

## TEHNOLOGII DE CULTIVARE A AGRİȘULUI ȘI EFICIENȚA ECONOMICĂ A PRODUȚIEI DE FRUCTE CULTIVATION TECHNOLOGIES OF GOOSEBERRY AND FRUITS PRODUCTION ECONOMIC EFFICIENCY

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### Abstract

The paper presents the results obtained in the study of different cultivation technologies for the production of fruit according to the cultivated varieties, the maintenance conditions, and the density of the plant placement and the evaluation of their economic efficiency. The appreciation of the cultivation technologies of the gooseberry varieties was conducted based on the productivity obtained from the plantations without irrigation: from 1.6 t / ha for the 'Grușenca' variety to 15.7 t / ha for the 'Severnâi Captain' (the planting distance of 2.5 x 1.0 m, 2002-2006) and with irrigation, the harvest ranging from 7.4 t / ha to the 'Grușenca' variety to 19.5 t / ha in the 'Captivator' variety (planting distance of 1.5 x 1, 0 m, years 2007-2010). The profitability of non-irrigated field fruit production ranged from 35% to 172%, and yields on irrigated land ranged from 69% to 198% depending on the variety. The recovery period of the capital investments made in the setting up of gooseberry plantations without irrigation, depending on the variety, varies between 1 and 7 years, and the super-crammed with irrigation - between 0.6-3 years.

**Cuvinte cheie:** agriș, soiuri, producție de fructe, eficiența economică, rentabilitate.

**Key words:** gooseberry varieties, fruits production, economic efficiency, profitability.

### 1. Introduction

Gooseberry is a fruit-growing species appreciated due to the nutritional, technological and commercial properties of fruits and biological properties to capitalize on a wide variety of pedo-climatic conditions, which bear fruits early and are most productive among fruit trees. Depending on the variety, its productivity may reach 20 t/ha in the case of compliance with the maintenance of agro-technical measures (Grădinariu et al., 2009; Mladin et al., 1992). It can be cultivated according to different technologies, which are selected according to variety, planting distance, maintenance system, etc. The industrial plantations of gooseberries are set up according to the applied technology, the properties of the variety, the conditions of maintenance, the purpose of planting, etc. Depending on the way of maintenance, the planting distances can be the following: 2.5x0.75 m-5333; 2.5x1.0 m-4000 pl/ha; 2.5x1.25 m-3200 pl/ha; 2.5x1.5 m-2670 pl/ha; 3x0.7 m-4762 pl/ha; 3x1 m-3333 pl/ha; 3x1.25 m-2660 pl/ha; 3x1.5 m-2220 pl/ha. In individual small plantations, where the aisle is not mechanical worked, can be used for small distances 1.5-1.8 x 0.5-0.75-1.0m. The varieties, which have compact bushes, are placed more cramped in comparison to varieties of spread-out bushes (Sava, 2014). Gooseberry is able to produce high yields on non-irrigated land (13-20 t/ha), but on irrigated land the average yield can reach 27.3 t/ha (Sava, 2005). The economic importance of gooseberry represents the considerable productive potential of varieties grown in our country, the high level of profitability of fruit production. According to the conception and the program for the sustainable development of the fruit growing, along with the expansion of the surface it is expected to increase the yield of the berry plantations up to 8.0 t/ha and more (Mladinoi, 2007).

### 2. Material and methods

The object of the investigations was the appreciation of the technologies for cultivating the fruits and the productivity of the gooseberry varieties in non-irrigated plantations at the planting distance of 2.5 x 1.0 m (regular system - witness, years 2002-2006); and with irrigation at the planting distance of 1.5 x 1.0 m (intensive system, years 2007-2010) and appreciation of economic efficiency. The researches were carried out according to biometric, statistical, economic, comparative methods, economic analysis, etc.

### 3. Results and discussions

Gooseberry culture can be highly effective in case of concentration of surfaces, introducing more advanced production technology, irrigation and specialization of the branch to fruit production. The basic indicator for estimating the use of a crop species or culture system in production is the economic efficiency of fruit production, which depends on plant productivity, cost price, profit, etc. (Barbaros et al., 2003).

The establishment of intensive gooseberry plantations, the use of varieties of performance, disease-resistant, low degree of thorns, high-yielding and quality fruit, with the application of irrigation, allow for increased harvests and high yields of production. Data obtained regarding soil influence, planting distance, maintenance conditions in different cultivation technologies (Fig. 1).

The varieties of 'Gruşenca' and 'Captivator' are influenced most by the variety's capacities, the conditions of cultivation and the degree of adaptation to the new cultivation conditions. The conditions under which these varieties were studied proved to be more drought compared to the conditions for which they were created and their harvest obtained in the case of irrigation is growing, respectively, by 4.6 times for 'Gruşenca' variety (1.6 - 7.4 t / ha) and 3.5 times for 'Captivator' variety (5.5 - 19.5 t / ha), compared with their cultivation without irrigation.

The economic efficiency of the production of gooseberry fruits is strictly dependent on plant productivity, variety and planting distance. Increasing the number of plants per unit area increases production costs, but after reporting them to a unit of product, it is possible to reduce the cost price of the plant, which contributes to a profitability of up to 125 % (Sava, 2012).

Among the gooseberry varieties studied, the most adaptable and least influenced by the cultivation conditions proved to be 'Severnâi Captain', the harvest of which in favorable conditions grows only 1.2 times compared to other varieties.

Gooseberry plantations, just like all perennial fruit plantations are part of the fixed means of production because they operate in the production cycle during the exploitation, they pass a part of their cost to the obtained product, thus recovering by the depreciation rate. The real capital investments for the establishment of gooseberry plantations in intensive system can reach about 190 thousand lei per hectare, and in the usual system - 135 thousand lei/ha. Surveys over the past few years confirm that the gooseberry fruits production as a whole is a profitable business.

The average annual profit is the highest on 'Severnâi Captain' at both planting schemes, the values of which reach 178.5 thousand lei/ha and 233.2 thousand lei/ha, and decrease with the reduction of the varieties productivity to 24.36 thousand lei/ha and 54.55 thousand lei/ha. The 'Gruşenca' variety could not adapt to the new cultivation conditions that are too dry for it, and without irrigation it yields low, that the crop cannot generate profit, but only costs that cannot be recovered. The average annual profit per 1 leu of capital investments at the planting distance of 2.5 x 1.0 m (without irrigation) varied between 0.14 - 1.33 lei, and at a distance of 1.5 x 1.0 m (with irrigation ) increases from 0.34 lei to 2.04 lei.

For the entire duration of the exploitation of the gooseberry plantation, the profit obtained leads to a recovery period of the investment in 5.1 years (Sumedrea et al., 2014). The increase in the profit obtained from the fruits production of different gooseberry varieties and in different cultivation conditions leads to the decrease recovery period of the capital investment. The recovery of the capital investments made at the establishment of the gooseberry plantations according to the variety at the planting distance of 2.5 x 1.0 m without irrigation varies between 1 and 7 years, and in the super-crammed with the planting distance of 1.5 x 1,0 m with irrigation varies between 0.6-3 years (Fig. 2).

Production costs include real capital investment and maintenance costs for fruit plantations, cost price, and profit per 1 ha, profit per 1 t of fruits, profitability of production. The average fruit harvest obtained from the varieties studied at the start of the plantation without irrigation with the planting distance of 2.5x1.0 m varied between the values of 1.6-15.7 t/ha and with the value of the obtained production respectively between 63.46 and 104.1 thousand lei/ha. The cost of production per hectare for the 'Gruşenca' variety, with a low productivity, is the highest - 39.67 thousand lei/ha and the profit per hectare and 1 ton of fruit, respectively, only generates expenses and is therefore not profitable to be cultivated. With the increase of the production of gooseberry fruit per hectare, the profit per hectare increases from 24.36 to 178.5 thousand lei/ha, at 1 t of fruit from 4.68 to 11.37 thousand lei/ha, and yields ranged from 35% to 172% depending on the variety.

In the irrigated plantation, established with a planting distance of 1.5 x 1.0 m, the value of the production obtained from the same variety of gooseberry is higher and varied between 7.4-19.5 thousand lei/ha and the value of this production between 133.2-351.0 thousand lei/ha, respectively the production costs increased from 78.65 to 117.79 thousand lei/ha. The cost price of fruit production decreases, and the profit and profitability respectively increases. Thus, the profitability of the gooseberry fruits production increased from 69 % to 198 % respectively.

The comparative analysis of the profitability of fruit production to the different gooseberry varieties, different planting distances, intensive and regular cultivation, with and without irrigation is shown in Fig. 3. The productivity of gooseberry varieties investigated, intensively cultivated exceeds the similar indicator of the witness in the usual system. Thus, 'Severnăi Captain', 'Coloboc' and 'Captivator' varieties in comparison with the other varieties investigated are highlighted by the higher plant productivity, both in the intensive system and in the usual one.

The indicators of the economic efficiency of the fruit production for gooseberry varieties in intensive system exceed the indicators of the witness: at the average yield by 1.4-4.6 times, and the net result for 1 tons of fruits by 1.1-2.8 times (except for the 'Grușenca' variety).

#### 4. Conclusions

On the basis of research conducted on the gooseberry cultivation, it was established that:

Gooseberry varieties are influenced both by the degree of adaptation and the cultivation conditions, and the yield obtained grows in intensive plantations with irrigation respectively by 4.6 times and 3.5 times compared to cultivation without irrigation in the usual plantations.

Under favorable conditions of cultivation, the most adaptable variety among those studied, increases its harvest only 1.2 times ('Severnăi Captain').

The setting up of intensively-managed gooseberry plantations requires considerable capital investment - up to 189955 lei/ha, or 1.3 times higher compared to traditional plantations.

The correct exploitation of the newly established gooseberry plantations contributes to raising the level of profitability of fruit production according to variety in the intensive system in the range of 69.4% – 198%.

#### References

1. Barbaroș M., Barbaroș Nadejda, 2003. Eficiența economică a investițiilor capitale în cultura speciilor bacifere. Simp.șt.intern. Hortic., Silvic., și protecția plantelor, Chișinău, p.89-90.
2. Grădinariu G., Istrate M., 2009. Pomicultură generală și specială. Tipogr. Moldova, Iași, 532 p.
3. Mladin Gh., Mladin Paulina, 1992. Cultura arbuștilor fructiferi pe spații restrânse, București, p.32-189.
4. Mladinoi V., 2007. Economia speciilor bacifere. Cercetări în pomicultură. Vol.6, Chișinău, 2007, p. 178-185.
5. Sava Parascovia, 2005. Eficiența producerii fructelor de agriș. Mater. simp. șt. intern. UASM. Lucrări științifice Horticultura, silvicultra și protecția plantelor, Ch., vol.13, p. 104-107.
6. Sava, Parascovia, 2012. Bazele științifice ale culturii agrișului în Republica Moldova. Monografie, Tipografia UASM, Chisinau, 192 p.
7. Sava Parascovia, 2014. Recomandări tehnologice pentru înființarea și întreținerea plantațiilor de agriș. Ch.: Tipografia "Print –Caro", 35 p. ISBN : 978-9975-56-131-0.
8. Sumedrea, D., Olteanu, A., Isac, I., Coman, M., Iancu, M., Duțu, I., Ancu, I. et al, 2014. Pomi, arbuști fructiferi, căpșun. Ghid tehnic și economic. Pitești, Ed. INVEL Multimedia, 284 p.

Figures

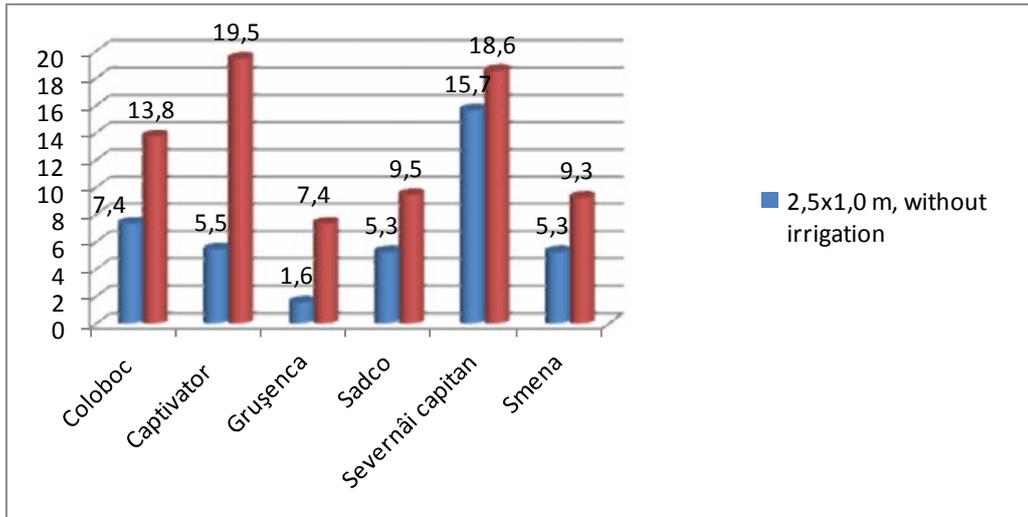


Fig. 1. Gooseberry production, depending on variety, planting distance, non-irrigated and irrigated land, t/ha

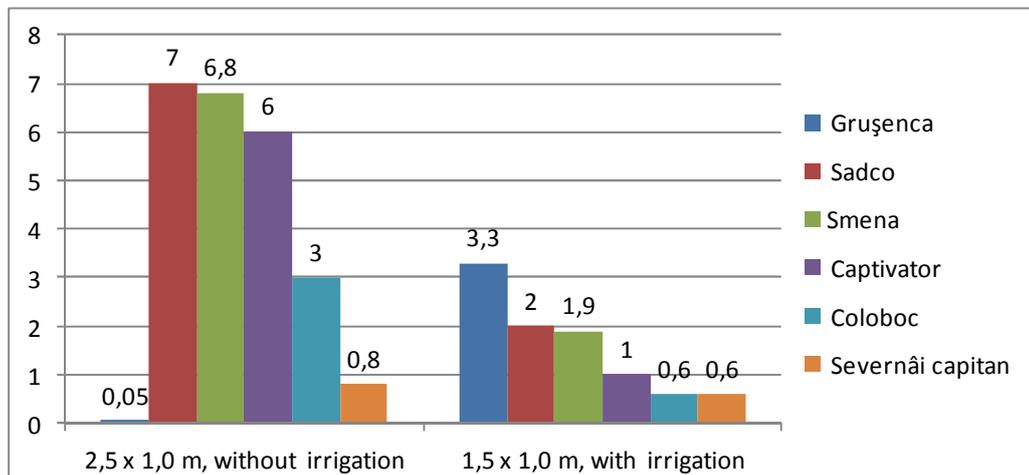


Fig. 2. Capital investment recovery period, years

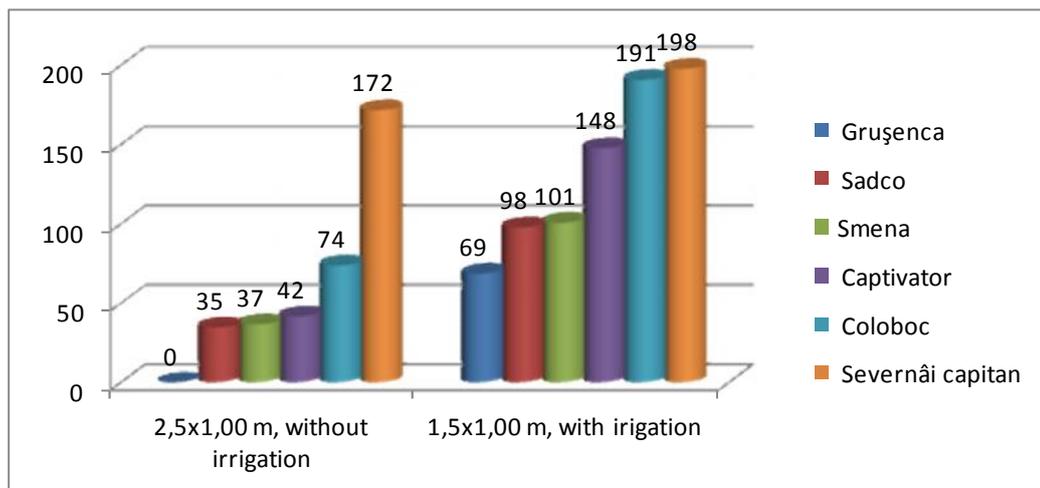


Fig. 3. Profitability of fruit production for gooseberry under different cultivation conditions, %