

## INITIATING A BUSINESS FOR ESTABLISHING A MODERN QUINCE CULTIVATION IN SOUTHWESTERN ROMANIA – A PROFITABLE SOLUTION FOR THE FUTURE

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### Abstract

*The quince is a fruit tree species that occupies 2% of the total orchard area in Romania. It can be utilized considering that quince is a fruit species used for ornamental purposes, for protective hedges, as a pollen-rich plant, for obtaining rootstock seedlings, in medicine, and the food industry. Following the identification of eco-pedological factors influencing the growth and development of quinces and the implementation of the stages underlying quince cultivation technology, it has been demonstrated that, in the pedoclimatic conditions of South Western Romania, establishing and exploiting a quince orchard is a highly profitable and interesting business with low investment and high returns. This fruit species yields abundantly, produces a large quantity of fruits, the production costs are low and can be recovered in a short time, the inter-row spaces can be used for intermediate crops, and the attractive selling price and the scarcity of quinces on the market provide the entrepreneur with an attractive income, making the business economically efficient.*

**Key words:** quince culture, business, profitability, Oltenia region, Romania

### INTRODUCTION

The quince is an ancient species cultivated for about 4,000 years, with its fruits highly appreciated by the Greeks and Romans for both fresh consumption and processing [10]. The seeds, fruits, and flowers are also used therapeutically. The quince species originated from the island of Crete, the city of Cydon, giving rise to the genus name *Cydonia* = quince [1]. Currently, Turkey is the leading producer of quince, contributing a quarter of the world's fruit production, followed by China, India, Morocco, Argentina, Lebanon, Serbia, and Montenegro. In terms of continents, Asia takes the lead in production with 68.9%, followed by Europe with 12.5%, Africa 9%, America 9.4% and Oceania 0.2% . In Romania, quince cultivation covers 2% of the total orchard area, primarily grown isolated or in mixed trees with other varieties in orchards near homes, spanning 883 hectares and yielding 6,540 tons in 2017. In the Oltenia region, local varieties are cultivated. Large cultivation areas that existed

in former collective, state agricultural farms enterprises (with the acronyms C.A.P. or I.A.S.) were destroyed due to the land reform laws or to the fire blight disease, which was reported in Romania after 1991 [22]. In the germplasm collection organized in Romania, there are 78-80 quince genotypes represented by native and foreign varieties and selections. The varieties differ in terms of ripening period and fruit shape: flattened spherical or apple-shaped (from Constantinople); spherical or globular (from Afumați); cylindrical (from Delta, rusty coloured); conical-truncated or pear-shaped (Campion, from Jarișteea) [24]. Originally cultivated in subtropical regions of Iran and the Caucasus, the quince is a thermophilic plant that thrives in cultivation without being affected during winter in regions where the average annual temperature ranges from -15 to +9°C [2, 4, 6,]. To achieve a healthy and abundant fruit production, the soil must be properly prepared before planting, ensuring adequate watering, and regular fertilization [3, 7].

**The environmental requirements of the quince** are as follows [5, 6, 8, 15]:

- Light - quinces are a species that is demanding and sensitive to light and warmth; they prefer expansive or slightly sloped, luminous areas exposed to sunlight
- Temperature - this species is the most demanding regarding temperature, being more sensitive to frost than apple and pear trees; it develops properly at an average annual temperature higher than 9.5°C;
- Water - quinces have a shallow root system and require a significant amount of water during the growing season (precipitation of 600-650 mm/year or irrigation) [3, 4, 16];
- Soil - quinces are particular about soil conditions, prefers fertile soils rich in nutrients, well-drained, water-permeable, and with a porous texture that allows the development of a deep and branched root system; they thrive in loamy, clay-loam, and clayey soils; they do not tolerate values above 8% active CaCO<sub>3</sub> because chlorosis may occur; easily tolerate alkaline or acidic soils but do not thrive in very poor or compacted soils; clayey soils are considered the best for quince growth due to their high water and nutrient retention capacity [7, 8]

In the pedoclimatic conditions of the southwestern Romania, establishing and exploiting a quince orchard is a highly profitable business, because is yielding abundant fruit, and the selling price, coupled with the limited availability of quinces on the market provide the entrepreneur with a substantial income [1, 2, 4].

Quince trees bear fruit early and consistently, in contrast to apple and pear trees. Depending on the variety, they produce between 45 and 120 kg of fruit per year, equivalent to 12,000-22,000 kg per hectare [4, 6].

#### **Quince utilizations**

A quince orchard can be exploited effectively since the quince is a pomological species used for [3, 4, 9, 10, 12, 19]:

- Ornamental purposes;
- Protective hedges (as a companion species);
- Rich in nectar for bees (the flowers bloom late, rich in nectar);
- Obtaining rootstock seedlings (from seeds);

-Medicinal and textile industries (utilizing the mucilaginous substance extracted from the seed coats);

-Consumption, fresh fruit;

-Food industry (for the preparation of jams, jellies, preserves, compotes, marmalade, liqueurs, brandy, and other valuable products).

**The biochemical and nutritional composition of quinces** is complex and varies depending on pedoclimatic conditions, cultivation location, weather conditions throughout the year, and the quince variety [11]:

-Water = 77.18 - 85.89%

-Sugars (glucose, fructose, and sucrose) = 5.57-20.7%

-Total acidity (malic and citric organic acids) = 0.59-1.76%

-Cellulose, tannic substances (tannins) = 0.19-0.56%, protein substances = 0.26-1%

-Pectin substances = 0.55 – 1.13% (high content, favouring gelation, making it a valuable raw material for preparing preserves, jams, and marmalade)

-Carbohydrates = 11%, fats = 0.1%, lipids = 0.50%, folic acid = 1%

-Ca = 10 mg%, Mg = 8 mg%, Fe = 0.60 mg%, Zn = 1%, Se = 1%, K = 20 mg%

-Vitamin C (more than apples, pears, and cherries) = 8.28 - 34.02 mg/100g

-Vitamins B<sub>1</sub> = 1%, B<sub>5</sub> = 1.5%, and B<sub>6</sub> = 3%

-Mineral substances (ash) = 0.28 – 0.55%

-Ash alkalinity = 2.40 – 7.2%

-Energy value = 56.44 – 83.69 cal.

**The quince cultivation technology** is based on the following stages [3, 5, 7, 8, 20, 23]:

#### *Land Preparation*

It relies on soil operations, representing the set of agricultural activities conducted to prepare and maintain the soil for obtaining a qualitative and quantitative quince production. Striking a balance between mechanized and manual work is crucial to ensure a good and sustainable quince yield.

The key stages include soil evaluation (to determine quality, properties, and the nutritional needs of the plant), ploughing, harrowing, cultivation, levelling, and seeding.

#### *Orchard Maintenance*

It is based on the following agricultural tasks: black ploughing, interrupted black ploughing,

combined black ploughing, and inter-row mulching or cover cropping (Photo 1).



Photo 1. Quince orchard maintenance  
Source: [14, 23].

### *Pruning and crown formation*

This stage aims to ensure normal growth and fruiting of quince trees and the development of a proper trunk [20]. The most commonly used crown forms for quince trees are: espalier, open vase, delayed flat vase, and free bush (Photo 2).



Photo 2. Pruning techniques and crown types for quince trees  
Source: [14, 20].

### *Irrigation*

It is necessary frequently and with small amounts of water, considering that quince trees have a shallow root system, tolerating temporary soil moisture excess, but they do not thrive well in such conditions. Drip irrigation is recommended, with water flow rates ranging from 2-6 liters per hour, reaching a depth of 30-50 cm [3, 7, 8].

### *Fertilization*

It is a fundamental practice with significant repercussions on the quantity and quality of the quince production. It is applied differentially based on the age of the trees, fruit production, and soil type. Depending on

the tree's age, the following fertilizer doses are applied [3, 6, 7, 8, 15]:

- in the first year of vegetation = 100 kg/ha of potassium salt
- in the second year = 200 kg/ha of ammonium nitrate, 250 kg/ha of superphosphate, and 160 kg/ha of potassium salt
- in the subsequent years = moderate doses of fertilizer, including 10-20 tons/ha of manure every three years, 60 kg/ha of N, 60 kg/ha of P<sub>2</sub>O<sub>5</sub>, and 40 kg/ha of K<sub>2</sub>O.

Fertilization with P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O, Ca, Mg and trace elements are applied based on the laboratory analysis results and on foliar analysis.

Given that Gorj County has an excellent climate for quince cultivation, and the demand for organic products is increasing in the export market, surpassing the supply, there is an opportunity to cultivate and sell quinces in fresh and processed state, in the form of brandy and jelly, and the establishment of a modern quince plantation, with certified planting material, brings major benefits and represents a solution for the future [2, 4, 17].

In this context, the purpose of this paper is to demonstrate that the business of establishing and exploiting a quince orchard, in the pedoclimatic conditions of South-Western Romania, is very profitable both for the development of the entrepreneur and for bringing added value to the respective rural area.

## **MATERIALS AND METHODS**

Initiating a business in the cultivation of quinces under CAEN code 0124 (cultivation of seeded fruits) involves establishing an organic quince orchard in southwestern Romania, Gorj County, as well as cultivating and commercializing of them. The products will be intended for both export and the domestic market, for sale in fresh condition or utilization in various traditional products [4, 10, 12]. The land allocated for the quince plantation is arable land located in the outskirts of the Bălești commune, Gorj County, with a total area of 2.73 hectares = 27,300 square meters, divided into 3 plots

according to the cadastral measurements. Over time, there have been no soil scarification works, and the land has become compacted, necessitating comprehensive soil preparation works for the planting and establishment of the organic quince farm in an intensive system (Map 1).



Map 1. Location of the agricultural land where the quince orchard will be established  
 Source: [13].

The pedoclimatic characteristics of the Bălești commune, Gorj County, indicate very favourable conditions for quince cultivation [22, 18]:

- Nf (natural favourability) = 2.83, Pf (potentiated favourability) = 3.48
- Warmest month: July, with an average temperature of 20.5°C, coldest month: January, with an average temperature of -2.1°C
- Absolute maximum temperature: 39.5°C, absolute minimum temperature: -29.0°C

- Average annual precipitation: 615.7 mm, average annual temperature: 10.1°C
- Most frequent winds: from the south, southwest, and north (the last one with the highest intensity).

For the establishment of a quince orchard, it is necessary to conduct a soil study and soil mapping of the cover soil, determining the eco-pedological factors that influence the growth and development of the quince trees. Depending on the soil properties and the terrain characteristics (such as topography and hydrology), the suitability of the soil-terrain system for establishing the plantation is assessed.

Basic pedological information required for establishing the quince orchard is derived from the relief (slope, exposure), soil (texture, structure, humus content), and hydrology (water table level, groundwater nature) [1, 3, 6].

Morphological and physico-chemical properties that determine and limit soil fertility are established through a suitability study, considering indicators related to climate and soil conditions [7, 15].

The soil is then classified into suitability classes.

For the establishment of a quince plantation, the suitability class of agricultural land is Class I (land with excellent suitability, suitable for any agricultural use, with no limitations for use as orchards) (Table 1) [22].

Table 1. Criteria for Class I suitability of the land where the quince orchard will be established

Soil thickness	>100	Reaction	5.3-7.7	Landslides	Absent
Edaphic volume	Very high >101	Vertical character of the soil	No	Ground coverage with boulders or rocks	Absent
Salinization	Non-salinized	Slope of the land	0.10	Depth of the water level	Very high >3.0 m
Alkalinization	Non-alkalized	Degree of non-uniformity	Uniform	Lateral drainage of groundwater	Good
Depth	≥ 101	Surface erosion	Non-eroded	Volume of non-gleyed soil	Very big > 91
Volume of non-pseudo-gleyed soil	Non-alkalinized	Flood-prone	Non-flooded		

Source: [22].

To determine the essential physical and hydro physical properties of the soil (apparent density, texture percentage, granulometry, penetration resistance, hydraulic conductivity), soil samples were collected in

their natural or unaltered state (using metal cylinders) from three depth levels, up to a depth of 100 cm, which corresponds to the rooting depth of quince trees (Table 2) [18].

Table 2. Physical properties of the soil determined based on analyses and collected samples

Depth (cm)	Apparent density AD (g/cm <sup>3</sup> )	Penetration resistance PR (kg/cm <sup>2</sup> )	Hydraulic conductivity HC (mm/hour)
15-20	1.25	14	2.6
40-60	1.42	19	1.7
60-80	1.51	22	0.8

Source: [18].

Considering the adaptability to soil and climate type, the Bereczki variety will be planted. This variety belongs to the *Rosaceae* family, *Cydonia oblonga* species, and is a vigorous, self-fertile tree that does not require pollination [2, 5, 9].

It is highly productive, producing fruits that exceed 600 g, the fruits are broadly pear-shaped or inversely ovoid, with wide ribs, irregular surface, and a more or less delimited neck [4, 6, 10].

The skin is yellow-lemon in colour, covered with a brown-grey furry outer coating. The pulp is yellowish, juicy, acid-sweet, intensely aromatic, slightly astringent, and excellent for industrial processing (Photo 3) [6,12,19, 21].



Photo 3. The quince variety Bereczki, which will be cultivated and valorized

Source: [21].

The modern plantation will have a tree density of 994 trees/ha, totalling 2,714 quince trees for the entire planted area, with a planting scheme of 2.5 m/4.0 m.

The plantation will be irrigated, and the irrigation water will come from a well drilled to a depth of 50 m, with a flow rate of 2-3 l/s (according to the hydrological study), an irrigation flow rate of 10 m<sup>3</sup>/h, and will be stored in a storage lagoon [15,17, 23].

Table 3. Data about the quince orchard established in Bălești commune, Gorj County, Romania

Indicator	Value
Natural favourability	2.83
Potentiated favourability	3.48
Cultivated area	2.73 ha
Density (plants/ha)	994
Cultivation system	I
Type of culture	ecologic
Planting distances (m)	2.50 m/ 4.00 m
Planting system	north-south
Total number of trees	2,714 pieces
Irrigation system	drip irrigation
Support system, hail net, rain net	no

Source: the authors' calculations.

Drip irrigation will be applied for 80-90 days per year, with a total water consumption of 4,800 m<sup>3</sup>/year. Galvanized wire mesh and precast concrete espaliers will be used for fencing.

Equipment and machinery will be acquired to mechanize the activities [7, 15, 23].

Data about the quince orchard established in Bălești commune, Gorj County, Romania, are presented in Table 3.

## RESULTS AND DISCUSSIONS

The estimated production at maturity is 14,200 kg/ha, achieved in the 10th year after planting (Year 1 = 0 kg, Year 2 = 0 kg, Year 3 = 3,000 kg, Year 4 = 5,000 kg, Years 5-10 = 6,000 – 10,000 kg) [3, 5, 6].

To demonstrate the economic efficiency of establishing and maintaining the quince orchard, the following items are presented:

- Technical-economic indicators for establishing the quince orchard (Table 4)
- Technical-economic indicators for maintaining the quince orchard in Year I and II (Table 5)
- Preliminary cost estimate for land preparation and establishment of the quince plantation (Table 6)
- Preliminary cost estimate for shrub maintenance in the first year after planting (Table 7)
- List of materials needed for establishing and maintaining the quince orchard (Table 8).

Table 4. Technical-economic indicators for establishing the quince orchard

Work name	Quantity / UM	Work Cost (euro/ha)	Total cost (euro)
Design, soil analysis, technical assistance	2.73 ha	620	<b>1,692.6</b>
Localized irrigation Equipment	2.73 ha	3,500	<b>9,555</b>
Localized irrigation equipment installation	2.73 ha	500	<b>1,365</b>
Land preparation	2.73 ha	840	<b>2,293.2</b>
Fertilization and soil disinfection. including:	2.73 ha	1,238	<b>3,379.74</b>
Mechanical and manual work	2.73 ha	430	1,173.9
Manure	2.73 ha	450	1,228.5
Other expenses	2.73 ha	358	977.34
Planting material	2,714 pieces	2.52	<b>6,839.28</b>
Planting (complete work). including:	2,714 pieces	1.05	<b>2,849.7</b>
Mechanical and manual work	2,714 pieces	0.95	2,578.3
Other expenses	2,714 pieces	0.1	271.4
<b>Total standard costs for the entire area</b>			<b>27,974.52</b>
Total standard costs per ha			<b>10,247.07</b>

Source: the authors' calculations.

Table 5. Technical-economic indicators for maintaining the quince orchard for Year I and II

Work name	Quantity / UM	Unit price (euro/ha)	Manual works	Mechanical work and raw materials	Total Cost (euro)
Disking/Cultivating the space between rows x 4	2.73 ha	24	-	65.5	65.5
Working the soil with an off-centre milling cutter with palpator x 4	0.82 ha (30 % x ha)	30	-	24.6	24.6
Training pruning	2,714 pieces	0.02	54.2	-	54.2
In-green interventions	2,714 pieces	0.02	54.2	-	54.2
Chipping branches resulting from pruning	2.73 ha	30	-	81.9	81.9
Phytosanitary treatments with Ecocert certified products x 4	2.73 x 4 ha	84	-	917.2	917.2
Fertilization - application of organic fertilizers	2.73 ha	150	-	409.5	409.5
Total expenses for the entire area / year			108.4	1,498.7	<b>1,607.1</b>
Total expenses for the entire area / Year I + Year II			216.8	2,997.4	<b>3,214.2</b>
Total expenses / ha / year			39.7	548.9	<b>588.6</b>

Source: the authors' calculations.

Table 6. Preliminary cost estimate for land preparation and establishment of the quince plantation

Calculation Element / Quantity	UM	Quantity
Transport and application of organic fertilizers 20 t/ha x 2.73 ha	t	54.6
Deep ploughing > 30 cm or soil loosening	ha	8.56
Discing the ploughed land twice before planting 2.73 ha x 2	ha	5.46
Staking the land for planting stakes x units	pcs.	2,714
Excavating the planting trench	pcs.	2,714
Creating trenches for stratification 50 x 50 m	ml	10
Stratifying bushes in the prepared trenches	cs.	2,714
Transporting bushes from a tree nursery from 100 km distance	km	200
Adding manure to the bottom of the planting pit 3 kg x 2,714	kg	8,142
Drawing soil over the manure in the pit and compacting	pcs.	2,714
Shaping the bushes and muddying the roots	pcs.	2,714
Transporting and distributing bushes from the planting pit	pcs.	2,714
Planting bushes in the prepared pits (complete work)	pcs.	2,714
Discing the spaces between the rows of trees, twice 2.73 ha x 2	ha	5.46
Watering after planting, 10 liters of water per tree	cm	27.14
Training pruning of the crown after planting	pcs.	2,714

Source: the authors' calculations.

Economic indicators for the organic quince plantation in an intensive system, with an average production of 30 t/ha, expected to be sold at approximately 1 euro/kg, in fresh

condition, for consumption during the season (Table 9).

The costs related to the establishment and maintenance of the quince orchard until it starts bearing fruit are:

- orchard establishment costs = 27,974.52 euro
  - orchard maintenance costs year I = 1,607.1 euro
  - orchard maintenance costs year II = 1,607.1 euro
- Total = 31,188.72 euro.

The quince plantation starts bearing fruit from the 3rd year, with the production reaching a quantity of 30 tons/ha of fruits. However, not all the trees bear fruit, so in the first 3 years, the average is 10 tons/ha (with zero production in the first two years). From the 10th year, the quantity can reach up to 50 tons/ha [3, 5, 6,10].

Table 7. Preliminary cost estimate for maintaining the bushes in Year I from planting

Calculation Element / Quantity	UM	Quantity
Large hoeing on the tree row (20% of the area) $2.73 \times 0.20 = 0.546$	ha	0.546
Manual hoeing with a hoe on the row (2 times/year) $2.73 \times 2 = 5.46$	ha	5.46
Filling gaps (10% complete work) $2,714 \text{ pcs.} \times 10\% = 271.4$	pcs.	271.4
Watering the trees 10 l water/tree	cm	27.14
Intensive ploughing between rows	ha	4.60
Hoeing between rows (4 times/year) $0.5 \times 4 = 2$	ha	2
Seeding perennial herbs between rows $0.5 \text{ ha} \times 40 \text{ kg/ha} = 20 \text{ kg}$	ha	20
Mowing grass between rows (2 times/year) $0.5 \text{ ha} \times 2 = 1 \text{ ha}$	ha	1
Applying phytosanitary treatments (5 times/year) $0.5 \text{ ha} \times 5 = 2.5 \text{ ha}$	ha	2,5
Preparing solution for spraying (5 treatments) $0.5 \text{ ha} \times 1,000 \text{ l/ha} \times 5 = 2,500 \text{ l}$	l	2,500

Source: the authors' calculations.

Table 8. List of materials needed for the establishment and maintenance of the quince orchard

Preparation and establishment of quince orchard	
Organic fertilizers	$20,000 \text{ kg / ha/ year} = 20,000 \text{ kg} \times 2.73 \text{ ha} = 5.46 \text{ t}$
Surface/area	2.73 ha
Wooden stakes	2,714 pcs.
Planting material	2,714 pcs.
Water for watering the trees	$10 \text{ l water / tree} = 27.14 \text{ cubic meters}$
Maintenance orchard year I	
Planting material	$10\% \times 2,714 \text{ pcs.} = 271.4 \text{ pcs.}$
Organic fertilizers	$20,000 \text{ kg / ha/ an} = 20,000 \text{ kg} \times 2.73 \text{ ha} = 5.46 \text{ t}$
Perennial herbs	$40 \text{ kg / ha} = 40 \text{ kg} \times 2.73 \text{ ha} = 109.2 \text{ kg}$
Ecocert pesticides	$2 \text{ kg / ha} = 2 \text{ kg} \times 2.73 = 5.46 \text{ kg}$
Maintenance orchard year II	
Ecocert pesticides	$2 \text{ kg / ha} = 2 \text{ kg} \times 2.73 = 5.46 \text{ kg}$
Organic fertilizers	$20,000 \text{ kg / ha/ an} = 20,000 \text{ kg} \times 2.73 \text{ ha} = 5.46 \text{ t}$
Water for watering trees	$10 \text{ l water / tree} = 27.14 \text{ cubic meters}$

Source: the authors' calculations.

For the quantity obtained from the 3rd year, the quince production will be processed (traditional product: palinka) to recover the expenses, considering that 1 liter of palinka is obtained from 10 kg of quinces [12,19]:

- 30 tons of quinces = 30,000 kg of quinces = 3,000 liters of palinka
- 1 liter of quince palinka is sold at the price of 40 euros
- 3,000 liters x 40 euros = 120,000 euros

Following the processing of quinces into palinka and its sale at a price of 40 euros/liter, an income of 120,000 euros is recorded, from which the expenses are amortized. Starting from the 4th year, the income increases through the processing and commercialization of the traditional quince jam product, as well as through the sale of fresh quinces [12,19].

The production in the 4th year reaches a quantity of 35 tons/ha of quinces, capitalized as follows:

-20 tons for palinka = 20,000 kg of quinces = 2,000 liters of palinka → 2,000 liters x 40 euros = 80,000 euros

-10 tons for quince jam = 10,000 kg of quinces = 10,000,000 g → 50,000 jars of 200 g → 50,000 jars x 5.6 euros = 280,000 euros

-5 tons of fresh quinces = 5,000 kg of quinces → 5,000 kg of quinces x 1.2 euros = 6,000 euros.

According to the highlighted calculations, a revenue of 366,000 euros is recorded in the 4th year.

The business of establishing a quince plantation is of interest, with low investment, high profitability, and substantial profit, for the following reasons [6, 7, 15, 17, 22]:

- The cost of obtaining the production is low;
- It can be recovered in a short time
- During the period until the orchard starts bearing fruit, the spaces between rows can be used for intermediate crops (root vegetables, peas, cabbage, strawberries, potatoes);
- Quince trees can reach economic exploitation ages of 25-30 years;
- Quince trees start bearing fruit 3-4 years after planting;
- At the maximum maturity age of 10 years, quince trees yield 70-120 kg per tree;
- Selling price ranges from 1-3 euros/kg of quinces, depending on the marketing period (in-season or off-season) for consumption, and 0.4-0.5 euros/kg for industrial processing;
- The price for 1 liter of quince palinka ranges from 25-40 euros.

Table 9. The economic indicators for the organic quince plantation in an intensive system, exploited for consumption, in a fresh state in the season

Specification	UM	ha	Total area (2.73 ha)
Operation duration (OD)	years		30
Exploitation duration (ED)	years		25
Total investment value (TI), of which:	euro	10,247.07	27,974.52
Design / Technical Assistance / Pedological Study	euro	620	1,692.6
Land preparation	euro	840	2,293.2
Material expenses	euro	6,813.23	18,600.12
Labor costs	euro	1,543.84	4,214.7
Mechanical expenses	euro	430	1,173.9
Annual expenses (AE) for:	euro	770.9	2,106
Annual operation and maintenance	euro	593	1,620
10% unforeseen direct expenses	euro	59,3	162
10% indirect expenses	euro	59,3	162
10% annual amortization share	euro	59,3	162
Annual production value (V): V = P (average production) x SP (selling price) = 30.000 kg/ha x 1 euro /kg	euro /year	30,000	81,900
Annual gross profit GP = V - AE	euro	29,229.1	79,794
Tax T = 16 % x GP	euro	4,676.6	12,767
Profit annual net (NP) Annual net profit NP = GP - T	euro	24,552.5	67,027
Annual profit rate R= NP /AE x 100	euro	3,184.9	3,182.6
Investment recovery terms (after starts producing) T= TI/GP	ani	0.49	0.4
Total profit over the exploitation period (TeP) TeP = GP x ED	euro	613,812.5	1,675,675
Economic return on investment RoI= TeP/TI x 100	%	59.9	59.9

Source: the authors' calculations.

The SWOT analysis of the business regarding the cultivation and utilization of the organic quince orchard in the Bălești commune, Gorj county, Romania is presented in Table 10.

The marketing plan is based on:

-Product strategies (choosing the most productive variety; verifying the quality of the

finished products; using organic fertilizers to obtain organic products) [15].

-Pricing strategies (initially setting the product price below the market price, with subsequent increases).

-Placement strategies (ensuring the market with the necessary quantities; drawing



attention to market preferences; establishing a recognizable market image; maintaining constant contact with the customer; providing information about the benefits of consuming quinces and their derived products).

-Promotion strategies (media advertising; promotions; presenting products in an

attractive manner; website; announcements; radio advertising spots; mass-media advertisements; promotions in shopping centres; brochures, posters, informational meetings).

Table 10. SWOT Analysis for the cultivation and utilization of the organic quince orchard in the Bălești Commune, Gorj County, Romania

Strengths	Weaknesses	Opportunities	Threats
-Stable activity in a well-established industry -Production of products meeting EU standards -Quality quince variety -Ideas for the future development of the business -Continuous customer engagement -Aspiration for business recognition and growth	- Newly established company - Newly planted orchard - Lack of experience - Limited financial resources - Lack of promotion	-Growing demand in both domestic and international markets -Increasing demand for organic products -Opportunity to access grants, subsidies, and non-refundable funds -Business security due to the growing consumption of natural products among the population	-Competition -High dependence on unstable weather conditions (hail, drought, strong infection with fire blight <i>Erwinia amylovora</i> ) -Emergence of diseases and pests resistant to applied treatments -Existence of exported products -Risk of landslides

Source: the authors' calculations.

## CONCLUSIONS

-The quince belongs to the *Rosaceae Juss* family, *Pomoideae Focke* subfamily, *Cydonia Mill* genus, represented by a single species, *C. oblonga Mill*. In the organized germplasm in Romania, there are 78-80 quince genotypes, represented by native and foreign varieties and selections.

-In the pedoclimatic conditions of Gorj County, Romania, establishing and exploiting a quince orchard is a highly profitable business because this fruit tree species bears fruit very well, produces abundant fruits, and the selling price, coupled with the scarcity of quinces on the market, provides the entrepreneur with a good income.

-The quince orchard can be valorised since the quince tree is used for ornamental purposes, protective hedges (as an accompanying species), as a nectar-rich plant, for obtaining rootstock seedlings, in medicine and in the textile industry, and for consuming in fresh or in the food industry.

-For establishing a quince orchard, a pedological study and mapping of the soil cover must be conducted to determine the eco-pedological factors influencing the growth and development of quinces.

-The preparation of the land for establishing the quince orchard is based on soil work,

representing the set of agricultural operations carried out for the preparation and maintenance of the soil to obtain a qualitative and quantitative quince production.

-The business in quince cultivation involves establishing an organic quince orchard in Bălești commune, Gorj County, Romania, as well as cultivating and selling the quinces. The products will be intended for export and the domestic market, for sale in fresh condition or utilization in various traditional products (palinka, jam, fruit preserves).

-Establishing a modern quince plantation with certified planting material brings significant benefits and represents a solution for the future.

## REFERENCES

- [1] Bordeianu, T., Constantinescu, N., Ștefan, N., 1964, Pomology of the People's Republic of Romania, Vol. 3, Publishing House of the Academy of the People's Republic of Romania, Bucharest, pp. 150-240.
- [2] Bordeianu, T., Cociu, V., Stanciu, G., 1968, Pomological Guide, Fruit Varieties, Vol. I (apples, pears, quinces), Agro Silvica Publishing House, pp.150-180.
- [3] Braniște, N., 2000, Guide for Fruit Growers, Ceres Publishing House, Bucharest, pp. 120-180.
- [4] Caliopei, R., 1971, The Quince, Ceres Publishing House, Bucharest, pp. 80-112.
- [5] Ceaușescu, I., Negrilă, A., Isac, I., Lazăr, A., 1982, Pomology, Ceres Publishing House, Bucharest, pp. 400-450.

- [6]Chira, L., Pașca, I., 2007, The Pear and the Quince, M.A.S.T Publishing House, Bucharest, pp. 210-235.
- [7]Corneanu, G., Corneanu, M., 2003, Trees growing tips, PIM Publishing House, Iași, pp.45-58.
- [8]Cociu, V., 1998, How to take care of fruit trees and bushes, Ceres Publishing House, pp. 30-48.
- [9]EUKARYA-Encyclopaedia of flora and fauna of Romania: *Cydonia oblonga*  
<https://glossarissimo.wordpress.com/2013/02/22/ro-eukarya-enciclopedia-florei-si-faunei-din-romania-eukarya-ro/> Accessed on January 11, 2024.
- [10]Gherghi, A., 1983, Fruits and Their Importance, Technical Publishing House, Bucharest, pp.80-125.
- [11]Gherghi, A., Burzo, I., Bibicu, M., Mărgineanu L., Bădulescu, M., 2001, Biochemistry and physiology of vegetables and fruits, Romanian Academy Publishing House, Bucharest, pp. 85-160.
- [12]Gherghi, A., 1999, Processing and Industrialization of Horticultural Products, Olimp Publishing House, Bucharest, pp.130-163.
- [13]Google Earth Pro,  
<https://sites.google.com/earthoutreach.org/imw-australia/agenda/google-earth-pro>, Accessed on January 11, 2024.
- [14]GradinaMea.ro, 2024, Gradina, plante, flori, sanatate (My garden, plants, flowers, health)  
<https://www.gradinamea.ro/>. Accessed on 16.01.2024.
- [15]Isac, I., 2001, Small Orchardist Guide, Pământul Publishing House, Pitești, pp.20-23.
- [16]Mladin, G., Mladin, P., Parlea, M., 1996, How to cultivate and care for fruit plants, Tipo Mul Publishing House, Tg. Mureș, pp. 120-145.
- [17]Negrilă, A., 1953, Horticultural Tips, State Agrosilvica Publishing House, Bucharest, pp.10-16.
- [18]Pedological study, Office for Pedological and Agrochemical Studies, Târgu Jiu
- [19]Pomohaci, N., Cioltean, I., Vișan, L., Rădoi, 2002, Plum brandy and natural brandies, Ceres Publishing House, pp. 35-40.
- [20]Schmid, H., 2006, Fruit Trees and Bushes. Pruning Works, M.A.S.T. Publishing House, Bucharest, pp. 121-133.
- [21]Semplus.ro, Pom fructifer, specie gutui, soi Bereczski,  
<https://www.semplus.ro/pom-fructifer-specie-gutui-soi-bereczski>, Accessed on January 11, 2024.
- [22]Studies and statistical data, Horticultural Development Research Station, Târgu Jiu.
- [23]Suditu, P., Corneanu, G., 2003, Mechanization of works in pomology, PIM Publishing House, Iași, pp. 50-75.
- [24]Szilvia, K., 2016, Species of fruit bushes in gardens and commercial plantations, Casa Publishing House, Oradea, pp. 80-130.