roku niż w 2017 roku, co znalazło odzwierciedlenie w wyniku finansowym. Wartość Standardowej Nadwyżki Bezpośredniej wyniosła odpowiednio 11 675 zł/ha w 2016 roku i 5875 zł/ha w 2017 roku. Uzyskany wynik finansowy wskazuje, że produkcja malin w analizowanym gospodarstwie rolnym w latach 2016-2017 była opłacalna.

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