

# THE ECONOMIC EFFICIENCY ON PRODUCING „KNIP-BAUM” APPLE TREES IN THE FRUIT NURSERY

## EFICIENȚA ECONOMICĂ A PRODUCERII POMILOR DE MĂR DE TIPUL „KNIP-BAUM” ÎN PEPINIERA POMICOLĂ

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**Abstract.** *The investigations were made during the period of three years (2005-2007) in the fruit nursery of the Moldovan-Dutch enterprise „Fruit Nurseries” Ltd. The economic efficiency on producing „knip-baum” apple trees in the fruit nursery was determined by three varieties (Idared, Jonagored and Golden Reinders), bench-grafted on rootstock M 9, based on the efficiency, freight quality and selling trees. It was established that the income from selling the „knip-baum” apple trees for all the studied varieties and on average for all the investigation years represented 1426,24-1495,84 thousand lei/ha, the profit was between the limits of 868,78-938,38 thousand lei/ha and the production rentability – 156-168 %.*

**Key words:** economic efficiency, „Knip-baum” apple trees, income, profit, production rentability

**Rezumat.** *Investigațiile au fost efectuate pe parcursul a trei ani (2005-2007) în pepiniera pomicolă a întreprinderii moldo-olandeze SRL „Fruit Nurseries”. Eficiența economică la producerea pomilor de măr de tipul „knip-baum” a fost determinată pe trei soiuri (Idared, Jonagored și Golden Reinders), altoite la masă pe portaltioiul M 9, în baza randamentului și calității biologice a pomilor. S-a stabilit că venitul din vânzarea pomilor de tipul „knip-baum”, la toate soiurile studiate și în medie pe anii de investigare, a reprezentat 1426,24-1495,84 mii lei/ha, profitul a fost de 868,78-938,38 mii lei/ha iar rentabilitatea producției de 156-168 %.*

**Cuvinte cheie:** eficiența economică, pomi de măr de tipul „knip-baum”, venit, profit, rentabilitatea producției

### INTRODUCTION

New stage development of fruit growing domain in the Republic of Moldova foresees to restore and set new forms of organization of producing fruits, introduce rapidly the science’s achievements, promote new perspective varieties in the orchards with high productivity (grafted on dwarf rootstocks) and implement technological modern elements that will increase the yield and ameliorate fruits quality according to the market requirements (Balan V. și colab., 2008; Barbaroș Nadejda, 2007).

All these tasks are foreseen to be solved in a limited term that requires in a considerable mode to increase the plant material production, especially that of grafted apple trees on dwarf rootstock and with crown (Babuc V., Rapcea M., 2002; Balan V. și colab., 2001).

Nowadays, in countries with a developed pomology as Poland,

Netherlands, Italy, etc., the superintensive apple orchards are established with two-year old trees with crown base already formed the nursery (Werth K., 2003; Wilton J., 2001; Bielicki P., Czynczyk A., 1999). Trees of this type and planted in the orchard, have an earlier fruit production and manifest an early fructification (Peșteanu A., 2007).

The aim of the study is to determine the economic efficiency on producing „knip-baum” apple trees in the fruit nursery in the Republic of Moldova.

## **MATERIAL AND METHOD**

The researches were made in the period of 2005-2007 years in the fruit nursery of the Moldovan-Dutch Joint stock company “Fruit Nurseries”. As biological material were used the apple trees of Golden Reinders, Jonagored and Idared varieties, bench-grafted of rootstock M 9.

Bench-grafting was made in March by using the method of perfected copulation with detached branch. The place of grafting was tied with a porous polyethylene, specialty destined to graft, and the grafting was paraffined. The grafted marcotes were stratified by placing them in vertical position into containers, so as the base part of marcote (20-25 cm) to be in a moist sand layer. The stratification temperature in the refrigerator is +2...+4°C. For grafting, were used marcotes with a diameter of 10.0 mm and virus free branches imported from Holland.

The first field of the fruit nursery was founded in the second part of April with bench-graftings. The distance of plantation of grafted trees was 90x35 cm. During the vegetation period, the grafting was tied to a bamboo stick.

In spring, in the second field, the annual shoots of grafts were shortened at a height of 50-60 cm from the grafting place. Simultaneously with the appearance of lateral shoots was cleared up from the trunk, leaving only the terminal shoot. With the aim to obtain sylleptic shoots on the central axle, when they have reached the length of 15-20 cm, it was made the periodic remove of apical leaves 6-7 times without affecting the growth terminal bud (according to “knip-baum” system). This operation was repeated every 5-7 days.

The researches were made according to methods unanimously recognized and used to evaluate the economic efficiency in agriculture.

## **RESULTS AND DISCUSSIONS**

The investigations made demonstrate that the apple trees production output in the second field of the fruit nursery depends on the degree of grafting pinning in the year of plantation and applied agro-technical measurements.

During the researches (tab. 1) the highest output of apple trees formed by “knip-baum” method was obtained in 2005 where the mentioned index of the varieties taken into study constituted 30.63-31.38 thsnd pcs/ha.

In 2006 and 2007 the apple trees output of the studied varieties decreased non-significantly.

At the varieties taken into study, in 2005 and 2006, high values of apple tree production output have registered the Golden Reinders variety (31.05 thsnd pcs/ha and 31.04 thsnd pcs/ha) and in 2007 the Idared variety (31.19 thsnd pcs/ha).

Jonagored variety registered average values between 29.77 and 31.38 thsnd

pcs/ha.

In 2005-2006 at Idared variety was registered the lowest output of apple trees (29.11-30.63 thsnd pcs/ha), and in 2007 at Golden Reinders variety (29.46 thsnd pcs/ha).

Table 1

“Knip-baum” apple trees output and freight quality in the fruit nursery

Variety	Output, thsnd pcs/ha	Freight quality			
		I		II	
		thsnd pcs/ha	%	thsnd pcs/ha	%
2005					
<b>Golden Reinders</b>	31.05	29.40	94.68	1.65	5.32
<b>Jonagored</b>	31.38	30.73	97.93	0.65	2.07
<b>Idared</b>	30.63	27.88	91.02	2.75	8.98
2006					
<b>Golden Reinders</b>	31.04	29.80	96.00	1.24	4.00
<b>Jonagored</b>	29.77	28.68	96.37	1.09	3.63
<b>Idared</b>	29.11	26.49	91.00	2.62	9.00
2007					
<b>Golden Reinders</b>	29.46	28.63	97.18	0.78	2.82
<b>Jonagored</b>	30.74	30.31	98.60	0.43	1.40
<b>Idared</b>	31.19	28.95	92.82	2.24	7.18

Biological quality of obtained apple trees in the second field of the fruit nursery depends on the variety’s biological peculiarities.

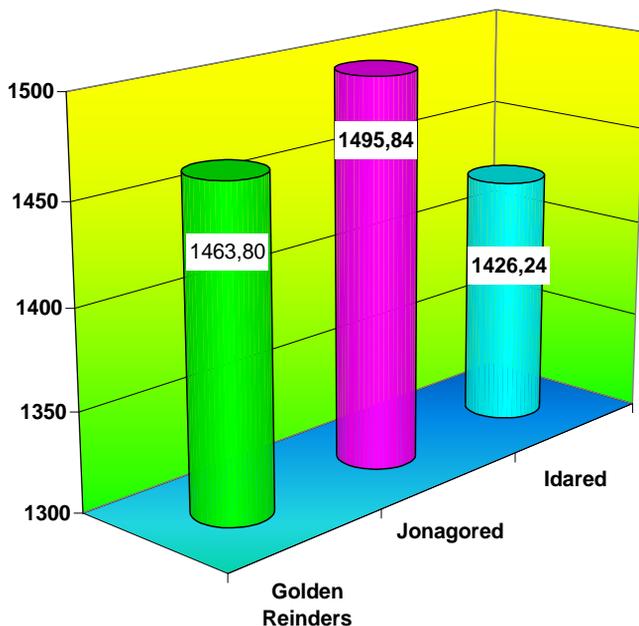
During the researches, the weight of first category apple trees at the studied varieties was constant (91.00-98.60%). The biggest quantity of first quality apple trees was registered Jonagold variety (96.37-98.60%). Further on, with a non-significant diminution was placed Golden Reinders variety (94.68-97.93%), and the lowest values of studied index registered Idared variety (91.00-92.82%). The highest weight of second category apple trees was obtained Idared variety (7.18-9.00%), and the lowest one at Jonagored variety (1.40-3.63%).

The economic efficiency of productivity “knip-baum” apple trees in the second field of the fruit nursery obtained through bench-grafting depends on produced planting material quantity and quality.

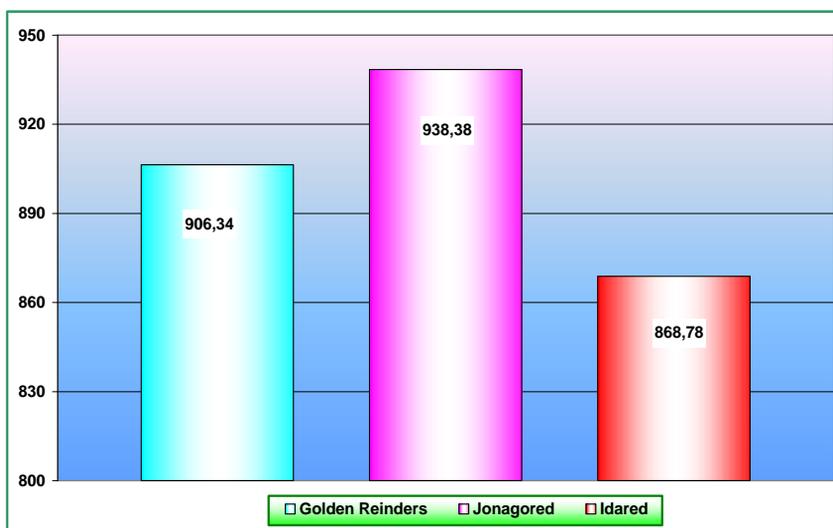
The obtained results on the bases of the investigations made in average on three years (2005-2007) demonstrate that the highest income from selling apple trees (fig. 1) was registered by Jonagored variety (1495.85 thsnd lei/ha), then was followed by Golden Reinders variety with 1463.80 thsnd lei/ha, and respectively, Idared variety with 1426.24 thsnd lei/ha.

The profit from apple trees commercialization has a direct dependence on the output of obtained trees per one surface unit and their quality. The biggest quantity of first category apple trees was obtained by Jonagored variety (tab. 1), registering a greater profit when marketing them – 938.38 thsnd lei/ha (fig. 2). Because at the Idared variety the 1<sup>st</sup> category apple trees weight was the lowest,

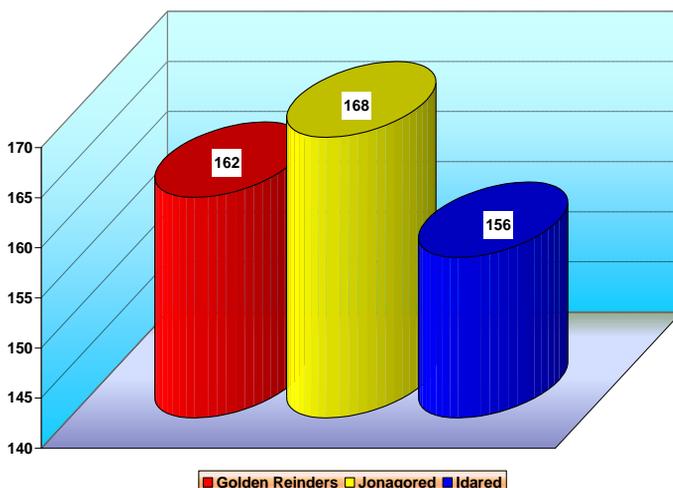
but at the second category – the biggest, and the obtained profit was diminished to 868.78 thsnd lei/ha. Golden Reinders variety registered average value of the profit of 906.34 thsnd lei/ha.



**Fig. 1.** Income from trees' sale, thsnd lei/ha. average on 2005-2007 years.



**Fig. 2.** Obtained profit from trees' sale, thsnd lei/ha. average on 2005-2007 years.



**Fig. 3.** Production rentability, %.  
average on 2005-2007 years.

The production rentability depends directly on registered profit from trees commercialization and their cost to obtain this planting material.

The investments made in the studied period demonstrate that at Jonagored due to its bigger profit, the production rentability was 168% (fig. 3), followed by Golden Reinders (162%) and respectively Idared variety (156%).

## CONCLUSIONS

1. The output and quality of the apple trees in the second field of fruit nursery is into a direct correlation with the degree of graftings pinning and the variety's biological peculiarities. As the vigor of variety's development is greater, so it increases the output of the obtained apple trees and their quality is better.

2. The rentability of apple trees production in the fruit nursery depends on 1<sup>st</sup> quality apple trees' weight that is influenced by the biological peculiarities of the variety, the lowest rentability of production was obtained by Idared variety (156%), and the biggest one – by Jonagored (168%). The variety Golden Reinders registered average values of production rentability.

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